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March 11, 2025

Mr. Javier Perez-Maldonado
Project Manager, Division of Environmental Remediation
NYSDEC
625 Broadway
Albany NY 12233

Subject: Draft Final Environmental Report
Former Ozone Industries, Inc., Ozone Park, Queens, New York
NYSEC Site Number: 2-41-033

Dear Mr. Perez-Maldonado,

AECOM, on behalf of Endzone, Inc., is submitting this Draft Final Environmental Report for your review, which summarizes activities performed at the site noted above in Queens, NY.

Endzone, Inc. has met the remedial objectives and feels that the property owner, New York City, should take over future activities at the site.

If you have any questions or comments regarding this matter, please do not hesitate to contact me.

Yours sincerely,

Sincerely,



Raimundo Matos, Ph.D., LSP
Project Manager
AECOM
Raimundo.Matos@aecom.com

cc. Marcie Redmond; AECOM Task Manager
Heather Frost; Signature Aviation
Shannon Collins; Signature Aviation

Former Ozone Industries, Inc.
OZONE PARK, QUEENS, NEW YORK

Draft Final Engineering Report

NYSDEC Site Number: 2-41-033

Prepared for:
Endzone, Inc.
P.O. Box 920
Elmer, NJ 08318

Prepared by:
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March 2025 Draft

Certifications

I, James Hondas, am currently a registered professional engineer licensed by the State of New York, I had primary direct responsibility for implementation of the remedial program activities, and I certify that the Remedial Action Work Plan were implemented and that all construction activities were completed in substantial conformance with the NYSDEC-approved Remedial Design.

I certify that the data submitted to the NYSDEC with this Final Engineering Report demonstrates that the remediation requirements set forth in the Remedial Action Work Plan and in all applicable statutes and regulations have been achieved in accordance with the time frames, if any, established for the remedy.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and/or any operation and maintenance requirements applicable to the Site will be contained in an environmental easement created and recorded pursuant to ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded.

I certify that a Site Management Plan has been submitted for the implementation of Institutional Controls since remaining contamination exists at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the NYSDEC.

I certify that all documents generated in support of this report have been submitted in accordance with the DER's electronic submission protocols and have been accepted by the NYSDEC.

I certify that all data generated in support of this report have been submitted in accordance with the NYSDEC's electronic data deliverable requirements and have been accepted by the NYSDEC.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Mark Nichols, of AECOM, 605 Third Avenue, 3rd Floor, New York, NY 10158, am certifying as Endzone’s Designated Site Representative for the Site.

Respectfully submitted,

AECOM

_____ _____

James Honda Date
Registered Professional Engineer
New York License No. 099429

PE Stamp –

WARNING: It is in violation of New York State Education Law, Article 145, Section 7209, Special Provision 2, for any person unless he is acting under the direction of a Licensed Professional Engineer or Land Surveyor to alter an item in any way. If an item bearing the seal of an Engineer or Land Surveyor is altered, the altering Engineer or Land Surveyor shall affix to the item his/her seal and notation “Altered By” followed by his/her signature and date of such alteration, and a specific description of the alteration.

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Acronyms and Abbreviations

ACM	Asbestos Containing Material
AECOM	AECOM Technical Services, Inc.
bgs	below ground surface
CAMP	Community Air Monitoring Plan
CCP	Community Participation Plan
CQAP	Construction Quality Assurance Plan
COC	Contaminant of Concern
DCE	Dichloroethene
DUSR	Data Usability Summary Report
EC	Engineering Control
eV	Electron Volt
FER	Final Engineering Report
FS	Feasibility Study
ft	feet
HASP	Health and Safety Plan
IWC	Inches of Water Column
IC	Institutional Control
ISMP	Interim Site Management Plan
LIRR	Long Island Railroad
mg/kg	milligrams per kilogram
mg/m^3	milligrams per cubic meter
MS/MSD	matrix spike/matrix spike duplicate
NA	Not Applicable
NAPL	Non-Aqueous Phase Liquid
ND	Non-Detect
NTU	Nephelometric Turbidity
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYPD	New York Police Department
OSHA	Occupational Safety and Health Administration
PAM	Portable Air Monitoring
PCB	Polychlorinated biphenyls
PCE	Tetrachloroethene
PFAs	Per- and Poly- fluoroalkyl
PID	Photoionization Detector
ppm	parts per million
PSA	Preliminary Site Assessment
POP	Project Operating Procedure
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RA	Remedial Action
RD	Remedial Design

RDWP	Remedial Design Work Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation and Feasibility Study
RAO	Remedial Action Objectives
ROD	Record of Decision
RPD	Relative Percent Difference
RPM10	Respirable Particulate Matter
SCFM	Standard Cubic Feet per Minute
SCG	Site Criteria and Guidance
SCO	Soil Cleanup Objective
SES	Sevenson Environmental Services, Inc.
SI	Supplemental Investigation
SMMP	Soil/Materials Management Handling Plan
SMP	Site Management Plan
SOP	Standard Operating Procedure
SSDS	Sub-slab Depressurization System
SVE	Soil Vapor Extraction
TCE	Trichloroethene
TCLP	Toxic Characteristic Leaching Protocol
TEP	Technical Execution Plan
TPH	Total Petroleum Hydrocarbons
TVOC	Total Volatile Organic Compound
$\mu g/m^3$	micrograms per cubic meter
VI	Vapor Intrusion
VOC	Volatile Organic Compound
WQS	Water Quality Standards

Executive Summary

Introduction and Background

This Draft Final Engineering Report (FER) has been prepared for the Former Ozone Industries Site, Site No 2-41-033, located in Ozone Park in Queens, New York (Site). This FER summarizes the remedial actions (RAs) for the Site.

The Former Ozone Industries, Inc. Site is comprised of a set of eight Bays (Bays 8 – 15) of approximately 12,000 square feet (0.25 acres) within the city block bounded by 99th and 100 Streets to the west and east, and by 101st and 103rd Avenues to the north and south (Ozone Park, New York City). Endzone, Inc. entered into an Order on Consent (#W2-0922-02-05) with the New York State Department of Environmental Conservation (NYSDEC) on February 5, 2003, to investigate and remediate the eight Bays, which are located across the street from 101-32 101st Street. AECOM Technical Services, Inc. (AECOM) is the designated representative of Endzone, Inc.

Remedial Action Objectives

As defined in the Record of Decision (ROD) [NYSDEC, 2010], based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) were identified for this Site.

- Remediate impacted source areas to a level protective of public health and the environment to the extent feasible. Preliminary calculations using existing data indicate that approximately 75-80% of the Site Volatile Organic Compounds (VOC) mass appears immediately below (0-2 ft below ground surface [bgs]) concrete slabs in Bays 8 through 13 and Bay 15;

- Remediate or mitigate soil vapor concentrations from beneath the Site Bays – the exposure assessment presented in Remedial Investigation/Feasibility Study (RI/FS) suggests indoor air is a potential exposure pathway;

- Decrease dissolved-phase contaminants of concern (COC) concentrations attributed to Endzone, Inc. to below Water Quality Standards (WQS); and

- Implement remedy(s) in a safe manner.

Remedial Actions Performed

RAs at the Site included or are planned:

- Implementation of a remedial design program;

- Removal of the floors in Bays 8-15 and excavating, as much as practical, the contaminated shallow soils beneath;

- Post-excavation soil sampling in each of the eight Bays;

- Disposal of excavated soil at a permitted disposal facility;

- Replacement of excavated material with clean backfill;

- Installation of a geomembrane barrier on top of the newly backfilled material beneath the reconstructed concrete floor;
- Installation and operation of a Soil Vapor Extraction (SVE) system consisting of vertical wells, subsurface piping network, and system equipment to collect vapors from the deeper soils;
- Installation and operation of a Sub-Slab Depressurization System (SSDS) beneath the floors in Bays 8 through 15;
- Monitoring of on-Site and off-Site impacted groundwater;
- Implementation of institutional control in the form of an environmental easement;
- Development of a Site Management Plan (SMP);
- Periodic certification of institutional and engineering controls per the property owner; and
- The operation of the components of the remedy until the remedial objectives have been achieved, or until NYSDEC determines that continued operation is technically impracticable or not feasible.

Conclusion

This FER summarizes the successful completion of the RAs for the Site (except for the final two items noted above that will be completed in the future) and details the contamination remaining, deviations from the Remedial Design/Remedial Design Work Plan (RD/RDWP) and remaining engineering controls at the Site. In addition, this FER provides a summary of the post-remediation assessment activities, including performance of the remedial systems (SVE/SSDS), rebound testing and post-remediation sampling events; which include support for the suspension of the SVE system and the implementation of Environmental Easement (e.g., institutional or engineering controls) regarding future occupancy.

1. Background and Site Description

1.1 Introduction

Endzone, Inc. entered into an Order on Consent with NYSDEC in February 2003, to investigate and remediate a 12,000 square foot (or approximately 0.25-acre) property (Site) located in Ozone Park, Queens, New York. The Site was remediated to restricted commercial use and it is expected that the Site will continue to be used for storage Bays owned and operated by City of New York.

The Site is located in the County of Queens, New York and is identified as a portion of Block 9106 and Lot 70 on the New York City Tax Map. The Site is an approximately 0.25-acre area bounded by 101st Avenue to the north, 103rd Avenue to the south, 101st Street to the east, and 100th Street to the west. Attached **Figure 1** is a Site Locus, **Figure 2** is a Site and Site Vicinity Plan depicting the Site and vicinity, and **Figure 3** depicts a more detailed view of the Site and immediate vicinity of the Site.

This Class 2 Inactive Hazardous Waste Disposal Site consists of eight Bays situated beneath an abandoned, elevated Long Island Railroad (LIRR) (**Figures 2** and **3**). Each Bay, approximately 25 feet (ft) wide and 60 ft long, is property between the support columns of the elevated LIRR.

The Bays are owned by the City of New York and were leased to various tenants for different uses prior to the work mentioned herein. Currently, the Bays are still under lease with the City of New York with future intent as use for storage. All work was completed under access agreements with the City of New York. Several of these Bays were used for storage of spent trichloroethene (TCE) in conjunction with the manufacture of aircraft parts (1948 to 1996). The Bays are located across the street from 101-32 101st Street, the location of the former Ozone Industries Facility. The boundaries of the Site are fully described in **Appendix A**: Survey Map, Metes and Bounds and **Appendix B**: Environmental Easement.

This FER summarizes the remedial actions for the Site. AECOM Technical Services, Inc. (AECOM) is the designated representative of Endzone Inc. and acted as the engineer of record. AECOM assumed all duties and responsibilities of and have rights and authority assigned to the engineer of record. The remedial activities at the Site per the NYSDEC approved Remedial Design/Remedial Action Work Plan (RD/RAWP) included soil excavation (Phase 1) and system installations (Phase 2), and system operation (Phase 3).

As summarized below, the Site has a long history of assessment, remediation, system operations and community outreach. The NYSDEC approved Remedial Investigation (RI) and Feasibility Study (FS) Report was completed in 2009, the Record of Decision (ROD) was issued by NYSDEC in February 2010, and the NYSDEC approved RD/RAWP was completed in 2011. Soil excavation and partial system installation (subsurface piping for SVE and SSDS) was completed in summer 2013 (Phase 1), and final system equipment installation (Phase 2) was conducted in fall 2015 (aboveground remedial system components in Bay 8) and startup occurred in April 2016. An NYSDEC Interim Site Management Plan (ISMP) was completed in 2016. System operation (Phase 3) was initiated following startup in April 2016 and has continued through the present date (with periods of system off time due to extensive rebound testing from July 2019 through 2021). System operation and maintenance were documented in multiple quarterly and semi-annual reports to NYSDEC.

In a January 2021 report, AECOM recommended the completion of a FER that included the shutdown and decommissioning of the SVE system and implementation of Environmental Easement to lock in future commercial use (the majority of remediation had occurred and results for the SVE appear to be approaching asymptotic levels). Subsequently, there were attempts to meet with NYSDEC and New York State Department of Health (NYSDOH) to discuss the results and Site closure, and AECOM provided additional requested figures to NYSDEC for their evaluation. Eventually, AECOM had a call with NYSDEC in May 2021, and NYSDEC requested that the remedial systems (SVE and SSDS) be re-started and operated as they create a “P” Site and launch an investigation into other off-Site source areas and responsible parties. The systems have been operating since the restart in June 2021.

On June 25, 2024, AECOM had a conference call with the NYSDEC Site manager (Mr. Javier Perez-Maldonado) to discuss the drafting of this FER and related attachments. During the call, Mr. Perez-Maldonado requested that AECOM obtain updated indoor and sub-slab sample results from the Bays to document in this report. The results of this event, in addition to post-remediation indoor air, sub-slab, soil gas and groundwater results collected from the Site are also included as part of this FER.

1.2 Green Sustainable Remediation

Unfortunately, green and sustainable remediation metrics were not tracked as part of the implementation of the remedial activities at the Site, since the DER-31: Green Remediation Guidelines were implemented in parallel to the approval of the completion RD/RAWP in 2011. However, AECOM applied general green and sustainable best practices and techniques during the completion of the remedial activities, including the reduction of all vehicles idling, sequenced vehicle loading of materials and/or soil for off-Site disposal, equipping both SVE and SSDS system with blowers controlled by variable frequency drives that can be slowed down or increased based on Site conditions and/or levels, and incorporation of activated carbon filtration on the effluent discharge of the systems to ensure low emissions to the atmosphere of Site contaminants or other compounds.

1.3 Site Location, Description and History

Ozone Park is a New York City neighborhood located in the southwestern section of the borough of Queens bordering Woodhaven, Richmond Hills, and Howard Beach. Housing was first developed in the area after the LIRR began service through the area in 1880 (LIRR abandoned the elevated line above the Site between 1955 and 1962). Ozone Park was created and settled in 1882.

The general area surrounding the Site includes manufacturing, commercial and limited residential properties. The streets abutting the Site (99th Street and 100th Street, between 101st Avenue and 103rd Avenue) mostly contain commercial businesses and a few residential properties. A new multi-residential complex was built alongside the southern part of 99th Street near 103rd Avenue in 2007. The typical building foundation construction material in the Site vicinity includes concrete and brick. From outside inspections, it appears that some off-Site buildings may have basements.

The majority of the underground utilities in the Site vicinity are within six ft of the ground surface, although some main sanitary sewer lines appear to be deeper (up to 14 ft below ground surface [bgs]) based upon initial information received. AECOM has received partial information concerning underground utilities from Consolidated Edison, KeySpan, Verizon and the New York City Water and Sewer (Department of Environmental Protection).

The project setting is comprised of a set of Bays of approximately 12,000 square feet (Bays 8 – 15) (the "Site") within the city block bounded by 99th and 100th Streets to the west and east, and by 101st and 103rd Avenues to the north and south. The Site is located beneath an abandoned elevated railroad. Both the Site and the abandoned railroad are owned by the City of New York. There are a total of 28 Bays located beneath the elevated railroad. Thirteen Bays are located south of the Site and seven Bays are located to the north of the Site as noted on **Figures 2 and 3**. None of the Bays have bathroom facilities, heating capabilities or water (therefore, no water, gas or sewer lines are known to run from the Bays to the street). Currently, one half of Bay 8 (Bay 8A) contains the above ground treatment system components for the SSDS and SVE systems, and the balance of the Bays at the Site contain subsurface piping related to the SSDS and SVE system and monitoring points flush with flooring, as discussed below.

Currently, Site Bays are constructed of the elevated railroad superstructure and further modified using various materials (wood, concrete and sheet metal), and are enclosed rooms or open areas surrounded by chain-link fencing, each approximately 50 ft by 30 ft. The foundation of the abandoned elevated railroad above the Bays is constructed of concrete, most likely covering a metal beam and secured to the ground with metal casing and steel rivets. Prior to the Site work conducted by AECOM, various commercial businesses and a private club occupied the Site Bays as tenants of the City of New York. In 2024, during a routine inspection of the systems, AECOM discovered that two of the previously unoccupied Bays were being used as a storage facility for a construction company. This was brought to the attention of the New York Police Department (NYPD) and the tenants were found to be occupying the space without the approval of the City and they vacated the area within a few days. Currently, the Bays which do not house system equipment are unoccupied and vacant.

A 60-Day Advance Notification of Site Change of Use was submitted by AECOM to NYSDEC in a letter dated April 26, 2024. As noted above, NYSDEC and NYSDOH requested updated air sampling data from the Bays for the FER and to supplement this request. The results of the sampling are included below in Section 5.5.

At the property across 100th Street from the Site, Ozone Industries, Inc. manufactured aircraft parts including landing gears, hydraulic assemblies, aircraft steering wheel assemblies, flight controls, etc. Ozone Industries, Inc. rented for storage purposes a portion of the Site for a period prior to 1998, possibly starting as early as 1961. During the period that Ozone Industries, Inc. rented the Site, a portion of the Site was used to store solvents, hydraulic fluids, and scrap metal chips in roll-off containers that resulted from Ozone Industries, Inc. manufacturing activities. A portion of the Site utilized by Ozone Industries, Inc. was constructed of cinder block walls and contained a dirt floor. During that period, it is believed that releases of solvents, oil and/or fluids may have occurred at the Site. Ozone Industries Inc. ceased using the Site at about the time it was sold in 1998. Consequently Endzone, Inc. is not familiar with the nature of the operations and activities that occurred at the Site subsequent to the sale.

Additional Site information, including Site setting and nature and extent of impacts (prior to remediation) are included in the ISMP (**Appendix C**) and 2009 RI/FS Report.

1.4 Previous Site Investigations and Remedial Measures

The following provides a brief chronology of previous investigations, reporting to NYSDEC and remedial work at the Site:

- In 1996, the New York City School Construction Authority conducted a Phase I and Phase II Environmental Site Assessment of the Former Voges Manufacturing Company property located south of 103rd Avenue on 99th Street (currently PS65). The 1996 Phase I Report identified Ozone Industries as having a 2000-gal storage tank that was used to store TCE and reported TCE in the groundwater at the Former Voges Manufacturing Company property. This led to further investigations at and near the Ozone Industries Facility.

- Two Environmental Site Assessments, Phase I in 1997 and Phase II in 1998, were conducted at the Ozone Industries Facility across the street from the Site (Bays 8-15). These investigations included inspection of existing aboveground storage tanks, underground storage tanks and a depressed area for staging 55-gallon drums. Soil samples were also collected and tested for petroleum related compounds. Some petroleum contamination was detected, and a 1,000-gallon underground storage tank and 2 open pits were later closed in October 1999. The 1997 Phase I Report also stated that waste TCE was placed in 55-gallon drums and stored across the street in areas located underneath the elevated LIRR (subject site for this report). No evidence of the use of polychlorinated biphenyls (PCBs) was found.

- In the summer of 1999, the NYSDEC conducted a Preliminary Site Assessment (PSA) in the vicinity of the Former Voges Manufacturing Company property (103-22 99th Street) and the Ozone Industries Facility (101-132 101st Street) to determine the source of the TCE contamination in the groundwater. Twenty-one groundwater sampling points were installed in the sidewalks upgradient and west of the Ozone Industries Facility and in the Former Voges Manufacturing Company property. TCE was found in a majority of the samples at varying concentrations except the upgradient samples did not detect any TCE in the groundwater. The PSA findings indicated there was a source of TCE contamination near the Ozone Industries Facility, possibly from stored drums beneath the elevated LIRR.

- The NYSDEC conducted further field investigations in June 2001, July 2002, August 2002 and May 2003 to collect additional soil samples, groundwater samples and soil vapor samples. This investigative work expanded on the earlier PSA investigations and included temporary well points, soil borings for piezometers and 19 permanent soil vapor wells. The analysis of soil samples for VOCs did not indicate detectable levels in many of the samples. The groundwater sampling results indicated decreasing TCE concentrations with depth and TCE was detected in all the soil vapor samples.

- An RI was performed to characterize the nature and extent of contamination at the Site between 2005 and 2006 after years of negotiations with the City of New York for access.

- The RI/FS Report for the Site was completed by AECOM (dated June 2009) and was approved by the NYSDEC in a letter dated October 14, 2009. A summary of the RI results is provided below.

    - RI Results Soil:
        - The overburden at the Site consists of a fill unit underlain by a sand unit. An unconsolidated silt-sand-gravel fill material is present underneath the Site from 3 to 4 ft bgs and off-Site from 1 to 3 ft bgs. A native sandy soil underlies the unconsolidated fill material.
        - Saturated soils were encountered at approximately 30 ft bgs in all soil boring locations. The groundwater flow direction is south across the Site vicinity.

- VOC contaminants TCE and cis-1,2-dichloroethene (DCE) were found in the on-Site shallow soil, soil vapor and groundwater.
- The highest levels of VOCs and TCE were observed in soil samples collected directly beneath the concrete floor at the Site, with levels decreasing with depth (generally non-detectable or low levels at the groundwater table). The shallow samples with the highest VOC levels and estimated TCE concentrations (greater than 100 milligram per kilogram [mg/kg]) were collected from Bays 9 and 10. Increased impacts were detected further south or off-Site in Bay 24 (evidence of soil impacts) and Bay 28 (headspace reading); however, such impacts are most likely a result of an alternative contaminant source due to lower detected impacts in Bay 17 between the Site and this area, as presented in the RI Conceptual Site Model.
- The levels of TCE and two other VOCs (acetone and cis-1,2-DCE) in soil samples collected from the shallow levels beneath the Site exceed the Subpart 375-6 Soil Cleanup Objectives (SCOs) for the Protection of Groundwater, however, these cleanup levels are not exceeded for all VOCs in all soil samples collected off-Site and at the groundwater interface beneath the Site (Bays 8 – 15).

- RI Results Water:
  - The RI evaluated approximately 264 off-Site grab and monitoring well groundwater samples collected since 1999. Groundwater analyses in 2005 and 2006 indicate the presence of VOCs generally consistent with pre-2005 detected levels. Levels (especially TCE) detected in 2006 are generally lower than previously detected in 2005 and considerably lower than those detected in 2002 and 2003.
  - TCE was detected in the April 2005 and August 2006 samples from upgradient well PZ-01D (located along 101st Avenue), and samples from PZ-05 located east of the Site on 101st Street (cross gradient or possibly upgradient of Site) have contained levels of TCE in all samples collected since 2002. The majority of the TCE levels in groundwater in the Site vicinity are above the NYSDEC GA groundwater standard, but the levels appear to be decreasing with time.
- RI Soil Gas
  - Soil gas sampling included 13 sample locations in 2005, and 27 sample locations in 2006. Soil gas samples collected from Site and off-Site Bay locations indicate the presence of various VOCs and TCE. The highest levels of VOCs (and estimated TCE concentrations) we observed in soil gas samples were collected directly beneath the concrete floor of Bays 8 through 15. Generally, lower VOC levels were detected in samples from the off-Site soil gas sample locations (Bays north and south of the Site and locations in streets east and west of the Site).

- The ROD was issued by NYSDEC in February 2010.

- The AECOM RAWP (dated January 2011) for completing the RD/RAWP was approved by the NYSDEC in a letter dated June 23, 2017.
- A draft RD/RAWP was submitted to NYSDEC and NYSDOH in August 2011. The NYSDEC issued an approval letter for the RD/RAWP on October 25, 2011, and the final RD/RAWP is dated November 2011.
- During 2011 through 2013, negotiations with City of New York for access and remediation took place.
- Soil excavation and partial system installation (subsurface piping for SSDS and SVE system) was completed in summer 2013.
- During 2013 through 2015, negotiations with City of New York for access and reconstruction of the Bays occurred.
- July 2015 through April 2016, the Bay interiors were reconstructed July through September 2015 and the aboveground SSDS and SVE system components in Bay 8A were installed and the systems started up in April 2016.
- The systems operated continuously from April 2016 through March 2018 when the first rebound testing began, except for the period of July 30 to November 2, 2016 (due to power termination at the Site). The systems were off again during rebound testing (4 rounds) from June 2017 through April 2018, and then additional rebound testing in July 2019 (all approved by NYSDEC). The systems were turned back on in June 2021 and have been operating to the present.
- In July 2016, submittal of an ISMP to NYSDEC (approval received on September 8, 2016) and start of ISMP activities and Progress Reports (August 2016). Through 2024, 20 Progress Reports were submitted to NYSDEC reporting on system monitoring and site assessment activities.
- In April 2017, submittal of a Groundwater Monitoring Opinion, Vapor Intrusion (VI) Assessment Plan, and Remedial Systems Rebound Testing (and May 9, 2017 confirmatory e-mail from AECOM to NYSDEC), to monitor the Site during system shut down and restart required as part of the VI assessment work (i.e., 2017 VI Work Plan).
- From June 2017 through April 2018, VI assessment activities were conducted (four Quarters) per the 2017 VI Workplan (indoor ambient air sampling in each of the eight Bays and sub-slab soil gas samples for VOCs), and installation of seven soil gas sampling points off-Site (outside of Bays) and sampling (June 2017).
- Submittal of a work plan in November 2018 for the completion of additional groundwater monitoring and soil gas sampling activities – to also include sampling for 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS).
- Results of groundwater sampling and analyses per NYSDEC, 1,4-dioxane and PFAS sampling was conducted in February 2019, and reported in a Memorandum to NYSDEC dated March 19, 2019.
- Submittal of a Work Plan dated August 21, 2019 for re-bound testing (approved by NYSDEC on October 30, 2019) (“October 2019 workplan”) to generally include four seasons or rounds

(November 2019, and February, May and August 2020) of groundwater, soil gas and ambient air monitoring (sampling and analyses) while the system is off.

- Extensive re-bound Site testing and monitoring was completed after the remedial systems were shut off in July 2019 per NYSDEC and in conjunction with the approved October 2019 workplan. The results of the testing were provided in the January 2021 semi-annual Progress Report by AECOM. In the January 2021 report, AECOM recommended the completion of a Final Engineering Report that includes the shutdown and decommissioning of the SVE system and implementation of Environmental Easement.
- Restart of the SSDS and SVE system in June 2021 following discussion with NYSDEC in May 2021, as they create a “P” Site and launch an investigation into other off-Site source areas and responsible parties.
- Collection of updated indoor and sub-slab sample results from the Bays in August 2024 following discussion with NYSDEC for purposes of documentation in this report.

1.5 Previous Community Outreach

Over the course of approximately 10 years (prior and during the implementation of remedial activities), public outreach was completed, including issuing of NYSDEC Fact Sheets (English and Spanish); numerous meetings and Site visits with local property owners, residents, and elected officials; and attendance and presentations at local Community Board meetings. Some of these fact sheets are available in the online NYSDEC Environmental Remediation Database for this Site, in addition to the Queens Public Library Repository.

2. Summary of Site Remedy

This information was provided in the RD/RAWP, and the majority of the remediation has occurred.

2.1 Remedial Action Objectives (RAOs)

The general RAOs for the Site are to:

- Remediate impacted source areas to a level protective of public health and the environment to the extent feasible. Preliminary calculations during the RI/FS, and as provided in the RAWP, indicated that approximately 75-80% of the Site VOC mass appears immediately below (0-2 ft bgs) concrete slabs in Bays 8 through 13 and 15 (this soil was removed);

- Remediate or mitigate soil vapor concentrations from beneath the Site Bays – the exposure assessment presented in RI/FS suggests indoor air is a potential exposure pathway (currently there is a SSD system operating);

- Decrease dissolved-phase COC concentrations attributed to Endzone, Inc. to below WQS; and

- Implement remedy(s) in a safe manner (soil excavation was completed and SVE and SSD systems were installed successfully).

These selected remedial actions will allow reuse of the Bay areas consistent with rental practices in the past by the City of New York. These selected remedial actions will also mitigate Site contamination as well as its potential area wide contributions to the identified exposure concerns.

2.2 Remedial Design Objective

As defined in the ROD (NYSDEC, 2010) and based on the primary objectives of the NYSDEC approved RD/RAWP, the Remedial Goals for the selected remedy were to ensure that the remedy was implemented in a safe and efficient manner. Specific activities followed to accomplish this objective to eliminate or reduce to the extent practicable:

- Exposures of persons at or around the Site to VOCs including TCE and its degradation product (cis-1,2 DCE) in contaminated groundwater and subsurface soil;

- The release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards;

- The release of contaminants from soil vapor into indoor air through vapor intrusion; and

- Potential safety issues with implementing the remedy(s).

Further, the Remediation Goals for the Site include attaining to the extent practicable:

- Ambient groundwater quality standards; and

- Soil standards, criteria, and guidance (SCGs) based on Part 375, Subpart 375-6.8: Remedial Program SCOs.

2.3 Description of Selected Remedy

The Site was remediated in accordance with the remedy selected by the NYSDEC in the ROD dated February 2010, and there were no interim remedial measures at the Site during the RI/FS.

These selected remedial actions allow for the reuse of the Bay areas consistent with rental practices in the past by the City of New York. These selected remedial actions also mitigated Site contamination as well as potential area wide contributions to the identified exposure concerns.

As stated in the ROD, and as further described in Section 4.0, the major components of the selected remedy to meet the RAOs include:

- A remedial design program was implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.
- The floors and contaminated shallow soils in Bays 8-15 were removed to the extent practical without compromising the structural integrity of the above grade structure beneath these eight Bays.
- Post-excavation soil sampling was conducted in each of the eight Bays to document the condition of the soil left in place.
- All excavated contaminated soil was disposed of off-Site at a permitted disposal facility.
- Clean backfill that was approved by NYSDEC replaced the excavated shallow soils.
- An impermeable vapor barrier was installed throughout each of the Bays to eliminate potential subsurface vapors from entering the breathing zone in the Bays.
- An SVE system of vertical wells with screens located at varying depths beneath the eight Bays and a subsurface piping system was installed to collect vapors from the deeper soils.
- An active SSDS was constructed beneath the floors in Bays 8 through 15 to provide consistent vapor mitigation measures in each bay.
- The SVE and SSDS mechanical equipment was installed in Bay 8A along with off-gas treatment in the form of vapor granular activated carbon (VGAC).
- A vapor intrusion mitigation program was implemented to investigate and remediate, if necessary, off-Site adjacent structures (residential, commercial) and off-Site adjacent Bays to the Site for vapor intrusion. Access to properties were not obtained and NYSDEC did not proceed with this program.
- The on-Site and off-Site impacted groundwater was sampled under a comprehensive monitoring program. A total of 13 sampling events were completed between 2016 and 2020. Results of these events were provided to NYSDEC in the Progress Reports.
- Imposition of an institutional control in the form of an environmental easement that required limiting the use and development of the property to residential use, which will also permit commercial or industrial uses.

- Development of an ISMP.

- Periodic certification of institutional and engineering controls outlined in the Environmental Easement, prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC, until the NYSDEC notifies the property owner in writing that this certification is no longer needed.

- The operation of the components of the remedy to continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

Although not included in the original ROD or RD/RAWP, a vapor intrusion program was implemented to evaluate on-Site (indoor air and sub-slab) and off-Site (soil gas) conditions after the soil removal activities at the Site and during the implementation of SVE/SSDS operation activities; including vapor intrusion sampling activities during a series of SVE rebound testing events, as further described in Section 4.0 below. This is not considered a deviation of the ROD or RD/RAWP since it is part of the above vapor intrusion mitigation program.

3. Interim Remedial Measures, Operable Units and Remedial Contracts

The remedy for the Site was performed as one RD/RAWP (under two phases: excavation of soil and SVE/SSDS system installation and Site restoration) and no interim remedial measures were performed. The ROD for the Former Ozone Industries Site does not define separate operable units.

4. Description of Remedial Actions Performed

The remedial activities completed at the Site (between May 2013 and April 2016) were conducted in accordance with the NYSDEC-approved RD/RAWP for the Site. There were three phases of remedial activities, including soil removal and subsurface SVE and SSDS piping installation (Phase 1), system installations (Phase 2), and system operations (Phase 3). The following sections provide details of the completed work and resulting conditions, chronologically.

4.1 Governing Documents

The engineer of record reviewed all plans and submittals for this remedial project and confirmed they complied with the February 2010 ROD (AECOM, 2015). Remedial documents were submitted to the NYSDEC before the start of remedial construction.

4.1.1 Site-Specific Health & Safety Plan (HASP)

The remedial work performed under this remedial action was in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal Occupational Safety and Health Administration (OSHA). Before each phase of work, AECOM prepared Site-specific Health and Safety Plans (HASPs) for all remedial and invasive work performed at the Site. These were updated as necessary when the scope of work changed and were updated on an annual basis at a minimum. A Site-specific HASP was compiled for all remedial and invasive work performed at the Site.

4.1.2 Quality Assurance Project Plan (QAPP)

The original QAPP was included as Appendix A of the RD/RAWP approved by the NYSDEC. The QAPP describes the specific policies, objectives, organization, functional activities, and quality assurance/quality control activities designed to achieve the project data quality objectives. The remedial action on Site was completed as described in the QAPP.

Mr. Jon Durnin was the point of contact at NYSDEC and had overall responsibility for all phases of the project under NYSDEC's oversight. The NYSDOH Project Manager, Ms. Dawn Hettrick, was the point of contact at NYSDOH and had overall responsibility for all phases of the project under NYSDOH oversight.

The Endzone Inc. Project Manager, Mr. Ted Coyle, was responsible for overall project direction and decisions concerning technical issues and strategies, procurement and oversight of contractors, and final review of project plans and reports.

The Laboratory Manager, June O'Connor, was responsible for the data produced by the laboratory. Specific responsibilities included implementing and adhering to the laboratory's quality assurance (QA) policies and procedures, maintaining adequate staffing and facility resources, and ensuring that corrective actions were implemented as needed.

The AECOM Project Manager, Mr. Raimundo Matos, was responsible for technical, financial, and scheduling matters. Responsibilities included subcontractor procurement, assignment of project staff, review and approval of project deliverables, maintenance of project records, and communication with the client and field personnel. The AECOM Project Manager was also the

primary point of contact with NYSDEC and NYSDOH. Key personnel described in the following paragraphs reported directly to the project manager.

The AECOM Field Team Leader, Mr. Matthew Pearsall, had overall responsibility and authority for the various remedial activities. The Field Team Leader was responsible for coordinating and managing the field team and subcontractors. The Field Team Leader reported directly to the Project Manager. A Field Team consisted of at least two people (when necessary) during the Remedial Action field activities. The team coordinated directly with the Field Team Leader and Project Manager. The Site Safety Officer (SSO) was responsible for training and monitoring Site conditions and worked closely with the Field Team Leader.

The AECOM Project Quality Assurance (QA) Officer, Mr. Robert McKeever, was responsible for ensuring that all remedial activities performed by AECOM or their subcontractors was being conducted in accordance with the Sampling Plan as presented in Section 4.0 of the RD/RAWP. The Project QA Officer was responsible for conducting on-Site and laboratory audit(s), if necessary, and reporting of deficiencies. The AECOM Data Manager, Ms. Lori Herberich, was responsible for developing and implementing project-specific procedures to track, store, verify, and load the data collected during the field and analytical programs and was also responsible for validating the analytical data.

To assess precision in field and laboratory activities, field duplicates were collected at a frequency of one for every 10 analytical samples; where field duplicates for solid samples were to have a relative percent difference (RPD) of 50% or less and aqueous samples were to have a RPD of 30% or less. Laboratory precision was calculated using the RPD for matrix spike/matrix spike duplicates (MS/MSDs).

To assess accuracy in field and laboratory activities, procedures were used that minimized bias, field equipment was calibrated, and sample holding times and preservation requirements were met. Accuracy in the field was evaluated through the use of trip blanks and equipment rinsate blanks. To meet completeness goals, a target of collecting 90% of the proposed sampling was set. The laboratory target was greater than 95% of the proposed samples to be analyzed.

Field data was reviewed daily by the Field Team Leader to ensure that the records are complete, accurate, and legible. Additionally, the Field Team Leader checked procedures used in the field, calibration of the field meters and instruments, and verified the accuracy of transcriptions. Laboratory data was validated by the AECOM Project QA Officer. The elements reviewed during validation were consistent with those necessary to develop a Data Usability Summary Report (DUSR).

Documentation of remedial activities are stored in the project files. The documentation includes correspondence, field logbooks, data, photographs, drawings, sample collection logs, data validation reports, progress reports, QA report, and custody documentation. The project files serve as the central repository for all documents, which constitute evidence relevant to sampling and analysis activities as described in the QAPP.

During the construction phase, daily meetings were held with the construction manager/excavation contractor and remedial contractors. Site visits by representatives from the regulatory agencies were made periodically as activities on Site were underway. In the absence of on-Site in person meetings, weekly communications were held on an as-needed basis by the appropriate parties.

4.1.3 Construction Quality Assurance Plan (CQAP)

The Construction Quality Assurance Plan (CQAP) managed performance of the Remedial Action tasks through designed and documented quality assurance/quality control (QA/QC) methodologies applied in the field and in the laboratory. A separate standalone CQAP was not developed for this project but was incorporated into Section 2.3.7 of the RD/RAWP. The CQAP section of the RD/RAWP provides a detailed description of the observation and testing activities that were used to monitor construction quality and confirm that remedial construction was in conformance with the remediation objectives and specifications.

4.1.4 Soil/Materials Management Handling Plan (S/MMP)

The soils and materials from the Site were managed in accordance with Section 2.3.7 of the RD/RAWP (AECOM, 2011). VOC-impacted soils and debris were transported in accordance with the applicable regulations for the transportation of solid or liquid materials.

Excavation commenced following the removal of contents inside the Bays and demolition of the concrete floors and interior walls. Groundwater on Site is approximately 30 ft bgs and was not encountered during excavation activities. Soils in the excavation area were screened periodically for VOCs using a photoionization detector (PID) and all soil exhibiting PID reading less than 1 parts per million (ppm) were to be segregated as non-impacted soil. During excavation, no soils were segregated and all soils that were excavated were shipped off-Site.

Contaminated soils were directly loaded into trucks for off-Site disposal. Accessible soils at the Site (Bays 8 – 15) were excavated to approximately 4 ft bgs. Confirmatory soil samples were collected from the side walls and base of the excavation in each Bay and analyzed for VOCs via EPA Method 8260 to confirm that the majority of the contamination was removed.

Excavated areas were covered with 6-mil polyethylene sheeting held in place with sandbags when they were not being directly worked on. This measure remained in place until the surface concrete was replaced. Excavation activities were completed bay-by-bay, with backfilling completed to 2 ft bgs in each bay before starting excavation in the following bay.

Odors, dust, or fugitive vapors which could potentially emanate from remedial activities were controlled by misting the working area with BIO SOLVE® (odor or vapor control) or water (dust control). The BIO SOLVE® was applied using a pressure washer. In addition, inactive portions of the stockpile and inactive areas of the excavation were covered with polyethylene sheeting to help minimize emissions.

An Exclusion Zone was established, which included the active excavation work area and the truck trailer, as well as a Contaminant Reduction Zone which included the truck loading area and was used as a primary decontamination area for equipment and personnel. The truck loading area was located adjacent to the Exclusion Zone in the Contamination Reduction Zone. The truck loading area was protected by placing 6-mil polyethylene sheeting on the ground. Sheeting was held in place by sandbags. Plastic tarps with shepherd hooks were draped over the loading side of the dump trailers to protect against spillage during loading. An excavator and/or wheel loader were used to load materials into trucks. Care was exercised when loading trucks not to spill material on the outside of the dump trailers.

Prior to leaving the loading area, each truck was visually inspected (i.e., box sidewall, box tailgate, and tires, etc.) and cleaned with brushes as required. When required, dump trailers were cleaned on the Equipment Contamination Reduction Pad. Drivers were not allowed to walk overloads. Remedial workers repositioned the tarp bars over the loads. The driver covered the trailer with a solid fabric (i.e., vinyl, reinforced polyethylene) over the entire load. Trucks were decontaminated within the Site limits as needed before leaving.

4.1.5 Community Air Monitoring Plan (CAMP)

A CAMP was implemented during intrusive activities to utilize a real-time system to monitor target parameters (Total Volatile Organic Compounds (TVOC) and particulates). Real-time monitoring data was used as an early warning system so that the field staff and the Site engineer and contractor were alerted that concentrations of target compounds were approaching Action Limits. Under this scenario, the Site engineer/contractor was able to implement appropriate Site controls to maintain acceptable ambient air concentrations. In addition, the CAMP included comprehensive data management and analysis procedures. Data was generated from a variety of sources, including pre-construction baseline sampling, real-time monitoring with portable air monitoring equipment, supplemental hand-held, integrated VOC sampling and meteorological monitoring. The data was reduced, evaluated, verified and presented to the Site engineer/contractor to facilitate decision-making as necessary.

TVOC monitoring was accomplished using a PID with a 10.6 electron volt (eV) lamp. Each day the analyzer was calibrated with a 100 ppm isobutylene air standard. Continuous real-time and periodic hand-held air monitoring was conducted upwind and downwind of the work area along the Site perimeter from three portable air monitoring (PAM) stations. PAM stations were located in the upwind and downwind directions and at a sensitive receptor location.

The NYSDOH Generic CAMP recommends a 15-minute alert and action level for TVOCs of 5.0 and 25.0 ppm respectively above background. The CAMP provided in Appendix B of the RD/RAWP details work zone and CAMP limits less than or equal to the NYSDOH Generic CAMP level of 5.0 ppm.

Work-zone action limits of 3.7 ppm and 5.0 ppm above existing ambient conditions were set within the Exclusion Zone. The CAMP monitoring had a single action limit set at 5.0 ppm, triggered by either an exceedance of the 15-minute average VOCs concentration of 5.0 ppm (above background) at the perimeter of the Exclusion Zone or odor complaint.

These action limits were used to determine whether modifications to remedial activities and operations were required. Engineering control measures or modifications to the excavation process to minimize VOC emissions were initiated for sustained VOC levels greater than 3.7 ppm within the work zone.

Following vapor suppression implementation, monitoring continued and the NYSDOH and NYSDEC were notified. If actions to control VOCs emissions were not effective and concentrations continued at or above 5.0 ppm (above background), the excavation and waste handling activities were halted, and vapor suppression techniques continued until corrective measures were effective and the 15-minute average TVOC concentration fell below the 3.7 ppm above background.

In conjunction with the real-time volatile emission monitoring, continuous monitoring equipment for respirable particulate matter (RPM10) was used to collect real-time airborne particulate data on an

hourly basis, as needed. The CAMP recommended for particulate matter less than 100 micrograms per cubic meter (µg/m3) an alert and action level of 0.10 and 0.15 milligrams per cubic meter (mg/m^3) [100 and 150 µg/m^3] respectively, above background. This action limit was used to determine whether modifications to remedial activities and operations were required. If the measurement of particles was greater than 0.10 mg/m^3 above the background level over a 15-minute averaging period, or if dust was observed leaving the project area, dust suppression techniques (i.e., misting surfaces with water or covering open piles) were implemented to reduce the generation of fugitive dust. If the action level of 0.15 mg/m^3 (above background) was exceeded for a 15-minute period, the NYSDOH and NYDEC were notified, and the source of the exceedance identified, and corrective actions implemented.

CAMP results are presented in Section 4.2.5 of this document.

4.1.6 Contractors Site Operations Plan (SOPs)

The engineer of record reviewed all plans and submittals for this remedial project (i.e., those described in Section 4.1 above plus contractor and subcontractor submittals) and confirmed that they were in compliance with the RD/RAWP. The Contractor supplied a Technical Execution Plan (TEP) prior to the start of work, which is included in **Appendix D**. The TEP detailed the Contractor's proposed traffic control, erosion control, decontamination procedures, sequences for each stage of work, and descriptions of procedures for each work task.

4.1.7 Community Participation Plan

A Community Participation Plan (CPP) was provided with the RI Work Plan in 2004 and outlined public participation activities to be conducted throughout the RI/FS process, up through issuing the ROD. Over the years, mailings with Fact Sheets were issued, a public repository of Site documents was maintained, and public meetings were held. The remediation phase of the Site included the following public participation activities, among many other:

- Mailing of a Fact Sheet to the latest and most up to date Mailing List; announcing the commencement of remedial activities, including an estimated schedule of proposed activities and listing of Site contacts.

- Submittal of monthly Progress Reports to the NYSDEC and NYSDOH, with copies sent to the public repository.

- Articles providing notice to the community were published in local papers including the Queens Chronicle, Queens Ledger, Queens Tribune, and a Queens blog, which included fact sheets for the Site.

4.2 Remedial Program Elements

There were three phases of remedial activities, including soil removal (Phase 1), system installations (Phase 2), and system operation (Phase 3). Details are provided below.

4.2.1 Contractors and Consultants

During the execution of the remedial activities at the Site under the RD/RAWP, the following contractors performed the work under contract with and direction by AECOM on behalf of Endzone, Inc:

Contractor	Location	Description of Work
Op-Tech Environmental Services, Inc.	East Syracuse, NY	Primary remediation services Demolition Excavation/backfill Installation of system piping Restoration of Bays
National Environmental Services, Inc.	Attleboro, MA	Sub Slab Depressurization System manufacturing and installation Soil Vapor Extraction System manufacturing and installation Process controls installation
Service Tech, Inc.	North Providence, RI	VGAC Vessel production
Alpha Analytical	Westborough, MA	Analytical services
Hillman Consulting, LLC.	Clifton Park, NY	Asbestos survey
US Environmental	Waltham, MA	System monitoring equipment rental
Pine Environmental	Woburn, NA	System monitoring equipment rental
VSC Electric, Inc.	Bayport, NY	Electric installation
GEOD Corporation	West Milford, NJ	Site Surveying
Clean Globe Environmental	Hauppague, NY	SVE/SSDS System operation and maintenance
Erlandsen-Crowell & Shaw	New Hyde Park, NY	Site Surveying

Sean Crowell, P.E., the engineer of record at time of Phase 1 and Phase 2 completion confirmed remedial activities were completed to the specifications outlined in the RD/RAWP.

4.2.2 Site Preparation

Mobilization activities at the Site generally included the delivery of primary materials, equipment, and personnel to the Site, and construction of the facilities necessary in order to complete construction activities. Prior to Phase 1 work, these activities also included the following:

- Asbestos clearance;
- Removal of remaining debris within the Bays;
- Erection of a temporary construction fence to secure the construction Site;
- A NYSDEC-approved project sign was erected at the project entrance and remained in place during all phases of the work. This sign identified the work area as an environmental construction Site and provided contact information;
- Setting up monitoring equipment and collection of baseline data associated with the CAMP; and
- Implementation of traffic control procedures.

The work area was relatively small and located completely within presently paved areas or buildings. Significant needs for erosion and sedimentation control were not necessary. Any drainage structures were covered with filter fabric and surrounded by straw bales prior to the start of construction.

Prior to the start of the Phase 1 excavation work, Dig Safe New York was notified, and all on-Site underground utilities were marked in the work areas. The local police, fire departments, and water and sewer department were also notified.

A pre-construction meeting for Phase 1 was held with NYSDEC and all contractors on June 10, 2013. Articles providing notice to the community were published in local papers including the Queens Chronicle, Queens Ledger, Queens Tribune, and a Queens blog, which included fact sheets for the Site. Communication guides were also created for field staff for guidance on how to navigate community inquiries.

Documentation of agency approvals and other non-agency permits relating to the remediation project are provided in **Appendix E**. These permits include building, asbestos, Site restoration, Department of Transportation, demolition, and building alterations.

4.2.3 General Site Controls

Site Controls during the Phase 1 remedial activities included the implementation of Site security, record keeping, soil screening and stockpiling controls. These controls are further defined below.

The entire work area was surrounded by a 6-foot-high chain link fence. "NO TRESPASSING" signs were installed on the perimeter fence. During daily operations, admittance requirements and visitor monitoring was in effect. Fence gates remained closed and locked. Persons entering and exiting the fenced area were required to check with a designated Site security person upon arrival and departure. No entry into the enclosed area was permitted during non-working hours;

The Contamination Reduction Zone (i.e. the area immediately outside the Exclusion Zone [active work zone]) was established to use as a primary decontamination area for equipment and personnel. The equipment contamination reduction pad was constructed and maintained inside the fenced enclosure. The pad consisted of a 20-mil poly liner bermed by straw bales. A high-pressure washer was used to clean all vehicles and equipment exiting the Site as necessary. A personnel contamination reduction area was constructed within this area that included Stage 1 which contained a boot washtub with solution of detergent, water and a long handle brush. Another boot washtub contained rinse water, a long handle brush and a final rinse with a hand pump sprayer. A 55-gallon barrel lined with a 6-mil thick polyethylene bag was available for personal protection equipment (PPE) disposal. Stage 2 contained a hand washtub with a solution of detergent and water. Stage 2 also included an additional hand washtub containing rinse water and a final rinse with a hand pump sprayer.

All sampling equipment used during the remedial activities was cleaned thoroughly before and after sample collection in accordance with AECOM Project Operating Procedure (POP), Decontamination of Equipment. Cleaning of the equipment was performed to prevent cross-contamination between samples, reduce the potential for tracking impacted media to different parts of the Site, and to maintain a clean working environment for all personnel.

The documentation associated with field sampling activities was summarized and placed in the project files. Backup copies of field logbooks, data sheets, and other original field records were scanned and stored in the project directory.

In order to assess the effectiveness of the soil excavation, and to assess if more restrictive land use and development controls would be necessary once the excavation activities were completed, post-excavation soil samples from each one of the Bay's excavation areas were collected. As part of sampling, a dedicated volume of the sample collected was screened in the field (i.e., head space screening) for VOCs using a PID. The sample was collected in accordance with AECOM "Headspace Screening for VOCs" POP.

A designated stockpile management area was prepared for stockpiling excavated soils. The area included straw bales around the perimeter of the expected area, one continuous sheet of 20-mil thick reinforced polyethylene sheeting was placed to cover the straw bales, and the cover was secured with sandbags.

4.2.4 Nuisance Controls

To minimize disturbances to the surrounding community resulting from the remedial activities under Phase 1 (primarily dust, odors, traffic, noise, etc.), the following nuisance control measures were implemented:

- **Traffic plan**: a traffic plan was provided by the contractor which outlined the route for construction traffic to take, specifically having trucks enter the Site from 101st Ave., and exiting back onto 99th Street towards 103rd Ave. 100th Street was not used by construction vehicles and proper signage was posted.

- **Air monitoring**: a CAMP was implemented as described In Section 4.1.5.

- **Odor/dust control**: odors, dust, and fugitive vapors which could have potentially emanated from remedial activities were controlled as described in Section 4.1.4.
- **Truck wash**: Trucks were visually inspected and washed if required as described in Section 4.1.4.

- **Responding to complaints**: Field staff were instructed to respond to community inquiries in accordance with AECOM Communications Guide: Communicating with the Public POP. Complaints from the public were directed to the project manager.

4.2.5 CAMP Results

A CAMP was implemented during the remedial activities (Phase 1) as described in Section 4.1.5. Copies of all field data sheets relating to the CAMP are provided in electronic format in **Appendix F**.

Fifteen (15) exceedances of the action limit were identified during remedial activities. These exceedances were caused by sweeping, rock moving, compaction, excavation, or truck traffic. To address exceedances, work was halted, and/or water was sprayed to mitigate fugitive dust. A summary of exceedances and corresponding response actions is included in **Appendix F.**

4.2.6 Reporting

Daily reports summarizing Site activities during construction were generated by OP-TECH which detailed activities carried out, personnel on Site, and any changes from the original scoped work. All daily reports by OP-TECH are included in electronic format in **Appendix G.** Daily reports summarizing CAMP results are included in electronic format in **Appendix F**. Monthly reports in addition to the daily reports were not generated for this work. The digital photo log required by the RD/RAWP is included in electronic format in **Appendix H.**

4.3 Contaminated Materials Removal

The selected remedial action for the Site included the removal of shallow contaminated materials to remediate impacted source areas to a level protective of public health and the environment to the extent feasible. SCGs are based on 6 NYCRR Part 375, Subpart 375-6: Remedial Program SCOs. A list of the SCOs for the primary COCs and applicable land use for this Site included New York Unrestricted Use Soil Clean Objectives 375-6.8(a), New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b), and New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b) and are shown on **Table 1**.

A total of 847.5 tons of impacted concrete, asphalt and shallow subsurface soils were disposed of at the Seneca Meadows Inc. landfill, in Seneca Falls, NY under waste profile 2013-083-15RIC from July 24th to August 5th, 2013. The soil disposal log and manifests are included in **Appendix I.** Based on pre-characterization sampling; the soils disposed of from Site were characterized as non-hazardous. A figure of the location of the original sources and the areas where excavations were performed is shown in Figures 9A and 9B in **Appendix C**.

In addition to the impacted soils that were removed, three sumps in the form of 55-gallon drums, were removed. Two of the sumps had been previously identified prior to excavation during preliminary Site investigations and one sump was uncovered during excavation activities. A total of five drums of material, including the sumps themselves as well as surrounding impacted soils, were generated during the Bay 12 sump cleanout. The locations of these drums are shown in Figure 10 in **Appendix C**.

4.3.1 Bay 12 Sumps

As mentioned above, two 55-gallon drums were identified in Bay 12 during the November 2009 pre-design investigation. Sump #1, located closest to 100th street, measured approximately 24 inches in diameter and approximately 26 inches deep. It was fully intact, had a solid bottom, and did not show any signs of significant deterioration. Sump #2, located in the approximate center of Bay 12, measured approximately 24 inches in diameter, approximately 32 inches deep and had a solid bottom with minor signs of deterioration. Sumps #1 and #2 were connected by a 1.5-inch PVC pipe sloped such that Sump #2 would drain into Sump #1. There were also two other small PVC pipes, approximately 1-inch in diameter, that were stubbed up on the wall adjacent to 100th street that fed into Sump #1.

Field headspace readings of the sumps indicated elevated VOC concentrations and subsequent laboratory analyses of material from the sumps indicated concentrations for 1,1,1-TCE and TCE at 26,000 and 550,000 mg/kg, respectively. During on-Site demolition activities conducted in June 2013, a third 55-gallon drum, Sump #3, was identified. Sump #3 measured approximately 24 inches in diameter and had holes, either manually punctured or drilled, in its base. Results of the analytical

sampling conducted for Sump #3 showed that vinyl chloride failed the TCLP (Toxic Characteristic Leaching Protocol), so it too was deemed hazardous. Exact locations of these sumps are shown on Figure 10 in **Appendix C.**

Per the NYSDEC approved RD/RAWP, each of the sumps uncovered in Bay 12 were cleaned and had their contents drummed before being disposed of off-Site. Sump cleaning activities occurred prior to commencing the soil excavation activities discussed below.

4.3.2 Disposal Details

A total of 847.5 tons of impacted concrete, asphalt and shallow subsurface soils were disposed of at the Seneca Meadows Inc. landfill in Seneca Falls, NY under waste profile 2013-083-15RIC from July 24th to August 5th, 2013.

A summary of samples collected to characterize the waste are attached in **Table 2**. **Table 3** shows the quantity of each category of material removed from the Site and the associated disposal facility. Prior to disposal, waste characterization samples were collected from each source to identify if it was hazardous or non-hazardous.

Letters to disposal facilities and acceptance letters from disposal facilities are attached in **Appendix I**. Manifests and bills of lading are included in electronic format in **Appendix I**.

4.3.2.1 Bay 12 Drums

Five drums of material were generated during the Bay 12 sump cleanout. The three drums of material generated from Sumps #1 and #2 were disposed of as hazardous based upon the results of waste characterization samples collected in November, 2009. Two drums of material were generated from Sump #3 and were disposed of as hazardous based upon the results of samples collected in August 2013. Laboratory reports for waste characterization are included in **Appendix J**. Waste was shipped off-Site by Cycle Chem, Inc. of Elizabeth, NJ on November 7, 2013 under EPA Waste Code D004-D0043 under USEPA Generator ID Number NYR000203505. Manifests for all materials disposed of off-Site are included in **Appendix I**.

4.3.2.2 Concrete Slabs and Subsurface Soils

To address the primary source of contamination, the concrete flooring in Bays 8-15 were broken up and the shallow soils (approximately 0-4 ft bgs) were removed to the extent practical without compromising the structural integrity of the above grade structure. Figures 9a and 9b in **Appendix C** depict the extents of excavation. Post-excavation soil sampling was conducted in each of the eight Bays to document the condition of the soil left in place. Post-excavation sampling locations are shown on Figure 13 in **Appendix C**. All excavated material was disposed of at Seneca Meadows Inc. landfill, in Seneca Falls, NY under waste profile 2013-083-15RIC between the dates of July 24th to August 5th, 2013. Waste disposal documentation is included in **Appendix C** and a summary table of the waste loads are shown in **Table 3**.

As outlined in the structural engineering report submitted with the NYSDEC approved RD/RAWP, each Bay was excavated, backfilled and compacted in two sections, designated the 99th street and 100th street side as shown on Figure 12 of the ISMP in **Appendix C**. Excavation activities consisted of breaking up and removing the flooring in each bay. The flooring between Bays varied, but across the Site, it consisted of either asphalt between 1-inch and 3-inches thick or concrete between 8 to 10 inches thick. Once the flooring was removed, the soil in each bay was excavated to a depth of

approximately 4 ft bgs. Excavation limits within each bay were then determined by a licensed New York State surveyor prior to backfilling activities.

4.3.3 On-Site Reuse

During the excavation process, all soils were removed from the Site and no material was reused as backfill material.

4.4 Remedial Performance/Documentation Sampling

To assess the effectiveness of the soil excavation and if more restrictive land use and development controls would be necessary following the completion of the excavation activities, post-excavation soil samples from each of the Bays were collected. Post-excavation sampling consisted of one composite sidewall sample collected every 15 ft around the excavation sidewalls and one composite sample collected from the bottom of every 25-foot by 25-foot area within the excavation, in addition to quality assurance samples. Composite samples were comprised of soils from five distinct areas within the sample area and uniformly mixed. A description of the quality assurance requirements during field sampling activities is provided in the QAPP which can be found as Appendix A of the RD/RAWP. Post-excavation samples were analyzed for VOCs and Percent Solids. A dedicated volume of each sample collected was also screened in the field (i.e., head space screening) for VOCs using a PID.

Samples were screened in accordance with AECOM “Headspace Screening for VOCs” POP, as detailed in Appendix E of the RD/RAWP. Following screening, the remaining sample volume was logged and immediately sealed in its respective sample vial and/or jar, labeled, and placed in a chilled cooler for transport to the analytical laboratory. At the completion of sampling activities, the samples were transported to the analytical laboratory for analyses using strict chain-of-custody protocols in accordance with the AECOM “Chain of Custody Procedures” POP (Appendix E of the RD/RAWP). Decontamination procedures for all equipment used during the sampling activities are described further below. The Site PID was operated and calibrated in accordance with AECOM “Operation and Calibration of a Photoionization Detector” POP (Appendix E of the RD/RAWP).

Locations of all post-excavation samples are shown on Figure 13 of **Appendix C** and the results of analyses are summarized in **Table 1** of **Appendix C**. Since excavation was limited to shallow soils that could only be removed to the extent practical in relation to the structural integrity of the structure, impacted soils remained in place following excavation activities.

DUSRs were prepared for all data generated in this remedial performance evaluation program. These DUSRs are included in **Appendix K** and associated raw data is provided electronically in **Appendix J**. Post-excavation soil sampling, groundwater sampling, indoor air sampling, sub-surface soil vapor sampling, and water level measurements were conducted to evaluate the remedial activities' effectiveness. Post-excavation samples were collected from each Bay, and included one composite sidewall sample every 15 ft, and one composite bottom sample for every 25 ft by 25 ft area. Samples were analyzed using SW-846 Methods 5035A/8260B. Prior to shipment, the headspace of samples were screened with a PID.

4.5 Imported Backfill

Once the appropriate excavation limits were reached as determined by a licensed NYS surveyor, each bay was filled using clean backfill from an NYSDEC approved source. Sequencing of the

backfilling occurred in two 14 inch lifts which were compacted to 12 inch lifts. An increase in the compaction requirement from the originally proposed 90% to 95% was approved by NYSDEC prior to the start of any backfilling. Once in place, each lift was compaction tested to meet the 95% compaction requirement. Imported material consisted of 3/4 inch clean washed stone from Ricelli Enterprises, Inc. of Syracuse, New York. The stone was comprised of crushed virgin limestone and was manufactured from a naturally occurring deposit and contained no additives or chemicals. DEC approved this submittal with no additional chemical analysis required. A cross-section figure showing the thickness of cut and backfill is shown in Figure 11 of **Appendix C**

Following subsurface piping installation for the two treatment systems (SVE and SSDS) under Phase 1, 3/8 inch pea gravel was used to cover the piping and bring the elevation of the subgrade to 6-inches below final grade. The gravel was sourced by 110 Sand Company of West Babylon, New York and was naturally mined from a virgin source, washed, free of contaminants, and contained no recycled material. NYSDEC approved this submittal with no additional chemical analysis required.

Approvals from NYSDEC are included in **Appendix L** which also contains the certified clean documentation for each type of imported fill provided by the respective suppliers. A table of all sources of imported backfill with quantities for each source is shown in **Table 4**. A figure showing the Site locations where backfill was used at the Site is shown in Figure 11 in **Appendix C**

4.6 Post-Excavation Impacts Remaining at the Site

A geotextile membrane (Section 4.7) is installed beneath the newly poured concrete slab which acts as a demarcation layer and is indicative of the remaining contaminated soils beneath it. It is located approximately 12-inches below the surface. Remaining Site impacts begin at a depth of 4 ft bgs. Figure 11 in **Appendix C** shows a typical cross section of the remaining contamination, clean fill, demarcation layer, and surface concrete.

One subsurface structure was identified during excavation activities. This structure measured 14 inches wide, was constructed of poured concrete, and ran parallel to 99th street. The top of structure was uncovered at 2.5 ft bgs and the remainder of the structure extended beneath the vertical extents of the excavation. The structure was left in place after all surrounding soils were removed from around it. Removal of the structure was not deemed feasible as it could have been compromising to the integrity of above grade structures. A second concrete structure, which was previously identified during Site investigation, contained six abandoned ceramic conduits. The top of the 2 foot by 2 foot conduit was uncovered at 2.5 ft bgs and extended to a depth of 4.5 ft bgs. A 25 foot length of this was removed to determine the vertical extents of the abandoned conduit, but the remainder of the structure remained in place. Inaccessible soils below the internal foundational columns were left in place so as to not disturb the critical infrastructure of the above-grade building.

4.6.1 Remaining Soil Impacts

Post-excavation soil sampling was conducted in each of the eight Bays to document the condition of the soil left in place after excavation. Limits of the excavation were constrained to the shallow soils per the structural engineering report and remedial design. Table 2 and Figure 16 (TCE only) included in **Appendix C**, the ISMP, summarize the results of all soil samples remaining at the Site after completion of Remedial Action that exceed the unrestricted SCOs.

Soil throughout the Site had TCE concentrations above New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a) whereas there were only two locations that had samples identify soils with TCE concentrations above New York Commercial Use Soil Cleanup Objectives 375-6.8(b). The sidewall samples for these two locations, in Bay 8 and Bay 11 along 100th Street, had TCE in concentrations of 220 mg/kg and 230 mg/kg respectively, as shown in Figure 13 of **Appendix C,** the ISMP. The TCE concentrations for all other samples throughout the Site were below 160 mg/kg.

Table 3 and Figure 17 (TCE only) included in **Appendix C** the ISMP, summarize the results of all soil samples remaining at the Site after completion of Remedial Action that exceed the Site-specific restricted commercial SCOs. Post-excavation samples collected at the bottom of the excavation, noted as “base” on the lab reports, represent the remaining levels of contamination at 4 ft bgs within the interior of each Bay.

Sidewall post-excavation samples represent the remaining levels of contamination at 1.5-4 ft bgs along the 99th and 100th street perimeter of each Bay and the interior walls in Bay 8 and 15 that abut the adjacent Bay 7 and Bay 16, respectively.

4.6.2 Bay 12 Sumps

As discussed above, in Section 4.3.1.1, Bay 12 contained three buried 55-gallon drum sumps with varying degrees of deterioration and had potential for subsurface infiltration. Sumps #1 and #2 did not show any signs of infiltration into the subsurface following their respective cleanouts; however, there was infiltration observed from the holes identified in the bottom of Sump #3. Material from Sump #3 appeared to have been leaching into the subsurface of Bay 12 on the 99th street side. It was contained below an approximately 4-inch-thick concrete slab that was encountered at approximately 1.5 ft bgs. This slab was only encountered on the 99th street side of Bay 12. The observed distribution of this material within the subsurface between the secondary slab (1.5 ft bgs) and the post-excavation depth (4 ft bgs) is shown on Figure 19 of **Appendix C**. A total petroleum hydrocarbon (TPH) fingerprint analysis on the composite post-excavation base sample (12W-SB-B-A) from the 99th street side of Bay 12 appeared to be similar to a combination of kerosene and heavy molecular weight material similar to lubricating oil. These products combined can be indicative of a cutting oil type product. Additionally, the presence of alkanes and isoprenoids indicate that the fuel oil has not undergone degradation.

4.7 Cap System – Geomembrane Vapor Barrier

A continuous 40-mil HDPE liner was installed and anchored as shown on the Figures included in **Appendix C** below the concrete slab throughout the Site to act as an impermeable vapor barrier between the subsurface soils and the indoor air within the Bays. The geomembrane barrier was installed in the area once it was deemed sufficiently and properly backfilled. The barrier was installed in accordance with all manufacturer’s requirements. Once installed, a layer of backfill was placed over the barrier as a base for the concrete slab. Any excess liner extending beyond the elevation of the slab was cut.

Penetrations through the barrier, in the form of PVC wells risers, were sealed with approved boots as shown as the Figures in **Appendix C**. Around the perimeter of the Bays and around interior footers, the barrier was anchored and sealed as outlined in the manufacturer’s instructions. When encountered, any portion of the membrane that was damaged (torn, twisted, crimped, slashed), the damaged section of membrane was removed, and the new section was sealed in its place.

Overlapping panels of liner were sealed via fusion welding as described in the manufacturer's specifications. Welding consisted of placing a heated wedge between two overlapping sheets so that the surface of both is heated above the polyethylene's melting point. Once heated, the overlapped panels were passed through a set of pre-set pressure wheels to compress the two panels together to create the weld. Seams were overlapped a minimum of 3-inches and panels were cleared of any debris, moisture, or dust and smoothed prior to welding.

Following the installation of the liner, the geomembrane was inspected for evidence of defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. Each seam was tested for continuity testing and if a seam failed, it was repaired using the most appropriate of following repair procedures:

- Patching, used to repair large holes, tears, undispersed raw materials, and contamination by foreign matter.
- Abrading and reseaming, used to repair small sections of extruded seams.
- Spot seaming, used to repair minor, localized flaws.
- Capping, used to repair long lengths of failed seams.
- Topping, used to repair areas of inadequate seams, which have an exposed edge less than four inches in length.
- Removing bad seam and replacing with a strip of new material seamed into place (used with long lengths of fusion seams).

The entirety of the membrane area passed inspection and all identified defects during initial inspection had been repaired before the final backfilling and restoration activities took place.

4.8 Other Engineering Controls – SSDS and SVE System

Because remaining impacts exist beneath the Site, Engineering Controls (EC) are required to protect human health and the environment. The Site has the following primary ECs, as described in the following subsections: SSDS and SVE (the SVE was installed and operated primarily to further remediate subsurface conditions and is not considered a required EC).

4.8.1 Sub-Slab Depressurization System

The SSDS piping was installed during backfilling activities, followed by above ground system component installations, to protect future occupants from potential vapor intrusion from subsurface soils by generating and maintaining a continual negative pressure beneath the slab. According to the NYSDOH Indoor Air Guidance, the State of New York does not have any standards, criteria or guidance values for concentrations of VOCs in subsurface vapors. Therefore, the remedial design for the SSDS was based on compliance with requirements set forth in 6 New York Codes Rules and Regulations (NYCRR) Part 257 – Air Quality Standards and DAR-1 and to reduce sub-slab vapors to the extent practical.

The SSDS was designed so a negative pressure would be maintained beneath the slab in the area of concern (Bays 8 through 15) and would operate until VOCs have been reduced to the point that no significant risk is present for subsurface vapors to migrate into the breathing space within the same Bays. Following the soil excavation within these Bays, the area was backfilled with fill that has

a permeability equal to or greater than the excavated Site materials. As-built drawings of the system are included in **Appendix C**, the ISMP. The O&M manual for the system, which includes relevant operational procedures and specific equipment details, drawings, and manuals, are included in **Appendix M**.

Based on industry standards, a typical flow rate of 20 standard cubic feet per minute (SCFM) for every 1,000 square feet of space is required to maintain an adequate vacuum to limit potential subsurface vapor migration. The area of concern (Site) measures 12,000 square feet resulting in a total design flow rate of 240 SCFM. A blower capable of achieving this flowrate and providing a vacuum of 15 inches of water column (IWC) was selected for the SSDS. The blower is connected to a manifold containing separate piping and valves for each of the independent legs of the system so that flow and pressure can be balanced across the area as necessary. The manifold provides the capability to independently monitor VOCs, vapor flow rates, and applied vacuums during system operations. A total of 16 horizontal SSDS legs extend from the system manifold with two legs terminating in each Bay. Each horizontal leg is constructed of 2-inch diameter Sch. 40 PVC (at varying lengths depending on the location of the well in relation to the system manifold in Bay 8A) and a 40-foot long,2-inch diameter 0.020-inch slotted Sch. 40 PVC well screen. Piping is installed 1-foot bgs as shown on the Figures included in **Appendix C**, the ISMP.

Piping is pitched back at a 1% slope from the SSDS to the horizontal legs to allow condensate to drain back into the horizontal legs Refer to the attachments in **Appendix C** for construction details.

In Bay 8A, the manifold and the system components, including a regenerative vent blower (10HP, 460VAC, 3-phase TEFC VFD controlled motor), 60-gallon moisture separator, passive heat exchanger, UL listed PLC based control panel with mounted VFD, are installed as shown on Figure 20 of **Appendix C**. Given the proximity to actively leased Bays and neighboring businesses, a galvanized steel sound enclosure, with sound attenuation lining, duct hoods and enclosure ventilation package, has been installed around the SSDS regenerative vent blower to minimize noise.

In order to maintain best management practices and meet requirements of DER-10, and because the proposed remediation system is located in a residential area, VGAC is being utilized for off-gas treatment prior to discharge to the atmosphere. Two 1,000 pound VGAC vessels are installed in series for SSDS to maintain a 95% destruction of influent contaminants.

Signs indicating AECOM as the system operator with appropriate contact information are located on the exterior of the Bay.

Procedures for monitoring, operating and maintaining the SSDS are provided in the Operation and Maintenance Plan included in **Appendix C**. The Monitoring Plan also addresses inspection procedures that must occur after any severe weather condition has taken place that may affect on-Site ECs.

4.8.1.1 System Operation

On April 28, 2016, AECOM conducted the initial startup of the SSDS in accordance with the procedures outlined in the ISMP. Vacuum was confirmed at the manifold for each of the SSDS legs and were above the design flowrate of 30 SCFM. Influent VOCs from each of the SSDS legs were measured with a calibrated PID and no VOCs were detected from the SSDS legs at the manifold.

Periodically system vapor samples are collected at the system influent and the combined effluent following carbon treatment to monitor off-gas efficiency.

During system operation, routine operation and maintenance events were conducted to confirm that the system was operating as designed with the following parameters collected during each event:

- SSDS Vacuum blower, vacuum, flow, and temperature readings;
- SSDS monitoring well head vacuums and PID concentrations;
- Effluent concentrations exiting the SSDS carbon vessels;

Per the schedule outlined in the ISMP submitted by AECOM to NYSDEC in November 2015 (and finalized on July 28, 2016), O&M events were initially conducted on a bimonthly basis.

The system operated continuously from system startup to May 15, 2017 when an evaluation of the O&M data and analytical system data indicated that influent concentrations from the SVE may be reaching asymptotic levels and both systems were shutdown to monitor VOC rebound. VOC concentrations were similar pre- and post-shutdown (end of system being off) and there was not a significant increase in concentrations when both system were restarted in June 2017.

The SSDS remained operating until October 30, 2018 when it was shut down so a carbon changeout could be performed. Following the changeout, the system was restarted and continued operating through August 2019 when it was shut down to conduct a second rebound test (pursuant to the approved October 2019 work plan) as communicated with NYSDEC.

On June 12, 2019, representatives from AECOM met with personnel from NYSDEC at the Site to perform a Site walk and discuss future activities at the Site. Following the Site walk and subsequent phone conversations with NYSDEC, it was determined that both the SSDS and the SVE systems would be shut down for a prolonged rebound period. The systems would remain off for a year with quarterly groundwater and ambient air monitoring occurring within that timeframe. Sampling would occur in November 2019, and February, May, and August 2020 and would include groundwater samples for VOCs, indoor air samples (collected in Bays) and soil gas (sub-slab) samples from within select Bays.

After review of the data from the 2019 – 2020 sampling events, the system remained off until May 2021 when NYSDEC requested that the remedial systems (SVE and SSDS) be restarted and operated as they create a “P” Site.

The SSDS has been operating since the 2021 system restart to present time. More detailed summaries of system operations can be found in the quarterly and semi-annual Progress Reports submitted to NYSDEC since system startup.

4.8.2 Soil Vapor Extraction System

A SVE system has been installed to provide control of vapors emanating from the deeper soils and groundwater and to remediate potentially impacted soils remaining in place that were not accessible during the excavation due to the structural limitations of the Site. The remedial goal for the SVE system is to reduce the concentrations of the sub-surface soil vapors to the lowest extent practical. As-built drawings of the system are included in **Appendix C** of the ISMP. The O&M manual for the

system, which includes relevant operational procedures and specific equipment details, drawings, and manuals, is included in **Appendix M**.

A design flow rate of 25 SCFM at a vacuum of 5 IWC at each of the 24 extraction wells was used to calculate a total anticipated flow of 675 SCFM at a vacuum of 10 IWC when accounting for pressure losses from piping and off-gas discharge. A network of 24 total vapor extraction wells were installed, with three wells per bay in Bays 8-11, and Bays 13-15, and a set of three paired wells in Bay 12 screened at different depths. Each vertical SVE well is piped and valved independently at a manifold housed in Bay 8A so that flows can be adjusted on an as-needed basis to individual legs to balance the system. Within each bay, the three SVE wells are positioned equidistant from each other along the centerline of the bay, approximately 25 ft apart to provide consistent vacuum beneath the entirety of the Site. As-built figures in **Appendix C** show the construction details for the wells and manifold piping.

The SVE wells are constructed of 2-inch diameter Sch. 40 PVC with a 10-foot screened interval constructed of 0.020-inch slotted Sch. 40 PVC well screen, extending to approximately 15 ft bgs. In Bay 12, where three dual-level wells are installed, the screened sections of the deep SVE wells contain a 15-foot, 0.020-inch slotted Sch. 40 PVC well screen that extends to a depth of approximately 30 ft below ground surface. The annular space around the screened intervals was backfilled with sand, followed by a one-foot bentonite seal and bentonite/cement slurry to 4 ft bgs, the remainder of the borehole annulus was filled with 3/8-inch crushed pea stone as shown in **Appendix C**.

The top of the screen transitions to a length of solid PVC riser which is connected to a PVC tee approximately 3 ft bgs. On one end of the tee, an additional length of riser extends to the surface where it terminated within an a standard 8-inch road box. The other branch of the tee is connected to horizontal piping that leads back to the SVE manifold in Bay 8A. Each well is piped to an individual leg on the SVE manifold. Piping was installed with a 1% pitch from the SVE system back to the wellheads to allow condensate to drain back into the SVE wells. The manifold allows for VOC concentrations, vapor flow rates, and applied vacuums to be individually monitored for each well. The piping connections in all piping runs passed as series of pressure testing so any identified leaks could be repaired prior to covering the piping with backfill. All connections passed.

In each of the eight Bays, except for Bay 12, two sets of paired monitoring wells were installed comprising of a shallow point screened at 1.5 ft bgs and a deep point screened at approximately 15 ft bgs. One set was installed on the 99th Street half of the bay while the other set was installed on the 100th Street side. A total of six monitoring points were installed in Bay 12 with each set of points consisting of three points each, a shallow point screened at 1.5 ft bgs, a deep point screened at 15 ft bgs, and the deepest point screened at approximately 30 ft bgs.

The depths of these monitoring points were selected based on the screened interval of the SSDS and SVE system in each bay. The shallow points are used to monitor the influence of the SSDS whereas the deeper points are used to monitor the vacuum influence of the SVE system.

The SVE treatment skid contains a regenerative vent blower (25HP, 208VAC, 3-phase TEFC VFD controlled motor), 120-gallon moisture separator, and passive heat exchanger along with a UL listed PLC based control panel with mounted VFD as shown on Figure 20 of **Appendix C**. Given the proximity to actively leased Bays and neighboring businesses, a galvanized steel sound enclosure,

with sound attenuation lining, duct hoods and enclosure ventilation package, has been installed around the SVE regenerative vent blower to minimize noise.

In order to maintain best management practices and meet requirements of DER-10, and because the remediation system is located in a residential area, VGAC is being utilized for off-gas treatment. The off-gas treatment is sized to maintain a 95% destruction of system influent contaminants throughout its period of operation.

Procedures for monitoring, operating and maintaining the SVE system are provided in the Operation and Maintenance Plan included in **Appendix C**. The Monitoring Plan also addresses inspection procedures that must occur after any severe weather condition has taken place that may affect on-Site ECs

4.8.2.1 System Operation

On April 28, 2016, AECOM conducted the initial startup of the SVE system in accordance with the procedures outlined in the ISMP. The valves on the manifold for each leg were manually adjusted so that each leg maintained a minimum flowrate of approximately 25 SCFM as stated in the ISMP. Although the ISMP indicated that a vacuum of 10 IWC would be applied to each leg, the actual vacuum measured was approximately 4.0 IWC for each leg; however, sufficient vacuum response at the corresponding monitoring points in each bay indicated that the SVE was performing as designed.

Periodically system vapor samples are collected at the system influent and the combined effluent following carbon treatment to monitor off-gas efficiency.

During system operation, routine operation and maintenance events were conducted to confirm that the system was operating as designed with the following parameters collected during each event:

- SVE vacuum blower, vacuum, vacuum, flow, and temperature readings;
- SVE monitoring point vacuums and PID concentrations;
- Effluent concentrations exiting the SVE carbon vessels;
- Total effluent concentrations being discharged from the exhaust stack;

Per the schedule outlined in the ISMP submitted by AECOM to NYSDEC in November 2015 (and finalized on July 28, 2016), O&M events were initially conducted on a bimonthly basis.

The system operated continuously from system startup to May 15, 2017 when an evaluation of the O&M data and analytical system data indicated that influent concentrations from the SVE may be reaching asymptotic levels. The SVE system was shut down as proposed in the April 2017 Workplan for approximately five weeks with air samples collected the first hour after the restart and one week following restart to see if VOC concentrations would rebound to initial concentrations. Following shutdown, total VOC readings were collected at each vapor monitoring point over the course of the shutdown to monitor VOC concentrations on May 22, May 30, June 5, and June 22, 2017. During the shutdown period, VOC concentrations at each of the monitoring points in each Bay were measured with a PID. During these events, the VOCs measured at each point were all below 1 ppm, with the exception of MP-10D in Bay 12 which had a low concentration of 7.6 ppm detected on June 6, 2017. Of the four monitoring events, limited rebound was observed in the wells (after an initial increase, levels dropped quickly and remained flat). VOC concentrations were similar pre- and post-shutdown (end of system being off) and there was not a significant increase in concentrations when

the system restarted in June. As noted, well MP-10D exhibited the highest VOC concentrations at 7.6 ppm (which is one of the deep 30 ft bgs wells in Bay 12) during the rebound monitoring in the hour after the system was restarted.

The 2017 SVE influent VOC concentrations did not significantly rebound to the higher levels observed prior to the startup of the system in 2016. Soil gas sample results in 2017 indicated significantly reduced levels from pre-remediation levels. Two successive shut down periods were initiated in the remainder of 2017, one in September and October 2017 and the final one in December 2017 to see if concentrations would rebound to initial conditions. The final shut down period as proposed in the April 2017 Workplan occurred in March and April 2018. VOC concentrations had significantly decreased from initial concentrations for all three shut down events with the SVE system approaching asymptotic levels indicating that it had was reaching the end of its effective treatment. Both systems remained operating until September 6, 2018 when the SVE system was shut down so a carbon changeout could be performed.

Upon review of the August 2018 effluent vapor discharge laboratory data, concentration of the total VOCs at the effluent indicated that breakthrough in the carbon had occurred. Though the mass of annual discharged VOCs were estimated to still be below the limits established prior to system start up, the original ISMP indicated a target removal efficiency of 95%. Although it was below the effluent emission limit, AECOM was able to shut down the SVE portion of the system remotely as a precautionary measure. NYSDEC was notified of the system (SVE) system shut down on September 6, 2018. A carbon changeout in the SVE vessels occurred on October 30, 2018 by Carbon Filtration Systems (CFS) of Johnston, Rhode Island and the system was restarted. Following the changeout, the system was restarted.

The SVE system continued operating through August 2019 when the SVE and SSDS systems were shut down to conduct a second rebound test (pursuant to the approved October 2019 work plan) as communicated with NYSDEC.

On June 12, 2019, representatives from AECOM met with personnel from NYSDEC at the Site to perform a Site walk and discuss future activities at the Site. Following the Site walk and subsequent phone conversations with NYSDEC, it was determined that both the SSDS and the SVE systems would be shut down for a prolonged rebound period. The systems remained off for a year with quarterly groundwater and ambient air monitoring occurring within that timeframe.

After review of the data from the 2019 - 2020 sampling events, the system remained off until May 2021 when NYSDEC requested that the remedial systems (SVE and SSDS) be restarted and operated as they create a “P” Site. The system was restarted in June 2021.

On June 11, 2024 and June 26, 2024, AECOM and NYSDEC discussed the path forward for the Site. NYSDEC indicated that in order to suspend operation of either of the systems, another round of indoor air and sub-slab samples was to be completed to show that the Site indoor air conditions have not changed.

In August 2024, indoor air sampling was conducted at the Site consisting of eight indoor and one outdoor (background) ambient air samples. Samples were collected from the Site in a similar manner to previous rounds; one sample for each bay (i.e., Bays 8B through 15) and one background sample collected from outside of Bay 14, for a duration of eight hours with the use of certified clean,

6-liter Summa® canisters situated approximately three to five ft off the ground to represent breathing zones within each bay.

After completing the indoor air sampling event, AECOM collected soil gas (sub-slab) samples from four existing vapor monitoring points from selected Bays. Each of the sub-slab samples were collected using a 2.6-liter Summa® canister over a period of approximately 30 minutes.

The indoor air, background air samples and the sub-slab samples were analyzed for VOC analysis via U.S. EPA Method TO-15 (indoor air via TO-15 SIM), with the reporting of five Site-specific VOC constituents (vinyl chloride, trans-1,2-DCE, cis-1,2-DCE, TCE, and PCE, like previous NYSDEC-approved sampling events. Results from this sampling event are discussed in Section 5 below.

The SVE system has been operating since system restart in 2021 to the present. More detailed summaries of system operations can be found in the quarterly and semi-annual Progress Reports submitted to NYSDEC since system startup.

4.9 Institutional Controls

A series of Institutional Controls (ICs) are required by the ROD which include: (1) limiting the use and development of the property to residential use, which will also permit commercial or industrial uses; (2) be in compliance with the approved SMP; (3) restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (4) requiring the property owner to complete and submit to the NYSDEC a periodic certification of institutional and engineering controls.

Adherence to these ICs on the Site is required by the Environmental Easement and will be implemented under the final SMP. The ICs identified in the Environmental Easement may not be discontinued without an amendment to, or extinguishment of, the Environmental Easement. These ICs are:

- All ECs must be operated and maintained as specified in the SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP;
- The property may be used for commercial use only;
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the NYSDEC;
- Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;
- Data and information pertinent to Site management must be reported at the frequency and in a manner as defined in the SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with the SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in the SMP;
- Access to the Site must be provided to agents, employees, or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement;
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on SMP Figure 2A and 2B, and any potential impacts that are identified must be monitored or mitigated; and,
- Vegetable gardens and farming on the Site are prohibited.

Other planned restrictions to the Site, as per the ROD, include compliance with the SMP provided as **Appendix C**.

The Environmental Easement for the Site was executed by the NYSDEC on [date], and filed with the [County] County Clerk on [date]. The County Recording Identifier number for this filing is [number]. A copy of the Environmental Easement and proof of filing is provided in Appendix [x].

4.10 Deviations from the Remedial Design

Remedial activities at the Site followed those outlined in the RD/RAWP except for the following:

Change in compaction of backfill material from common fill to DOT #4 from 90% to 95%. The original plan called for common borrow at 90% compaction was adequate for the intended future use of the Bays. However, following the architect review of the design, it was determined that greater loads may be present in the Bays due to stored equipment or vehicular use. Based on that review, and Department of Building requirements, a determination was made that 95% compaction would be more appropriate. Due to the limitations of the Site that restricted the equipment used for compacting it was thought that there was a high level of uncertainty in achieving the updated 95% compaction with common borrow. To achieve this, the use of 3/4 inch crushed stone was proposed and accepted. With this change, all backfilled areas met the 95% compaction.

5. Post-System Installation Monitoring and Sampling Activities

As presented in previous sections, since the installation and start-up of the SSDS/SVE systems, system monitoring data has been collected, and a total of nine off-Site soil gas sampling rounds, 10 indoor ambient air and sub-slab sampling events, and 13 groundwater sampling rounds were conducted to evaluate Site conditions. See **Table 5** for dates of all sampling events. A summary of the results of the post-system installation monitoring and sampling activities were reported in previously submitted Progress Reports to NYSDEC.

The results of Site system monitoring and Site assessment activities are summarized below.

5.1 Remedial Systems Monitoring Results

Per the ISMP, SVE and SSD system monitoring has occurred since 2016, and two extensive rebound testing episodes were completed. The first was in 2017-2018 as proposed in the Groundwater Monitoring Opinion, Vapor Intrusion Assessment Plan, & Remedial Systems Rebound Testing Workplan submitted to NYSDEC by AECOM on April 17, 2017, and the May 9, 2017, confirmatory e-mail from AECOM to NYSDEC. During this testing the systems were shut down quarterly for approximately three weeks at a time throughout the 2nd year of system operation (2017 – 2018), with indoor air and sub-slab sampling occurring in the Bays prior to system restart at end of shut down periods. The objective of these tests was to evaluate ambient air conditions within the Bays and in soil gas beneath the Bays during a cessation of system operations. The second rebound testing period was between 2019 and 2021, as outlined in the NYSDEC approved October 2019 Workplan, where the SSD/SVE systems were shut down to further assess the on-site VI conditions of no remedial system operations (the systems were shut down on August 12, 2019, and restarted on June 16, 2021). Groundwater, ambient air, on-site soil gas, and off-site soil gas samples were collected during the period of system shutoff.

5.1.1 SSD Monitoring Results

Since system start-up in 2016, the influent VOCs measured in the field during system O&M events from each of the SSD legs were primarily non-detect (below 0.10 ppm), and total VOC levels prior to carbon treatment ranged from typically below detection limits with isolated instances where they measured above detection limits, such as following restart after a rebound event. The same trend is noted in the results of the system air sampling and laboratory analyses (22 SSD influent samples before carbon treatment) collected since system start-up, with the exception of sampling events directly following system re-starts where there were slight increases in VOC levels. Though greater than non-detect, these results did not rebound to levels measured in sampling events prior to the respective shutdowns. These details and data have been provided in the Progress Reports and indicate the lack of VOCs present in the shallow soils at the Site. A graph depicting VOCs Screening and Lab Results – SSD System since start-up is attached in **Appendix N**.

5.1.2 SVE Monitoring Results

An extensive amount of field monitoring screening data and laboratory analyses of air samples (23 SVE influent before carbon treatment) have been collected since 2016, and as previously reported the VOC levels have dropped off significantly since system start-up indicating asymptotic conditions. Two long rebound testing episodes indicated slight increases in VOC levels in samples upon re-start, but over time, rebounding to levels detected at the beginning of remediation and system operation never occurred (analytical results are still well below the initial concentration observed at the start-up of the systems in 2016). These details and data have been provided in the previously submitted

Progress Reports and indicate that the remediation capabilities of the SVE system have been achieved. A graph depicting VOCs Screening and Lab Results – SSD System is attached in **Appendix N**.

To confirm that the combined system effluent was below permit levels, the total system effluent after carbon treatment has been routinely sampled as well (24 total system effluent samples). During all sampling events, the mass removal has remained below a level that would indicate a need for carbon treatment, but it remained in place as a precautionary measure. The mass removal rate has also continued to decrease over the duration of system operations further indicating that the remediation capabilities of the SVE system have been achieved.

5.2 Groundwater Monitoring Results

Groundwater sampling included collecting water level measurements and analytical samples from each well as part of long-term monitoring. The wells included in the monitoring program were MW-201S, MW-201D, PZ-08, and PZ-09. Groundwater samples were analyzed using SW-846 Methods 5030B/8260B.

Groundwater monitoring has occurred since 2005, starting with RI/FS sampling, followed by post-system installation and start-up (2016 and 2017), and during rebound testing episodes (2017 and 2018, and five rounds between August 2019 and August 2020). The last groundwater sampling occurred in August 2020. As previously reported, VOC levels in groundwater have decreased since monitoring began, except for the presence of PCE, which is suspected to be the result of offsite sources. Over the course of the five sampling events during the last rebound period, there were no increasing or decreasing trend in concentrations, and concentration levels were consistent with results from the groundwater sampling events conducted during the first two years of system operation from May 2016 to August 2017.

As previously reported, groundwater levels at the Site are stable, and PCE is not a historical site contaminant and appears to be the result of offsite source(s). The groundwater results are included in **Table 6**.

5.3 Ambient Air / On-Site Soil Gas Results

Indoor or ambient air samples from within the Bays and outside have been collected since 2017. Indoor air samples were collected over a duration of eight hours inside the eight Bays and analyzed for VOC analysis via EPA Method TO-15 SIM, outdoor air samples were collected for background comparison over a duration of eight hours outside of Bay 14 and were analyzed for VOCs via EPA Method TO-15 SIM. Sub-slab soil vapor samples were collected from monitoring points within the Bays over a duration of approximately 30 minutes and analyzed via EPA Method TO-15. Indoor air samples, ambient air samples, and sub-slab soil vapor samples only included the reporting of five Site-specific VOC constituents (vinyl chloride, trans-1,2-DCE, cis-1,2-DCE, TCE, and tetrachloroethene [PCE]).

The results, summarized in **Table 7**, have consistently detected TCE and PCE, with both compounds also being detected in outdoor samples (PCE in every round). There is no trend in the data (up, down or stable) and given the presence of vapor barrier and SSD, and the construction of Bays used for storage, the levels are unlikely from subsurface impacts at the Site.

Soil gas samples have been collected from the Bays in 2005 and 2006 during the RI/FS and post-installation and operation of SVE and SSD systems. The results, summarized in **Table 8,** indicated a significant decrease in levels post-remediation (soil removal and system installation and operation). The soil gas sampling in 2024 (noted below) generally indicates the lowest levels detected since 2005.

5.4 2024 Indoor and Soil Gas Sampling

On August 20, 2024, seven indoor and one outdoor (background) ambient air samples were collected from the Site; one sample for each Bay (i.e., Bay 8B and Bays 10 through 15) and one background sample collected from outside Bay 14. Additionally, on the same day, four soil gas samples were collected from Bay -9, -11, -13, and -15 from existing SVE vapor monitoring points as follows: MP-6S (Bay 9), MP-8S (Bay 11), MP-12S (Bay 13) and MP-15S (Bay 15). Refer to **Figure 4** for the location of each soil gas sample location. Data sheets collected at the time of the sampling are included in **Appendix O**.

The seven indoor ambient air samples and the one outdoor ambient air sample were collected for a period of up to eight hours with the use of certified clean, 6-liter Summa® canisters. Canisters were labeled with caution signs (“Do not Touch”) and situated approximately three to five ft off the ground to represent breathing zones. The outdoor sample was also labeled with a caution sign and situated approximately three to five ft off the ground.

The four soil gas samples from Bays -9, -11, -13, and -15 were collected for a period of up to 30 minutes (grab samples) with the use of certified clean, 6-liter Summa® canisters. Prior to collecting the sample, approximately five liters were purged from the sampling points to remove the stagnant air and ensure that air from the surrounding soil was being collected. After purging, the soil gas was screened using a PID and subsequently connected to a Summa® canister for sampling.

The samples were picked up by laboratory courier and relinquished under a chain-of-custody for delivery to Alpha Analytical Laboratories in Mansfield, Massachusetts. All on-Site samples were analyzed for VOC analysis via EPA Method TO-15, with the reporting of 5 VOC constituents (vinyl chloride, trans-1,2-dichloroethene, cis-1,2-dichloroethene, TCE, and PCE) as specified in the April 2017 Workplan.

The indoor and one outdoor (background) ambient air sample results for the August 20, 2024 sampling event indicate the following:

- No-detections above the laboratory reportable limits for vinyl chloride, trans-1,2-dichloroethene and cis-1,2-dichloroethene in any of the eight indoor samples;
- TCE was detected above the laboratory reportable limits in all indoor sample locations. The highest level of TCE (1.90 ug/m^3) was detected in the sample from Bay-8;
- PCE was detected above the laboratory reportable limits in all indoor sample locations. The highest level of PCE (2.31 ug/ m^3) was detected in the sample from Bay-14 and is suspected to be the result of offsite sources; and
- The outdoor (background) sample results indicate that PCE was detected in the sample (1.52 ug/m^3) collected near Bay-14. All other analytes were not above the laboratory detection limit.

Refer to **Table 7** for the results of the 2017 - 2024 ambient air sampling analyses, and to **Appendix J** for the 2024 laboratory analytical results.

Regarding the four soil gas samples taken in Bays -9, -11, -13, and -15, the results indicate the following:

- No detections above the laboratory reportable limits for vinyl chloride, Cis-1,2-dichloroethene, or Trans-1,2-dichloroethene in any of the samples collected;
- TCE was detected above the laboratory reportable limits in all three sample locations. The highest level of TCE (8.06 ug/m^3) was detected in Bay-9; and
- PCE was detected above the laboratory reportable limits in all four sample locations. The highest level of PCE (4.92 ug/m^3) was detected in Bay-13.

Refer to **Table 8** for the results of the 2005 - 2024 soil gas sampling analyses, and to **Appendix J** for the 2024 laboratory analytical results.

6. Conclusions

This FER summarizes the successful completion of the RAs for the Site and details the contamination remaining, deviations from the Remedial Design/Remedial Design Work Plan (RD/RDWP) and remaining engineering controls at the Site. In addition, this FER provides a summary of post-system installation assessment activities such as SVE/SSDS rebound testing, groundwater sampling and vapor intrusion assessment; which supports for the suspension of the SVE system and the implementation of Institutional (Engineering) Controls (via Environmental Easement) for future occupancy.

The following conclusions are presented based upon the data collected to date:

- The remedial system VOC influent data suggests that the SVE remedial system has reached the limit of its effectiveness and its shut-down is appropriate.
- Groundwater levels at the Site continue to be stable through time.
- PCE is not a historical Site contaminant and appears to be the result of off-Site source(s).
- Site garage Bays are designed for storage only (i.e., not heated and devoid of any plumbing) and not for business or as long-term workspaces; therefore, continuous exposure to soil vapors is not expected for tenants or workers. Indoor ambient air levels are very low, have been consistent over the multiple rounds conducted, and have been similar to outside levels.
- Site restoration activities included the installation of a vapor barrier and cover system that, based on indoor air data to date, is effective in the migration of VOCs from the subsurface to the inside of the Bays.
- Other potential sources of VOCs may be present and further investigation to assess conditions at the Site and vicinity would possibly be inconclusive.

Even though the indoor ambient air levels are very low and the Bays are meant for limited use storage, because remaining impacted soil and soil vapor exists beneath the Site, an Environmental Easement will be implemented (as described in previous sections).

7. References

AECOM, 2011 Remedial Design/Remedial Action Work Plan (RD/RAWP), approved by NYSDEC on January 31, 2011.

AECOM, 2016, Final Interim Site Management Plan (ISMP), July 28, 2016, as amended on April 17, 2017.

AECOM, 2018 Groundwater and Soil Gas Sampling Work Plan, approved by NYSDEC on November 29, 2018.

AECOM, 2019 Work Plan Addendum, approved by NYSDEC on October 30, 2019.

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (February 2023 addendum).

NYSDEC, 2003. Order on Consent", Index No. W2-0922-02-05, between the Department and Endzone, Inc., executed on February 5, 2003.

NYSDEC, 2006. 6 NYCRR Part 375 Environmental Remediation Programs Subparts 375-1 to 375- 4 and 375-6. December 2006.

NYSDEC, 2010. DER-10 "Technical Guidance for Site Investigation and Remediation" May 3, 2010.

NYSDEC, 2010. *Record of Decision, Ozone Industries Site State Superfund Site, Ozone Park, Queens County, New York, Site No. 241033,* February 2010.

NYSDEC, 2010, DER-31 "Green Remediation" August 11, 2010

TABLES

Table 1
Soil Clean-up Objectives (SCOs) for the Project
Former Ozone Industries, Queens, NY

COC	CAS	Unrestricted Use	Restricted Commercial Use	Restricted Industrial Use
Vinyl Chloride	75-01-4	0.02	13	27
Trans-1,2-DCE	156-60-5	0.19	500	1,000
cis-1,2-DCE	156-59-2	0.25	500	1,000
Trichloroethene	79-01-6	0.47	200	400
Tetrachloroethene	127-18-4	1.3	150	300

All soil cleanup objectives (SCOs) are in parts per million (PPM)

Table 2
Waste Characterization Samples by Area
Former Ozone Industries, Queens, NY

Lab Name	Lab ID	Bay 12 Drums	Bay 12 Soils	Site Soils
Alpha Analytical	L0916693			X
Alpha Analytical	L0916117			X
Alpha Analytical	L0916292			X
Alpha Analytical	L0916053			
Alpha Analytical	L1315909		X	
Alpha Analytical	L1316227	X		
Alpha Analytical	L0916292	X		
Alpha Analytical	L1316226	X		
Alpha Analytical	L1316225	X		
Alpha Analytical	L1316224	X		

Table 3
Off-Site Soil/Waste Disposal Volumes and Facilities
Former Ozone Industries, Queens, NY

DATE	TRUCK NAME	DISPOSAL FACILITY	PROFILE #	CUSTOMER REF. #/ MANIFEST #	DESCRIPTION	VOLUME (CY)
7/24/2013	RIC836	Seneca Meadows Inc.	2013-083-15RIC	004	Soils	36.43
7/24/2013	RIC835	Seneca Meadows Inc.	2013-083-15RIC	002	Soils	29.22
7/24/2013	RIC830	Seneca Meadows Inc.	2013-083-15RIC	001	Soils	35.66
7/24/2013	RIC840	Seneca Meadows Inc.	2013-083-15RIC	-	Soils	28.65
7/25/2013	DOUBLE A1	Seneca Meadows Inc.	2013-083-15RIC	72413002	Soils	41.92
7/25/2013	CH106	Seneca Meadows Inc.	2013-083-15RIC	72413003	Soils	33.91
7/25/2013	CH96	Seneca Meadows Inc.	2013-083-15RIC	72413001	Soils	31.53
7/26/2013	RIC835	Seneca Meadows Inc.	2013-083-15RIC	72513001	Soils	38.31
7/26/2013	RIC830	Seneca Meadows Inc.	2013-083-15RIC	72513002	Soils	35.98
7/26/2013	RIC836	Seneca Meadows Inc.	2013-083-15RIC	72512004	Soils	40.31
7/26/2013	RIC840	Seneca Meadows Inc.	2013-083-15RIC	72513003	Soils	43.40
7/31/2013	CH106	Seneca Meadows Inc.	2013-083-15RIC	72013002	Soils	30.65
7/31/2013	RIC836	Seneca Meadows Inc.	2013-083-15RIC	73013001	Soils	42.71
7/31/2013	RIC840	Seneca Meadows Inc.	2013-083-15RIC	73013003	Soils	34.12
7/31/2013	DOUBLEA3	Seneca Meadows Inc.	2013-083-15RIC	73113001	Soils	37.23
8/1/2013	RIC839	Seneca Meadows Inc.	2013-083-15RIC	73113002	Soils	36.88
8/2/2013	RIC837	Seneca Meadows Inc.	2013-083-15RIC	80113002	Soils	36.63
8/2/2013	RIC830	Seneca Meadows Inc.	2013-083-15RIC	80113001	Soils	36.40
8/2/2013	RIC840	Seneca Meadows Inc.	2013-083-15RIC	80113003	Soils	42.42
8/3/2013	DOUBLEA7	Seneca Meadows Inc.	2013-083-15RIC	80213003	Soils	36.04
8/3/2013	RIC825	Seneca Meadows Inc.	2013-083-15RIC	80213001	Soils	41.18
8/3/2013	RIC846	Seneca Meadows Inc.	2013-083-15RIC	8213002	Soils	36.71
8/5/2013	DOUBLEA7	Seneca Meadows Inc.	2013-083-15RIC	80513001	Soils	41.21
						847.5

Table 3
Off-Site Soil/Waste Disposal Volumes and Facilities
Former Ozone Industries, Queens, NY

DATE	CONTAINER NUMBER	DISPOSAL FACILITY	PROFILE #	CUSTOMER REF. #/ MANIFEST #	DESCRIPTION	VOLUME (CY)
6/25/2013	232	Rizzo Environmental Services	NA	51745	Construction/demolition general debris	20
6/25/2013	232	Rizzo Environmental Services	NA	51764	Construction/demolition general debris	10
6/25/2013	219	Rizzo Environmental Services	NA	51767	Construction/demolition general debris	20
6/26/2013	201	Rizzo Environmental Services	NA	51877	Construction/demolition general debris	20
6/26/2013	202	Rizzo Environmental Services	NA	52103	Construction/demolition general debris	20
6/26/2013	233	Rizzo Environmental Services	NA	52104	Construction/demolition general debris	20
6/26/2013	202	Rizzo Environmental Services	NA	52105	Construction/demolition general debris	20
6/26/2013	233	Rizzo Environmental Services	NA	52106	Construction/demolition general debris	20
7/1/2013	202	Rizzo Environmental Services	NA	52313	Construction/demolition general debris	20
7/10/2013	268	Rizzo Environmental Services	NA	52340	Construction/demolition general debris	20
7/15/2013	236	Rizzo Environmental Services	NA	53011	Steel	20
7/15/2023	289	Rizzo Environmental Services	NA	53013	Concrete	20
7/15/2023	225	Rizzo Environmental Services	NA	53014	Concrete	20
7/15/2023	289	Rizzo Environmental Services	NA	53015	Concrete	20
7/16/2013	225	Rizzo Environmental Services	NA	53016	Concrete	20
7/16/2013	289	Rizzo Environmental Services	NA	53017	Steel	20

Table 4
Backfill Quantities and Sources
Former Ozone Industries, Queens, NY

DATE	Ticket number	Source	Product Description	Weight (Tons)
7/24/2013	016735	Hanson	Crusher Run	34.35
7/24/2013	016731	Hanson	Crusher Run	33.93
7/24/2013	016740	Hanson	Crusher Run	35.21
7/24/2013	016742	Hanson	Crusher Run	36.07
7/29/2013	893583	Hanson	Crusher Run	34.34
7/29/2013	893585	Hanson	Crusher Run	34.55
7/30/2013	017637	Hanson	Crusher Run	35.29
7/30/2013	017640	Hanson	Crusher Run	35.45
7/31/2013	893701	Hanson	Crusher Run	34.35
7/31/2013	017780	Hanson	Crusher Run	36.57
7/31/2013	017782	Hanson	Crusher Run	36.82
8/1/2013	893810	Hanson	Crusher Run	34.65
8/1/2013	893809	Hanson	Crusher Run	34.22
				455.80

Hanson Aggregates New York, LLC.

Table 5
Post System Installation Sampling Schedule (2016 - 2024)
Former Ozone Industries, Queens, NY

Date	Sampling Event		
	Ambient Air / On-site Soil Gas	Off-site Soil Gas	Groundwater
2016, May			X
2016, August			X
2016, November			X
2017, February			X
2017, May			X
2017, June	X	X	
2017, August			X
2017, October	X		
2018, January	X		
2018, April	X		
2019, February		X	X
2019, May		X	X
2019, August		X	X
2019, November		X	X
2019, December	X		
2020, February	X	X	X
2020, May	X	X	X
2020, August	X	X	X
2020, November	X	X	
2024, August	X		
Totals	**10**	**9**	**13**

Table 6
Groundwater Sample Results 2005 - August 2020
Former Ozone Industries
Queens, NY

			MW-201D														
		Location ID	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D
		Sample Date	1/19/2005	4/27/2005	8/9/2006	5/11/2016	8/4/2016	12/3/2016	2/15/2017	5/16/2017	8/10/2017	2/6/2019	5/21/2019	5/21/2019	8/20/2019	8/20/2019	11/19/2019
		Sample ID	MW201DGWA1	MW201DGWA2	MW201DGWA3	MW-201DGWA1 05-16	MW-201D GWA2 08-16	MW-201D GWA3 12-16	MW201D-GWA4-02-17	MW-201D GWA5 05-17	MW-201D 08-17	MW-201D-GWA7-020619	MW-201D-GWA8-052119	MW-201D-GWB8-052119	MW-201D-GWA9-082019	MW-201D-GWB9-082019	MW-201D-GWA10-
		Lab Sample ID	789859	810575	929187	L1614244-06	L1624290-02	L1639436-01	L1704822-01	L1716007-05	L1727963-04	L1905246-03	L1921853-02	L1921853-03	L1938031-04	L1938031-05	L1956826-06
Analyte	Units	Ambient GW Quality Standard															
VOCS DETECTED																	
1,1,1-TRICHLOROETHANE	ug/l	5	1 U	1.0 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,1,2-TRICHLOROETHANE	ug/l	1	1 U	1.0 U	1 U	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**
1,1-DICHLOROETHENE	ug/l	5	1 U	1.0 U	1 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4,5-TETRAMETHYLBENZENE	ug/l	5				2.0 U	2.0 U	3.1	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-DICHLOROETHENE (TOTAL)	ug/l	5				2.5 U	2.5 U	**14**	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-BUTANONE	ug/l	50	5 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
ACETONE	ug/l	50	10 U	10 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CHLOROFORM	ug/l	7	0.61 J	0.54 J	0.39 J	1.0 J	1.1 J	2.5 U	1.5 J	1.4 J	1.2 J	1.2 J	2.5 U	2.5 U	1.1 J	1.1 J	0.77 J
CIS-1,2-DICHLOROETHENE	ug/l	5	1 U	1.0 U	1 U	2.5 U	2.5 U	**14**	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
DICHLOROMETHANE	ug/l	5	1 U	1.0 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
METHYL TERT BUTYL ETHER	ug/l	10	1 U	1.0 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
SEC-BUTYLBENZENE	ug/l	5				2.5 U	2.5 U	1.2 J	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TETRACHLOROETHENE	ug/l	5	**18**	**28**	**20**	4.9	**5.2**	**67**	**6.7**	**5.4**	**5.2**	4.1	4.2	4.2	3.6	3.2	3.0
TOLUENE	ug/l	5	1 U	1.0 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TRANS-1,2-DICHLOROETHENE	ug/l	5	1 U	1.0 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TRICHLOROETHENE	ug/l	5	**48**	**44**	**30**	**5.7**	**6.4**	**77**	**6.6**	**6.2**	**5.3**	4.5	4.1	4.3	4.0	4.2	3.3

Notes:
Only compounds which were detected in at least one sample are shown.
Blank spaced indicated not analyzed.
U = Non-detect at laboratory detection limit.
J = Estimated value.
B = Found in associated blank
D = Concentration recovered in diluted sample.
Ambient GW Quality Standard = NY Ambient Water Quality Standards and Guidance Values (i.e., TOGS 1.1.1) June 1998
Bold value exceeds Ambient GW Quality Standard.
ug/l = micrograms per liter
ND = Not Detected

Table 6
Groundwater Sample Results 2005 - August 2020
Former Ozone Industries
Queens, NY

			MW-201D						MW-201S								
		Location ID	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201D	MW-201S	MW-201S	MW-201S	MW-201S	MW-201S	MW-201S	MW-201S	MW-201S	MW-201S
		Sample Date	8/26/2020	11/19/2019	2/18/2020	2/18/2020	5/12/2020	5/12/2020	1/18/2005	4/27/2005	8/9/2006	5/11/2016	8/3/2016	11/22/2016	2/15/2017	2/15/2017	5/16/2017
		Sample ID	MW-201D-GWA13-	MW-201D-GWB10-	MW-201D-GWA11-	MW-201D-GWB11-	MW-201D-GWA12-	MW-201D-GWB12-	MW201SGWA1	MW201SGWA2	MW201SGWA3	MW-201SGWA1 05-16	MW-201S GWA2 08-16	MW-201S GWA3 11-16	MW201S-GWA4-02-17	MW201S-GWB4-02-17	MW-201S GWA5 05-17
		Lab Sample ID	L2035262-07	L1956826-07	L2007652-04	L2007652-05	L2019690-05	L2019690-06	789855	810576	929184	L1614244-05	L1624178-04	L1638129-03	L1704822-02	L1704822-03	L1716007-04
Analyte	Units	Ambient GW Quality Standard															
VOCS DETECTED																	
1,1,1-TRICHLOROETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1 U	0.51 J	1 U	**5.0 U**	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,1,2-TRICHLOROETHANE	ug/l	1	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	1 U	1.0 U	1 U	**3.0 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**
1,1-DICHLOROETHENE	ug/l	5	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	1.0 U	1 U	1.0 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4,5-TETRAMETHYLBENZENE	ug/l	5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U				1.3 J	2.4	3.7	4.9	5.5	2.9
1,2-DICHLOROETHENE (TOTAL)	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U				**14**	**16**	**13**	**14**	**15**	**8.6**
2-BUTANONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
ACETONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10 U	10 UJ	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CHLOROFORM	ug/l	7	0.87 J	0.75 J	0.95 J	0.96 J	0.78 J	0.78 J	1 U	0.64 J	0.43 J	5.0 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
CIS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	4.1	**5.3**	3.1	**14**	**16**	**13**	**14**	**15**	**8.6**
DICHLOROMETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1 U	1.0 U	1 U	5.0 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
METHYL TERT BUTYL ETHER	ug/l	10	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1 U	1.0 U	1 U	5.0 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
SEC-BUTYLBENZENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U				5.0 U	0.98 J	1.2 J	1.6 J	1.8 J	1.2 J
TETRACHLOROETHENE	ug/l	5	3.0	3.0	3.6	3.7	2.9	3.4	1.8	2.3	2.7	**39**	**48**	**54**	**71**	**71**	**96**
TOLUENE	ug/l	5	2.5 U	2.5 U	4.4	4.5	1.2 J	1.2 J	1 U	1.0 U	1 U	5.0 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TRANS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1 U	1.0 U	1 U	5.0 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TRICHLOROETHENE	ug/l	5	3.7	3.2	3.6	3.8	3.2	3.3	**86**	**110**	**71**	**89**	**82**	**87**	**82**	**84**	**32**

Notes:
Only compounds which were detected in at least one sample are shown.
Blank spaced indicated not analyzed.
U = Non-detect at laboratory detection limit.
J = Estimated value.
B = Found in associated blank
D = Concentration recovered in diluted sample.
Ambient GW Quality Standard = NY Ambient Water Quality Standards and
Bold value exceeds Ambient GW Quality Standard.
ug/l = micrograms per liter
ND = Not Detected

Table 6
Groundwater Sample Results 2005 - August 2020
Former Ozone Industries
Queens, NY

			MW-201S								MW-203						
		Location ID	MW-201S	MW-201S	MW-201S	MW-201S	MW-201S	MW-201S	MW-201S	MW-201S	MW-203	MW-203	MW-203	MW-203	MW-203	MW-203	MW-203
		Sample Date	8/10/2017	8/10/2017	2/6/2019	8/20/2019	11/19/2019	2/18/2020	5/11/2020	8/25/2020	1/19/2005	8/14/2006	5/12/2016	8/3/2016	8/3/2016	3/24/2017	5/17/2017
		Sample ID	DUPLICATE 08-17	MW-201S 08-17	MW-201S-GWA7-020619	MW-201S-GWA9-082019	MW-201S-GWA10-	MW-201S-GWA11-	MW-201S-GWA12-	MW-201S-GWA13-	MW203GWA1	MW203GWA3	MW-203GWA1 05-16	MW-203 GWA2 08-16	MW-203 GWB2 08-16	MW-203 GWA4 03-17	MW-203 GWA 05-17
		Lab Sample ID	L1727963-02	L1727963-03	L1905246-02	L1938031-03	L1956826-05	L2007652-03	L2019690-04	L2035262-05	789860	929976	L1614435-06	L1624178-02	L1624178-07	L1709119-01	L1716172-04
Analyte	Units	Ambient GW Quality Standard															
VOCS DETECTED																	
1,1,1-TRICHLOROETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,1,2-TRICHLOROETHANE	ug/l	1	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	1 U	1 U	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**
1,1-DICHLOROETHENE	ug/l	5	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	0.50 U	1 U	1 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4,5-TETRAMETHYLBENZENE	ug/l	5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U			2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-DICHLOROETHENE (TOTAL)	ug/l	5	**9.5**	**7.9**	2.2 J	1.1 J	2.3 J	3.4	2.5 U	4.2			2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-BUTANONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
ACETONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CHLOROFORM	ug/l	7	2.0 J	1.7 J	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1.6	1.3	0.98 J	1.2 J	1.1 J	1.4 J	1.4 J
CIS-1,2-DICHLOROETHENE	ug/l	5	**9.5**	**7.9**	2.2 J	1.1 J	2.3 J	3.4	4.2	5.0	1 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
DICHLOROMETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
METHYL TERT BUTYL ETHER	ug/l	10	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
SEC-BUTYLBENZENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U			2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TETRACHLOROETHENE	ug/l	5	**99**	**92**	**32**	**23**	**34**	**49**	**48**	**54**	1 U	0.43 J	0.83	2.4	2.6	1.7	1.3
TOLUENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TRANS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TRICHLOROETHENE	ug/l	5	**14**	**11**	**5.3**	**5.6**	**40**	**5.5**	**5.5**	**8.9**	**10**	**8.3**	**8.5**	**12**	**13**	**6.2**	**5.9**

Notes:
Only compounds which were detected in at least one sample are shown.
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D = Concentration recovered in diluted sample.
Ambient GW Quality Standard = NY Ambient Water Quality Standards and
Bold value exceeds Ambient GW Quality Standard.
ug/l = micrograms per liter
ND = Not Detected

Table 6
Groundwater Sample Results 2005 - August 2020
Former Ozone Industries
Queens, NY

			MW-203							PZ-01							
		Location ID	MW-203	MW-203	MW-203	MW-203	MW-203	MW-203	MW203	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01
		Sample Date	2/7/2019	5/23/2019	8/19/2019	11/18/2019	2/17/2020	5/11/2020	8/25/2020	8/27/1999	8/26/2002	8/26/2002	4/3/2003	4/3/2003	1/19/2005	4/28/2005	8/9/2006
		Sample ID	MW-203-GWA7-020719	MW-203-GWA8-052219	MW-203-GWA9-081919	MW-203-GWA10-111819	MW-203-GWA11-021720	NOT SAMPLED	NOT SAMPLED	PZ1	BLIND DUP-0823405A	PZ-1_8/26/2002 0823402A	BD-02_4/3/2003 0405910A	PZ-01_4/3/2003 0405901A	PZ01GWA1 789858	PZ01GWA2 810584	PZ01GWA3 929185
		Lab Sample ID	L1905246-11	L1921853-10	L1938031-02	L1956826-02				61650001							
Analyte	Units	Ambient GW Quality Standard															
VOCS DETECTED																	
1,1,1-TRICHLOROETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NS	NS	**10 U**	**5.00 U**	**5.00 U**	**5.00 UJ**	**5.00 U**	1 U	1.0 U	1 U
1,1,2-TRICHLOROETHANE	ug/l	1	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	NS	NS	**10 U**	**5.00 U**	**5.00 U**	**5.00 U**	**5.00 U**	1 U	1.0 U	1 U
1,1-DICHLOROETHENE	ug/l	5	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	NS	NS	**10 U**	5.00 U	5.00 U	5.00 U	5.00 U	1 U	1.0 U	1 U
1,2,4,5-TETRAMETHYLBENZENE	ug/l	5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NS	NS								
1,2-DICHLOROETHENE (TOTAL)	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NS	NS	**10 U**							
2-BUTANONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NS	NS	27	10.0 U	10.0 U	10.0 U	10.0 U	5 U	5.0 U	5 U
ACETONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NS	NS	2 BJ	10.0 U	10.0 U	10.0 U	10.0 U	10 U	10 U	10 U
CHLOROFORM	ug/l	7	1.3 J	2.5 U	0.72 J	0.86 J	1.5 J	NS	NS	1 J	0.514 J	0.629 J	5.75	5.97	1.1	0.73 J	1
CIS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NS	NS		5.00 U	5.00 U	5.00 U	5.00 U	1 U	1.0 U	1 U
DICHLOROMETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NS	NS	1 J	5.00 U	5.00 U	5.00 U	5.00 U	1 U	1.0 U	1 U
METHYL TERT BUTYL ETHER	ug/l	10	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NS	NS		5.00 U	5.00 U	5.00 U	5.00 U	1 U	1.0 U	1 U
SEC-BUTYLBENZENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NS	NS								
TETRACHLOROETHENE	ug/l	5	**6.6**	**9.3**	**7.3**	**9.0**	**7.1**	NS	NS	**10 U**	0.602 J	0.605 J	5.00 U	0.456 J	1 U	1.0 U	1 U
TOLUENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NS	NS	**10 U**	5.00 U	5.00 U	5.00 U	5.00 U	1 U	1.0 U	1 U
TRANS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NS	NS		5.00 U	5.00 U	5.00 U	5.00 U	1 U	1.0 U	1 U
TRICHLOROETHENE	ug/l	5	**5.1**	**8.9**	**7.8**	**9.4**	**8.3**	NS	NS	**10 U**	5.00 U	5.00 U	5.00 U	0.901 J	1 U	1.0 U	1 U

Notes:
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D = Concentration recovered in diluted sample.
Ambient GW Quality Standard = NY Ambient Water Quality Standards and
Bold value exceeds Ambient GW Quality Standard.
ug/l = micrograms per liter
ND = Not Detected

Table 6
Groundwater Sample Results 2005 - August 2020
Former Ozone Industries
Queens, NY

			PZ-01													PZ-01D	
		Location ID	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01	PZ-01D	PZ-01D
		Sample Date	5/11/2016	8/4/2016	11/21/2016	2/16/2017	5/17/2017	8/9/2017	2/6/2019	5/21/2019	8/20/2019	11/19/2019	2/18/2020	5/12/2020	8/25/2020	4/28/2005	8/9/2006
		Sample ID	PZ-01GWA1 05-16	PZ-01 GWA2 08-16	PZ-01 GWA3 11-16	PZ-01-GWA4-02-17	PZ-01 GWA 05-17	PZ-01 08-17	PZ-01-GWA7-020619	PZ-01-GWA8-052119	PZ-01-GWA9-082019	PZ-01-GWA10-111919	PZ-01-GWA11-021820	PZ-01-GWA12-051220	PZ-01-GWA13-082520	PZD1DGWA2	PZD1DGWA3
		Lab Sample ID	L1614244-01	L1624290-01	L1637979-01	L1704992-02	L1716172-02	L1727753-02	L1905246-04	L1921853-04	L1938031-07	L1956826-04	L2007652-06	L2019690-03	L2035262-04	810602	929188
Analyte	Units	Ambient GW Quality Standard															
VOCS DETECTED																	
1,1,1-TRICHLOROETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1.0 U	1 U
1,1,2-TRICHLOROETHANE	ug/l	1	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**2.5 U**	**1.5 U**	1.0 U	1 U
1,1-DICHLOROETHENE	ug/l	5	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	0.50 U	1.0 U	1 U
1,2,4,5-TETRAMETHYLBENZENE	ug/l	5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		
1,2-DICHLOROETHENE (TOTAL)	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U		
2-BUTANONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5 U
ACETONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10 U
CHLOROFORM	ug/l	7	2.5 U	2.4 J	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	0.53 J	1.3
CIS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1.0 U	1 U
DICHLOROMETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1.0 U	1 U
METHYL TERT BUTYL ETHER	ug/l	10	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1.0 U	1 U
SEC-BUTYLBENZENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U		
TETRACHLOROETHENE	ug/l	5	0.50 U	0.50 U	0.50 U	0.37 J	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.18 J	0.5 U	0.62 J	0.75 J
TOLUENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1.0 U	1 U
TRANS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1.0 U	1 U
TRICHLOROETHENE	ug/l	5	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	**23**	**8**

Notes:
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J = Estimated value.
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D = Concentration recovered in diluted sample.
Ambient GW Quality Standard = NY Ambient Water Quality Standards and
Bold value exceeds Ambient GW Quality Standard.
ug/l = micrograms per liter
ND = Not Detected

Table 6
Groundwater Sample Results 2005 - August 2020
Former Ozone Industries
Queens, NY

											PZ-01D						PZ-08	
		Location ID	PZ-01D	PZ-01D	PZ-01D	PZ-01D	PZ-01D	PZ-01D	PZ-01D	PZ-01D	PZ-01D	PZ-01D	PZ-01D	PZ-01D	PZ-01D	PZ-01D	PZ-08	PZ-08
		Sample Date	5/12/2016	8/4/2016	11/21/2016	2/16/2017	5/17/2017	8/9/2017	2/6/2019	5/21/2019	8/20/2019	11/19/2019	2/18/2020	5/12/2020	8/25/2020	6/20/2001	8/27/2002
		Sample ID	PZ-01DGWA1 05-16	PZ-01D GWA2 08-16	PZ-01D GWA3 11-16	PZ-01D-GWA4-02-17	PZ-01D GWA 05-17	PZ-01D 08-17	PZ-01D-GWA7-020619	PZ-01D-GWA8-052119	PZ-01D-GWA9-082019	PZ-01D-GWA10-111919	PZ-01D-GWA11-021820	PZ-01D-GWA12-051220	PZ-01D-GWA13-082520	PZ-8	PZ-8_8/27/2002
		Lab Sample ID	L1614435-07	L1624290-03	L1637979-02	L1704992-03	L1716172-03	L1727753-03	L1905246-05	L1921853-05	L1938031-06	L1956826-03	L2007652-07	L2019690-02	L2035262-03	06177-03A	0825701A
Analyte	Units	Ambient GW Quality Standard																
VOCS DETECTED																		
1,1,1-TRICHLOROETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**6 J**	2.03 J
1,1,2-TRICHLOROETHANE	ug/l	1	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**2.5 U**	**1.5 U**	**10 U**	0.583 J
1,1-DICHLOROETHENE	ug/l	5	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	0.50 U	**10 U**	5.00 U
1,2,4,5-TETRAMETHYLBENZENE	ug/l	5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		
1,2-DICHLOROETHENE (TOTAL)	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U		
2-BUTANONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10.0 U
ACETONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10.0 U
CHLOROFORM	ug/l	7	1.2 J	1.6 J	1.2 J	2.5 U	1.5 J	0.96 J	0.89 J	2.5 U	2.1 J	1.1 J	1.3 J	1.1 J	1.6 J	4 J	0.637 J
CIS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**82**	**30.3**
DICHLOROMETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**10 U**	5.00 U
METHYL TERT BUTYL ETHER	ug/l	10	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	10 U	5.00 U
SEC-BUTYLBENZENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U		
TETRACHLOROETHENE	ug/l	5	0.56	0.26 J	0.52	0.40 J	1.4	0.37 J	0.81	0.95	0.58	1.3	1.4	0.86	0.70	**7 J**	3.33 J
TOLUENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**10 U**	5.00 U
TRANS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**10 U**	5.00 U
TRICHLOROETHENE	ug/l	5	0.69	0.79	0.73	0.56	1.5	0.98	0.75	0.80	0.80	1.0	1.3	0.72	0.80	**510 D**	**204 D**

Notes:
Only compounds which were detected in at least one sample are shown.
Blank spaced indicated not analyzed.
U = Non-detect at laboratory detection limit.
J = Estimated value.
B = Found in associated blank
D = Concentration recovered in diluted sample.
Ambient GW Quality Standard = NY Ambient Water Quality Standards and
Bold value exceeds Ambient GW Quality Standard.
ug/l = micrograms per liter
ND = Not Detected

Table 6
Groundwater Sample Results 2005 - August 2020
Former Ozone Industries
Queens, NY

			PZ-08														
		Location ID	PZ-08	PZ-08	PZ-08	PZ-08	PZ-08	PZ-08	PZ-08	PZ-08	PZ-08	PZ-08	PZ-08	PZ-08	PZ-08	PZ-08	PZ-08
		Sample Date	4/3/2003	1/18/2005	4/28/2005	8/11/2006	5/11/2016	5/11/2016	8/3/2016	11/22/2016	2/15/2017	5/16/2017	5/16/2017	8/10/2017	2/6/2019	5/21/2019	8/21/2019
		Sample ID	PZ-08_4/3/2003	PZ08GWA1	PZ08GWA2	PZ08GWA3	PZ-08GWA1 05-16	PZ-08GWB1 05-16	PZ-8 GWA2 08-16	PZ-08 GWA3 11-16	PZ08-GWA4-02-17	PZ-08 GWA5 05-17	PZ-08 GWB5 05-17	PZ-08 08-17	PZ-08-GWA7-020619	PZ-08-GWA8-052119	PZ-08-GWA9-082119
		Lab Sample ID	0405905A	789857	810600	929429	L1614244-02	L1614244-03	L1624178-01	L1638129-04	L1704822-04	L1716007-01	L1716007-02	L1727963-05	L1905246-07	L1921853-06	L1938031-08
Analyte	Units	Ambient GW Quality Standard															
VOCS DETECTED																	
1,1,1-TRICHLOROETHANE	ug/l	5	**5.00 U**	1 U	0.40 J	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,1,2-TRICHLOROETHANE	ug/l	1	0.926 J	1 U	1.0 U	1 U	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**
1,1-DICHLOROETHENE	ug/l	5	5.00 U	1 U	1.0 U	1 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4,5-TETRAMETHYLBENZENE	ug/l	5					2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-DICHLOROETHENE (TOTAL)	ug/l	5					2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-BUTANONE	ug/l	50	10.0 U	5 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
ACETONE	ug/l	50	10.0 UJ	10 U	10 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CHLOROFORM	ug/l	7	1.08 J	1.4	1.9	2.7	1.7 J	1.7 J	1.9 J	1.8 J	0.99 J	1.1 J	1.1 J	1.2 J	2.5 U	2.5 U	2.5 U
CIS-1,2-DICHLOROETHENE	ug/l	5	**55.6**	3.4	3.9	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
DICHLOROMETHANE	ug/l	5	5.00 U	1 U	1.0 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
METHYL TERT BUTYL ETHER	ug/l	10	1.22 J	1 U	1.0 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
SEC-BUTYLBENZENE	ug/l	5					2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TETRACHLOROETHENE	ug/l	5	**5.59**	1 U	0.74 J	0.32 J	0.21 J	0.18 J	0.52	0.52	1.8	0.42 J	0.47 J	0.59	1.4	0.90	0.57
TOLUENE	ug/l	5	5.00 U	1 U	1.0 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TRANS-1,2-DICHLOROETHENE	ug/l	5	0.349 J	1 U	1.0 U	1 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TRICHLOROETHENE	ug/l	5	**395 J**	**38**	**40**	**7**	1.5	1.5	3.2	2.2	4.4	1.6	1.7	2.0	2.4	2.0	1.9

Notes:
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Ambient GW Quality Standard = NY Ambient Water Quality Standards and
Bold value exceeds Ambient GW Quality Standard.
ug/l = micrograms per liter
ND = Not Detected

Table 6
Groundwater Sample Results 2005 - August 2020
Former Ozone Industries
Queens, NY

			PZ-08				PZ-09									PZ-09	
		Location ID	PZ-08	PZ-08	PZ-08	PZ-08	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09
		Sample Date	11/19/2019	2/18/2020	5/11/2020	8/24/2020	6/20/2001	8/27/2002	4/3/2003	1/20/2005	4/28/2005	4/28/2005	8/10/2006	5/12/2016	8/3/2016	11/22/2016	2/15/2017
		Sample ID	PZ-08-GWA10-111919	PZ-08-GWA11-021820	PZ-08-GWA12-051120	PZ-08-GWA13-082420	PZ-9	PZ-9_8/27/2002	PZ-09_4/3/2003	PZ09GWA1	PZ09GWA2	PZ09GWB1	PZ09GWA3	PZ-09GWA1 05-16	PZ-9 GWA2 08-16	PZ-09 GWA3 11-16	PZ09-GWA4-02-17
		Lab Sample ID	L1956826-08	L2007652-10	L2019690-07	L2035252-08	06177-04A	0825702A	0405906A	789850	810603	810604	929182	L1614435-02	L1624178-03	L1638129-05	L1704822-05
Analyte	Units	Ambient GW Quality Standard															
VOCS DETECTED																	
1,1,1-TRICHLOROETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	**46**	**26.9 J**	**5.00 U**	3.4	0.57 J	0.51 J	1.7	**6.2 U**	**12 U**	2.5 U	2.5 U
1,1,2-TRICHLOROETHANE	ug/l	1	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**5 J**	**5.18 J**	0.952 J	1 U	1.0 U	1.0 U	1 U	**3.8 U**	**7.5 U**	**1.5 U**	**1.5 U**
1,1-DICHLOROETHENE	ug/l	5	0.50 U	0.50 U	0.50 U	0.50 U	**10 U**	0.634 J	5.00 U	1 U	1.0 U	1.0 U	1 U	1.2 U	2.5 U	0.50 U	0.50 U
1,2,4,5-TETRAMETHYLBENZENE	ug/l	5	2.0 U	2.0 U	2.0 U	2.0 U								5.0 U	10 U	2.0 U	2.0 U
1,2-DICHLOROETHENE (TOTAL)	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U								**14**	**25**	**8.6**	**27**
2-BUTANONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10.0 UJ	10.0 U	5 U	5.0 U	5.0 U	5 U	12 U	25 U	5.0 U	5.0 U
ACETONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10.0 UJ	10.0 UJ	5.2 J	10 U	10 U	10 U	12 U	25 U	5.0 U	5.0 U
CHLOROFORM	ug/l	7	2.5 U	0.83 J	0.72 J	0.93 J	3 J	**13.0 J**	0.930 J	1.2	0.72 J	0.71 J	2.1	6.2 U	**12 U**	1.7 J	1.6 J
CIS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	**460 D**	**283 D**	**107**	**25**	4.8	5.0	**14**	**14**	**25**	**8.6**	**27**
DICHLOROMETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	**10 U**	0.324 J	5.00 U	1 U	1.0 U	1.0 U	1 U	**6.2 U**	**12 U**	2.5 U	2.5 U
METHYL TERT BUTYL ETHER	ug/l	10	2.5 U	2.5 U	2.5 U	2.5 U	10 U	0.638 J	0.375 J	1 U	1.0 U	1.0 U	1 U	6.2 U	**12 U**	2.5 U	2.5 U
SEC-BUTYLBENZENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U								6.2 U	12 U	2.5 U	2.5 U
TETRACHLOROETHENE	ug/l	5	0.34 J	0.82	0.77	0.52	**18**	**23.6 J**	**6.63**	1.5	1.5	1.2	1.2	**190**	**270**	**100**	**280**
TOLUENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	**10 U**	5.00 UJ	5.00 U	1 U	1.0 U	1.0 U	0.36 J	**6.2 U**	**12 U**	2.5 U	2.5 U
TRANS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2 J	2.69 J	0.509 J	1 U	1.0 U	1.0 U	1 U	**6.2 U**	**12 U**	2.5 U	2.5 U
TRICHLOROETHENE	ug/l	5	1.2	1.6	1.6	1.5	**2100 D**	**1180 D**	**578 J**	**180**	**99**	**98**	**110**	**25**	**54**	**14**	**64**

Notes:
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D = Concentration recovered in diluted sample.
Ambient GW Quality Standard = NY Ambient Water Quality Standards and
Bold value exceeds Ambient GW Quality Standard.
ug/l = micrograms per liter
ND = Not Detected

Table 6
Groundwater Sample Results 2005 - August 2020
Former Ozone Industries
Queens, NY

										PZ-09							PZ-10	
		Location ID	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-09	PZ-10	PZ-10	PZ-10	PZ-10	PZ-10	PZ-10
		Sample Date	5/16/2017	8/10/2017	2/6/2019	5/21/2019	8/21/2019	11/20/2019	2/18/2020	5/11/2020	8/24/2020	6/20/2001	8/27/2002	4/3/2003	1/20/2005	8/10/2006	5/12/2016
		Sample ID	PZ-09 GWA5 05-17	PZ-09 08-17	PZ-09-GWA7-020619	PZ-09GWA8-052119	PZ-09-GWA9-082119	PZ-09-GWA10-112019	PZ-09-GWA11-021820	PZ-09-GWA12-021120	PZ-09-GWA13-082420	PZ-10	PZ-10_8/27/2002	PZ-10_4/3/2003	PZ10GWA1	PZ10GWA3	PZ-10GWA1 05-16
		Lab Sample ID	L1716007-03	L1727963-06	L1905246-06	L1921853-07	L1938031-09	L1956826-09	L2007652-09	L2019690-08	L2036262-09	06177-05A	0825705A	0405907A	789851	929180	L1614435-01
Analyte	Units	Ambient GW Quality Standard																
VOCS DETECTED																		
1,1,1-TRICHLOROETHANE	ug/l	5	**5.0 U**	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	4 J	2.19 J	**5.00 U**	1 U	2	2.5 U
1,1,2-TRICHLOROETHANE	ug/l	1	**3.0 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**10 U**	**5.00 U**	**5.00 U**	1 U	1 U	**1.5 U**
1,1-DICHLOROETHENE	ug/l	5	1.0 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**10 U**	5.00 U	5.00 U	1 U	1 U	0.50 U
1,2,4,5-TETRAMETHYLBENZENE	ug/l	5	4.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U						2.0 U
1,2-DICHLOROETHENE (TOTAL)	ug/l	5	**14**	4.1	**7.7**	**5.4**	2.0 J	**7.2**	**7.2**	**2.2 J**	**2.2 J**						2.1 J
2-BUTANONE	ug/l	50	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10.0 U	10.0 U	5 U	5 U	5.0 U
ACETONE	ug/l	50	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10.0 U	10.0 UJ	10 U	10 U	5.0 U
CHLOROFORM	ug/l	7	1.4 J	1.5 J	**7.2**	**7.1**	**12**	**11**	**22**	**14**	4.2	**10 U**	0.550 J	0.977 J	0.75 J	0.81 J	0.83 J
CIS-1,2-DICHLOROETHENE	ug/l	5	**14**	4.1	**7.7**	**5.4**	2.0 J	**7.2**	**7.2**	2.2 J	**8.4**	**13**	**38.8**	**60.4**	3.6	**7.5**	2.1 J
DICHLOROMETHANE	ug/l	5	5.0 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**10 U**	5.00 U	5.00 U	1 U	1 U	2.5 U
METHYL TERT BUTYL ETHER	ug/l	10	5.0 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	3 J	0.521 J	0.462 J	1 U	1 U	2.5 U
SEC-BUTYLBENZENE	ug/l	5	5.0 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U						2.5 U
TETRACHLOROETHENE	ug/l	5	**180**	**64**	**41**	**32**	**12**	**20**	**24**	**12**	**52**	**10 U**	1.35 J	4.68 J	0.95 J	1.6	**24**
TOLUENE	ug/l	5	5.0 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**10 U**	5.00 U	5.00 U	1 U	1 U	2.5 U
TRANS-1,2-DICHLOROETHENE	ug/l	5	5.0 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**10 U**	5.00 U	5.00 U	1 U	1 U	2.5 U
TRICHLOROETHENE	ug/l	5	**48**	**6.6**	**7.6**	**11**	**7.2**	**16**	**11**	**5.8**	**10**	**120**	**253 D**	**388 J**	**78**	**260**	**6.8**

Notes:
Only compounds which were detected in at least one sample are shown.
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U = Non-detect at laboratory detection limit.
J = Estimated value.
B = Found in associated blank
D = Concentration recovered in diluted sample.
Ambient GW Quality Standard = NY Ambient Water Quality Standards and
Bold value exceeds Ambient GW Quality Standard.
ug/l = micrograms per liter
ND = Not Detected

Table 6
Groundwater Sample Results 2005 - August 2020
Former Ozone Industries
Queens, NY

								PZ-10	
		Location ID	PZ-10	PZ-10	PZ-10	PZ-10	PZ-10	PZ-10	
		Sample Date	8/4/2016	11/22/2016	11/22/2016	2/15/2017	5/11/2020	8/24/2020	
		Sample ID	PZ-10 GWA2 08-16	PZ-10 GWA3 11-16	PZ-10 GWB3 11-16	PZ-10-GWA4-02-17	PZ-10-GWA12-051120	PZ-10-GWA13-082420	
		Lab Sample ID	L1624290-04	L1638129-06	L1638129-07	L1704992-01	L2019690-09	L2035262-10	
Analyte	Units	Ambient GW Quality Standard							
VOCS DETECTED									
1,1,1-TRICHLOROETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	
1,1,2-TRICHLOROETHANE	ug/l	1	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	
1,1-DICHLOROETHENE	ug/l	5	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	
1,2,4,5-TETRAMETHYLBENZENE	ug/l	5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	
1,2-DICHLOROETHENE (TOTAL)	ug/l	5	**6.1**	1.5 J	1.5 J	2.2 J	0.70 J	0.70 J	
2-BUTANONE	ug/l	50	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	
ACETONE	ug/l	50	5.0 U	5.0 U	5.0 U	1.6 J	5.0 U	5.0 U	
CHLOROFORM	ug/l	7	1.1 J	0.89 J	0.88 J	2.5 U	0.91 J	1.2	
CIS-1,2-DICHLOROETHENE	ug/l	5	**6.1**	1.5 J	1.5 J	2.2 J	0.70 J	2.5 U	
DICHLOROMETHANE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	
METHYL TERT BUTYL ETHER	ug/l	10	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	
SEC-BUTYLBENZENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	
TETRACHLOROETHENE	ug/l	5	**68**	**24**	**24**	**40**	**15**	**15**	
TOLUENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	
TRANS-1,2-DICHLOROETHENE	ug/l	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	
TRICHLOROETHENE	ug/l	5	**12**	**8.9**	**8.8**	**12**	**7.2**	5.0	

Notes:
Only compounds which were detected in at least one sample are shown.
Blank spaced indicated not analyzed.
U = Non-detect at laboratory detection limit.
J = Estimated value.
B = Found in associated blank
D = Concentration recovered in diluted sample.
Ambient GW Quality Standard = NY Ambient Water Quality Standards and
Bold value exceeds Ambient GW Quality Standard.
ug/; = micrograms per liter
ND = Not Detected

Table 7
Summary of Indoor Air Sampling Results
Former Ozone Industries, Queens, NY

Location ID	Sample ID	Sample Date	Chemical Concentration (ug/m3)				
			VINYL CHLORIDE	TRANS-1,2-DCE	CIS-1,2-DCE	TRICHLOROETHENE	TETRACHLOROETHENE
BAY-8-INDOOR	BAY 8 - INDOOR AIR - 061517	06/15/2017	< 0.051 U	< 0.079 U	< 0.079 U	**0.134**	**0.481**
BAY-8-INDOOR	BAY 8-INDOOR AIR-101117	10/11/2017	< 0.051 U	< 0.079 U	< 0.079 U	**1.10**	**15.5**
BAY-8-INDOOR	BAY 8-INDOOR AIR-01-11-18	01/11/2018	< 0.051 U	< 0.079 U	< 0.079 U	**0.645**	**5.95**
BAY-8-INDOOR	BAY 8-INDOOR AIR_041918	04/19/2018	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**1.80**
BAY-8-INDOOR	BAY8A-INDOORAIR_122319	12/23/2019	< 0.051 U	< 0.079 U	< 0.079 U	**0.253**	**1.64**
BAY-8-INDOOR	BAY8_INDOOR AIR_022020	2/20/2020	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**0.868**
BAY-8-INDOOR	BAY8B_INDOOR AIR_051420	5/14/2020	< 0.051 U	< 0.079 U	< 0.079 U	**0.188**	**0.861**
BAY-8-INDOOR	BAY8B_INDOOR AIR_082720	8/27/2020	<0.051 U	< 0.079 U	<0.079 U	**0.957**	**27.1**
BAY-8-INDOOR	BAY 8B_INDOORAIR_111220	11/12/2020	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**0.692**
BAY-8-INDOOR	BAY-8-IA	8/20/2024	< 0.051 U	< 0.079 U	< 0.079 U	**1.90**	**1.42**
BAY-8-OUTDOOR	BAY 8-OUTDOOR AIR--01-11-18	01/11/2018	< 0.051 U	< 0.079 U	< 0.079 U	**2.65**	**17.2**
BAY-8-OUTDOOR	BAY 8-OUTDOOR AIR_041718	04/19/2018	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**5.45**
BAY-8-OUTDOOR	100THSTREET-OUTDOORAIR_122319	12/23/2019	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**1.46**
BAY-9-INDOOR	BAY 9 - INDOOR AIR - 061517	06/15/2017	< 0.051 U	< 0.079 U	< 0.079 U	**0.226**	**0.258**
BAY-9-INDOOR	BAY 9-INDOOR AIR-101117	10/11/2017	< 0.051 U	< 0.079 U	< 0.079 U	**1.32**	**26.9**
BAY-9-INDOOR	BAY 9-INDOOR AIR-01-11-18	01/11/2018	< 0.051 U	< 0.079 U	< 0.079 U	**1.66**	**11.9**
BAY-9-INDOOR	BAY 9-INDOOR AIR_041918	04/19/2018	< 0.051 U	< 0.079 U	< 0.079 U	**0.167**	**27.6**
BAY-9-INDOOR	BAY 9-INDOOR AIR_022020	2/20/2020	<0.051 U	<0.079 U	<0.079 U	<0.107 U	**2.25**
BAY-9-INDOOR	BAY 9-INDOOR AIR_051420	5/14/2020	<0.051 U	<0.079 U	<0.079 U	**0.269**	**0.705**
BAY-9-INDOOR	BAY 9_INDOOR AIR_082720	8/27/2020	<0.051 U	<0.079 U	<0.079 U	**0.752**	**6.85**
BAY-9-INDOOR	BAY 9_INDOORAIR_111220	11/12/2020	< 0.051 U	< 0.079 U	< 0.079 U	**0.124**	**4.17**
BAY-10-INDOOR	BAY 10-INDOORAIR-061517	06/15/2017	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**0.210**
BAY-10-INDOOR	BAY 10-INDOOR AIR-101117	10/11/2017	< 0.051 U	< 0.079 U	< 0.079 U	**1.11**	**27.5**
BAY-10-INDOOR	BAY 10-INDOOR AIR--01-11-18	01/11/2018	< 0.051 U	< 0.079 U	< 0.079 U	**1.44**	**9.09**
BAY-10-INDOOR	BAY 10-INDOOR AIR_041918	04/19/2018	< 0.051 U	< 0.079 U	< 0.079 U	**0.156**	**22.0**
BAY-10-INDOOR	BAY10-INDOORAIR_122319	12/23/2019	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**1.40**
BAY-10-INDOOR	BAY10-INDOORAIR_022020	2/20/2020	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**1.71**
BAY-10-INDOOR	BAY10-INDOORAIR_051420	5/14/2020	<0.051 U	<0.079 U	<0.079 U	<0.107 U	**0.427**
BAY-10-INDOOR	BAY10_INDOORAIR_082720	8/27/2020	<0.051 U	<0.079 U	<0.079 U	**3.71**	**5.45**
BAY-10-INDOOR	BAY 10_INDOORAIR_111220	11/12/2020	<0.051 U	<0.079 U	<0.079 U	**0.709**	**4.95**
BAY-10-INDOOR	BAY-10-IA	8/20/2024	<0.051 U	<0.079 U	<0.079 U	**1.69**	**2.26**

Table 7
Summary of Indoor Air Sampling Results
Former Ozone Industries, Queens, NY

Location ID	Sample ID	Sample Date	Chemical Concentration (ug/m3)				
			VINYL CHLORIDE	TRANS-1,2-DCE	CIS-1,2-DCE	TRICHLOROETHENE	TETRACHLOROETHENE
BAY-11-INDOOR	BAY 11 - INDOORAIR-061517	06/15/2017	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**0.224**
BAY-11-INDOOR	BAY 11-INDOOR AIR-101117	10/11/2017	< 0.051 U	< 0.079 U	< 0.079 U	**0.871**	**15.9**
BAY-11-INDOOR	BAY 11-INDOOR AIR--01-11-18	01/11/2018	< 0.051 U	< 0.079 U	< 0.079 U	**1.12**	**6.43**
BAY-11-INDOOR	BAY 11-INDOOR AIR_041918	04/19/2018	< 0.051 U	< 0.079 U	< 0.079 U	**0.129**	**18.6**
BAY-11-INDOOR	BAY11-INDOORAIR_122319	12/23/2019	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**1.45**
BAY-11-INDOOR	BAY11_INDOORAIR_022020	2/20/2020	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**2.45**
BAY-11-INDOOR	BAY11_INDOORAIR_051420	5/14/2020	<0.051 U	<0.079 U	<0.079 U	**0.107**	**0.373**
BAY-11-INDOOR	BAY11_INDOORAIR_082720	8/27/2020	<0.051 U	<0.079 U	<0.079 U	**0.441**	**5.49**
BAY-11-INDOOR	BAY 11_INDOORAIR_111220	11/12/2020	<0.051 U	<0.079 U	<0.079 U	**0.150**	**8.88**
BAY-11-INDOOR	BAY-11-IA	8/20/2024	<0.051 U	<0.079 U	<0.079 U	**1.50**	**2.25**
BAY-12-INDOOR	BAY12 - INDOORAIR - 061517	06/15/2017	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**0.285**
BAY-12-INDOOR	BAY12_INDOOR AIR_101117	10/11/2017	< 0.051 U	< 0.079 U	< 0.079 U	**0.752**	**13.9**
BAY-12-INDOOR	BAY12_INDOOR AIR_01-11-18	01/11/2018	< 0.051 U	< 0.079 U	< 0.079 U	**1.28**	**7.19**
BAY-12-INDOOR	BAY12_INDOOR AIR_041918	04/19/2018	< 0.051 U	< 0.079 U	< 0.079 U	**0.107**	**3.87**
BAY-12-INDOOR	BAY12_INDOORAIR_122319	12/23/2019	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**0.888**
BAY-12-INDOOR	BAY12_INDOORAIR_022020	2/20/2020	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**0.970**
BAY-12-INDOOR	BAY12_INDOORAIR_051420	5/14/2020	<0.051 U	<0.079 U	<0.079 U	<0.107 U	**1.46**
BAY-12-INDOOR	BAY12_INDOORAIR_082720	8/27/2020	<0.051 U	<0.079 U	<0.079 U	**0.226**	**2.60**
BAY-12-INDOOR	BAY 12_INDOORAIR_111220	11/12/2020	<0.051 U	<0.079 U	<0.079 U	<0.107 U	**2.68**
BAY-12-INDOOR	BAY-12-IA	8/20/2024	<0.051 U	<0.079 U	<0.079 U	**0.623**	**1.5**
BAY-13-INDOOR	BAY13 - INDOORAIR - 061517	06/15/2017	< 0.051 U	< 0.079 U	< 0.079 U	**0.167**	**0.251**
BAY-13-INDOOR	BAY13-INDOOR AIR-101117	10/11/2017	< 0.051 U	< 0.079 U	< 0.079 U	**0.559**	**10.0**
BAY-13-INDOOR	BAY13-INDOOR AIR--01-11-18	01/11/2018	< 0.051 U	< 0.079 U	< 0.079 U	**1.26**	**5.95**
BAY-13-INDOOR	BAY13-INDOOR AIR_041918	04/19/2018	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**12.6**
BAY-13-INDOOR	BAY13-INDOORAIR_122319	12/23/2019	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**1.59**
BAY-13-INDOOR	BAY13-INDOORAIR_022020	2/20/2020	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**3.72**
BAY-13-INDOOR	BAY13-INDOORAIR_051420	5/14/2020	<0.051 U	<0.079 U	<0.079 U	<0.107 U	**0.692**
BAY-13-INDOOR	BAY13_INDOORAIR_082720	8/27/2020	<0.051 U	<0.079 U	<0.079 U	**0.392**	**2.33**
BAY-13-INDOOR	BAY 13_INDOORAIR_111220	11/12/2020	<0.051 U	<0.079 U	<0.079 U	**0.290**	**12.1**
BAY-13-INDOOR	BAY-13-IA	8/20/2024	<0.051 U	<0.079 U	<0.079 U	**1.66**	**2.19**

Table 7
Summary of Indoor Air Sampling Results
Former Ozone Industries, Queens, NY

Location ID	Sample ID	Sample Date	Chemical Concentration (ug/m3)				
			VINYL CHLORIDE	TRANS-1,2-DCE	CIS-1,2-DCE	TRICHLOROETHENE	TETRACHLOROETHENE
BAY-14-INDOOR	BAY14 - INDOORAIR - 061517	06/15/2017	< 0.051 U	< 0.079 U	< 0.079 U	**0.172**	**0.217**
BAY-14-INDOOR	BAY14-INDOOR AIR-101117	10/11/2017	< 0.051 U	< 0.079 U	< 0.079 U	**0.554**	**6.98**
BAY-14-INDOOR	BAY14-INDOOR AIR-01-11-18	01/11/2018	< 0.051 U	< 0.079 U	< 0.079 U	**0.903**	**3.96**
BAY-14-INDOOR	BAY14-INDOOR AIR_041918	04/19/2018	< 0.051 U	< 0.079 U	< 0.079 U	**0.279**	**29.4**
BAY-14-INDOOR	BAY14-INDOORAIR_122319	12/23/2019	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**1.59**
BAY-14-INDOOR	BAY14_INDOORAIR_022020	2/20/2020	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**5.00**
BAY-14-INDOOR	BAY14_INDOORAIR_051420	5/14/2020	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**0.597**
BAY-14-INDOOR	BAY14_INDOORAIR_082720	8/27/2020	<0.051 U	<0.079 U	<0.079 U	**0.425**	**1.79**
BAY-14-INDOOR	BAY 14_INDOORAIR_111220	11/12/2020	<0.051 U	<0.079 U	<0.079 U	**0.188**	**2.39**
BAY-14-INDOOR	BAY-14-IA	8/20/2024	<0.051 U	<0.079 U	<0.079 U	**1.32**	**2.31**
BAY-14-OUTDOOR	BAY 14 - OUTDOORAIR - 061517	06/15/2017	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**0.244**
BAY-14-OUTDOOR	BAY 14-OUTDOOR AIR-101117	10/11/2017	< 0.051 U	< 0.079 U	< 0.079 U	**0.554**	**12.2**
BAY-14-OUTDOOR	BAY14-OUTDOOR AIR-01-11-18	01/11/2018	< 0.051 U	< 0.079 U	< 0.079 U	**0.693**	**4.79**
BAY-14-OUTDOOR	BAY 14-OUTDOOR AIR_041718	04/19/2018	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**3.26**
BAY-14-OUTDOOR	99THSTREET-OUTDOOR AIR_122319	12/23/2019	< 0.051 U	< 0.079 U	**0.230**	**0.172**	**0.936**
BAY-14-OUTDOOR	BAY14_OUTDOOR AIR_022020	2/20/2020	< 0.051 U	< 0.079 U	< 0.051 U	< 0.107 U	**1.29**
BAY-14-OUTDOOR	BAY14_ODAIR_051420	5/14/2020	<0.051 U	<0.079 U	<0.079 U	<0.107	**1.45**
BAY-14-OUTDOOR	BAY14_OUTDOORAIR_082720	8/27/2020	<0.051 U	<0.079 U	<0.079 U	**0.140**	**3.86**
BAY-14-OUTDOOR	BAY 14_OUTDOORAIR_111220	11/12/2020	<0.051 U	<0.079 U	<0.079 U	**0.215**	**1.38**
BAY-14-OUTDOOR	OUTDOOR AIR-BAY-14	8/20/2024	<0.051 U	<0.079 U	<0.079 U	< 0.107 U	**1.52**
BAY-15-INDOOR	BAY15 - INDOORAIR - 061517	06/15/2017	< 0.112 U	< 0.174 U	< 0.174 U	< 0.236 U	**0.313**
BAY-15-INDOOR	BAY15-INDOOR AIR-101117	10/11/2017	< 0.051 U	< 0.079 U	< 0.079 U	**0.709**	**12.1**
BAY-15-INDOOR	BAY15-INDOOR AIR--01-11-18	01/11/2018	< 0.051 U	< 0.079 U	< 0.079 U	**0.677**	**3.85**
BAY-15-INDOOR	BAY15-INDOOR AIR_041918	04/19/2018	< 0.051 U	< 0.079 U	< 0.079 U	**0.161**	**40.8**
BAY-15-INDOOR	BAY15_INDOOR AIR_122319	12/23/2019	< 0.051 U	< 0.079 U	< 0.079 U	< 0.107 U	**1.18**
BAY-15-INDOOR	BAY15_INDOOR AIR_022020	2/20/2020	< 0.051 U	< 0.079 U	**0.139**	**0.371**	**1.81**
BAY-15-INDOOR	BAY15_INDOOR AIR_051420	5/14/2020	<0.051 U	<0.079 U	<0.079 U	<0.107 U	**1.31**
BAY-15-INDOOR	BAY15_INDOORAIR_082720	8/27/2020	<0.051 U	<0.079 U	<0.079 U	**0.344**	**1.33**
BAY-15-INDOOR	BAY 15_INDOORAIR_111220	11/12/2020	<0.051 U	<0.079 U	<0.079 U	**0.731**	**15.5**
BAY-15-INDOOR	BAY-15-IA	8/20/2024	<0.051 U	<0.079 U	<0.079 U	**0.226**	**0.97**

Notes:

ug/m3 = micrograms per cubic meter

U = not detected at or above reporting limit. Value shown in reporting limit.

TRANS-1,2-DICHLOROETHENE (DCE)

CIS-1,2-DICHLOROETHENE (DCE)

Concentration in **BOLD** are detected.

Table 8
Summary of Soil-Gas Sampling Results
Former Ozone Industries, Queens, NY

Location ID	Sample ID	Sample Date	Depth (ft)	Matrix	Chemical Concentration (ug/m3)				
					VINYL CHLORIDE	TRANS-1,2-DCE	CIS-1,2-DCE	TRICHLOROETHENE	TETRACHLOROETHENE
BAY-8	SG-1_AIR	07/19/2005	4	GS	< 13 U	**100**	**5,500 E**	**60,000 E**	**1,400**
BAY-8	SG-1-2006	08/09/2006	4	GS	< 12.8 U	**159**	**46,600**	**675,000**	**5,000**
BAY-9	SG-2_AIR	07/20/2005	8	GS	< 13 U	**100**	**5,400 E**	**40,000 E**	**620**
BAY-9	SG-2-2006	08/09/2006	8	GS	< 1990 U	< 3080 U	**3910**	**104,000**	< 5280 U
BAY-9	MP-4S-061517	06/15/2017	4	GS	< 0.511 U	< 0.793 U	**1.31**	**53.7**	**4.41**
BAY-9	BAY 9-MP4S-101117	10/11/2017	4	GS	< 0.511 U	< 0.793 U	**0.952**	**33.8**	**11.3**
BAY-9	BAY 9-MP4S-011118	01/11/2018	4	GS	< 0.511 U	< 0.793 U	**1.92**	**30.4**	**7.59**
BAY-9	BAY 9-MP-4S_041918	04/19/2018	4	GS	< 0.511 U	< 0.793 U	< 0.793 U	< 1.07 U	**7.53**
BAY-9	BAY 9-MP4S_0511520	5/15/2020	4	GS	<0.511 U	<0.0793 U	**13.3**	**521**	**29.6**
BAY-9	MP4S-MP4S-082820	8/28/2020	4	GS	<2.56 U	<3.96 U	**54.7**	**1,980**	**256**
BAY-9	BAY 9_MP4**S**_111320	11/13/2020	4	GS	< 0.051 U	0.206	**3.89**	**105**	**5.38**
BAY-9	BAY 9_MP4**D**_111320	11/13/2020	8	GS	< 0.670 U	**1.56**	**48.8**	**2,780**	**183**
BAY-9	MP-65-SS	8/20/2024	4	GS	<0.511 U	< 0.793 U	< 0.793 U	**8.06**	**2.92**
BAY-10	SG-3_AIR	07/20/2005	4	GS	< 13 U	**170**	**7,900 E**	**41,000 E**	**630**
BAY-10	SG-3-2006	08/08/2006	4	GS	< 2240 U	**< 3470 U**	**6,520**	**128,000**	< 5940 U
BAY-10	BAY 10_MP5S_111320	11/13/2020	4	GS	< 0.051 U	**0.492**	**6.58**	**72.0**	**2.34**
BAY-11	SG-4_AIR	07/22/2005	4	GS	< 13 U	**400**	**18,000 E**	**75,000 E**	**2,400 E**
BAY-11	SG-4-2006	08/08/2006	4	GS	< 2240 U	< 3480 U	**23,800**	**346,000**	**8,300**
BAY-11	MP-8S-061517	06/15/2017	4	GS	< 0.511 U	< 0.793 U	**6.03**	**114**	**7.19**
BAY-11	BAY 11-MP8S-101117	10/11/2017	4	GS	< 0.511 U	< 0.793 U	**6.38**	**104**	**10.0**
BAY-11	BAY 11-MP8S-011118	01/11/2018	4	GS	< 0.511 U	< 0.793 U	< 0.793 U	< 1.07 U	**3.42**
BAY-11	BAY 11-MP-8S_041918	04/19/2018	4	GS	< 0.511 U	< 0.793 U	< 0.793 U	< 1.07 U	**6.98**
BAY-11	BAY 11-MP-8S-SOILGAS_122319	12/23/2019	4	GS	< 0.511 U	< 0.793 U	**2.03**	**10.4**	< 1.36 U
BAY-11	BAY 11-MP-8S-051520	5/15/2020	4	GS	<0.511 U	<0.793 U	**8.17**	**71.5**	**4.46**
BAY-11	BAY11-MP8S-082820	8/28/2020	4	GS	<5.11 U	<7.93 U	**230**	**3,670**	**180**
BAY-11	BAY 11_MP8**S**_111320	11/13/2020	4	GS	< 0.102 U	**0.896**	**27.4**	**287**	**12.5**
BAY-11	BAY 11_MP8**D**_111320	11/13/2020	8	GS	< 1.04 U	**7.53**	**184**	**4,530**	**159**
BAY-11	MP-85-SS	8/20/2024	4	GS	<0.511 U	<0.793 U	<0.793 U	**1.64**	**4.44**
BAY-12	SG-5_AIR	07/25/2005	4	GS	< 26 U	**2,500**	**54,000 E**	**130,000 E**	**2,300**
BAY-12	SS-5-2006	08/14/2006	4	GS	< 63.8 U	**1,240**	**17,800**	**135,000**	**11,000**
BAY-12	BAY 12_MP9**S**_111320	11/13/2020	4	GS	< 0.051 U	**1.16**	**10.5**	**172**	**7.26**
BAY-12	BAY 12_MP9**D**_111320	11/13/2020	8	GS	< 1.09 U	**7.02**	**58.7**	**4,810**	**266**

Table 8
Summary of Soil-Gas Sampling Results
Former Ozone Industries, Queens, NY

Location ID	Sample ID	Sample Date	Depth (ft)	Matrix	Chemical Concentration (ug/m3)				
					VINYL CHLORIDE	TRANS-1,2-DCE	CIS-1,2-DCE	TRICHLOROETHENE	TETRACHLOROETHENE
BAY-13	SG-6_AIR	07/25/2005	4	GS	< 13 U	**600**	**29,000 E**	**69,000 E**	**1,900 E**
BAY-13	SS-6-2006	08/11/2006	4	GS	< 1100 U	< 1710 U	**29,500**	**363,000**	< 2930 U
BAY-13	MP-12S-061517	06/15/2017	4	GS	< 0.511 U	**0.856**	**6.90**	**164**	**7.32**
BAY-13	BAY 13-MP12S-101117	10/11/2017	4	GS	< 0.511 U	< 0.793 U	**5.04**	**137**	**6.27**
BAY-13	BAY 13-MP12S-011118	01/11/2018	4	GS	< 0.511 U	< 0.793 U	< 0.793 U	**11.2**	< 1.36 U
BAY-13	BAY13-MP-12S-SOILGAS_122319	12/23/2019	4	GS	< 0.511 U	< 0.793 U	< 0.793 U	**35.5**	**1.47**
BAY-13	BAY13-MP-12S-051520	5/15/2020	4	GS	<3.66 U	<5.67 U	**214**	**2,600**	**76.6**
BAY-13	BAY 13-MP12S-082820	8/28/2020	4	GS	<8.51 U	<13.2 U	**213**	**4,200**	**159**
BAY-13	BAY 13_MP12S_111320	11/13/2020	4	GS	< 0.064 U	0.342	**6.70**	**202**	**11.1**
BAY-13	MP-125-SS	8/20/2024	4	GS	< 0.675 U	< 1.05 U	**< 1.05 U**	**2.44**	**4.92**
BAY-14	SS-14	08/11/2005	4	GS	< 64 U	< 99 U	< 99 U	**1,500**	< 170 U
BAY-14	SS-14-2006	08/10/2006	4	GS	< 208 U	< 322 U	3420	**52,700**	< 551 U
BAY-14	BAY 14_MP14S_111320	11/13/2020	4	GS	< 0.051 U	**0.282**	**2.14**	**125**	**6.73**
BAY-15	SG-8_AIR	07/26/2005	4	GS	< 26 U	**40**	**3,200**	**33,000 E**	**330**
BAY-15	SS-8-2006	08/10/2006	4	GS	< 2020 U	< 3130 U	**8,910**	**133,000**	< 5350 U
BAY-15	MP-15S-061517	06/15/2017	4	GS	< 0.511 U	< 0.793 U	< 0.793 U	**6.61**	< 1.36 U
BAY-15	BAY 15-MP15S-101117	10/11/2017	4	GS	< 0.511 U	< 0.793 U	< 0.793 U	**20.5**	**4.73**
BAY-15	BAY 15-MP15S-101117-2	10/11/2017	4	GS	< 0.511 U	< 0.793 U	< 0.793 U	**20.9**	**3.99**
BAY-15	BAY 15-MP15S-011118	01/11/2018	4	GS	< 0.511 U	< 0.793 U	< 0.793 U	**7.74**	< 1.36 U
BAY-15	BAY 15-MP15S_041918	04/19/2018	4	GS	< 0.511 U	< 0.793 U	< 0.793 U	< 1.07 U	**4.38**
BAY-15	BAY15-MP-15S-SOILGAS_122319	12/23/2019	4	GS	< 0.511 U	< 0.793 U	**1.03**	**3.12**	< 1.36 U
BAY-15	BAY15-MP15S-051520	5/15/2020	4	GS	<0.511 U	<0.793 U	**1.9**	**57**	**7.26**
BAY-15	BAY15-MP15S-082820	8/28/2020	4	GS	<3.20 U	<4.96 U	**88**	**2370**	**141**
BAY-15	BAY 15_MP15**S**_111320	11/13/2020	4	GS	< 0.051 U	**0.182**	**2.29**	**129**	**22.0**
BAY-15	BAY 15_MP15**D**_111320	11/13/2020	8	GS	< 0.930 U	**2.53**	**103**	**4,200**	**224**

Table 8
Summary of Soil-Gas Sampling Results
Former Ozone Industries, Queens, NY

Location ID	Sample ID	Sample Date	Depth (ft)	Matrix	Chemical Concentration (ug/m3)				
					VINYL CHLORIDE	TRANS-1,2-DCE	CIS-1,2-DCE	TRICHLOROETHENE	TETRACHLOROETHENE
LOC-22	SG-22	07/17/2006	4.5	GS	< 2.55 U	<3.96 U	< 3.96 U	**252**	**10.3**
LOC-22	LOC-22-062217	06/22/2017	8	GS	< 0.511 U	< 0.793 U	< 0.793 U	**76.3**	**7.05**
LOC-22	LOC-22-020719	02/07/2019	8	GS	< 0.511 U	< 0.793 U	< 0.793 U	**17.8**	**26.3**
LOC-22	LOC-22-SG-052319	05/23/2019	8	GS	< 0.511 U	< 0.793 U	< 0.793 U	**28.8**	**7.05**
LOC-22	LOC-22-SG-082019	08/20/2019	8	GS	< 0.511 U	< 0.793 U	< 0.793 U	**104**	**10.4**
LOC-22	LOC-22-SG-112019	11/20/2019	8	GS	< 0.511 U	< 0.793 U	< 0.793 U	**17.9**	**1.43**
LOC-22	LOC-22-SG-021920	2/19/2020	8	GS	<0.511 U	<0.793 U	<0.793 U	**44.1**	**2.62**
LOC-22	LOC-22-SG-051320	5/13/2020	8	GS	<2.32 U	<3.60 U	<3.60 U	**48.3**	**15.1**
LOC-22	LOC-22G-082620	8/26/2020	8	GS	<29.4 U	**51.5**	**2,070**	**19,600**	**387**
LOC-22	LOC-22-SG-110520	11/5/2020	8	GS	< 0.051 U	**< 0.079 U**	**< 0.079 U**	**222**	**13.0**
LOC-24	SG-24	07/13/2006	5	GS	< 31.9 U	< 49.5 U	< 49.5 U	**22,100**	**367**
LOC-24	LOC-24-062217	06/22/2017	8	GS	< 0.511 U	< 0.793 U	**1.11**	**500**	**42.0**
LOC-24	LOC-24-020819	02/08/2019	8	GS	< 0.511 U	< 0.793 U	< 0.793 U	**45.3**	**64.5**
LOC-24	LOC-24-SG-052219	05/22/2019	8	GS	< 0.511 U	< 0.793 U	< 0.793 U	**84.9**	**25.9**
LOC-24	LOC-24-SG-082019	08/21/2019	8	GS	< 0.511 U	< 0.793 U	**0.987**	**405**	**65.0**
LOC-24	LOC-24-SG-112119	11/21/2019	8	GS	< 0.511 U	< 0.793 U	< 0.793 U	**44.3**	**5.43**
LOC-24	LOC-24-SG-021920	2/19/2020	8	GS	<0.511 U	<0.793 U	<0.793 U	**70.4**	**50.0**
LOC-24	LOC-24-SG-051320	5/13/2020	8	GS	<1.28 U	<1.98 U	<1.98 U	**137**	**44.0**
LOC-24	LOC-24-SG-082620	8/26/2020	8	GS	<0.946 U	<1.47 U	<1.47 U	**688**	**242**
LOC-24	LOC-24-SG-110520	11/5/2020	8	GS	< 0.128 U	< 0.198 U	0.833	**466**	**278**
LOC-25	SG-25	07/17/2006	4	GS	< 31.9 U	< 49.5 U	< 49.5 U	**17,800**	**214**
LOC-25	LOC-25-062217	06/22/2017	8	GS	< 2.56 U	< 3.96 U	**35.6**	**1390**	**597**
LOC-25	LOC-25-020719	02/07/2019	8	GS	< 0.511 U	< 0.793 U	**1.36**	**69.9**	**11.2**
LOC-25	LOC-25-SG-052319	05/23/2019	8	GS	< 0.511 U	< 0.793 U	**7.14**	**288**	**95.6**
LOC-25	LOC-25-SG-082019	08/20/2019	8	GS	< 0.511 U	**1.11**	**5.55**	**236**	**29.2**
LOC-25	LOC-25-SG-112019	11/20/2019	8	GS	< 0.511 U	< 0.793 U	**1.47**	**76.9**	**2.49**
LOC-25	LOC-25-SG-021920	2/19/2020	8	GS	< 0.511 U	< 0.793 U	**3.43**	**83.3**	**13.8**
LOC-25	LOC-25-SG-051320	5/13/2020	8	GS	<0.511 U	<0.793 U	**2.45**	**317**	**24.3**
LOC-25	LOC-25-SG-082620	8/26/2020	8	GS	<1.71 U	<2.64 U	**5.15**	**1,250**	**292**
LOC-25	LOC-25-SG-110520	11/5/2020	8	GS	< 0.256 U	0.733	**2.52**	**838**	**72.6**

Table 8
Summary of Soil-Gas Sampling Results
Former Ozone Industries, Queens, NY

Location ID	Sample ID	Sample Date	Depth (ft)	Matrix	Chemical Concentration (ug/m3)				
					VINYL CHLORIDE	TRANS-1,2-DCE	CIS-1,2-DCE	TRICHLOROETHENE	TETRACHLOROETHENE
LOC-26	SG-26	07/13/2006	4	GS	< 31.9 U	< 49.5 U	**226**	**32200**	**761**
LOC-26	LOC-26-062217	06/22/2017	8	GS	< 2.56 U	< 3.96 U	**5.87**	**1500**	**72.6**
LOC-26	LOC-26-020819	02/08/2019	8	GS	< 0.511 U	< 0.793 U	**1.73**	**123**	**93.6**
LOC-26	LOC-26-SG-052219	05/22/2019	8	GS	< 0.511 U	< 0.793 U	**1.67**	**147**	**27.4**
LOC-26	LOC-26-SG-082019	08/21/2019	8	GS	< 1.02 U	< 1.59 U	**4.84**	**763**	**64.3**
LOC-26	LOC-26-SG-112119	11/21/2019	8	GS	< 0.511 U	< 0.793 U	**1.52**	**224**	**7.12**
LOC-26	LOC-26-SG-021920	2/19/2020	8	GS	< 0.511 U	< 0.793 U	**1.32**	**189**	**21.8**
LOC-26	LOC-26-SG-051320	5/13/2020	8	GS	<1.28 U	<1.28 U	**2.87**	**376**	**28.5**
LOC-26	LOC-26-SG-082620	8/26/2020	8	GS	<2.84 U	<4.40 U	**7.26**	**1,900**	**164**
LOC-26	LOC-26-SG-110520	11/5/2020	8	GS	< 0.256 U	< 0.396 U	**4.36**	**1680**	**191**
LOC-27	SG-27	07/17/2006	4	GS	< 31.9 U	**86.9**	**5,890**	**49,300**	**849**
LOC-27	LOC-27-062217	06/22/2017	8	GS	< 24.8 U	< 38.5 U	**1,750**	**13,300**	**257**
LOC-27	LOC-27-020719	02/07/2019	8	GS	< 0.511 U	**2.65**	**101**	**464**	**22.7**
LOC-27	LOC-27	06/08/2019	8	GS	< 1.28 U	**4.04**	**263**	**1,320**	**24.3**
LOC-27	LOC-27-SG-082019	08/20/2019	8	GS	< 11.3 U	**23.2**	**1,470**	**10,700**	**66.2**
LOC-27	LOC-27-SG-112019	11/20/2019	8	GS	< 2.56 U	**15.1**	**428**	**2,120**	**9.22**
LOC-27	LOC-27-SG-021920	2/19/2020	8	GS	<0.984 U	**8.17**	**209**	**623**	**11.9**
LOC-27	LOC-27-SG-051320	5/13/2020	8	GS	<2.56	**20.9**	**468**	**1,910**	**29.3**
LOC-27	LOC-27-SG-082620	8/26/2020	8	GS	<0.511	**<0.793**	**<0.793**	**126**	**11.3**
LOC-27	LOC-27-SG-110520	11/5/2020	8	GS	< 3.25 U	**45.2**	**1290**	**10900**	**340**
LOC-27B	LOC-27B-062217	06/22/2017	8	GS	< 5.11 U	< 7.93 U	**55.5**	**3,830**	**27.9**
LOC-27B	LOC-27B-020719	02/07/2019	8	GS	< 0.511 U	< 0.793 U	**13.2**	**564**	**8.54**
LOC-27B	LOC-27B-SG-052319	05/23/2019	8	GS	< 0.511 U	< 0.793 U	**14.9**	**512**	**5.53**
LOC-27B	LOC-27B-SG-082019	08/20/2019	8	GS	< 5.11 U	< 7.93 U	**42.8**	**4,430**	**33.2**
LOC-27B	LOC-27B-SG-112019	11/20/2019	8	GS	< 1.02 U	< 1.59 U	**15.3**	**897**	**5.67**
LOC-27B	LOC27B-SG-021920	2/19/2020	8	GS	<1.42 U	<2.20 U	**19.0**	**924**	**18.3**
LOC-27B	LOC-27B-SG-051320	5/13/2020	8	GS	<0.851	<1.32	<1.32	**36.3**	**9.15**
LOC-27B	LOC-27B-SG-082620	8/26/2020	8	GS	<6.39 U	<9.91 U	55.9	**3,540**	**70.5**
LOC-27B	LOC-27B-SG-110520	11/5/2020	8	GS	< 0.511 U	1.27	47.6	**4320**	**121**

Table 8
Summary of Soil-Gas Sampling Results
Former Ozone Industries, Queens, NY

Location ID	Sample ID	Sample Date	Depth (ft)	Matrix	Chemical Concentration (ug/m3)				
					VINYL CHLORIDE	TRANS-1,2-DCE	CIS-1,2-DCE	TRICHLOROETHENE	TETRACHLOROETHENE
LOC-28	SG-28	07/13/2006	4	GS	< 31.9 U	< 49.5 U	**822**	**38,700**	**1,350**
LOC-28	LOC-28-062217	06/22/2017	8	GS	< 1.71 U	< 2.64 U	< 2.64 U	**1370**	**73.2**
LOC-28	LOC-28-020819	02/08/2019	8	GS	< 0.511 U	< 0.793 U	< 0.793 U	**34.2**	**4.53**
LOC-28	LOC-28-SG-052219	05/22/2019	8	GS	< 0.511 U	< 0.793 U	< 0.793 U	**130**	**15.1**
LOC-28	LOC-28-SG-082019	08/21/2019	8	GS	< 0.851 U	< 1.32 U	< 1.32 U	**715**	**35.7**
LOC-28	LOC-28-SG-112119	11/21/2019	8	GS	< 0.511 U	< 0.793 U	< 0.793 U	**118**	**1.97**
LOC-28	LOC-28-SG-021920	2/19/2020	8	GS	< 0.511 U	**1.15**	< 0.793 U	**177**	**12.1**
LOC-28	LOC-28-SG-051320	5/13/2020	8	GS	<0.851 U	<1.32 U	**6.34**	**482**	**25.8**
LOC-28	LOC-28-SG-082620	8/26/2020	8	GS	<1.83 U	<2.83 U	<2.83 U	**1350**	**99.7**
LOC-28	LOC-28-SG-110520	11/5/2020	8	GS	< 0.366 U	< 0.567 U	0.936	**1050**	**113**

Notes:

ug/m3 = micrograms per cubic meter

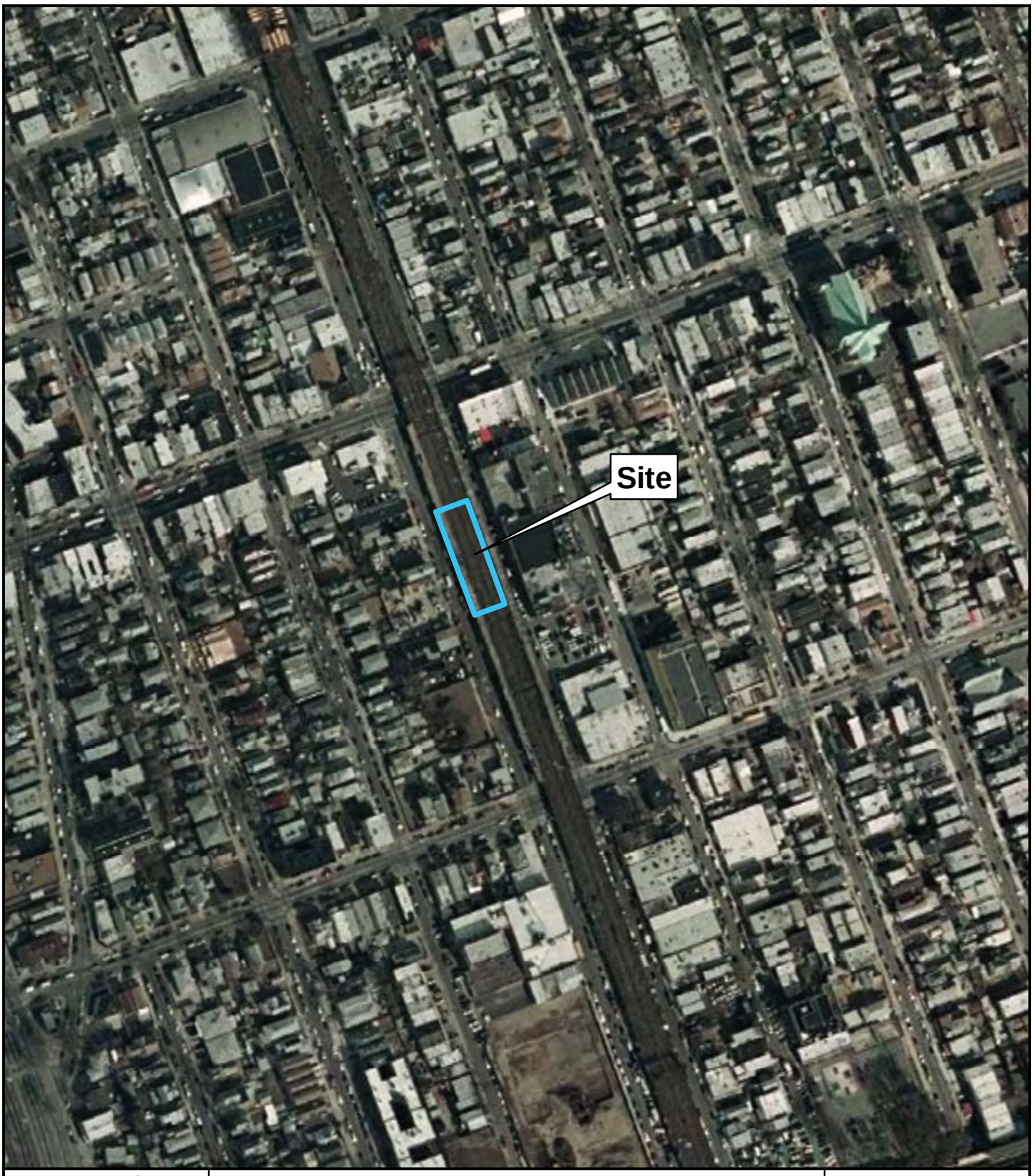
U = not detected at or above reporting limit. Value shown in reporting limit.

TRANS-1,2-DICHLOROETHENE (DCE)

CIS-1,2-DICHLOROETHENE (DCE)

Concentration in **BOLD** are detected.

FIGURES



Map Location



Site Locus Map

Former Ozone Industries, Inc.
NYSDEC Site #2-41-033
Block Bounded by 99th & 100th Streets
and 101st & 103rd Avenues
Ozone Park, Queens, Queens County, New York

0 50 100 200 300 400 500 600 Feet

0 10 20 40 60 80 100 120 140 160 Meters

Map Projection: State Plane, NAD 83, Feet.
Image Source: USGS Topographic Quadrangle: Jamaica, NY.

Scale: 1:24,000

AECOM

Figure 1

Date: August 2011

Project #: 60138748.A.1

J:\Indl_Service\Project Files\Endzone, Inc\Ozone - Queens, NY\GIS\Projects\RD-RAWP\Figure 1 Site Locus.mxd

AS-BUILT SVE/SSD PIPING STUB-UPS LOCATION

SVE AND SSD SYSTEM LOCATION

CARBON VESSELS LOCATION FOR OFF-GAS TREATMENT

AS-BUILT SSD PIPING

AS-BUILT SVE PIPING (MIN. 0.5% PITCH BACK TO WELLS)

SUBSURFACE ELECTRICAL BOXES (NYC ELECTRIC)

SCREEN INTERVAL (TYP.)

101-11
100th STREET
TAVELLA PLUMBING AND HEATING

101-15
100th STREET
NEW YORK WATER SERVICE

100-21
101st STREET
(MOVING STORAGE COMPANY)

101-20
AUTO REPAIR
LISENSA
LANDSCAPING

101-32
100th STREET
(FIVE STAR ELECTRICAL CORP.)

101-28
RESIDENCE

RESIDENCE

RESIDENTIAL

PARKING LOT

OVERHEAD RAILROAD

SIDEWALK

98th STREET

99th STREET

100th STREET

101st STREET

94609

94608

366

367

SVE-1 SVE-2 SVE-3 SVE-4 SVE-5 SVE-6 SVE-7 SVE-8 SVE-9 SVE-10 SVE-11 SVE-12 SVE-13 SVE-14 SVE-15 SVE-16 SVE-17 SVE-18 SVE-19 SVE-20 SVE-21 SVE-22 SVE-23 SVE-24 SVE-25 SVE-26 SVE-27

LEGEND

- TRAFFIC FLOW
- EXISTING UTILITY POLE
- AS-BUILT SVE WELL
- AS-BUILT DUAL-LEVEL SVE WELL
- AS-BUILT SVE/SSD MONITORING POINT
- AS-BUILT SUBGRADE SVE PIPING
- AS-BUILT SUBGRADE SSD PIPING

10 0 20
SCALE IN FEET

ISSUED FOR QUARTERLY REPORT

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1	MRP	05/25/17	ISSUED FOR QUARTERLY REPORT				
0	RWM	03/18/15	ISSUED FOR SMP	RM	03/19/15	SAC	03/19/15

AECOM
250 APOLLO DRIVE
CHELMSFORD, MA 01824
www.aecom.com

FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 05/25/17

LOCATION OF SOIL VAPOR EXTRACTION AND SUB SLAB DEPRESSURIZATION TREATMENT SYSTEMS

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: 2

SHEET NUMBER: 2 of 2

REVISION 0

File: N:\Profiles\Rem_Eng\MPearsall\Ozone\2017\NEW OZONE.dwg Layout: SMP (Figure 1-4 - SVE-SSD Location) User: Pearsallm Plotted: May 26, 2017 - 2:49pm

Bay	Tenant (based upon site visit by ENSR)
1	Stevie Brown
2	Stevie Brown
3	Olympic Fence
4	Olympic Fence
5	Olympic Fence
6	Olympic Fence
7	Rumpersand Iron Workshop
8	Store contruction material - Bike shop/Bar
9	Store contruction material - Bike shop/Bar
10	Store contruction material - Bike shop/Bar
11	Store contruction material - Bike shop/Bar
12	LTDC Corp
13	Rajkumar Bisram - Iron and wood working shop
14	Rajkumar Bisram - Iron and wood working shop
15	Rajkumar Bisram - Iron and wood working shop
16	Rocco Constatino
17	Rocco Constatino
18	Richard Stevens - company vehicle storage
19	Tadco
20	Tadco
21	Tadco
22	Tadco
23	Marra
24	Adamira de al Cruz - company vehicle storage
25	Adamira de al Cruz - company vehicle storage
26	Adamira de al Cruz - company vehicle storage
27	Acardi - custom auto storage
28	Morea - old truck part storage

LEGEND

- SITE (12,000 Square Feet)
- SOIL GAS SAMPLE LOCATION
- SOIL GAS/GROUNDWATER GRAB SAMPLE LOCATION
- SOIL/SOIL GAS SAMPLE LOCATION
- SOIL/GROUNDWATER SAMPLE LOCATION
- SOIL / GROUNDWATER / GROUNDWATER GRAB SAMPLE LOCATION
- PIEZOMETER / MONITORING WELL LOCATION
- GROUNDWATER GRAB SAMPLE LOCATION

NOTES:

1. THE WIDTHS OF BAYS 1, 2, 24, 25, 26, 27, AND 28 ARE BASED ON ENSR'S FIELD MEASUREMENTS.
2. SAMPLE LOCATIONS AND THE BUILDING FOR BAYS 1 THROUGH 28 WERE SURVEYED BY GEOD CORP., NEWFOUNDLAND, NJ DURING OCTOBER 2006.
3. DUE TO SITE ACCESS CONSTRAINTS AT THE TIME OF THE SURVEY BY GEOD CORP., THE INSIDE SAMPLING LOCATIONS ARE DEPICTED AT THE CENTER OF THE RESPECTIVE BAY. HOWEVER, THE ACTUAL LOCATIONS VARY.

UTILITIES REFERENCES:

1 . COMMUNICATION LINES FROM VERIZON DRAWINGS.

2. GAS AND ELECTRIC LINES FROM KEYSPAN ENERGY DRAWINGS.

3. SANITARY AND STORM SEWER LINES FROM NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION.

0 30 60 120 Feet

Sheet Number:	Figure Number:
1	3

SITE AND SITE VICINITY PLAN

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

Scale:	Date:	Project Number:
1" = 60'	08/26/11	60138748.A.1

AECOM Environment
250 APOLLO DRIVE
CHELMSFORD, MA 01824
(978) 905-2100
www.aecom.com

Designed By:	Revisions			
	No.:	Description:	Date:	By:
Drawn By: J.E.B.				
Checked By: R.M.				
Approved By: D.A.				

Path: \\USCHL1FP001\Data\Projects\Jobs\Indl_Service\Project Files\Endzone, Inc\Ozone - Queens, NY\400 Technical\403 - GIS\Projects\Quarterly_Report\201709\MXD\Fig_3_Loc_Sampling_Points.mxd



LEGEND

- OFF-SITE SOIL GAS SAMPLE LOCATION
- ON-SITE INDOOR/AMBIENT AIR SAMPLE LOCATION
- ON-SITE SOIL GAS SAMPLE LOCATION
- SITE (12,000 Square Feet)

NOTES:

1. SAMPLE LOCATIONS ARE APPROXIMATE.
2. SOIL GAS SAMPLES INSIDE THE BAYS WERE COLLECTED FROM THE PREVIOUSLY INSTALLED SHALLOW VAPOR MONITORING POINTS.
3. THE INDOOR AIR SAMPLES WERE COLLECTED FOR 8 HRS FROM THE APPROXIMATE CENTER POINT WITH IN EACH BAY.
4. SOIL GAS SAMPLES FROM LOCATIONS OFF-SITE WERE COLLECTED FROM VAPOR POINTS WHICH WERE INSTALLED IN JUNE 2017.

SITE and LOCATION OF SAMPLING POINTS FORMER OZONE INDUSTRIES, INC. OZONE PARK, NEW YORK, NY

Project No.: 60527976.1Date: 2017-09-18

AECOM

Figure: 4

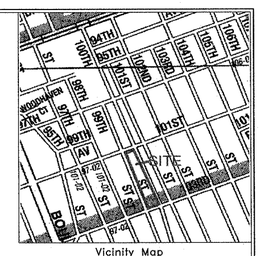
APPENDIX A

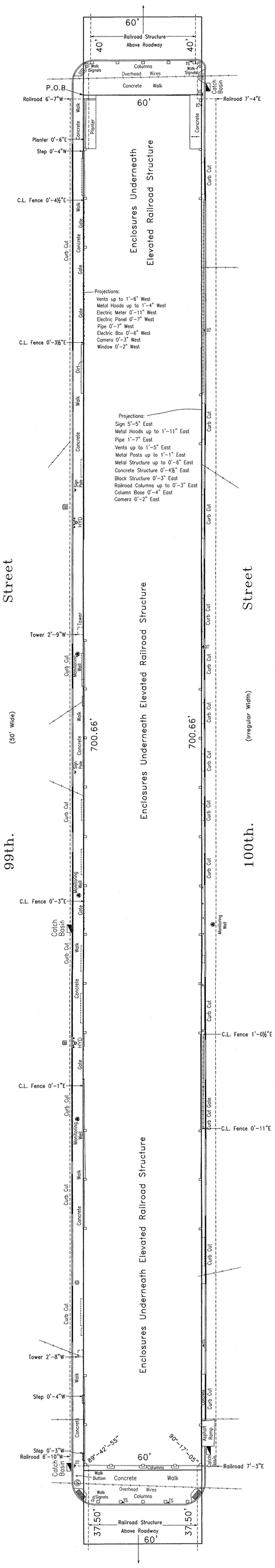
Survey Map, Metes and Bounds

LEGEND

Tree & Caliper	⌀"
Water Valve	W
Gas Valve	G
Fire Hydrant	HYD
Traffic Sign	T.S.
Siamese Connection	
Overhead Wires	
Iron Fence/Railing	
Chain Link Fence	
Steel Face Curb	
Concrete or Stone Curb	
Drop Curb	
Point of Beginning	P.O.B.







DESCRIPTION
QUEENS TAX BLOCK 9106 LOT 70

ALL that certain plot, piece or parcel of land, situated, lying and being in the County of Queens, State of New York bounded and described as follows:

BEGINNING at the corner formed by the intersection of the southerly side of 101st Avenue (80' wide) and the easterly side of 99th Street (50' wide);

RUNNING thence easterly along the southerly side of 101st Street, 60 feet to the westerly side of 100th Street;

THENCE southerly along the westerly side 100th Street, 700.66 feet to the northerly side of 103rd Avenue;

THENCE westerly along the northerly side of 103rd Avenue, 60 feet to the easterly side of 99th Street;

THENCE northerly along the easterly side of 99th Street, 700.66 feet to the point or place of beginning.

THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL EASEMENT HELD BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PURSUANT TO TITLE 36 OF ARTICLE 71 OF THE NEW YORK ENVIRONMENTAL CONSERVATION LAW.

THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN ("SMP"). A COPY OF THE SMP MUST BE OBTAINED BY ANY PARTY WITH AN INTEREST IN THE PROPERTY. THE SMP CAN BE OBTAINED FROM THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION OF ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT derweb@.dec.ny.gov.

DEC SITE NUMBER–

NOTES

1) At the time of this survey there was no observable evidence of recent earth moving work, building construction, or building additions.

2) There is no evidence of recent street or sidewalk construction or any proposed changes in street right of way lines.

3) There are no wetland areas delineated on this property.

4) No portion of the property shown on the survey lies within a special hazard area, as described on the Flood Insurance Rate Map Number 3604970237F, dated September 5, 2007, for the community in which the subject property is located (Zone X)

5) There are no porking spaces on this property.

TITLE No.
EFFECTIVE DATE:

AREA (NOT INCLUDING THE BED OF 101st. AVENUE OR 103rd. AVENUE = 42,039 SQ. FT. or 0.97 Acres
TAX BLOCK 9106 – LOT 70
BOROUGH OF QUEENS, CITY OF NEW YORK

Scale: 1cm = 1.92 m.
1.92m 3.84m 5.76m 7.68m

Scale: 1"=30'
0' 30' 60'

"ALTA/NSPS LAND TITLE SURVEY"

To:

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1,2,3,4,7(a),8,9 and 14 of Table A thereof. The field work was completed on February 4, 2025.

David A. Shaw
License Number: 50252
Date of Plat or Map: February 4, 2025

ERLANDSEN-CROWELL & SHAW
FOUNDED IN 1852 BY E.K. CONKLIN
Civil Engineers & City Surveyors
241 JERICHO TPKE NEW HYDE PARK, NY 11040 516–326–4353 718–526–0339

70832

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APPENDIX B

Environmental Easement

ENVIRONMENTAL EASEMENT
CHECKLIST/CERTIFICATION
SITE No. 2-41-033

The following requirements and attachments must be included as part of the submission to the Department for an Environmental Easement. Upon completion of the review, an attorney must sign the checklist indicating that they have fully completed the checklist. The Department will not accept submissions which have not been signed as being accurate and complete by both the Remedial Party and Attorney. Where the property owner is not the Remedial Party, the Department also requires the Owner to sign the checklist.

1) Special Circumstances

The last owner search was completed and the deed transfer is by Quit Claim or other restricted transfer deed ☐Yes ☑No

The property in the Brownfield Cleanup Agreement includes lands under water ☐Yes ☑No

The property has multiple owners ☐Yes ☑No

If you answered "Yes" to any of these items, contact the Department's Environmental Easement contact person for a determination as to whether further title work is necessary.

2) Verification of ownership of the property

- ☐ Submit documentation (such as a corporate resolution) that the signatory on the easement has authority to sign the Easement
- ☐ Ownership of the property matches the current deed.
- ☐ Verification reviewed and included for authority to sign Easement.
- ☐ Updated copies of legal organizational documents have been reviewed and are included. Examples of the appropriate documentation will include, for:
  - corporations: articles of incorporation, organizational agreements, minutes of annual meetings, resolutions, authorities for signature;
  - partnerships: a copy of the partnership agreement; verification that necessary parties are participating in the Easement;
  - trusts: trust agreement, affidavit of no change in the trust; and
  - estates: estate letters, powers of attorney.

3) Verification of Property Subject to Easement

- ☐ Description of the property for the Easement and DEC Agreement/Order/SAC matches description of property in the deed (Separate submittal must be included to explain to the satisfaction of the Department why there is any discrepancy).
- ☐ The Tax Map identifier (SBL) matches on all documents.

4) Survey Review

- ☑ Survey includes metes and bounds description.
- ☑ Survey includes a graphic scale.
- ☑ Survey includes Tax Map Section, Block and Lot.
- ☑ Survey includes physical address and is consistent with the DEC Agreement/Order/SAC.
- ☑ The survey must bear the name, address, telephone number, signature and certification of the professional land surveyor who performed the survey, his or her official seal and registration number, the date the survey was completed, the dates of all of the surveyor's revisions.
- ☑ The survey boundaries must be drawn to a convenient scale, with that scale clearly indicated. A graphic scale, shown in feet and meters, must be included.
- ☑ The symbols and abbreviations that are used on the survey must be identified by the use of a legend.
- ☑ Diagrams must be accurately presented.
- ☑ The point of beginning of the legal description must be shown.
- ☑ The legal description must be correct.
- ☑ The legal description must state the acreage.
- ☑ If the deed(s) description differs from the measured bearings/angles/distances, both must be indicated on the survey.
- ☑ The survey must show the location of all buildings/monuments/overlaps/encroachments upon the surveyed property with their locations defined by measurement perpendicular to the nearest perimeter boundaries.
- ☑ The survey must depict the location of visible improvements within five feet of each side of boundary lines.
- ☑ The survey must show ponds, lakes, springs, rivers or a natural water boundary bordering on or running through the surveyed property; the survey must measure the location of the natural water boundary and note on the survey the date of the measurement.
- ☑ The survey must correctly depict the environmental easement area with corresponding metes & bounds description and acreage, and include the following sentence: "*This property is subject to an environmental easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the New York Environmental Conservation Law. The engineering and institutional controls for this Easement are set forth in the Site Management Plan (SMP). A copy of the SMP must be obtained by any party with an interest in the property. The SMP can be obtained from NYS Department of Environmental Conservation, Division of Environmental Remediation, Site Control Section, 625 Broadway, Albany, NY 12233 or at derweb@dec.ny.gov".* This reference must be located on the face of the survey and be in at least 15-point type.
- ☑ If the survey consists of more than one sheet, sheets must be numbered and the total number of sheets must be indicated on each sheet.

☐ In addition to county-specific requirements, submittal of the approved survey to the Department must include the following:

- A "D" sized copy (24" x 36") of the final signed, stamped map
- A 600 DPI scan of the final signed, stamped map
- An Autocad .dwg or exported .dxf file of the polyline (at a minimum) of the final survey

5) Submissions

☐ The Environmental Easement Package being submitted to the Department includes the applicable documents set forth in Attachment A.

PLEASE READ THE FOLLOWING CAREFULLY

The Remedial Party and the Remedial Party's attorney understand and acknowledge that the New York State Department of Environmental Conservation will rely on each and every answer in this statement: (1) to determine whether the Easement Package can be reviewed in a timely fashion; and (2) to determine whether the Easement Package should be approved. The Remedial Party and the Remedial Party's attorney understand and acknowledge that any false statement or misrepresentation herein will constitute cause for the revocation of the Certificate of Completion issued in reliance on this checklist and accompanying documentation. The Remedial Party and the Remedial Party's attorney further acknowledge that the failure to provide the Department with valid and enforceable Environmental Easement on the property may be grounds for the Department to revoke any Certificate of Completion for the site.

Statement of Certification and Signatures

I have reviewed the information being submitted in relation to this Easement Package and this information, to the best of my knowledge and belief, is accurate and correct. I further acknowledge that the failure to provide the Department with valid and enforceable Environmental Easement on the property may be grounds for the Department to revoke any Certificate of Completion for the site.

1) By Remedial Party:
I hereby affirm that information provided on this form and its attachments is true and complete to the best of my knowledge and belief. I further acknowledge that the failure to provide the Department with valid and enforceable Environmental Easement on the property may be grounds for the Department to revoke any Certificate of Completion for the site.

Date: _____ Signature: _____

Print Name:_____

2) By Remedial Party's Attorney:
I hereby affirm that I am the attorney for _____ (entity); that I am authorized by that entity to make this certification; that this certification was prepared by me or under my supervision and direction; and that information provided on this form and its attachments is true and complete to the best of my knowledge and belief.

Date: _____ Signature: _____

Print Name:_____

Attachment

Attachment A

Documents required to be sent in hard copy with electronic formats copied to the Project Manager and Project Attorney for a complete Environmental Easement package:

1) Copy(ies) of current deed(s) and supporting title documentation (see Department Title Requirements).

2) Copy of tax map.

3) Proof of authority to obligate owner of property as set forth in "Verification of ownership of property" on the Easement checklist.

4) Legal description of the easement area, electronic copy to be in an electronic text format (i.e., MS Word or Rich Text Format).

5) One full-sized, signed Survey and an electronic Survey submitted as a fully rendered PDF (not scanned).

6) A draft Notice to Municipality, with appropriate site-specific provisions.

7) Easement Checklist with certification signed by Remedial Party and Remedial Party's attorney.

8) Signed transfer tax forms (TP-584 or ACRIS Forms).

Hard copy submission shall be sent to:

Cheryl Salem
New York State Department of Environmental Conservation
Office of General Counsel
625 Broadway
Albany, NY 12233-1500

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

This page is part of the instrument. The City Register will rely on the information provided by you on this page for purposes of indexing this instrument. The information on this page will control for indexing purposes in the event of any conflict with the rest of the document.

2003050100226001001ED149

RECORDING AND ENDORSEMENT COVER PAGE **PAGE 1 OF 4**

Document ID: 2003050100226001 Document Date: 03-10-2003 Preparation Date: 05-01-2003
Document Type: COURT ORDER
Document Page Count: 3

PRESENTER:
FIDELITY NATIONAL TITLE
1415 KELLUM PLACE
GARDEN CITY, NY 11530
516-741-5050
CAMOS@FNF.COM

RETURN TO:
DENISE D. PURSLEY, ESQ.
990 STEWART AVENUE
GARDEN CITY, NY 11530

PROPERTY DATA

Borough	Block	Lot		Unit	Address
QUEENS	9106	70	Entire Lot		N/A POWER ROAD

Property Type: OTHER

CROSS REFERENCE DATA

CRFN *or* Document ID *or* Year Reel Page *or* File Number

PARTIES

PARTY 1/PLANTIF:
ENDZONE, INC. C/O NIXON PEABODY LLP
990 STEWART AVENUE
GARDEN CITY, NY 11530

PARTY 2/DEFENDENT:
NEW YORK STATE DEPARTMENT PF
ENVIRONMENTAL CONSERV
625 BROADWAY
ALBANY, NY 12233

FEES AND TAXES

Mortgage
Mortgage Amount: $ 0.00
Taxable Mortgage Amount: $ 0.00
Exemption:
TAXES:
County (Basic): $ 0.00
City (Additional): $ 0.00
Spec (Additional): $ 0.00
TASF: $ 0.00
MTA: $ 0.00
NYCTA: $ 0.00
TOTAL: $ 0.00

Recording Fee: $ 52.00
Affidavit Fee: $ 0.00
NYC Real Property Transfer Tax Filing Fee: $ 0.00
NYS Real Estate Transfer Tax: $ 0.00

RECORDED OR FILED IN THE OFFICE OF THE CITY REGISTER OF THE CITY OF NEW YORK
Recorded/Filed 07-10-2003 15:49
City Register File No.(CRFN): **2003000223097**

City Register Official Signature

NOTICE OF ORDER

Endzone, Inc. (registered in New York d/b/a Nojoy), f/k/a BBA Acquisition, Inc., and Ozone Industries, Inc. ("Respondent) has entered into an Order On Consent Index #W2-0922-02-05, (the "Order") with the New York State Department of Environmental Conservation (the "Department") relative to an Inactive Hazardous Waste Disposal Site under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York ("ECL") for the Former Ozone Industries Site located in Queens County, New York within a block that is bounded by 99th and 100th Streets to the east and west, and by 101st and 103rd Avenues to the north and south and beneath an abandoned, elevated Long Island Railroad ("LIRR") right of way (the "Site" or "facility").

The Site has been designated by the Department as an inactive hazardous waste disposal site, as that term is defined at ECL Section 27-1301.2, and it has been listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site #2-41-033. The Department has classified the Site as a Class "2" site pursuant to ECL Section 27-1305.4.b. This classification means that the Department has determined that the Site presents a significant threat to the public health or environment. The Site is more particularly described in the legal description that is attached hereto as Schedule "A."

The purpose of the Order is to address the environmental conditions at or migrating from the Site. The effective date of the Order was February 15, 2003. A copy of the Order, as well as any and all Department-approved Work Plans under this Order can be reviewed at the Department's Central Office located at 625 Broadway, Albany, New York by contacting Tara King.

This Notice of Order is being filed with the New York City Register in accordance with Paragraph IX of the Order to give all parties who may acquire any interest in the Site notice of this Order.

WHEREFORE, the undersigned has signed this Notice of Order in compliance with the terms of the Order.

ENDZONE, INC.

By: _____
Steven E. Pazar

Title: Assistant Secretary

Date: March 10, 2003

STATE OF MASSACHUSETTS)
) ss.:
COUNTY OF MIDDLESEX)

On the 10th day of March, in the year 2003, before me, the undersigned, personally appeared Steven E. Pazar, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Signature and Office of Individual Taking Acknowledgment

Commission expires: 7-10-03

SCHEDULE A

A portion of real property located in Ozone Park, Queens County, New York within the block bounded by 99th and 100th Streets to the east and west, and by 101st and 103rd Avenues to the north and south, and beneath an abandoned elevated Long Island Railroad right of way consisting of part of Block 9106, Lot 70 on the Tax Map of the City of New York

NOTICE OF ORDER

Endzone, Inc.

Block 9106
Lot 70
Ozone Park, Queens, New York

Return By Mail To:

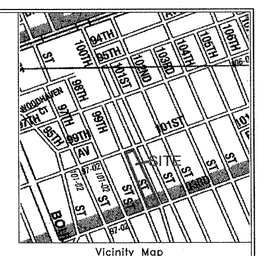
Denise D. Pursley, Esq.
Nixon Peabody LLP
990 Stewart Avenue
Garden City, New York 11530

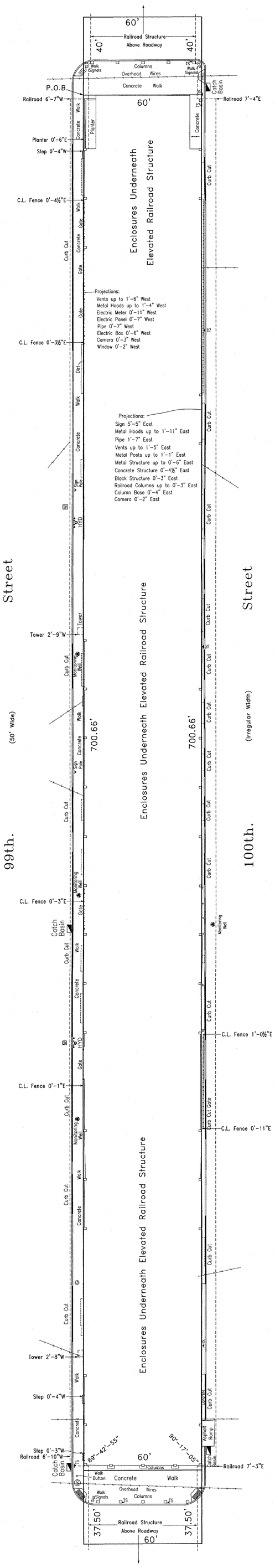
Reserve This Space For Use Of Recording Office

LEGEND

Tree & Caliper	⌀"
Water Valve	W
Gas Valve	G
Fire Hydrant	HYD
Traffic Sign	T.S.
Siamese Connection	
Overhead Wires	
Iron Fence/Railing	
Chain Link Fence	
Steel Face Curb	
Concrete or Stone Curb	
Drop Curb	
Point of Beginning	P.O.B.







DESCRIPTION
QUEENS TAX BLOCK 9106 LOT 70

ALL that certain plot, piece or parcel of land, situated, lying and being in the County of Queens, State of New York bounded and described as follows:

BEGINNING at the corner formed by the intersection of the southerly side of 101st Avenue (80' wide) and the easterly side of 99th Street (50' wide);

RUNNING thence easterly along the southerly side of 101st Street, 60 feet to the westerly side of 100th Street;

THENCE southerly along the westerly side 100th Street, 700.66 feet to the northerly side of 103rd Avenue;

THENCE westerly along the northerly side of 103rd Avenue, 60 feet to the easterly side of 99th Street;

THENCE northerly along the easterly side of 99th Street, 700.66 feet to the point or place of beginning.

THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL EASEMENT HELD BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PURSUANT TO TITLE 36 OF ARTICLE 71 OF THE NEW YORK ENVIRONMENTAL CONSERVATION LAW.

THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN ("SMP"). A COPY OF THE SMP MUST BE OBTAINED BY ANY PARTY WITH AN INTEREST IN THE PROPERTY. THE SMP CAN BE OBTAINED FROM THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION OF ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT derweb@.dec.ny.gov.

DEC SITE NUMBER–

NOTES

1) At the time of this survey there was no observable evidence of recent earth moving work, building construction, or building additions.

2) There is no evidence of recent street or sidewalk construction or any proposed changes in street right of way lines.

3) There are no wetland areas delineated on this property.

4) No portion of the property shown on the survey lies within a special hazard area, as described on the Flood Insurance Rate Map Number 3604970237F, dated September 5, 2007, for the community in which the subject property is located (Zone X)

5) There are no porking spaces on this property.

TITLE No.
EFFECTIVE DATE:

AREA (NOT INCLUDING THE BED OF 101st. AVENUE OR 103rd. AVENUE = 42,039 SQ. FT. or 0.97 Acres
TAX BLOCK 9106 – LOT 70
BOROUGH OF QUEENS, CITY OF NEW YORK

Scale: 1cm = 1.92 m.
1.92m 3.84m 5.76m 7.68m

Scale: 1"=30'
0' 30' 60'

"ALTA/NSPS LAND TITLE SURVEY"

To:

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1,2,3,4,7(a),8,9 and 14 of Table A thereof. The field work was completed on February 4, 2025.

David A. Shaw
License Number: 50252
Date of Plat or Map: February 4, 2025

ERLANDSEN-CROWELL & SHAW
FOUNDED IN 1852 BY E.K. CONKLIN
Civil Engineers & City Surveyors
241 JERICHO TPKE NEW HYDE PARK, NY 11040 516–326–4353 718–526–0339

70832

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AECOM
250 Apollo Drive
Chelmsford, MA 01824

978.905.2100 tel
978.905.2101 fax

March XX, 2025

Mr. Donovan Richards Jr
Queens Borough President
Queens Borough Hall
120-55 Queens Boulevard
Kew Gardens, NY 11424

Subject: Environmental Easement

Dear Mr. Richards,

Attached please find a copy of an environmental easement granted to the New York State Department of Environmental Conservation ("Department")

on _____,

by Endzone, Inc.,

for property at 102-20 99th Street, Ozone Park, Queens, NY,

Tax Map No. Block 09106, Lot 0070,

DEC Site No: 2-41-033.

This Environmental Easement restricts future use of the above-referenced property to restricted commercial or industrial uses. Any on-site activity must be done in accordance with the Environmental Easement and the Site Management Plan which is incorporated into the Environmental Easement. Department approval is also required prior to any groundwater use.

Article 71, Section 71-3607 of the New York State Environmental Conservation Law requires that:

1. Whenever the department is granted an environmental easement, it shall provide each affected local government with a copy of such easement and shall also provide a copy of any documents modifying or terminating such environmental easement.

2. Whenever an affected local government receives an application for a building permit or any other application affecting land use or development of land that is subject to an

environmental easement and that may relate to or impact such easement, the affected local government shall notify the department and refer such application to the department. The department shall evaluate whether the application is consistent with the environmental easement and shall notify the affected local government of its determination in a timely fashion, considering the time frame for the local government's review of the application. The affected local government shall not approve the application until it receives approval from the department.

An electronic version of every environmental easement that has been accepted by the Department is available to the public at: http://www.dec.ny.gov/chemical/36045.html. Please forward this notice to your building and/or planning departments, as applicable, to ensure your compliance with these provisions of New York State Environmental Conservation Law.

If you have any questions or comments regarding this matter, please do not hesitate to contact me. Please contact me if you have any questions.

Yours sincerely,

Marcie Redmond
Task Manager
AECOM
Marcie.Redmond@aecom.com

Raimundo Matos, Ph.D., LSP
Project Manager
AECOM
Raimundo.Matos@aecom.com

APPENDIX C

Interim Site Management Plan

Former Ozone Industries, Inc.

OZONE PARK

QUEENS, NEW YORK

Interim Site Management Plan

NYSDEC Site Number: 2-41-033

Prepared for:

Endzone, Inc.

P.O. Box 920

Elmer, NJ 08318

Prepared by:

AECOM

250 Apollo Drive

Chelmsford, MA 01824

978-905-2100

Revisions to Final Approved Interim Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date

JULY 2016

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INTERIM SITE MANAGEMENT PLAN

1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM

1.1 INTRODUCTION

This Interim Site Management Plan (ISMP) will guide site operation, monitoring and maintenance activities, including the start-up and operation of the Soil Vapor Extraction System (SVE) and Sub-slab Depressurization System (SSDS), as well as interim groundwater monitoring and an off-site soil vapor sampling element over the next approximately one to two years at the former Ozone Industries Inc. Site (the site). After that time, the effectiveness of the remedial systems will be evaluated to determine whether they must continue operating or whether they may be decommissioned. The need for continued groundwater monitoring, institutional controls (e.g., an environmental easement) with an updated site management plan (SMP) and long-term periodic review monitoring will be deferred and evaluated at that time.

1.1.1 General

Endzone, Inc. entered into an Order on Consent with the NYSDEC to remediate a 0.25 acre property located in Ozone Park, Queens, New York City, New York. This Order on Consent required the Remedial Party, Endzone, Inc., to investigate and remediate contaminated media at the site.

The contaminated soil excavation component of the remedy is complete but some residual soil contamination remains in the subsurface at the site. This ISMP was prepared to manage the remaining contamination at the site and can only be revised with the approval of the NYSDEC.

For proper implementation of this ISMP and to ensure the QA/QC of the sampling data (air, groundwater) is representative of the site conditions throughout, it is preferable that all 8 Bays (the site) remain vacant and be continuously accessible during initial system operation and monitoring (3 – 8 months).

1.2 SITE BACKGROUND

1.2.1 Site Location and Description

The site is located in a mixed commercial/industrial/residential area of the Ozone Park section of Queens County of New York City, New York and is identified as Block 9106 and Lot 70 on the New York City Tax Map. The site is an approximately 0.25-acre area bounded by 101st Avenue to the north, 103rd Avenue to the south, 101st Street to the east, and 100th Street to the west (see Figures 1 and 3). The site is located across the street from 101-32 101st Street, the location of the former Ozone Industries facility.

This Class 2 Inactive Hazardous Waste Disposal Site (Class 2 site) consists of eight Bays (totaling 12,000 square feet) situated beneath an abandoned, elevated Long Island Railroad (LIRR) (Figure 2). Each Bay, approximately 25 feet wide and 60 feet long, is property between the support columns of the elevate LIRR. The Bays are owned by the City of New York and leased to various tenants for different uses. Several of these Bays were used for storage of spent trichloroethene (TCE) in conjunction with the manufacture of aircraft parts (1948 to 1996).

1.2.2 Site History

For some period prior to 1998 the Ozone Industries facility rented, for storage purposes, several Bays beneath the LIRR that make up this Class 2 site. The Bays, typically constructed of cinder block walls and concrete or asphalt floors, were used to store solvents, hydraulic fluids, and scrap metal chips in roll-off containers that resulted from the Ozone Industries manufacturing activities. The facility manufactured aircraft parts including landing gears, hydraulic assemblies, aircraft steering assemblies and flight controls. It is believed that releases of solvents, oil and/or fluids may have occurred in one or more of these Bays. The Ozone Industries Facility was sold in 1998.

In 2002, the Department listed the site as a Class 2 site in the NYS Registry of Inactive Hazardous Waste Disposal Sites in New York. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

Several site investigations took place between 1996 and 2003 which involved the Ozone Industries site. In 1996, the New York City School Construction Authority conducted a Phase I and Phase II Environmental Site Assessment of the Former Voges Manufacturing Company property located south of 103rd Avenue on 99th Street (currently PS65). The 1996 Phase I Report identified Ozone Industries as having a 2000-gal storage

tank that was used to store TCE and reported TCE in the groundwater at the Former Voges Manufacturing Company property. This led to further investigations at and near the Ozone Industries facility.

Two Environmental Site Assessments, Phase I in 1997 and Phase II in 1998, were conducted at the Ozone Industries facility across the street from the site (Bays 8-15). These investigations included inspection of existing aboveground storage tanks, underground storage tanks and a depressed area for staging 55-gallon drums. Soil samples were also collected and tested for petroleum related compounds. Some petroleum contamination was detected and a 1,000 gallon underground storage tank and 2 open pits were later closed in October 1999. The 1997 Phase I Report also stated that waste TCE was placed in 55-gal drums and stored across the street in areas located underneath the elevated LIRR. No evidence of the use of polychlorinated biphenyls (PCBs) was found.

In the summer of 1999, the Department conducted a Preliminary Site Assessment (PSA) in the vicinity of the Former Voges Manufacturing Company property (103-22 99th Street) and the Ozone Industries facility (101-132 101st Street) to determine the source of the TCE contamination in the groundwater. Twenty one groundwater sampling points were installed in the sidewalks upgradient and west of the Ozone Industries facility and in the area of the Former Voges Manufacturing Company property. TCE was found in a majority of the samples at varying concentrations except the upgradient samples did not detect any TCE in the groundwater. The PSA findings indicated there was a source of TCE contamination near the Ozone Industries facility, possibly from stored drums beneath the elevated LIRR.

The Department conducted further field investigations in June 2001, July 2002, August 2002 and May 2003 to collect additional soil samples, groundwater samples and soil vapor samples. This investigative work expanded on the earlier PSA investigations and included temporary well points, soil borings for piezometers and 19 permanent soil vapor wells. The analysis of soil samples for VOCs did not indicate detectable levels in the majority of the samples. The groundwater sampling results indicated decreasing TCE concentrations with depth and TCE was detected in all the soil vapor samples.

The Remedial Investigation (RI) and Feasibility Study (FS) Report for the site was completed by AECOM (dated June 2009) and was approved by the NYSDEC in a letter dated October 14, 2009. The Record of Decision (ROD) was issued by NYSDEC in February 2010. The AECOM Remedial Design Work Plan (dated January 2011) for

completing the Remedial Design/Remedial Action Work Plan (RD/RAWP) was approved by the NYSDEC in a letter dated January 31, 2011. A draft RD/RAWP was submitted to NYSDEC and NYSDOH in August 2011. The NYSDEC issued an approval letter for the RD/RAWP on October 25, 2011, and the final RD/RAWP is dated November 2011. Soil excavation and partial system installation was completed in summer 2013. Subsequently, permitting and access tasks in regard to reconstruction of the Bay interiors and system installation were completed. The Bay interiors were reconstructed July through September 2015 and the remedial system began operation in April 2016.

1.2.3 **Geologic Conditions**

Based on soil borings advanced at the site during the RI/FS activities, the overburden consisted of a fill unit underlain by a sand unit. An unconsolidated silt-sand-gravel fill material (dark gray in color) was encountered in the borings underneath the Bays from 3 to 4 feet below ground surface (bgs) and in the off-site borings from 1 to 3 feet bgs. A native sandy soil was observed at all soil borings, underlying the unconsolidated fill material. This mostly homogenous native sandy soil consists of medium to coarse grained clean sands (light brown to yellowish orange in color) was encountered from an average depth of 2.5-feet bgs to the end of the deepest borehole (75-feet bgs). According to a Bedrock Geologic Map of the New York Metropolitan Area, the Ozone Park area is surrounded by unconsolidated glacial deposits. Bedrock in the area of the site consists of Early Paleozoic rock (mostly metamorphic) and it is encountered at a depth of over 500 feet bgs.

The nearest down slope surface water body to the site is the Shellbank Basin, which is 1.5-miles south of the site. Runoff is inferred to drain off-site via overland flow into storm drains located on the streets. Surface water runoff enters storm drains in the area, which discharge into the Jamaica Bay.

The presence of water saturated subsurface soils was noted in the RI/FS boring logs. In general, groundwater was encountered at approximately 30-feet bgs. Water level measurements rounds completed during the years 2004 through 2006 indicate similar groundwater level results. Based on these elevations, the apparent groundwater flow direction is south across the site vicinity, consistent with previous findings and reports. Groundwater elevations tables and groundwater contour maps depicting the groundwater elevations from 2005 and 2006 are included in the RI/FS report.

The average groundwater hydraulic conductivity (K) value at the site is approximately 120 feet per day. This value is within ranges for glacial outwash on Long

Island and is consistent with the site geology, which is medium to coarse grained sands. Assuming a hydraulic gradient of 0.1 foot water level decline every 100 feet and porosity typical of coarse sands of 0.3, groundwater velocity would be 0.4 ft./day. A groundwater flow figure from the RI/FS Report is attached as Figure 4.

1.3 SUMMARY OF REMEDIAL INVESTIGATION FINDINGS

A Remedial Investigation (RI) was performed to characterize the nature and extent of contamination at the site. The results of the RI are described in detail in the following reports:

- RI/FS Work Plan (May 2004) for the site approved in a letter by NYSDEC (dated July 8, 2004);
- February 15, 2006 Data Package Letter Report completed by AECOM submitted to NYSDEC followed by the final Data Package Letter Report dated June 8, 2006 (based upon NYSDEC comments provided in a letter dated May 23, 2006);
- RI/FS Work Plan Addendum submitted to NYSDEC (dated June 9, 2006);
- Additional Remedial Investigation Data Package Letter Report submitted on March 29, 2007 and on September 14, 2007 (final Additional Remedial Investigation Data Package Letter Report based on NYSDEC comments provided in a letter dated July 12, 2007); and
- Revised RI/FS Report and Conceptual Site Model Report (June 2009).

Generally, the RI determined that the presence of a localized area of VOC and TCE-impacted surface soil at the site. The VOC and TCE- impacted soil levels are noticeable higher directly beneath the concrete floor at the site; however, soil levels generally decrease with depth. The VOC levels found in the soil gas samples are probably attributed to such VOC impacted soils. Finally, due to the vertical distance between the VOC and TCE-impacted soils and the depth to water, and to the finding of non-detectable to low levels of VOCs in soils collected above the groundwater table, the results suggest that VOC contamination in groundwater in the site and off-site area may be affected by other possible sources.

The VOC levels in all of the soil samples utilized for the RI are below the Subpart 375-6 SCOs for Restricted Commercial and Industrial Use concentrations (used for comparison purposes). The levels of TCE and two other VOCs in soil samples collected

from the shallow levels beneath the site exceed the Subpart 375-6 SCOs for the Protection of Groundwater, however, these cleanup levels are not exceeded for all VOCs in all soil samples collected off-site and at the groundwater interface beneath the site. The results indicate that no significant impacts are present at depth beneath the site and in the soils in the immediate site vicinity.

The RI evaluated approximately 264 off-site grab and monitoring well groundwater samples collected since 1999. Groundwater analyses in 2005 and 2006 indicate the presence of VOCs generally consistent with previously detected levels. Levels (especially TCE) detected in 2006 are generally lower than previously detected in 2005 and considerably lower than those detected in 2002 and 2003. TCE was detected in the April 2005 and August 2006 samples from upgradient well PZ-01D (located along 101st Avenue), and samples from PZ-05 located east of the site on 101st Street (cross gradient or possibly upgradient of site) have contained levels of TCE in all samples collected since 2002 (and MTBE was detected in the April 2005 duplicate sample). See Figure 5 (Remedial Investigation Monitoring Well Locations) for well locations. The majority of the TCE levels in groundwater in the site vicinity are above the NYSDEC GA groundwater standard, but the levels appear to be decreasing with time.

The RI soil gas sampling included 13 sample locations in 2005, and 27 sample locations in 2006. Soil gas samples collected from site and off-site Bay locations indicate the presence of various VOCs and TCE. The highest levels of VOCs (and estimated TCE concentrations) we observed in soil gas samples collected directly beneath the concrete floor of Bays 8 through 15. Generally, lower VOC levels were detected in samples from the off-site soil gas sample locations (Bays north and south of the site and locations in streets east and west of the site). The soil gas sampling and analyses indicated the highest levels of VOCs (and estimated TCE concentrations) in soil gas samples collected directly beneath the site floor (Bays 8 – 15). Generally, lower VOC levels were detected in samples from the off-site locations (samples from adjacent Bays and streets).

A separate report (Conceptual Site Model Report) submitted simultaneously with the 2009 RI/FS Report presents the findings of three dimensional (3-D) modeling and the resulting figures. The soil and groundwater data from the various sampling events were evaluated graphically to determine if there were spatial trends in the data that could comment on potential sources within the site and off-site areas. This analysis allowed the data to be interpreted further in regard to separate and specific sources. The results of this work, which presents evidence about other possible sources of impacts in the area of the

site, are presented in the Conceptual Site Model Report (June 2009) by AECOM.

The presence of sumps in Bay 12 and soil impacts (headspace readings) deeper in this area than in other Bays were identified during pre-design assessment activities conducted in 2009. The assessment of the sumps is included in the Pre-Design Assessment Activities report, Attachment C to the RD/RAWP. Removal of these sumps is discussed in Section 1.4.1.1.

It was reported in 2009 that there is not a complete exposure pathway for contact with surface soils at the site due to the concrete and pavement floors in the Bays. If future construction work were to occur at the site, construction workers might potentially contact subsurface soils. The potential exposure pathway for indoor air is a complete pathway for workers at the site and off-site residents. Groundwater in the area is not used for drinking water. The only off-site receptor with a potential for direct contact with groundwater is a construction worker, but this is unlikely due to the depth of the groundwater (28 to 30 feet below grade). There are no surface water bodies within 1 mile of the site.

Below is a summary of site conditions when the RI was performed from 2004 to 2008:

1.3.1 **Soil**

The primary contaminants of concern (COCs) within the subsurface soil at this site are VOCs including TCE and its degradation product (cis-1,2 DCE). As part of the RI, subsurface soil samples from below the floors of the site (Bays 8-15) and off-site Bays 2, 4, 17, 24 and 28 were analyzed for VOCs. Subsurface soil samples below the sidewalks, both upgradient and downgradient of the site, were also investigated. Figure 6a presents the subsurface soil sampling results for TCE and cis-1,2 DCE in shallow soil and Figure 6b presents the results from deep soil.

Of the 90 subsurface soil samples collected, all were non-detect or well below the Unrestricted Use Soil Cleanup Objectives (SCOs) including upgradient and downgradient subsurface soil samples except for the shallow soils (0-2 feet deep). These shallow soil samples, collected directly beneath the asphalt or concrete Bay floors, were impacted by TCE and may have provided a continuing source of contamination for groundwater and soil vapor contamination. TCE was found as high as 150 ppm in the subsurface soil samples beneath the on-site Bay floors, with levels of TCE decreasing with depth, generally non-detectable near the groundwater table.

1.3.2 **Site-Related Groundwater**

Groundwater sampling was conducted near and in the vicinity of the site as early as 1996, prior to the RI. Then, in January 2005 to August 2006, as part of the RI, four rounds of groundwater sampling took place at 20 monitoring wells. The TCE levels detected in the groundwater in 2006 were generally lower than those detected in 2005 and considerably lower than those detected in 2002 and 2003. Figure 7a and Figure 7b depict TCE in groundwater over time. The applicable SCG (Class GA groundwater criteria) for TCE is 5 ppb.

In June 1999, the highest level of TCE in the groundwater was 22,000 ppb found just south of the site along 100th Street. The highest TCE level in the August 2006 groundwater sample was 260 ppb located along 99th Street. The August 2006 groundwater sample adjacent to the site (near Bay 7) had TCE at 7 ppb, slightly above the SCG for TCE.

Downgradient groundwater wells near 103rd Avenue, sampled in August 2006, had TCE concentrations ranging between 8.3 ppb and 74 ppb. TCE was also detected in the upgradient well along 101st Avenue in April 2005 (23 ppb) and in August 2006 (8 ppb).

The groundwater sampling results indicated decreasing TCE concentrations with depth with the highest concentrations at the groundwater/soil interface. Generally, three areas were found to have the highest concentrations of TCE in the groundwater: near Bays 14-20; near the intersection of 103rd Avenue and 99th Street; and on 98th street south of 103rd Avenue.

Given that the depth to water is approximately 30 feet and because analytical results for soils collected above the groundwater table indicate non-detectable to low levels of VOCs, it does not appear that VOCs are migrating from surface soil to groundwater.

1.3.3 **Site-Related Soil Vapor Intrusion**

The RI included soil vapor samples collected from beneath the site and off-site in 2005 and 2006. All samples, analyzed for VOCs, were collected between the depths of 4 and 8 feet bgs. Soil vapor sampling was also conducted in the vicinity of the site before the RI began, as early as 2002. The analytical results of TCE and cis-1,2 DCE in soil vapor for all samples from 2002 to 2006 are presented in Figure 8. The results were used to delineate the source area and evaluate the potential for exposures via soil vapor

intrusion. A concerted effort by Endzone, Inc., NYSDEC and NYSDOH was made to obtain off-site indoor air and sub-slab vapor data but access has not been granted by property owners.

The 2006 on-site soil vapor sample analyses found elevated sub-slab TCE contaminant levels in all eight Bays, as high as 675,000 ug/m3 (Bay 8). The 2006 off-site soil vapor samples were collected in the sidewalks outside the Bays and covered an area from 101st Avenue to below 103rd Avenue. The TCE soil vapor concentrations near 101st Avenue ranged from 252 ug/m3 to 5,960 ug/m3. South of the site, Bay 24 and Bay 28 were sampled (near 103rd Avenue). Bay 24 had TCE at 94,900 ug/m3 but Bay 28 was non-detect. Another four locations were sampled for soil vapor on 103rd Avenue and south toward Liberty Avenue and the all the 2006 results for TCE and cis-1,2 DCE were non-detect.

As discussed above, VOC and TCE- impacted soil levels are noticeably higher directly beneath the concrete floor at the site; however, impacted VOC and TCE soil levels generally decrease with depth. Therefore, the VOC levels found in the soil gas samples are probably attributed to such VOC impacted soils.

1.4 SUMMARY OF REMEDIAL ACTIONS

The site contaminated soils were remediated in 2013 in accordance with the NYSDEC-approved Remedial Design/Remedial Action Work Plan dated November 2011.

The following is a summary of the Remedial Actions performed or to be performed at the site:

1. Excavation of as much, as practical, of the shallow soils beneath Bays 8 through 15 exceeding commercial SCOs listed in Table 1, to approximately 4 feet bgs as shown on Figures 9a and 9b;
2. Replacement of excavated shallow soils with “clean fill”;
3. Construction and maintenance of a SSD system, underlying HDPE liner and SVE system to remediate non-accessible remaining contaminated soil, and subsequent soil vapors, remaining at the site. The HDPE liner and SSD system will also eliminate potential for vapor intrusion into the Bays while the SVE system will remediate in place soils, not accessible for excavation, and also provide vapor control from deeper soils and groundwater;

4. Groundwater monitoring; and
5. After the SVE system and the SSDS system has operated for some time, an Off-site Soil Vapor Sampling Plan will be developed and submitted to the Department to collect off-site soil vapor data in the vicinity of the site.

1.4.1 **Removal of Contaminated Materials from the Site**

The remedial action, related to removal of contaminated materials, for the site was to remediate impacted source areas to a level protective of public health and the environment to the extent feasible. Soil standards, criteria, and guidance (SCGs) are based on 6 NYCRR Part 375, Subpart 375-6: Remedial Program SCOs. A list of the SCOs for the primary COCs and applicable land use for this site are provided in Tables 1 through 3.

1.4.1.1 **Bay 12 Sumps**

As discussed above, two sumps located in Bay 12 were identified during the November 2009 pre-design investigation work. One sump (Sump #1, closest to 100th street) was approximately 24 inches in diameter, approximately 26 inches deep and had a solid bottom. Sump #2, located in the approximate center of the Bay, was approximately 24 inches in diameter, approximately 32 inches deep and had a solid bottom. Field headspace readings indicated elevated VOC impacts and subsequent laboratory analyses of material from the sumps indicated 1,1,1-Trichloroethane and TCE concentrations of 26,000 and 550,000 mg/kg, respectively. During on-site demolition activities, in June 2013, a third sump was identified but was not sampled as part of the pre-investigation. Exact locations of these sumps are shown on Figure 10.

Per the NYSDEC approved RD/RAWP, each of the sumps in Bay 12 were cleaned, and their contents drummed and disposed of off-site, prior to commencing soil excavation activities discussed below. Each of the sumps was a buried 55 gallon drum. Sump 1 was fully intact, did not show any signs of significant deterioration and no infiltration was observed post-cleanout. Sump 2 showed minor signs of deterioration and a very slow infiltration rate was observed post-cleanout. Sump 3 had holes drilled (or manually punctured) through the bottom, presumably to drain its contents into the subsurface. Sumps 1 and 2 were connected with a 1.5” PVC pipe sloped such that Sump 2 would drain into Sump 1. There were also 2 other small (~1”) PVC pipes that were stubbed up on the wall adjacent to 100th street that fed into Sump 1.

A total of 5 drums of material were generated during the Bay 12 sump cleanout.

Three drums of material came from Sumps 1 and 2 and were disposed of as hazardous based upon sample analyses from November, 2009 (manifests will be provided in the Final Engineering Report). Two drums of material came from Sump 3 and were disposed of as hazardous based upon sample analyses from August, 2013 (manifests will be provided in the Final Engineering Report).

1.4.1.2 **Concrete Slabs and Subsurface Soils**

Preliminary calculations, using RI data, indicated that approximately 75-80% of the site VOC mass appears immediately below (0-2 ft. bgs) concrete slabs in Bays 8 through 13 and 15. To address this primary source contamination, the floors in Bays 8-15 were removed and as much of the contaminated shallow soil, to the extent practical, was excavated from beneath these 8 Bays (site). A figure showing areas where excavation was performed is shown in Figures 9a and 9b. Post-excavation soil sampling was conducted in each of the 8 Bays, to document the condition of the soil left in place, and all excavated contaminated soil was disposed of at a permitted disposal facility. Clean backfill, from an NYSDEC approved source, was used to replace the excavated shallow soils. A cross section figure showing the thickness of cut and backfill is shown in Figure 11.

Each Bay was excavated, backfilled and compacted in two sections, designated the 99th street and 100th street side (Figure 12), per the structural engineering report submitted with the NYSDEC approved RD/RAWP in Appendix C. Excavation activities consisted of breaking up and removing 1-3" thick asphalt or 8-10" thick concrete flooring and then excavating impacted soil material down to 4 feet bgs. Post-excavation sampling consisted of one 5-point composite sidewall sample every 15-feet around the excavation sidewalls and one 5-point composite sample for approximately every 25-foot x 25-foot area within the excavation bottom. Post-excavation samples were analyzed for VOCs and % Solids. Locations of all post-excavation samples are shown on Figure 13 and the results of analyses are summarized in Table 1. A dedicated volume of each sample collected was also screened in the field (i.e., head space screening) for VOCs using a PID. Excavation limits were then determined by a licensed NYS surveyor prior to the first lift of DOT #4 crushed stone being placed and compacted. In each Bay, two ~14" lifts of backfill were placed, compacted to ~12" and compaction tested to meet 95% compaction requirement.

A total of 847.5 tons of impacted concrete, asphalt and shallow subsurface soils were disposed of at the Seneca Meadows Inc. landfill, in Seneca Falls, NY under waste

profile 2013-083-15RIC from July 24th to August 5th, 2013 (manifests will be provided in the Final Engineering Report).

1.4.2 **Site-Related Treatment Systems**

Following the contaminated soil excavation, the subgrade piping for the approved SVE and SSDS systems was installed in the Bays. The SVE system consists of 24 vapor extraction wells (21 single levels, and 3 dual-level) spaced throughout the site. Similarly, the SSD system consists of 16 active horizontal SSD legs. The locations of the SVE and SSD systems are shown in Figure 14 and 15, respectively.

1.4.3 **Remaining Contamination**

Post-excavation soil sampling was conducted in each of the 8 Bays (site), to document the condition of the soil left in place after excavating as much shallow subsurface soils as practical per the structural engineering report and remedial design. Table 2 and Figure 16 (TCE only) summarize the results of all soil samples remaining at the site after completion of Remedial Action that exceed the unrestricted SCOs. Table 3 and Figure 17 (TCE only) summarize the results of all soil samples remaining at the site after completion of Remedial Action that exceed the site-specific restricted commercial SCOs. Base post-excavation samples represent the remaining levels of contamination at 4 feet bgs within the interior of each Bay. Sidewall post-excavation samples represent the remaining levels of contamination at 1.5-4 feet bgs along the 99th and 100th street edges of each Bay and the Bay 7 and Bay 16 edges, for Bays 8 and 15, respectively.

Several subsurface concrete structures were encountered during excavation activities at the site and are identified on Figure 18. The two main structures encountered ran the length of the Bays parallel to 99th and 100th street and included: 1) a 14” wide, poured concrete structure, of undetermined origin and purpose, beginning at approximately 2.5 feet bgs and extending below 4 feet bgs (exact depth extent undetermined) and 2) a 2’x2’ concrete encased group of empty (unused) ceramic conduits (6 total) beginning at approximately 2.5 feet bgs and extending down to 4.5 feet bgs. All subsurface infrastructures, with the exception of a 25 feet length of the concrete encased unused ceramic conduits (which was removed to determine depth extent), was excavated around, fully exposed, cleaned and left in place.

1.4.4 **Bay 12 Sumps**

As discussed above, in Section 1.4.1.1, Bay 12 contained three buried 55-gallon drum sumps with varying degrees of deterioration and potential for subsurface

infiltration. Sumps 1 and 2 did not show any signs of significant infiltration into the subsurface post-cleanout. However, Sump 3 had holes drilled (or manually punctured) through the bottom and the subsequent infiltration into the subsurface was observed during Bay 12 excavation activities. Material from Sump 3 appears to have been leaching into the subsurface of Bay 12 on the 99th street side. It was contained below a 3-4" concrete slab that was encountered at approximately 18" below ground surface. This slab was only encountered on the 99th street side of Bay 12. The observed distribution of this material within the subsurface between the secondary slab (1.5 ft. bgs) and the post-excavation depth (4 ft. bgs) is shown on Figure 19. A TPH fingerprint analysis on the composite post-excavation base sample (12W- SB-B-A) from the 99th street side of Bay 12 provided the following information: "Based on the data generated sample, 12W-SB-B-A (L1315909-01) contains material eluting in the low, mid and heavy molecular weight ranges of the chromatogram. The material appears to be similar to a combination of kerosene and heavy molecular weight material which is similar to lubricating oil. These products combined can be indicative of a cutting oil type product. In an analysis of an un-degraded product the n-alkanes are typically the dominant constituents, as seen in the petroleum reference chromatogram. As the product degrades, the n-alkanes are preferentially digested, leaving behind other constituents such as isoprenoids. The analytical testing of the sample identified a pattern of alkanes and isoprenoids. The presence of alkanes and isoprenoids indicate that the fuel oil has not undergone degradation." Additional information will be provided in the Final Engineering Report.

2.0 ENGINEERING CONTROLS

2.1 GENERAL

The approved remedy requires the installation of an SSDS system and an SVE system, both of which are Engineering Controls.

2.1.1 Sub-slab Depressurization System

The SSD system was installed to protect indoor air quality by eliminating potential for vapor intrusion into the Bays. According to the NYSDOH Indoor Air Guidance, the State of New York does not have any standards, criteria or guidance values for concentrations of VOCs in subsurface vapors. Therefore the remedial design for the SSD system included the reduction of sub-slab vapor to the extent practical and compliance with requirements set forth in 6 New York Codes Rules and Regulations (NYCRR) Part 257 – Air Quality Standards and DAR-1.

The SSD system was designed in order to maintain a negative pressure beneath the area of concern (Bays 8 through 15, the site) until VOCs have been reduced to the point that no significant risk is present for subsurface vapors to migrate into the breathing space in the site Bays. Soil excavation has been completed over the entire footprint of the area of concern and backfilled with permeable fill that is of equal or greater permeability to the excavated site materials (which had favorable results during pilot testing).

For the SSD system, based on industry standards, it is expected that a flow rate of 20 SCFM for every 1,000 square feet of space is required to maintain adequate protection for mitigation of potential subsurface vapor migration. The entire area of concern in this case is 12,000 square feet. Based on this standard, a total design flow rate of 240 SCFM is required to maintain adequate negative pressure beneath the entire area of concern or site. This flow rate will be achieved with a blower capable of producing a vacuum of 15 IWC. The blower will be connected to the network of horizontal SSD legs with independent piping and valves such that flow and pressure can be balanced across the area as necessary. A total of 16 horizontal SSD legs (two legs in each Bay) are installed at the site. The horizontal legs consist of 40 ft. long sections of 2” diameter 0.020-inch slotted Sch. 40 PVC well screen installed at approximately 1 foot bgs as shown on Drawings in Appendix A.

Individual 2” PVC pipes are connected to the combined slotted SSD system legs in each Bay and run back to the system, where they are connected to the SSD system

manifold. Piping, was installed with a 1% slope from the SSD system to the horizontal legs, to allow condensate to drain back into the horizontal legs. Each of the eight (8) 2-inch PVC pipes, which extend from the 16 SSD horizontal legs (2 legs per Bay connected to a common header) to the SSD system, are independently connected via 2-inch hoses to the SSD manifold. The manifold provides the capability to independently monitor VOCs, vapor flow rates, and applied vacuums. Refer to Appendix A for construction details.

The SSD Remedial System Housing consists of a temporary skid, containing a regenerative vent blower (10HP, 460VAC, 3-phase TEFC VFD controlled motor), 60 gallon moisture separator, passive heat exchanger, UL listed PLC based control panel with mounted VFD, installed within the 100th street side of Bay 8 as shown on Figure 20. Given the proximity to actively leased Bays and neighboring businesses, a galvanized steel sound enclosure, with sound attenuation lining, duct hoods and enclosure ventilation package, has been designed around the SSD regenerative vent blower to minimize noise.

In order to maintain best management practices and meet requirements of DER-10, and because the proposed remediation system is located in a residential area, vapor phase granular activated carbon (VGAC) will be utilized for off gas treatment. The off gas treatment is sized appropriately to maintain 95% destruction of system influent contaminants throughout its period of operation. Two 1,000lb VGAC vessels will be installed in series for SSD off gas treatment. During later stages of the system operation, when influent concentrations decrease to very low levels, it may not be possible to maintain 95% destruction. In this case the system will be evaluated against current standards, and the use of off gas treatment may be discontinued or other modifications may be made in order to meet current regulatory requirements.

A new power drop was procured and installed within the 100th street side of Bay-8 to power the SSD equipment. The 100th street side of Bay 8 will not be in use (i.e., rented and/or leased) during the operation of the SSD system. All underground piping has been extended from each set of SSD legs (2 legs per Bay, 8 sets total) to the system control location. Signs clearly indicating AECOM as the system operator with appropriate contact information are located outside of the Bay.

2.1.2 **Soil Vapor Extraction System**

The SVE system has been installed to remediate in place soils, not accessible for excavation due to structural concerns, and to provide vapor control from deeper soils and groundwater. The remedial goal for the SVE system will include the reduction of sub-

surface soil vapor to the extent practical. See Section 2.2.2 for the description of site conditions to discontinue operating the SVE system.

At a design flow rate of 25 SCFM at 5 IWC (at each well), the total anticipated required flow is approximately 675 SCFM and the total anticipated suction, including suction losses due to piping and discharge losses for off-gas treatment, is estimated to be approximately 10 IWC. Therefore, the network of 24 vapor extraction wells (21 single-level wells and 3 dual-level wells) is expected to provide adequate coverage over the target remediation zone. Each vertical SVE well is piped and valved independently to balance flow and vacuum/pressure. The SVE wells are positioned equidistant (~25') and on center within each Bay to ensure that the entire area from Bay 8 through 15 is under a constant vacuum. There are three vertical SVE wells installed within each Bay; dual level wells are installed within Bay 12 and single level wells are installed within the remainder of the Bays or site.

The SVE wells are constructed of 2" diameter Sch. 40 PVC. Screened sections of the SVE wells consist of approximately 10 feet of 0.020-inch slotted Sch. 40 PVC well screen, extending to approximately 15 feet below ground surface. The screened sections of the deep SVE wells (applicable only to the dual-level wells) consist of approximately 15 feet of 0.020-inch slotted Sch. 40 PVC well screen, extending to approximately 30 feet below ground surface (Bay 12 only). The annular space around the screened intervals was backfilled with sand, followed by a one-foot bentonite seal and bentonite/cement slurry to 4 feet bgs, the remainder of the borehole annulus was filled with natural backfill and 3/8" crushed pea stone as shown in Appendix A.

The screen lengths are each connected to a section of solid riser. The solid riser is connected to a PVC T which allows the piping to extend both to the surface, where access is available to the well in the field via a standard 8-inch road box, and to the SVE manifold. Individual 2" PVC pipes are connected to each SVE well and run back to the system, where they are connected to the SVE manifold. Each pipe is connected to a separate leg on the SVE System manifold. Piping was installed with a 1% slope from the SVE system to the wellheads to allow condensate to drain back into the SVE wells. Each of the twenty-seven (27) 2-inch PVC pipes, which extend from the 24 SVE wells (1 pipe for single level wells, 2 pipes for dual level wells) to the SVE system, are independently connected via 2-inch hoses to the SVE manifold. The manifold provides the capability to independently monitor VOCs, vapor flow rates, and applied vacuums. Refer to Appendix A for construction details.

The SVE Remedial System Housing consists of a temporary skid, containing a regenerative vent blower (25HP, 208VAC, 3-phase TEFC VFD controlled motor), 120 gallon moisture separator, passive heat exchanger, UL listed PLC based control panel with mounted VFD, installed within the 100th street side of Bay 8 as shown on Figure 20. Given the proximity to actively leased Bays and neighboring businesses, a galvanized steel sound enclosure, with sound attenuation lining, duct hoods and enclosure ventilation package, has been installed around the SVE regenerative vent blower to minimize noise.

In order to maintain best management practices and meet requirements of DER-10, and because the proposed remediation system is located in a residential area, vapor phase granular activated carbon (VGAC) is being utilized for off gas treatment. The off gas treatment is sized appropriately to maintain 95% destruction of system influent contaminants throughout its period of operation. Currently, two 2,000lb VGAC vessels are installed in series for SVE off gas treatment. During later stages of the system operation, when influent concentrations decrease to very low levels, it may not be possible to maintain 95% destruction. In this case the system will be evaluated against current standards, and the use of off gas treatment may be discontinued or other modifications may be made in order to meet current regulatory requirements.

A new power drop was procured and installed within the 100th street side of Bay-8 to power the SVE equipment. The 100th street side of Bay 8 will not be in use (i.e., rented and/or leased) during the operation of the SVE system. All underground piping has been extended from each SVE well to the system control location. Signs clearly indicating AECOM as the system operator with appropriate contact information are located outside of the Bay.

2.2 CRITERIA FOR COMPLETION OF REMEDIATION/TERMINATION OF REMEDIAL SYSTEMS

Generally, remedial processes are considered completed when effectiveness monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.6 of NYSDEC DER-10.

2.2.1 Sub-slab Depressurization (SSD) System

The active SSD system will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the SSD system is no longer required, a proposal to discontinue the SSD system will be submitted by

Endzone, Inc. or the property owner to the NYSDEC and NYSDOH. It is expected that air monitoring of the SSD system effluent over three consecutive quarters (3 months for each quarter) that indicate non-detectable levels would be sufficient to propose the discontinuation of the SSD system.

2.2.2 Soil Vapor Extraction (SVE) System

The SVE system will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the SVE system is no longer required, a proposal to discontinue the system will be submitted by Endzone, Inc. or the property owner. Conditions that warrant discontinuing the SVE system include contaminant concentrations in groundwater that reach levels that are consistently below ambient water quality standards, influent levels have become asymptotic to a low level over an extended period of time (3 quarters or approximately 9 months) as accepted by the NYSDEC, or the NYSDEC has determined that the SVE system has reached the limit of its effectiveness. This assessment will be based in part on system monitoring or other site data. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC.

2.3 MONITORED NATURAL ATTENUATION (MNA)

Groundwater monitoring activities to assess natural attenuation will continue, as determined by the NYSDEC, until residual groundwater concentrations are found to be consistently below NYSDEC standards or have become asymptotic at an acceptable level over an extended period. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC.

2.4 INSPECTIONS AND NOTIFICATIONS

2.4.1 Inspections

Inspections of all remedial components will be in accordance with the procedures and frequencies in the Monitoring Plan in Section 3.

A comprehensive site- wide inspection will be conducted annually. The inspections will determine and document the following:

- Whether Engineering Controls continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this ISMP;

- Achievement of remedial performance criteria;
- Sampling and analysis of appropriate media during monitoring events;
- If site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring system.

2.4.2 Notifications

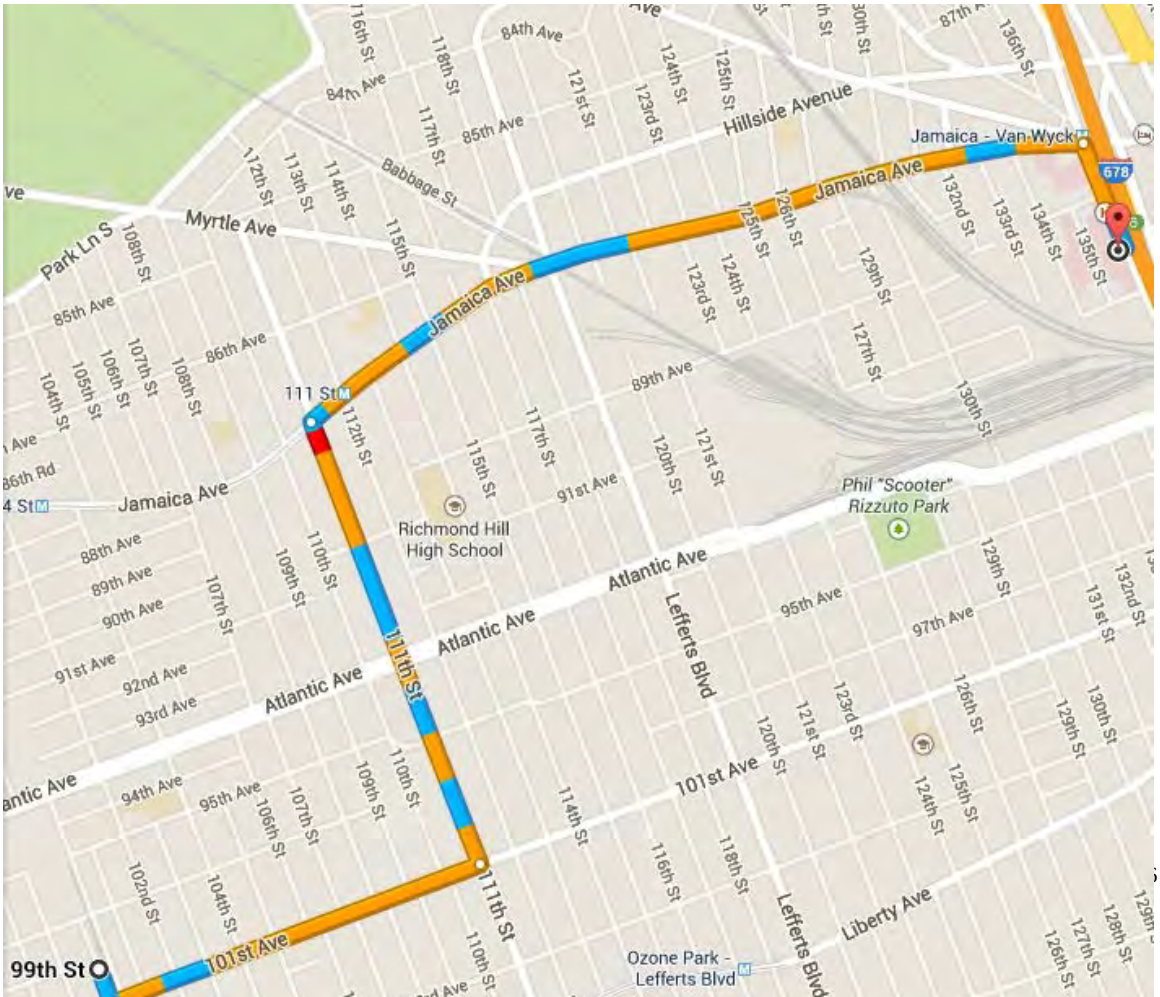
Notifications will be submitted by Endzone, Inc. to the NYSDEC (see Table 5) as needed for the following:

- Provide notice within 48-hours of any damage to the Engineering Controls that significantly reduces its the effectiveness.
- Email, by the following day, of any emergency, such as a fire, flood, or earthquake that reduces the effectiveness of Engineering Controls at the site.

These actions shall be described in the subsequent Monthly Progress Report submitted to the NYSDEC.

2.5 CONTINGENCY PLAN

2.5.1 Figure 21 Map of Route from Site to Hospital



Site Location: 101-61 99th St, Ozone Park, NY 11416
Nearest Hospital Name: Jamaica Hospital
Hospital Location: 8900 Van Wyck Express Way, Jamaica, NY 11418
Hospital Telephone: 718-206-6000
Directions to the Hospital:
Head south on 99th St toward 101st Ave.
Take the 1st left onto 101st Ave.
Turn left onto 111th St.
Turn right onto Jamaica Ave.
Turn right onto Van Wyck Expressway State Rd W.
Total Distance: 2.6 miles
Total Estimated Time: 8 minutes

As appropriate, the fire department and other emergency response group will be notified immediately by telephone of an emergency. The list in Table 4 will also be posted prominently in the Bay containing the remedial system and made readily available to all personnel at all times.

Table 4: Emergency Contact Numbers

Medical, Fire, and Police:	911
One Call Center:	(800) 272-4480 (3 day notice required for utility mark out)
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

Table 5: Other Contact Numbers

NYSDEC	John Durnin, 518 402 9797
Endzone, Inc.	Ted Coyle, 214 649 0590
AECOM	David Austin, 978 – 905 - 2114

* Note: Contact numbers subject to change and should be updated as necessary

2.5.2 **Corrective Measures Work Plan**

If any component of the SVE or SSDS systems requires repair involving excavation of the floor and vapor barrier, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the required work and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC.

2.5.2.1 **Remediated Site Conditions**

The site has been remediated as per the RAWP. The existing site conditions in all eight bays include (beginning at the surface):

- New six inch reinforced concrete slab,
- Continuous geotextile layer,
- Continuous HDPE liner, sealed at all the support structures and edges,
- 3”-6” DOT #4 crushed stone aggregate layer,
- 12”-15” of 3/8 dia. pea stone layer,
- Minimum of 24” of DOT #4 crushed stone aggregate layer.
- Total depth: approximately 45” to 51”

2.5.2.2 **Site Restoration**

Should any invasive activities occur, the new reinforced concrete floor and vapor

barrier will be restored to its original condition in a manner that complies with the approved RAWP.

No special handling of soil is required if the work does not extend below the existing clean DOT #4 crushed stone aggregate backfill (approximately 45” to 51”).

Any imported soils will meet the backfill soil quality standards established in 6NYCRR 375-6.7(d) and be pre-approved by NYSDEC.

A figure showing details of the final repair will be included in an updated ISMP.

3.0 SITE MONITORING PLAN

3.1 INTRODUCTION

3.1.1 General

The Monitoring Plan describes the measures for evaluating the performance and effectiveness of the remedy to reduce or mitigate contamination at the site and all affected site media identified below.

3.1.2 Purpose and Schedule

This Monitoring Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media, including groundwater and soil vapor from SSD and SVE systems;
- An off-site soil vapor sampling component for potential vapor intrusion near the adjacent structures to be implemented after the SVE/SSDS systems have been operating and their effectiveness has been documented. At this point, detailed off-site soil vapor sampling plan would be submitted for approval.
- Assessing compliance with applicable NYSDEC standards, criteria and guidance, particularly ambient groundwater standards and Part 375 SCOs for soil;
- Assessing achievement of the remedial performance criteria;
- Preparing the necessary reports for the various monitoring activities.

To adequately address these issues, this Monitoring Plan provides information on:

- Sampling locations, protocol, and frequency;
- Information on all designed monitoring systems ;
- Analytical sampling program requirements;
- Reporting requirements;
- Quality Assurance/Quality Control (QA/QC) requirements; and
- Inspection and maintenance requirements for monitoring wells.

Monitoring programs are summarized in Table 6 and outlined in detail in Sections 3.2 and 3.3 below.

Table 6: Monitoring/Inspection Schedule

Monitoring Program	Frequency*	Matrix	Analysis
Groundwater	Quarterly, for at least 2 years, until approval from NYSDEC to modify or end the monitoring is obtained.	Groundwater	VOCs and MNA indicators
SVE System	Operation (on or off) - on- going by telemetry system. Influent and Effluent levels – as specified in Section 4 and quarterly for approximately 12 months to determine if the system has reached the limit of its effectiveness.	Air	VOCs
SSD System	Operation (on or off) - on- going by telemetry system. Influent (discharge from system/piping) - samples will be collected quarterly for approximately 12 months to determine if the SSD system has reached the limit of its effectiveness.	Air	VOCs
Off-site soil vapor sampling	After the SVE/SSDS systems have been operating and their effectiveness has been documented, a detailed off-site soil vapor sampling plan will be submitted for approval.	Air	VOCs

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC and NYSDOH

3.2 SSDS SYSTEM MONITORING (LABORATORY SAMPLES)

Any disturbance to or change in the Bay floor conditions will be recorded and included in the Quarterly Monitoring Report. The SSDS operation (is it operational or off) will be monitored by a telemetry system. Air samples will be collected from the system discharge when the SVE system operation and monitoring is indicating levels that have become asymptotic. At a minimum, samples will be collected quarterly for approximately 12 months for VOC analyses to determine if the SSDS has reached the limit of its effectiveness. The samples will be grab samples collected in a SUMMA canister, and analyses will be by EPA TO-15 Method. All SSDS samples will be utilized as needed to monitor the performance of the remedy and residual VOC levels in the

subsurface.

3.3 MEDIA (GROUNDWATER AND SVE) MONITORING PROGRAM

3.3.1 Groundwater Monitoring

The network of monitoring wells has been installed (or proposed) to monitor both up-gradient and down-gradient groundwater conditions at the site. The network of on-site (and off-site) 8 wells (existing) has been designed based on the following criteria that will be used for the monitoring program including:

- Upgradient – existing wells PZ-01 and PZ-01D on 101st Avenue;
- Next to site (Bays) along 99th Street – existing wells PZ-08 and PZ-09;
- Downgradient of site (Bays) – on 99th Street: existing wells PZ-10 (next to Bay 21) and MW-203 (across from Bay 25), and on 100th Street: existing wells MW-201S and MW-201D.

Figure 22 depicts the groundwater monitoring wells. Information on well construction, groundwater depths and flow, and groundwater quality is provided in previous reports including the Revised RI/FS Report and Conceptual Site Model Report (June 2009).

If any of the existing wells are no longer present or usable, an alternative plan for installing wells and / or monitoring will be presented to NYSDEC. Drilling methods will follow the procedures in the RI/FS Work Plan and well construction details will be provided subsequent to any new well installations.

The sampling frequency and duration will be quarterly for the first 2 years and then be re-evaluated for any the subsequent sampling frequency based on the historical data. Groundwater monitoring will continue until approval from NYSDEC to end the monitoring is obtained. Samples will be analyzed for VOCs via SW-846 Method 8260B and MNA indicator parameters.

The sampling frequency may be modified with the approval NYSDEC. The SMP will be modified to reflect changes in sampling plans approved by NYSDEC.

3.3.1.1 Groundwater Sampling Protocol

Groundwater sampling will be conducted in compliance with the procedures outlined in Sections 4.2.3, 4.3.2, 4.4 and 4.5 of the RD/RAWP.

3.3.1.2 **Monitoring Well Repairs, Replacement and Decommissioning**

Groundwater monitoring wells will be properly decommissioned and replaced (as per the Monitoring Plan), if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair of monitoring wells for the purpose of replacement. The repair and replacement process will be documented in the subsequent Quarterly Monitoring Report. Well decommissioning without replacement will be done only with a NYSDEC approved Well Decommissioning Plan and in accordance with NYSDEC's "Groundwater Monitoring Well Decommissioning Procedures". Monitoring wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC.

3.3.2 **SVE System Monitoring (laboratory samples)**

Air samples will be collected from the system influent when the SVE system operation and monitoring is indicating influent levels that have become asymptotic. At a minimum, samples will be collected quarterly for approximately 12 months for VOC analyses to determine if the SVE system has reached the limit of its effectiveness. The samples will be grab samples collected in a SUMMA canister, and analyses will be by EPA TO-15 Method. All SVE system samples will be utilized as needed to monitor the performance of the remedy and residual VOC levels in the subsurface.

3.4 **OFF-SITE SOIL VAPOR SAMPLING**

After the SVE/SSDS systems have been operating and their effectiveness has been documented, a detailed off-site soil vapor sampling plan will be submitted for approval.

3.5 **SITE-WIDE INSPECTION**

Site-wide inspections will be performed on a regular schedule at a minimum of once a year. Site-wide inspections will also be performed after all severe weather conditions that may affect Engineering Controls or monitoring devices.

3.6 **MONITORING QUALITY ASSURANCE/QUALITY CONTROL**

All sampling and analyses will be performed in accordance with the requirements of the Quality Assurance Project Plan (QAPP) prepared for the site which was presented

in the RD/RAWP (2011) in Attachment A. Updates to the QAPP as appropriate will be made and submitted to NYSDEC.

3.7 MONITORING REPORTING REQUIREMENTS

The electronic submission of Monthly Progress Reports to NYSDEC will continue as per the Consent Order. In addition, Quarterly Monitoring Reports will be submitted to NYSDEC for the first two years and while the SVE and SSDS systems are operating. All Quarterly Monitoring Reports will be submitted in digital format and will include, at a minimum:

1. Description of the activities performed;
2. Type of samples collected;
3. Sampling results in comparison to appropriate standards/criteria;
4. A figure illustrating sample type and sampling locations;
5. Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC- identified format);
6. Any observations, conclusions, or recommendations; and
7. A determination as to whether groundwater and SSDS and SVE system influent and effluent conditions have changed since the last reporting event.

4.0 OPERATION AND MAINTENANCE PLAN

4.1 INTRODUCTION

This Operation and Maintenance Plan describes the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the site. This Operation and Maintenance Plan:

- Includes the steps necessary to allow qualified trained technicians familiar with the site to operate and maintain the SSDS and SVE systems;
- Includes an operation and maintenance contingency plan; and,
- Will be updated periodically to reflect changes in site conditions or the manner in which the SSDS and SVE systems are operated and maintained.

A copy of this Operation and Maintenance Plan, along with the complete ISMP, will be kept at the site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of the ISMP.

4.2 ENGINEERING CONTROL SYSTEM OPERATION AND MAINTENANCE

4.2.1 SSD and SVE Systems

AECOM has completed the installation of the underground SSDS and SVE system components (SSDS/SVE extraction wells, monitoring wells, trenching and piping) as described in Sections 2.2.1.1 and 2.2.1.2. The above ground SSDS and SVE system mechanical equipment was installed in 2015 and 2016. T h e SSDS and SVE System Design with mechanical equipment drawings are included in Appendix A and will be replaced with as-built drawings (subsurface piping, SSDS extraction legs, SVE extraction wells, monitoring wells and stub-up locations). The system started operation in April 2016.

4.2.2 Scope

Monthly operation and maintenance (O&M) visits have begun as described below.

4.2.3 SSDS and SVE Systems Start-Up and Testing

4.2.3.1 Day One

The pre-startup inspection will be executed as follows:

- An inspection of the exterior and interior of control panel for damage that may have occurred during shipment will be performed. All interior components within panel will be checked for tightness (vibration during transport may loosen screw terminals, din rail mounted components, hardware, etc.). Motor starter overloads will be checked and reset if tripped.
- Before applying power to any equipment, the component manufacturers operation and start-up manual (compressor, blower, pump, etc.) will be reviewed. Some equipment cannot be operated in the wrong rotation even momentarily without damage therefore verifying proper rotation will only be done after thorough review of the associated equipment manual.
- All fluid levels, drive components, plumbing attachments, etc. will be inspected. The equipment will be initially started in a no-load condition with non-contaminated process fluid (i.e. SVE vacuum blower started with all recovery wells shut off, and the ambient air dilution valve open fully).

Once the pre-startup inspection has been performed the system startup will begin. First, the SSDS will be activated. AECOM will monitor the influent and effluent vapors removed from the shallow subsurface (SSDS horizontal piping) with a PID. The SSDS blower will be started at one half the intended vacuum. AECOM will operate the blower at this level for approximately 30 minutes. AECOM will gradually increase the vacuum of the SSDS blower until the vacuum being applied to the shallow subsurface in all bays meets or exceeds the design vacuum. To balance the SSDS the field technician will manually adjust the vacuum applied to each individual SSDS leg one at a time (using the valving present on the SSDS manifold) and will gauge respective shallow SSDS monitoring wells with a differential pressure gauge to determine that the design vacuum is being applied to the shallow subsurface within each bay to eliminate the chance of vapor migration to the interior of the Bays.

Once the SSD system has been activated and calibrated the SVE system will be activated. AECOM will monitor the influent and effluent vapors removed from the subsurface (SVE vertical wells) with a PID. The SVE blower will be started at one half the intended vacuum. AECOM will operate the blower at this level for approximately 30 minutes. AECOM will gradually increase the vacuum of the SVE blower until the vacuum being applied to the subsurface in all Bays meets or exceeds the design vacuum. To balance the SVE system the field technician will manually adjust the vacuum applied

to each individual SVE leg one at a time (using the valving present on the SVE manifold) until all legs have an equal contribution to the total soil vapor extraction flow rate. AECOM will gauge surrounding SVE monitoring wells with a differential pressure gauge to determine that the intended vacuum is being applied to the subsurface before proceeding to the off-gas screening.

Screening of the combined effluent vapors (SSDS and SVE) with a PID after both systems are running and calibrated will confirm that vapors are below established NYSDEC screening limits. If they are not, the SVE system will be adjusted to meet these limits.

The final step of the initial startup period will be testing of all the system alarm conditions. All alarm conditions (i.e. SVE moisture separator high level, SSDS blower low vacuum, etc.) will be manually actuated to ensure proper system response prior to departure. If unforeseen problems arise before the next scheduled O&M visit (1 week after initial startup) technicians will return to the site, as needed, to address the issues.

4.2.3.2 **Week One**

One week after initial startup, AECOM will conduct an O&M visit that will consist of the following:

- Monitor the influent and effluent vapors removed from the subsurface.
- Check the blower, gauges, piping, and other associated equipment to make sure everything is operating properly.
- Gauge the SSDS and SVE pressure monitoring points (pre-SVE optimization).
- Optimize the vapor phase removal the field technician will first isolate each SVE leg. Once an SVE leg has been isolated, several iterations of valve adjustments and influent organic vapor PID screenings will be performed to determine the optimal configuration of each SVE leg.

  Note: The SVE portion of the system will only be optimized to increase vapor mass removal once lab data can be properly correlated with PID readings in order to ensure that effluent vapors will remain significantly below NYSDEC levels.
- Gauge the SSDS and SVE pressure monitoring points (post-SVE optimization).

- Periodically monitor the effluent vapors to verify that the vapors discharged are well below NYSDEC limits.

  Note: This will include a second laboratory sampling event for confirmation after optimization of the SVE system.

If during week 1, SSDS and or SVE effluent concentrations are not found to be significantly below NYSDEC limits (i.e. below 30% of limits) then the system will continue to be operated in SSDS mode only. Visits will continue on a weekly basis until such a time that SVE influent concentrations have decreased to 30% of NYSDEC limits or lower. At that time the schedule will continue as specified above.

The system testing described above will be conducted if, in the course of the SSDS and SVE system lifetime, significant changes are made to the system, and the system must be restarted.

4.2.4 SVE and SSDS System Operation: Routine Operation Procedures and Schedule

The inspection frequency of the SVE and SSDS systems for the first month of operation will be executed as described in Section 4.2.1.2 System Start-Up and Testing. Once the startup activities are complete the inspection frequency of the systems will transition to two times per month (during each O&M visit). The O&M visits will consist of the following activities:

- Monitor the influent and effluent vapors removed from the subsurface.
- Check the blowers, gauges, piping, and other associated equipment to make sure everything is still installed and operating properly.
- Gauge the SSD and SVE pressure monitoring points (pre-adjustments).
- Isolate SVE legs to determine the optimal configuration for removing organic vapors.
- Monitor the effluent vapors to verify that effluent vapors are compliant with NYSDEC.
- Gauge the SSDS and SVE pressure monitoring points (post-adjustments; if applicable).

Inspection frequency is subject to change with the approval of the NYSDEC. Unscheduled inspections and/or sampling may take place when a suspected failure of the

SSDS and SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system.

4.2.5 Routine System Operation

Routine equipment maintenance will take place in accordance with the manufacturer's recommendations in the EC Maintenance Schedules for the SVE and SSDS systems which are provided in Appendix B.

4.3 ENGINEERING CONTROL SYSTEM PERFORMANCE MONITORING

4.3.1 SVE and SSDS System Monitoring

A visual inspection of the complete SVE and SSDS systems will be conducted during the monitoring event. SSDS system components to be monitored include, but are not limited to (also see Section 3.2: SSDS System Monitoring), the following:

- SSDS Vacuum blower, vacuum, flow, and temperature;
- Monitoring well head vacuums; and
- Effluent concentrations exiting the SSDS carbon vessels.

SVE system components to be monitored include, but are not limited to (also see Section 3.3.2: System Monitoring), the following:

- SVE Vacuum blower, vacuum, flow, and temperature;
- Monitoring well head vacuums; and
- Effluent concentrations exiting the SVE carbon vessels.

A complete list of components to be checked is provided in the Inspection Checklist, presented in Appendix C. If any equipment readings are not within their typical range, any equipment is observed to be malfunctioning, or the system is not performing within specifications, maintenance and repair as per the Operation and Maintenance Plan are required immediately, and the respective system restarted.

4.3.2 SVE and SSDS System Monitoring Devices and Alarms

There will be a system monitoring device and alarm notification for the SVE and the SSDS systems for vacuum blower failure; vacuum blower low pressure; stream high temperature; and, for low, high, and high-high water level in moisture separator and an alarm notification for high-high moisture separator level.

The SVE and SSD systems will each have a warning device to indicate that the

system is not operating properly. In the event that the warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the respective system restarted. Operational problems will be noted in the subsequent Quarterly Monitoring Report.

4.3.3 SSDS and SVE System Sampling Event Protocol

Combined SSDS and SVE system effluent vapor samples will be collected and analyzed to confirm that vapor concentrations are below NYSDEC limits. These samples will be collected, shipped and analyzed in accordance with the 2011 QAPP and any applicable updates.

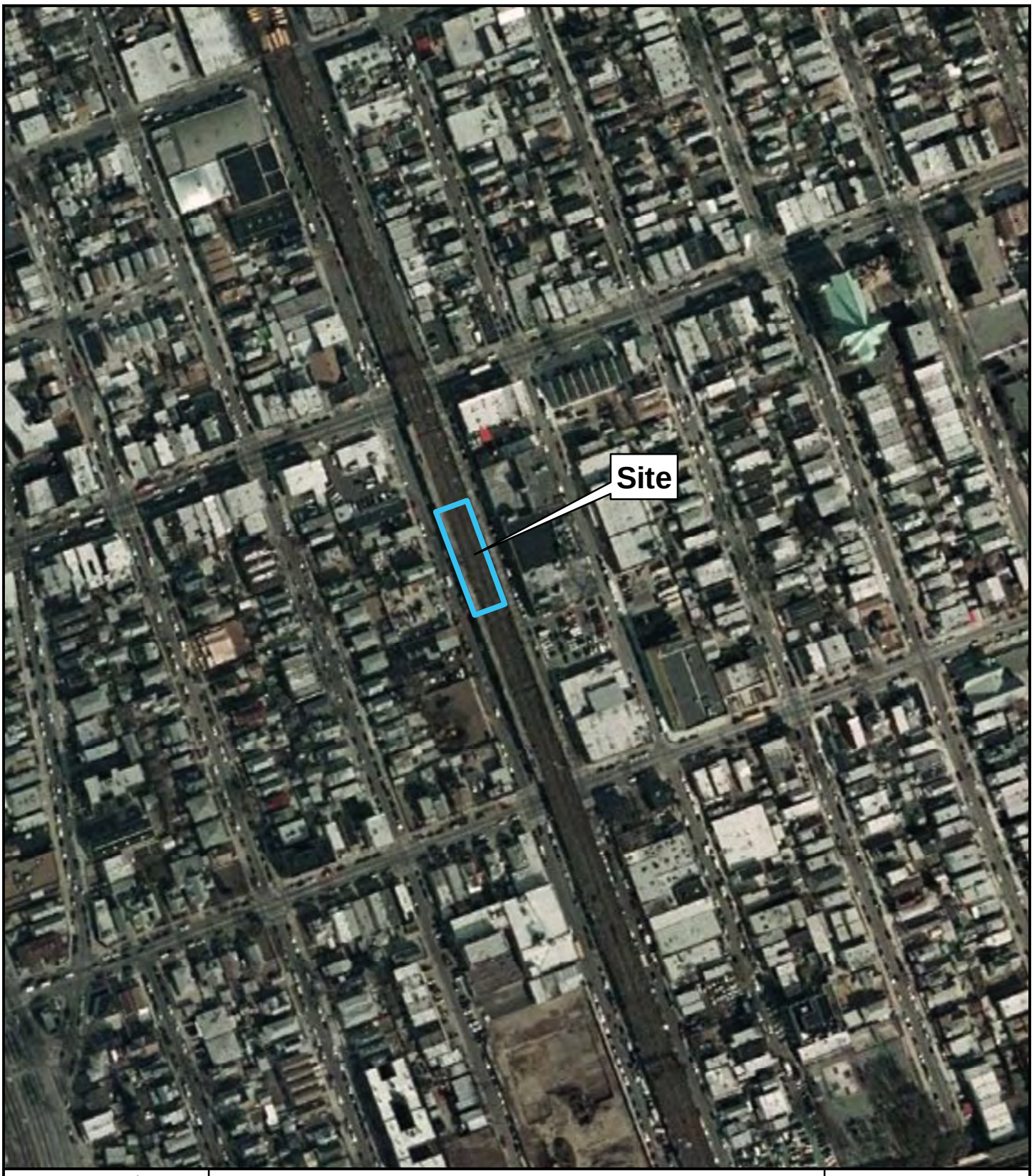
4.4 MAINTENANCE REPORTS

Maintenance reports and any other information generated during regular operations at the site will be kept on-file on-site. All reports, forms, and other relevant information generated will be available upon request to the NYSDEC.

Applicable checklists or forms (see Appendix C) will be completed during each routine maintenance event. Checklists/forms will include, but not be limited to the following information:

- Date;
- Name, company, and position of person(s) conducting maintenance activities;
- Maintenance activities conducted;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Figures



Map Location



Site Locus Map

Former Ozone Industries, Inc.
NYSDEC Site #2-41-033
Block Bounded by 99th & 100th Streets
and 101st & 103rd Avenues
Ozone Park, Queens, Queens County, New York

0 50 100 200 300 400 500 600 Feet

0 10 20 40 60 80 100 120 140 160 Meters

Map Projection: State Plane, NAD 83, Feet.
Image Source: USGS Topographic Quadrangle: Jamaica, NY.

Scale: 1:24,000

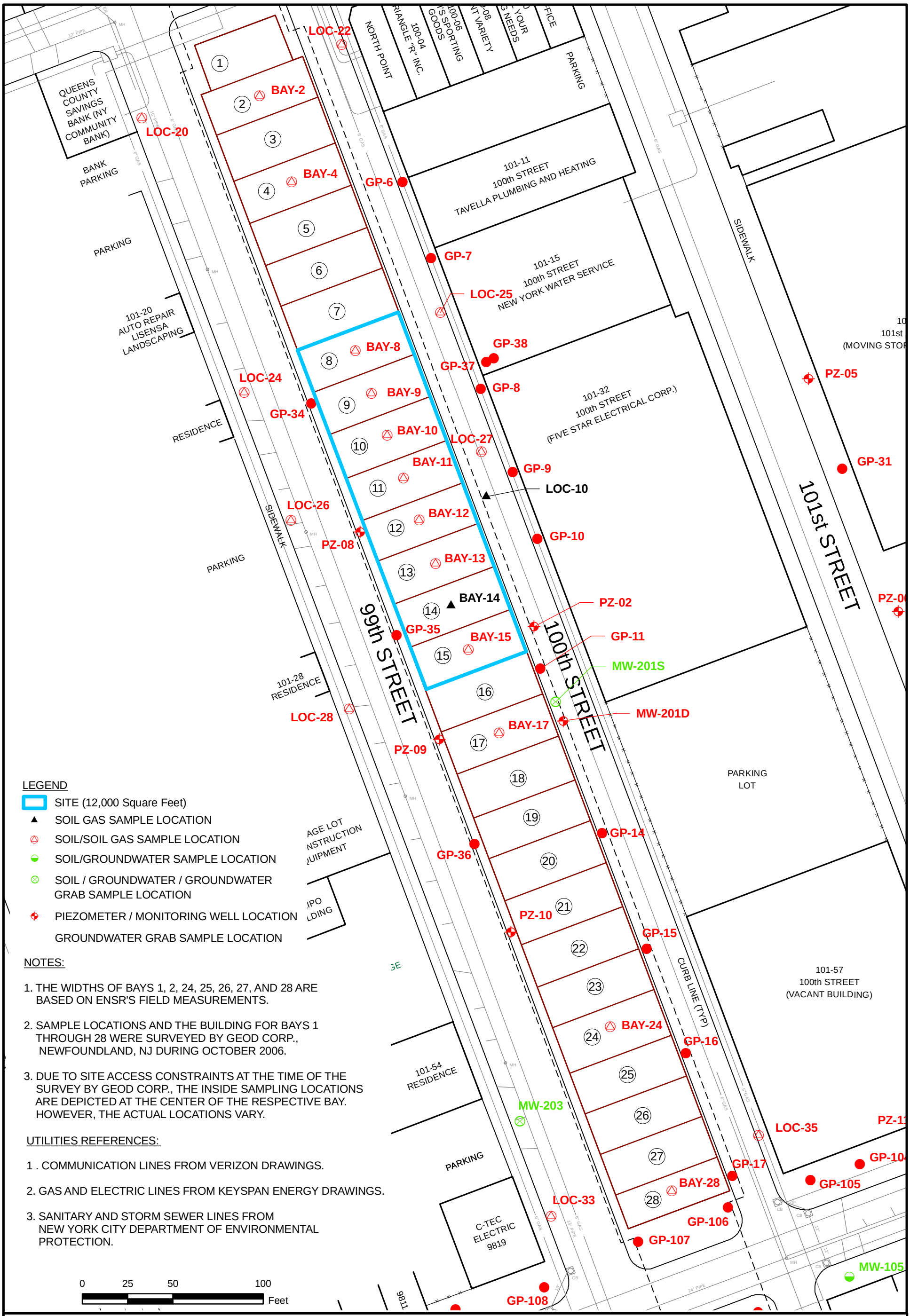
AECOM

Figure 1

Date: August 2011

Project #: 60138748.A.1

J:\Indl_Service\Project Files\Endzone, Inc\Ozone - Queens, NY\GIS\Projects\RD-RAWP\Figure 1 Site Locus.mxd



LEGEND

- SITE (12,000 Square Feet)
- SOIL GAS SAMPLE LOCATION
- SOIL/SOIL GAS SAMPLE LOCATION
- SOIL/GROUNDWATER SAMPLE LOCATION
- SOIL / GROUNDWATER / GROUNDWATER GRAB SAMPLE LOCATION
- PIEZOMETER / MONITORING WELL LOCATION
- GROUNDWATER GRAB SAMPLE LOCATION

NOTES:

1. THE WIDTHS OF BAYS 1, 2, 24, 25, 26, 27, AND 28 ARE BASED ON ENSR'S FIELD MEASUREMENTS.
2. SAMPLE LOCATIONS AND THE BUILDING FOR BAYS 1 THROUGH 28 WERE SURVEYED BY GEOD CORP., NEWFOUNDLAND, NJ DURING OCTOBER 2006.
3. DUE TO SITE ACCESS CONSTRAINTS AT THE TIME OF THE SURVEY BY GEOD CORP., THE INSIDE SAMPLING LOCATIONS ARE DEPICTED AT THE CENTER OF THE RESPECTIVE BAY. HOWEVER, THE ACTUAL LOCATIONS VARY.

UTILITIES REFERENCES:

1 . COMMUNICATION LINES FROM VERIZON DRAWINGS.

2. GAS AND ELECTRIC LINES FROM KEYSPAN ENERGY DRAWINGS.

3. SANITARY AND STORM SEWER LINES FROM NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Figure Number: 2
Sheet Number: 1

PLAN DEPICTING SITE AND BAY AREAS

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

Scale:	Date:	Project Number:
1" = 50'	2/09	10748-002-0003

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WESTFORD, MA 01886
(978) 589-3000
www.aecom.com

Bay	Tenant (based upon site visit by ENSR)
1	Stevie Brown
2	Stevie Brown
3	Olympic Fence
4	Olympic Fence
5	Olympic Fence
6	Olympic Fence
7	Rumpersand Iron Workshop
8	Store contruction material - Bike shop/Bar
9	Store contruction material - Bike shop/Bar
10	Store contruction material - Bike shop/Bar
11	Store contruction material - Bike shop/Bar
12	LTDC Corp
13	Rajkumar Bisram - Iron and wood working shop
14	Rajkumar Bisram - Iron and wood working shop
15	Rajkumar Bisram - Iron and wood working shop
16	Rocco Constatino
17	Rocco Constatino
18	Richard Stevens - company vehicle storage
19	Tadco
20	Tadco
21	Tadco
22	Tadco
23	Marra
24	Adamira de al Cruz - company vehicle storage
25	Adamira de al Cruz - company vehicle storage
26	Adamira de al Cruz - company vehicle storage
27	Acardi - custom auto storage
28	Morea - old truck part storage

LEGEND

- SITE (12,000 Square Feet)
- SOIL GAS SAMPLE LOCATION
- SOIL GAS/GROUNDWATER GRAB SAMPLE LOCATION
- SOIL/SOIL GAS SAMPLE LOCATION
- SOIL/GROUNDWATER SAMPLE LOCATION
- SOIL / GROUNDWATER / GROUNDWATER GRAB SAMPLE LOCATION
- PIEZOMETER / MONITORING WELL LOCATION
- GROUNDWATER GRAB SAMPLE LOCATION

NOTES:

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2. GAS AND ELECTRIC LINES FROM KEYSPAN ENERGY DRAWINGS.

3. SANITARY AND STORM SEWER LINES FROM NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION.

0 30 60 120 Feet

Sheet Number:	Figure Number:
1	3

SITE AND SITE VICINITY PLAN

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

Scale:	Date:	Project Number:
1" = 60'	08/26/11	60138748.A.1

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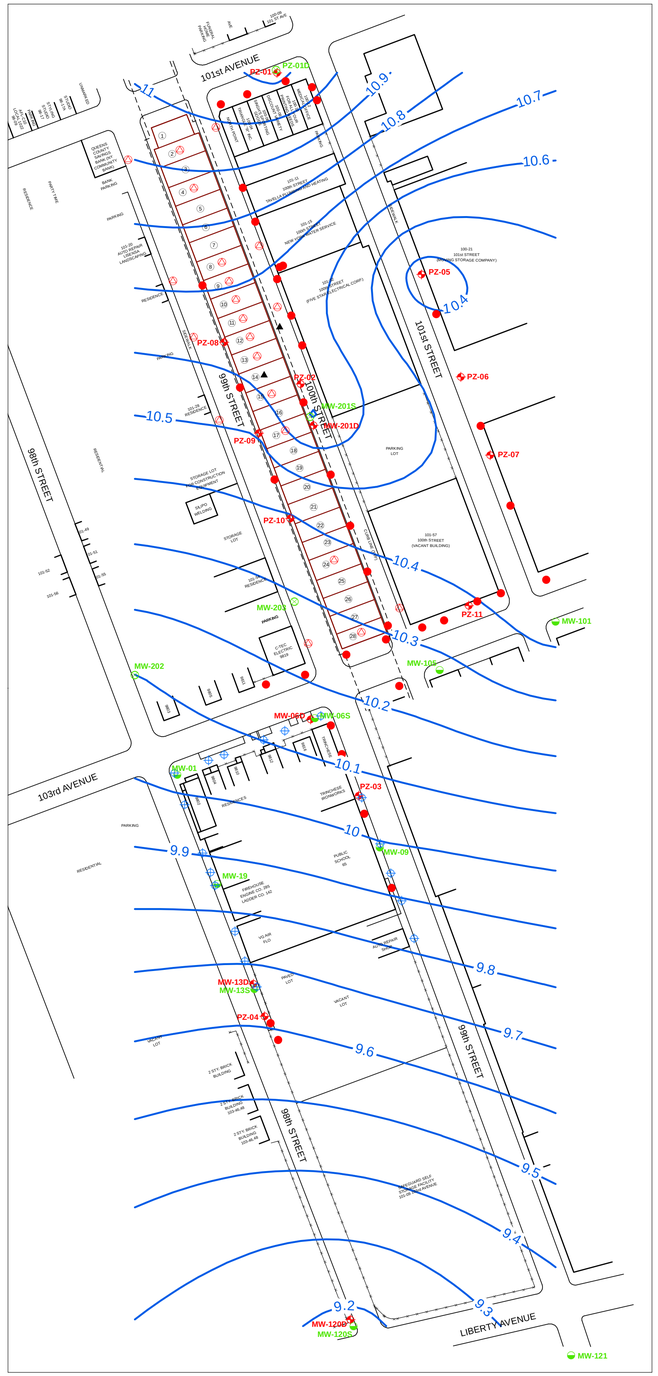
Designed By:	Revisions			
	No.:	Description:	Date:	By:
Drawn By: J.E.B.				
Checked By: R.M.				
Approved By: D.A.				



JANUARY 2005



APRIL 2005



AUGUST 2006

LEGEND

- SOIL/GROUNDWATER SAMPLE LOCATION
- SOIL / GROUNDWATER / GROUNDWATER GRAB SAMPLE LOCATION
- PIEZOMETER / MONITORING WELL LOCATION

NOTE:
1. THE WIDTHS OF BAYS 1, 2, 24, 25, 26, 27, AND 28 ARE BASED ON ENSR'S FIELD MEASUREMENTS.

0 45 90 180 Feet

Designed By:
Drawn By: J.E.B.
Checked By: R.M.
Approved By: D.A.

Revisions

No.:	Description:	Date:	By:

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GROUNDWATER CONTOUR PLANS

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

Scale: As Shown
Date: 2/09
Project Number: 10748-002-0003

Figure Number: 4

Sheet Number: 1

Bay	Tenant (based upon site visit by ENSR)
1	Stevie Brown
2	Stevie Brown
3	Olympic Fence
4	Olympic Fence
5	Olympic Fence
6	Olympic Fence
7	Rumpersand Iron Workshop
8	Store contruction material - Bike shop/Bar
9	Store contruction material - Bike shop/Bar
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13	Rajkumar Bisram - Iron and wood working shop
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16	Rocco Constatino
17	Rocco Constatino
18	Richard Stevens - company vehicle storage
19	Tadco
20	Tadco
21	Tadco
22	Tadco
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24	Adamira de al Cruz - company vehicle storage
25	Adamira de al Cruz - company vehicle storage
26	Adamira de al Cruz - company vehicle storage
27	Acardi - custom auto storage
28	Morea - old truck part storage

LEGEND

- SITE (12,000 Square Feet)
- SOIL GAS SAMPLE LOCATION
- SOIL GAS/GROUNDWATER GRAB SAMPLE LOCATION
- SOIL/SOIL GAS SAMPLE LOCATION
- SOIL/GROUNDWATER SAMPLE LOCATION
- SOIL / GROUNDWATER / GROUNDWATER GRAB SAMPLE LOCATION
- PIEZOMETER / MONITORING WELL LOCATION
- GROUNDWATER GRAB SAMPLE LOCATION

NOTES:

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3. SANITARY AND STORM SEWER LINES FROM NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION.

0 30 60 120 Feet

Remedial Investigation Monitoring Locations

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

Scale:	Date:	Project Number:
1" = 60'	2/09	10748-002-0003

Sheet Number: 1

Figure Number: 5

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	No.:	Description:	Date:	By:
Drawn By: J.E.B.				
Checked By: R.M.				
Approved By: D.A.				

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26	Adamira de al Cruz - company vehicle storage
27	Acardi - custom auto storage
28	Morea - old truck part storage

LEGEND

SITE (12,000 Square Feet)

CIS-1,2 CIS-1,2-DICHLOROETHENE
TCE TRICHLOROETHENE
(0-2) DEPTH OF SAMPLE IN FEET

NOTES:

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0 30 60 120 Feet

Sheet Number: 1

Figure Number: 6a

CIS-1,2-DICHLOROETHENE AND TRICHLOROETHENE IN SHALLOW SOIL (ug/kg)

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

Scale:	Date:	Project Number:
1" = 60'	2/09	10748-002-0003

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	No.:	Description:	Date:	By:
Drawn By: J.E.B.				
Checked By: R.M.				
Approved By: D.A.				

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25	Adamira de al Cruz - company vehicle storage
26	Adamira de al Cruz - company vehicle storage
27	Acardi - custom auto storage
28	Morea - old truck part storage

LOC-22
CIS-1,2 (28-30) 5 U
TCE (28-30) 2.6 J

PZ-01D
CIS-1,2 (33-35) 4.1 U
TCE (33-35) 4.1 U
CIS-1,2 (53-55) 3.1 U
TCE (53-55) 1.3 J

Bay_2
CIS-1,2 (28-30) 4.1 U
TCE (28-30) 0.88 J

Bay_4
CIS-1,2 (28-30) 3.6 U
TCE (28-30) 1 J

Bay_8
CIS-1,2 (30-32) 0.86 J
TCE (30-32) 23

LOC-25
CIS-1,2 (28-30) 0.52 J
TCE (28-30) 12

Bay_9
CIS-1,2 (30-32) 4.9 J
TCE (30-32) 61

Bay_10
CIS-1,2 (30-32) 4.9 J
TCE (30-32) 59

LOC-27
CIS-1,2 (28-30) 18
TCE (28-30) 84

LOC-20
CIS-1,2 (28-30) 4.5 U
TCE (28-30) 1.2 J

LOC-24
CIS-1,2 (28-28) 4.4 U
TCE (28-28) 3 J

Bay_11
CIS-1,2 (30-32) 0.64 J
TCE (30-32) 14

LOC-26
CIS-1,2 (28-30) 2 J
TCE (28-30) 30

Bay_12
CIS-1,2 (30-32) 15
TCE (30-32) 95

Bay_13
CIS-1,2 (30-32) 43
TCE (30-32) 340 J

Bay_15
CIS-1,2 (30-32) 58
TCE (30-32) 390 J

LOC-28
CIS-1,2 (28-30) 9
TCE (28-30) 80

Bay_17
CIS-1,2 (28-30) 0.97 J
TCE (28-30) 13

MW-201S
CIS-1,2 (31-35) 3.5 U
TCE (31-35) 8.8
CIS-1,2 (65-70) 3.5 U
TCE (65-70) 7.1
CIS-1,2 (70-75) 4.2 U
TCE (70-75) 2.4 J

Bay_24
CIS-1,2 (28-30) 0.32 J
TCE (28-30) 22

LOC-35
CIS-1,2 (28-30) 0.72 J
TCE (28-30) 68 J

MW-101
CIS-1,2 (15-17) 5 UJ
TCE (15-17) 5 UJ
CIS-1,2 (25-27) 6 UJ
TCE (25-27) 6 UJ

Bay_28
CIS-1,2 (28-30) 27 J
TCE (28-30) 9.4

MW-105
CIS-1,2 (25-27) 6 U
TCE (25-27) 6 U

MW-203
CIS-1,2 (15-19) 2.9 U
TCE (15-19) 1.1 J
CIS-1,2 (30-32) 3.7 U
TCE (30-32) 22
CIS-1,2 (40-42) 3.5 U
TCE (40-42) 8.4

LOC-33
CIS-1,2 (28-30) 0.29 J
TCE (28-30) 16

GP-108
CIS-1,2 (38-40) 12 U
TCE (38-40) 27

MW-202
CIS-1,2 (25-27) 3.7 U
TCE (25-27) 3.7 U
CIS-1,2 (29-31) 3.4 U
TCE (29-31) 3.4 U

MW-06S
CIS-1,2 (27-28) 5 U
TCE (27-28) 5 U

MW-01
CIS-1,2 (28-30) 6 U
TCE (28-30) 6 U

MW-09
CIS-1,2 (16-17) 5 UJ
TCE (16-17) 5 UJ
CIS-1,2 (20-22) 5 U
TCE (20-22) 5 U
CIS-1,2 (25-27) 5 U
TCE (25-27) 5 U

MW-19
CIS-1,2 (25-26) 5 U
TCE (25-26) 5 U

MW-13S
CIS-1,2 (10-12) 5 U
TCE (10-12) 5 U
CIS-1,2 (15-17) 5 U
TCE (15-17) 5 U
CIS-1,2 (20-22) 5 U
TCE (20-22) 5 U
CIS-1,2 (25-26) 5 U
TCE (25-26) 5 U

MW-120S
CIS-1,2 (23-25) 6 U
TCE (23-25) 6 U

MW-121
CIS-1,2 (15-17) 5 U
TCE (15-17) 5 U
CIS-1,2 (25-27) 5 U
TCE (25-27) 5 U
CIS-1,2 (27-28) 5 U
TCE (27-28) 5 U

101st AVENUE
103rd AVENUE
97th STREET
98th STREET
99th STREET
100th STREET
101st STREET
LIBERTY AVENUE

FLORIST
RESTAURANT 98-05
EAGLE TAX 98-07
AC-DC LOCAL 1022 98-09
PARKING
STYLING STUDIO 98-17
STUDIO 98-17A
UNMARKED
FUNERAL HOMES PARKING
100-09 101 ST AVE
QUEENS COUNTY SAVINGS BANK (NY COMMUNITY BANK)
BANK PARKING
RESIDENCE
MIKES MARKET & DELI
FANTASIA NAILS
PARKING
101-20 AUTO REPAIR LISENSA LANDSCAPING
RESIDENCE
SIDEWALK
NORTH POINT
100-04 TRIANGLE PRINTING INC.
100-06 SINGH'S SPORTING GOODS
100-08 DISCOUNT VARIETY
100-10 FOR ALL YOUR PRINTING NEEDS
100-12 MEDICAL OFFICE
PARKING
TAVELLA PLUMBING & HEATING
NEW YORK WRECKING SERVICE
(FIVE STAR ELECTRIC)
SIDEWALK
PARKING
100-21 101st STREET (MOVING STORAGE COMPANY)
PARKING LOT
CURB LINE (TYP)
101-57 100th STREET (VACANT BUILDING)
STORAGE LOT FOR CONSTRUCTION EQUIPMENT
SILIPO WELDING
STORAGE LOT
101-54 RESIDENCE
PARKING
C-TEC ELECTRIC 9819
9811
9805
9803
RESIDENTIAL
RESIDENTIAL
101-49
101-51
101-52
101-55
101-56
DO IT BEST HARDWARE CITY
XL HAIR SALON
M&T MORTGAGE CORP.
EL VIEJO YAYO RESTAURANT
OZONE PARK LIQUERS
ABSOLUTE INSURANCE
JV CARTER & CO. JEWELERS
DECO DESTINATIONS
101st AVE FOOT CARE
EICHLER PHARMACY
JOE'S TATOO
RAINBOW STUDIOS
9816
9812
9810
9804
9802
TRINCHESE
TRINCHESE IRONWORKS
RESIDENCES
PUBLIC SCHOOL 65
PARKING
FIREHOUSE ENGINE CO. 285 LADDER CO. 142
VG AIR FLO
AUTO REPAIR SHOP
PAVED LOT
VACANT LOT
VACANT LOT
2 STY. BRICK BUILDING
2 STY. BRICK BUILDING 103-46.4B
2 STY. BRICK BUILDING 103-46.4B
SAFEGUARD SELF STORAGE FACILITY 101-09 103rd AVENUE

LEGEND

SITE (12,000 Square Feet)
CIS-1,2 CIS-1,2-DICHLOROETHENE
TCE TRICHLOROETHENE
(28-30) DEPTH OF SAMPLE IN FEET

NOTES:

1. THE WIDTHS OF BAYS 1, 2, 24, 25, 26, 27, AND 28 ARE BASED ON ENSR'S FIELD MEASUREMENTS.
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0 30 60 120
Feet

Figure Number: 6b
Sheet Number: 1

CIS-1,2-DICHLOROETHENE AND TRICHLOROETHENE IN DEEP SOIL (ug/kg)

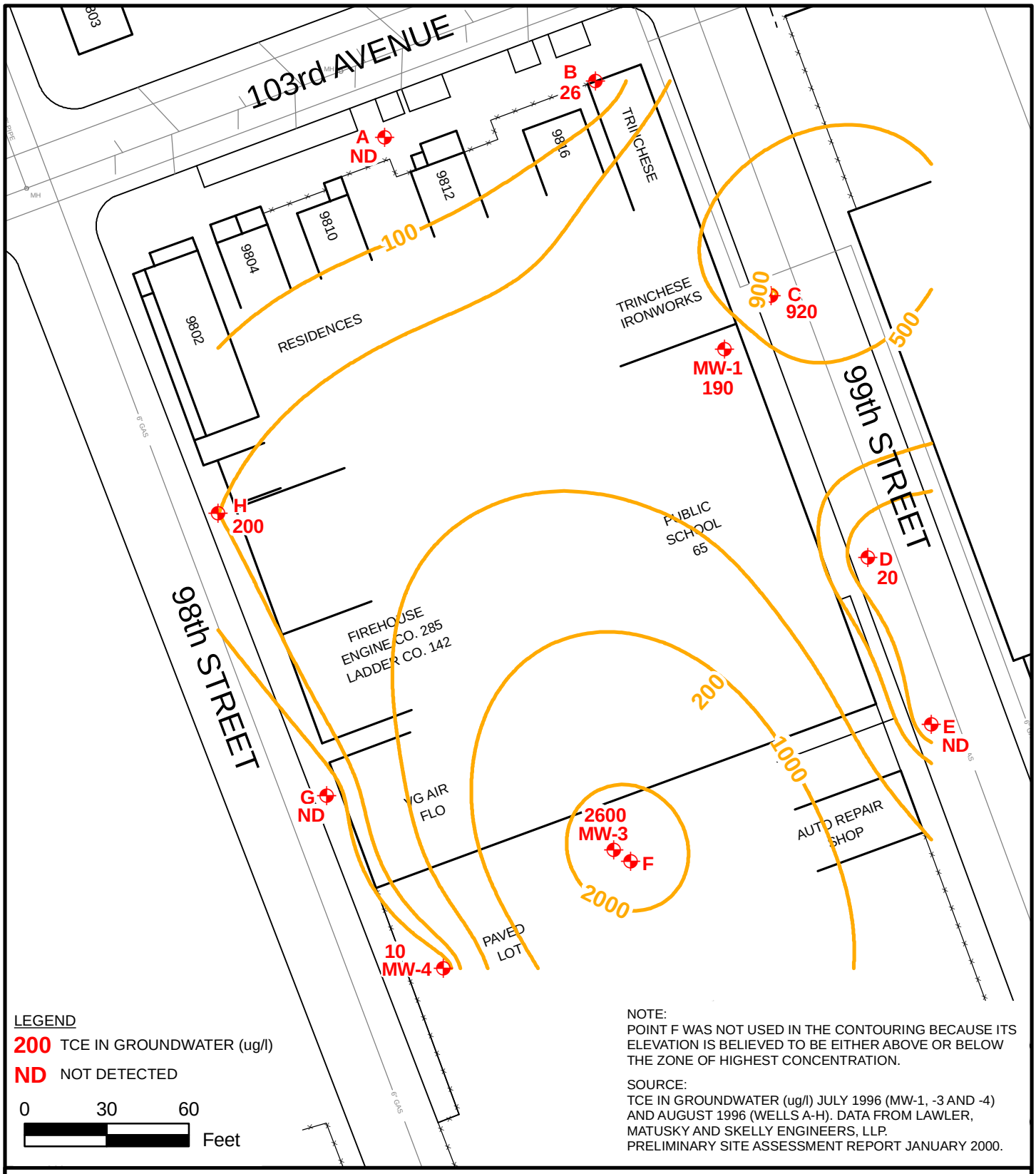
FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

Scale:	Date:	Project Number:
1" = 60'	2/09	10748-002-0003

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Drawn By: J.E.B.				
Checked By: R.M.				
Approved By: D.A.				

N W E S



LEGEND

200 TCE IN GROUNDWATER (ug/l)

ND NOT DETECTED

0 30 60 Feet

NOTE:
POINT F WAS NOT USED IN THE CONTOURING BECAUSE ITS ELEVATION IS BELIEVED TO BE EITHER ABOVE OR BELOW THE ZONE OF HIGHEST CONCENTRATION.

SOURCE:
TCE IN GROUNDWATER (ug/l) JULY 1996 (MW-1, -3 AND -4) AND AUGUST 1996 (WELLS A-H). DATA FROM LAWLER, MATUSKY AND SKELLY ENGINEERS, LLP. PRELIMINARY SITE ASSESSMENT REPORT JANUARY 2000.

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TCE IN GROUNDWATER 1996
PS65 VICINITY
FORMER OZONE INDUSTRIES. INC.
OZONE PARK. NEW YORK, NY

Scale:	Date:	Project Number:
1" = 60'	2/09	10748-002-0003

Figure Number: 7a

Sheet Number: 1

Bay	Tenant (based upon site visit by ENSR)
1	Stevie Brown
2	Stevie Brown
3	Olympic Fence
4	Olympic Fence
5	Olympic Fence
6	Olympic Fence
7	Rumpersand Iron Workshop
8	Store contruction material - Bike shop/Bar
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LEGEND

SITE (12,000 Square Feet)

(MAXIMUM RESULT AND 2006 RESULT SHOWN)

- 8/2002
- 4/2003
- 1/2005
- 4/2005
- 8/2006

NOTES:

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0 30 60 120 Feet

Figure Number: 7b

Sheet Number: 1

TRICHLOROETHENE IN GROUNDWATER (ug/l)

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

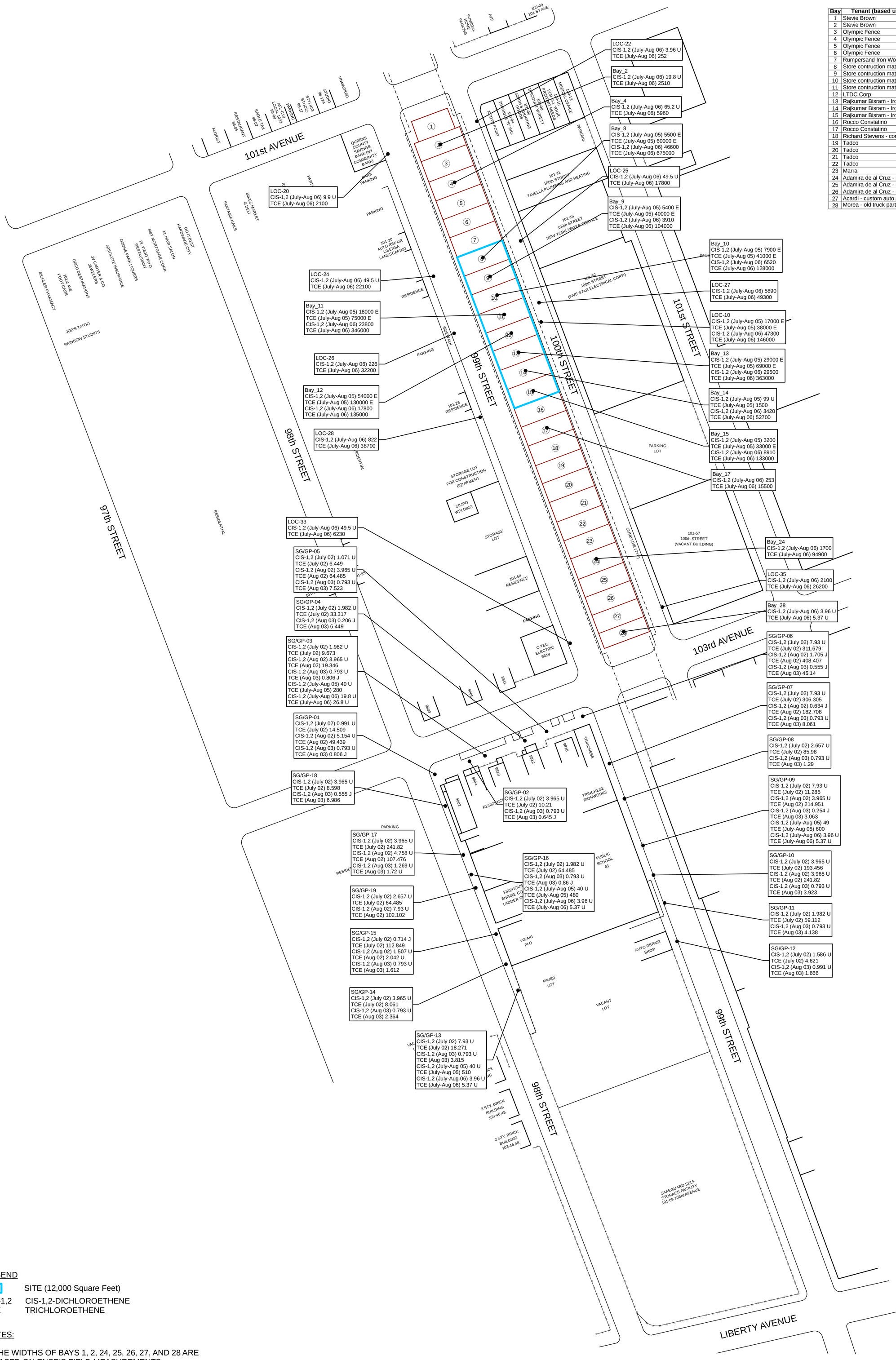
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Designed By:	Revisions			
	No.:	Description:	Date:	By:
Drawn By: J.E.B.				
Checked By: R.M.				
Approved By: D.A.				

N W E S

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14	Rajkumar Bisram - Iron and wood working shop
15	Rajkumar Bisram - Iron and wood working shop
16	Rocco Constatino
17	Rocco Constatino
18	Richard Stevens - company vehicle storage
19	Tadco
20	Tadco
21	Tadco
22	Tadco
23	Marra
24	Adamira de al Cruz - company vehicle storage
25	Adamira de al Cruz - company vehicle storage
26	Adamira de al Cruz - company vehicle storage
27	Acardi - custom auto storage
28	Morea - old truck part storage



LEGEND

SITE (12,000 Square Feet)

CIS-1,2 CIS-1,2-DICHLOROETHENE
TCE TRICHLOROETHENE

NOTES:

1. THE WIDTHS OF BAYS 1, 2, 24, 25, 26, 27, AND 28 ARE BASED ON ENSR'S FIELD MEASUREMENTS.

2. SAMPLE LOCATIONS AND THE BUILDING FOR BAYS 1 THROUGH 28 WERE SURVEYED BY GEOD CORP., NEWFOUNDLAND, NJ DURING OCTOBER 2006.

3. DUE TO SITE ACCESS CONSTRAINTS AT THE TIME OF THE SURVEY BY GEOD CORP., THE INSIDE SAMPLING LOCATIONS ARE DEPICTED AT THE CENTER OF THE RESPECTIVE BAY. HOWEVER, THE ACTUAL LOCATIONS VARY.

0 30 60 120 Feet

Sheet Number: 1

Figure Number: 8

CIS-1,2-DICHLOROETHENE AND TRICHLOROETHENE IN SOIL GAS (2002-2006) (ug/m3)

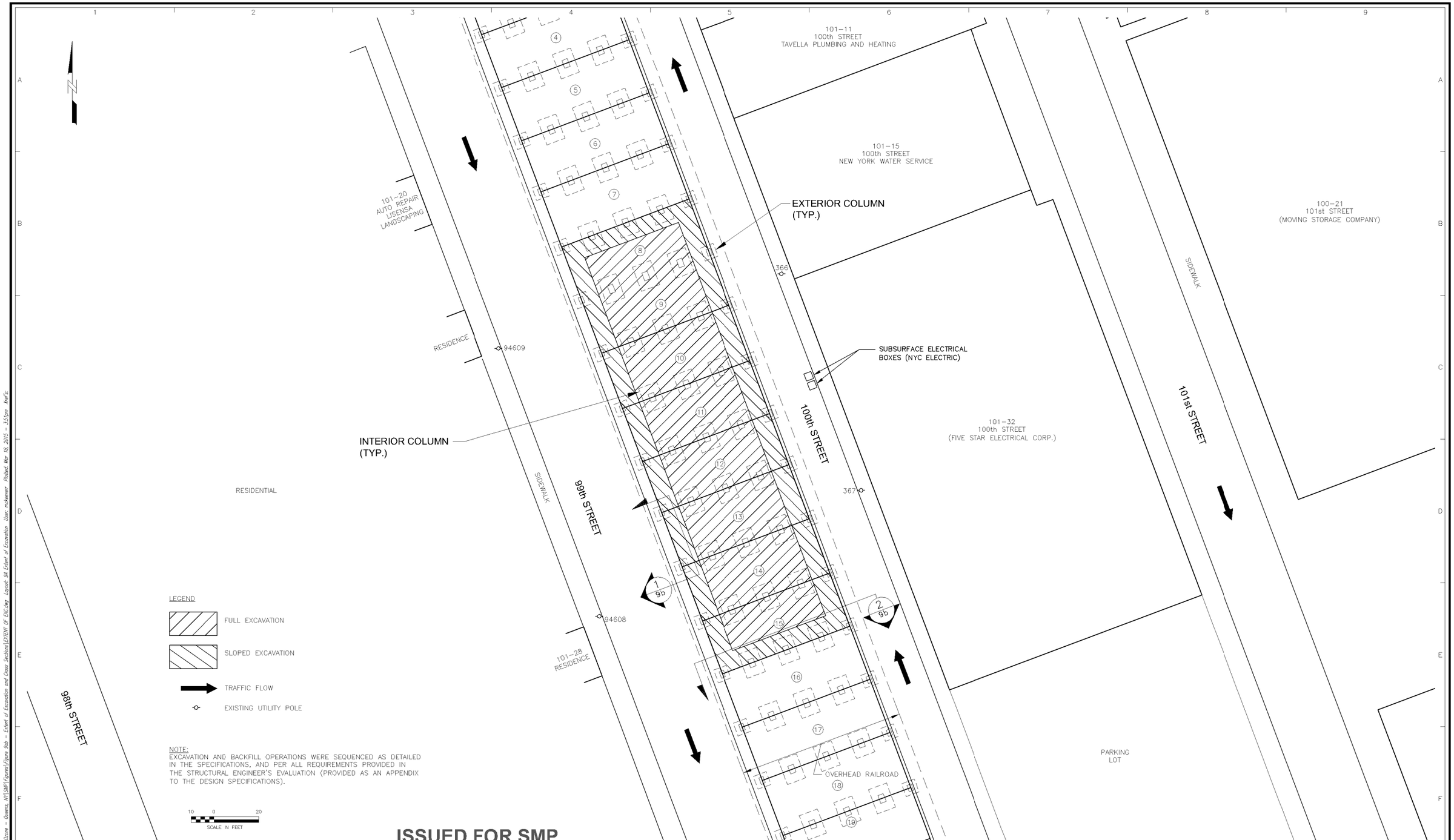
FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

Scale:	Date:	Project Number:
1" = 60'	2/09	10748-002-0003

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2 TECHNOLOGY PARK DRIVE
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(978) 589-3000
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Designed By:	Revisions			
	No.:	Description:	Date:	By:
Drawn By:				
J.E.B.				
Checked By:				
R.M.				
Approved By:				
D.A.				

N W E S



ISSUED FOR SMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
2	RWM	04/21/14	AS–BUILT EXTENT OF EXCAVATION				
1	RWM	02/09/12	ISSUED FOR BID				
0	JEB	10/28/11	ISSUED FOR DESIGN SPECIFICATIONS				

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PROJ. NUMBER: 60221764

DATE: 04/21/14

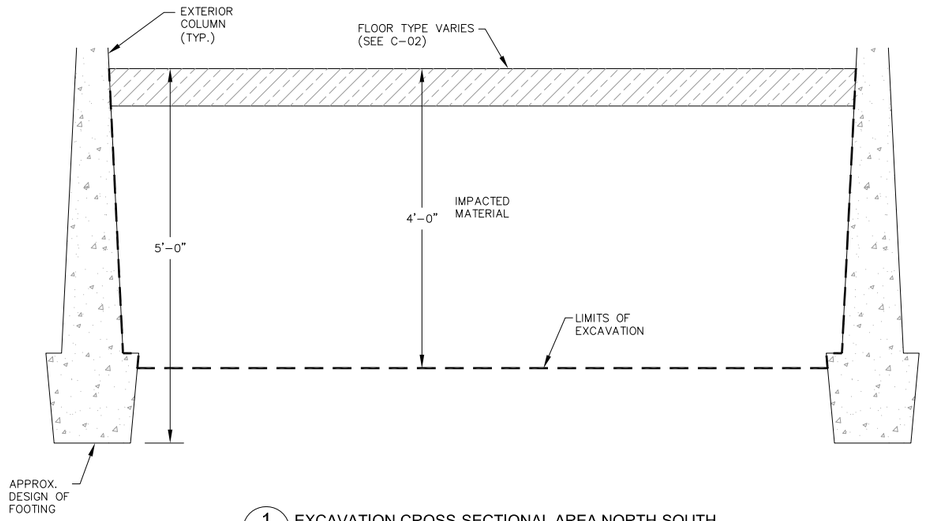
EXTENT OF REMEDIAL EXCAVATION PERFOMED

DRAWING NUMBER: 9a

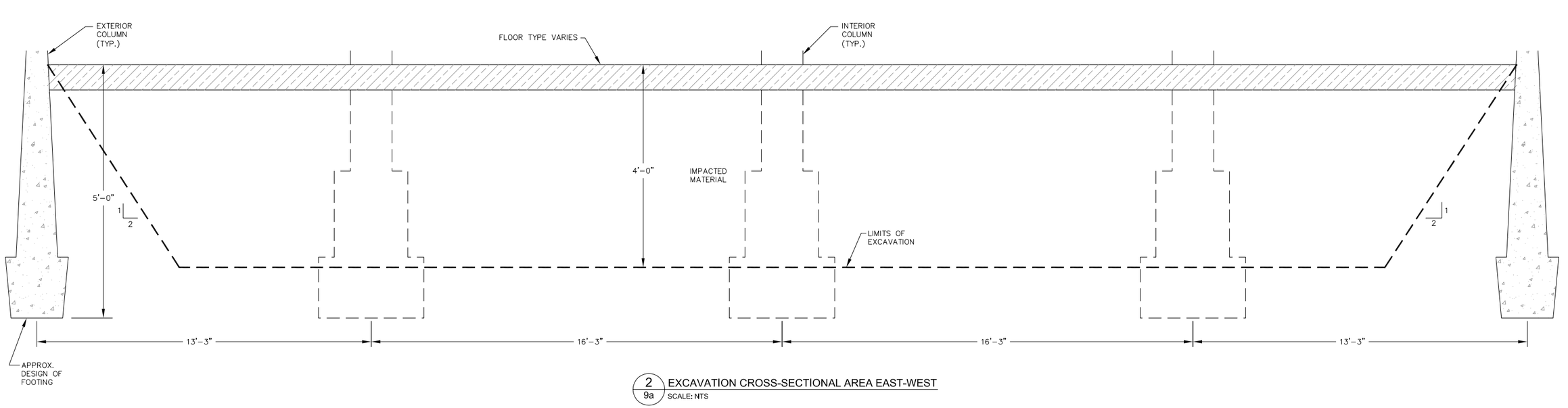
SHEET NUMBER:

REVISION 2

File: J:\Ind_Service\Project Files\Endzone, Inc\Ozone – Queens, NY\336\Figures\Figure 9ab – Extent of Excavation and Cross Sections\EXTENT OF EXC.dwg Layout: 9A Extent of Excavation User: mukeever Plotted: Mar 18, 2015 – 3:51pm Xref's:



1 / 9a EXCAVATION CROSS-SECTIONAL AREA NORTH-SOUTH
SCALE: NTS



2 / 9a EXCAVATION CROSS-SECTIONAL AREA EAST-WEST
SCALE: NTS

ISSUED FOR SMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
2	RWM	04/21/14	AS-BUILT EXCAVATION CROSS-SECTIONS				
1	RWM	02/09/12	ISSUED FOR BID				
0	JEB	10/28/11	ISSUED FOR DESIGN SPECIFICATIONS				

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PROJ. NUMBER: 60221764

DATE: 04/21/14

EXCAVATION CROSS SECTIONS

DRAWING NUMBER: 9b

SHEET NUMBER:

REVISION 2

File: C:\Users\mckeever\Desktop\Ozone SMP\Figures\Figure 9 - Extent of Excavation\EXTENT OF EXC.dwg Layout: 9B Excavation Cross Sections User: mckeever Plotted: Apr 21, 2014 - 5:14pm Xref's:

99th STREET

100th STREET

11

12

13

SUMP 1

SUMP 2

SUMP 3

TWO 1" PVC STUB-UPS
ON WALL FEEDING
INTO SUMP 1

N

LEGEND

- - - - - - - SUB-GRADE SUMP PIPING

2 0 4
SCALE IN FEET

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0							

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DATE: 04/21/14

LOCATION OF SUMPS IN BAY 12

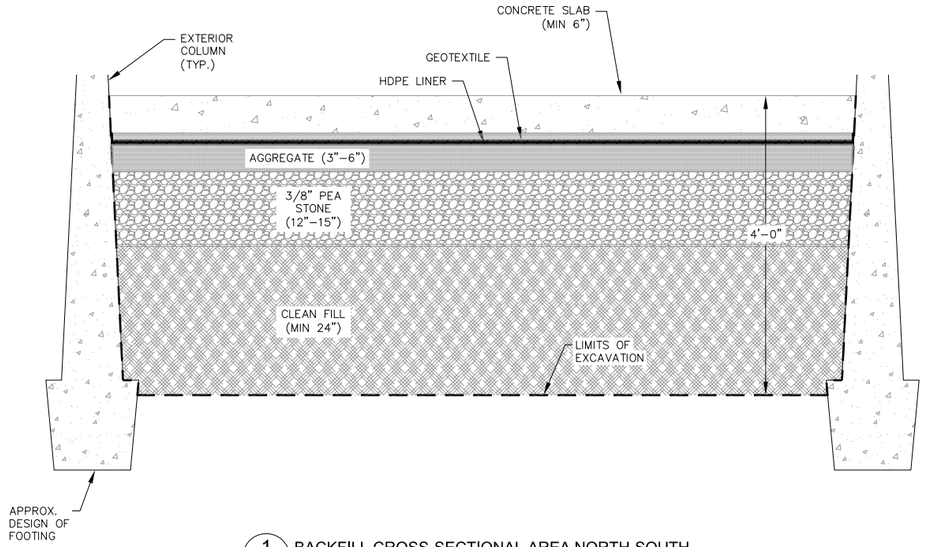
101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: 10

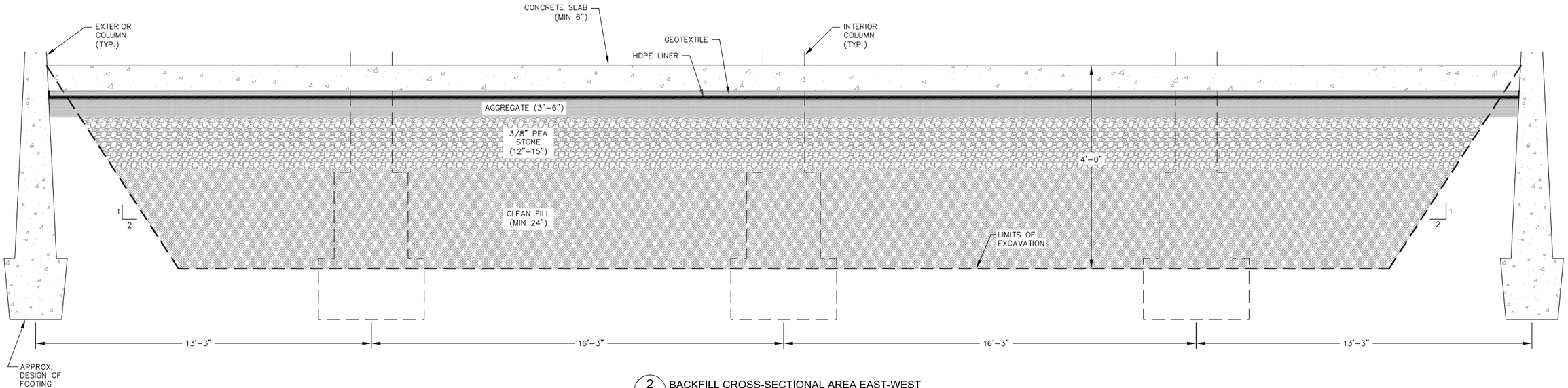
SHEET NUMBER: 1 of 1

REVISION 0

File: C:\Users\mckeever\Desktop\Ozone\SMP\Figures\Figure 10 - Location of Sumps in Bay 12\Location of Bay 12 Sumps.dwg Layout: Figure 10 User: mckeever Plotted: Apr 21, 2014 - 5:22pm Xref's:



1 / 9a BACKFILL CROSS-SECTIONAL AREA NORTH-SOUTH
SCALE: NTS



2 / 9a BACKFILL CROSS-SECTIONAL AREA EAST-WEST
SCALE: NTS

ISSUED FOR SMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
2	RWM	04/21/14	AS–BUILT BACKFILL CROSS–SECTIONS				
1	RWM	02/09/12	ISSUED FOR BID				
0	JEB	10/28/11	ISSUED FOR DESIGN SPECIFICATIONS				

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DATE: 04/21/14

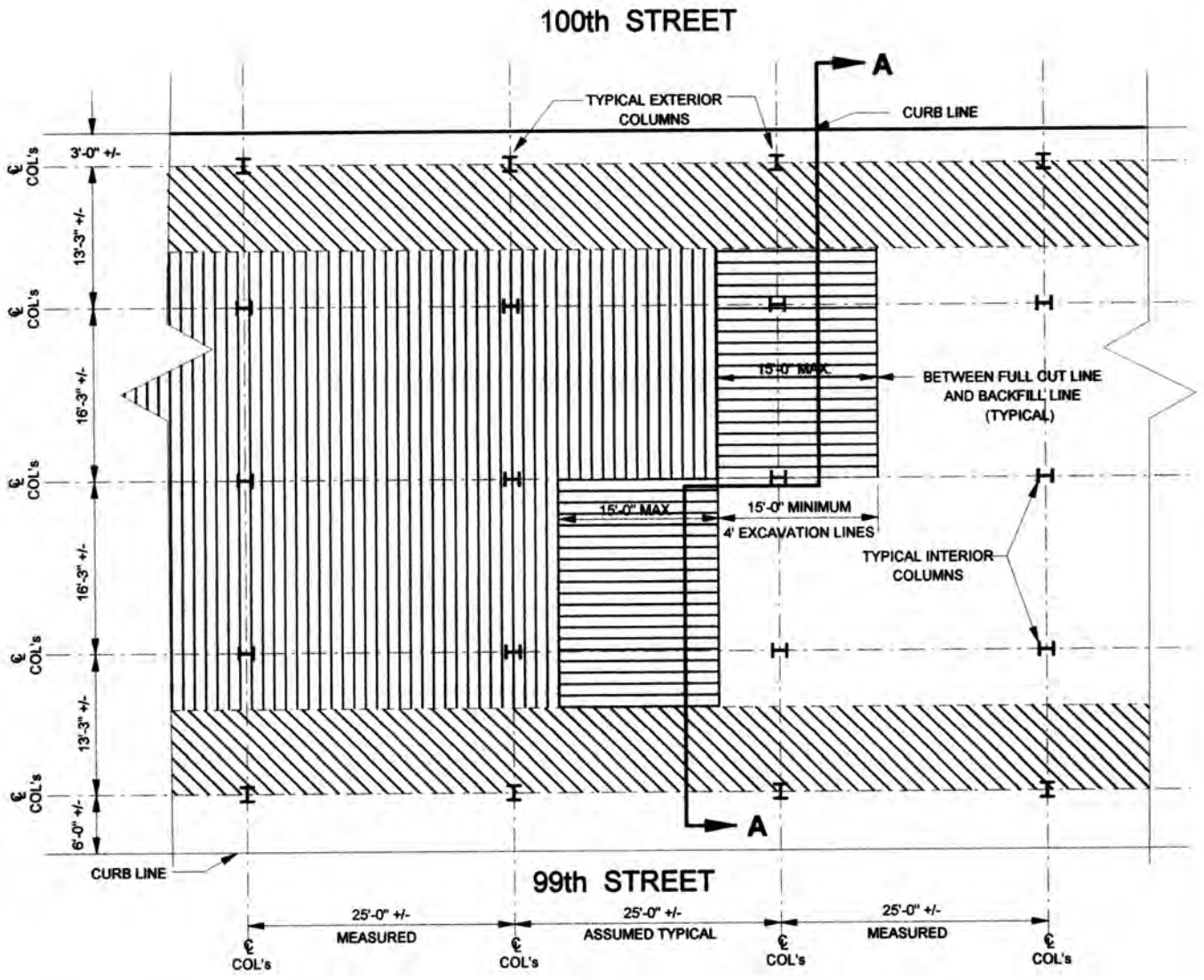
BACKFILL CROSS SECTIONS

DRAWING NUMBER: 11

SHEET NUMBER:

REVISION 2

File: C:\Users\mckeever\Desktop\Ozone\SMP\Figures\Figure 11 – Excavation and Backfill Contour\Excavation and Backfill Contour.dwg Layout: 11 Backfill Cross Sections User: mckeever Plotted: Apr 21, 2014 – 6:28pm Xref's:



TYPICAL EXCAVATION & BACKFILL SEQUENCING

0' 5' 15' 25'
GRAPHIC SCALE

UNEXCAVATED AREAS

4'-0" MAX. EXCAVATION

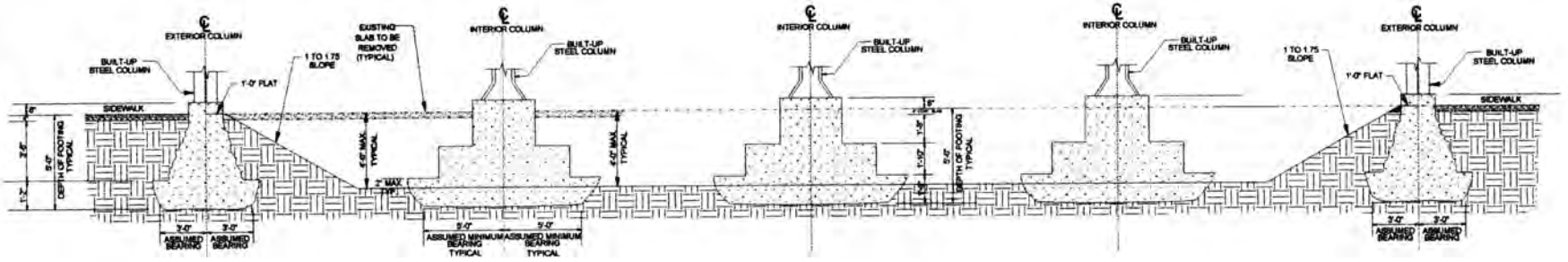
4'-0" EXCAVATION WITH 2'-0" COMPACTED BACKFILL

"SLOPED" EXCAVATION (SEE OTHER DWG's)

LEGEND

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AECOM PROJECT NO. 60138748.A.1		
ISSUE 08/08/11	ARTECNICS ENGINEERING	DRAWN BY D.L. CHK'D BY ℄
AECOM CORPORATION		

Figure 12: Excavation/Backfill Sequencing



SECTION A-A

(NOTE THAT THIS SECTION IS NOT COLINEAR)

5' 15' 25'

GRAPHIC SCALE

NOTE THAT THE LONG SECTION (PROJECT NORTH TO SOUTH) IS SIMILAR. BE SURE TO WORK WITH THE SEQUENCING SCHEME SHOWN ON AECOZN1-1. EXCAVATION TO 4'-6" ALL AROUND ANY COLUMN IS NOT PERMITTED.

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ISSUE 08/08/11

ARTECNICS ENGINEERING

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AECOM CORPORATION

SECTION A-A

DWG. NO. AECOZN2-2

POST–EXC SAMPLE DESIGNATION KEY:

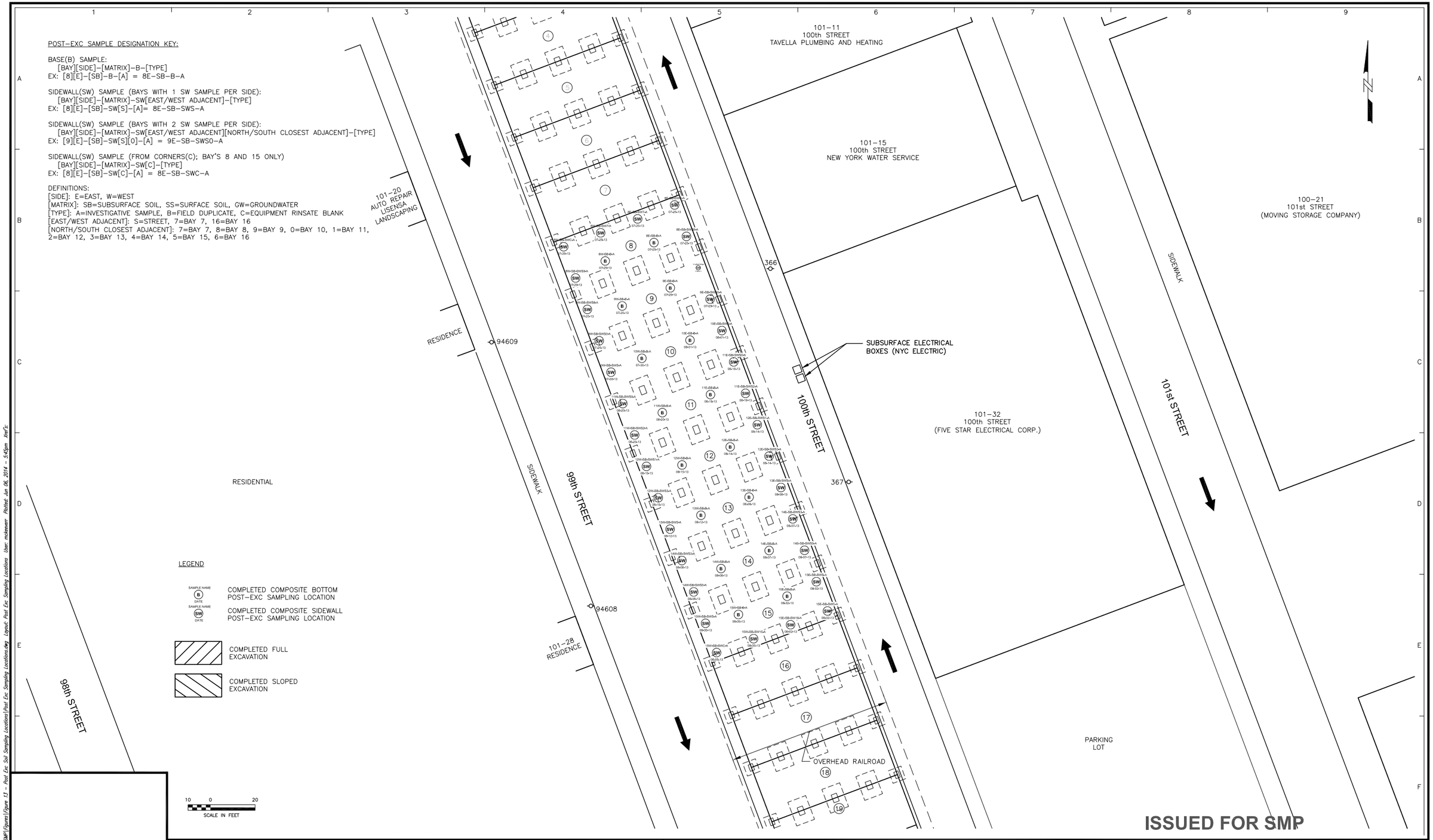
BASE(B) SAMPLE:
[BAY][SIDE]–[MATRIX]–B–[TYPE]
EX: [8][E]–[SB]–B–[A] = 8E–SB–B–A

SIDEWALL(SW) SAMPLE (BAYS WITH 1 SW SAMPLE PER SIDE):
[BAY][SIDE]–[MATRIX]–SW[EAST/WEST ADJACENT]–[TYPE]
EX: [8][E]–[SB]–SW[S]–[A]= 8E–SB–SWS–A

SIDEWALL(SW) SAMPLE (BAYS WITH 2 SW SAMPLE PER SIDE):
[BAY][SIDE]–[MATRIX]–SW[EAST/WEST ADJACENT][NORTH/SOUTH CLOSEST ADJACENT]–[TYPE]
EX: [9][E]–[SB]–SW[S][0]–[A] = 9E–SB–SWS0–A

SIDEWALL(SW) SAMPLE (FROM CORNERS(C); BAY'S 8 AND 15 ONLY)
[BAY][SIDE]–[MATRIX]–SW[C]–[TYPE]
EX: [8][E]–[SB]–SW[C]–[A] = 8E–SB–SWC–A

DEFINITIONS:
[SIDE]: E=EAST, W=WEST
[MATRIX]: SB=SUBSURFACE SOIL, SS=SURFACE SOIL, GW=GROUNDWATER
[TYPE]: A=INVESTIGATIVE SAMPLE, B=FIELD DUPLICATE, C=EQUIPMENT RINSATE BLANK
[EAST/WEST ADJACENT]: S=STREET, 7=BAY 7, 16=BAY 16
[NORTH/SOUTH CLOSEST ADJACENT]: 7=BAY 7, 8=BAY 8, 9=BAY 9, 0=BAY 10, 1=BAY 11, 2=BAY 12, 3=BAY 13, 4=BAY 14, 5=BAY 15, 6=BAY 16



LEGEND

SAMPLE NAME (B) DATE — COMPLETED COMPOSITE BOTTOM POST–EXC SAMPLING LOCATION

SAMPLE NAME (SW) DATE — COMPLETED COMPOSITE SIDEWALL POST–EXC SAMPLING LOCATION

COMPLETED FULL EXCAVATION

COMPLETED SLOPED EXCAVATION

10 0 20
SCALE IN FEET

ISSUED FOR SMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0	RM	6/6/14	AS–BUILT POST–EXC SOIL SAMPLING LOCATIONS				

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POST-EXCAVATION SAMPLING LOCATIONS

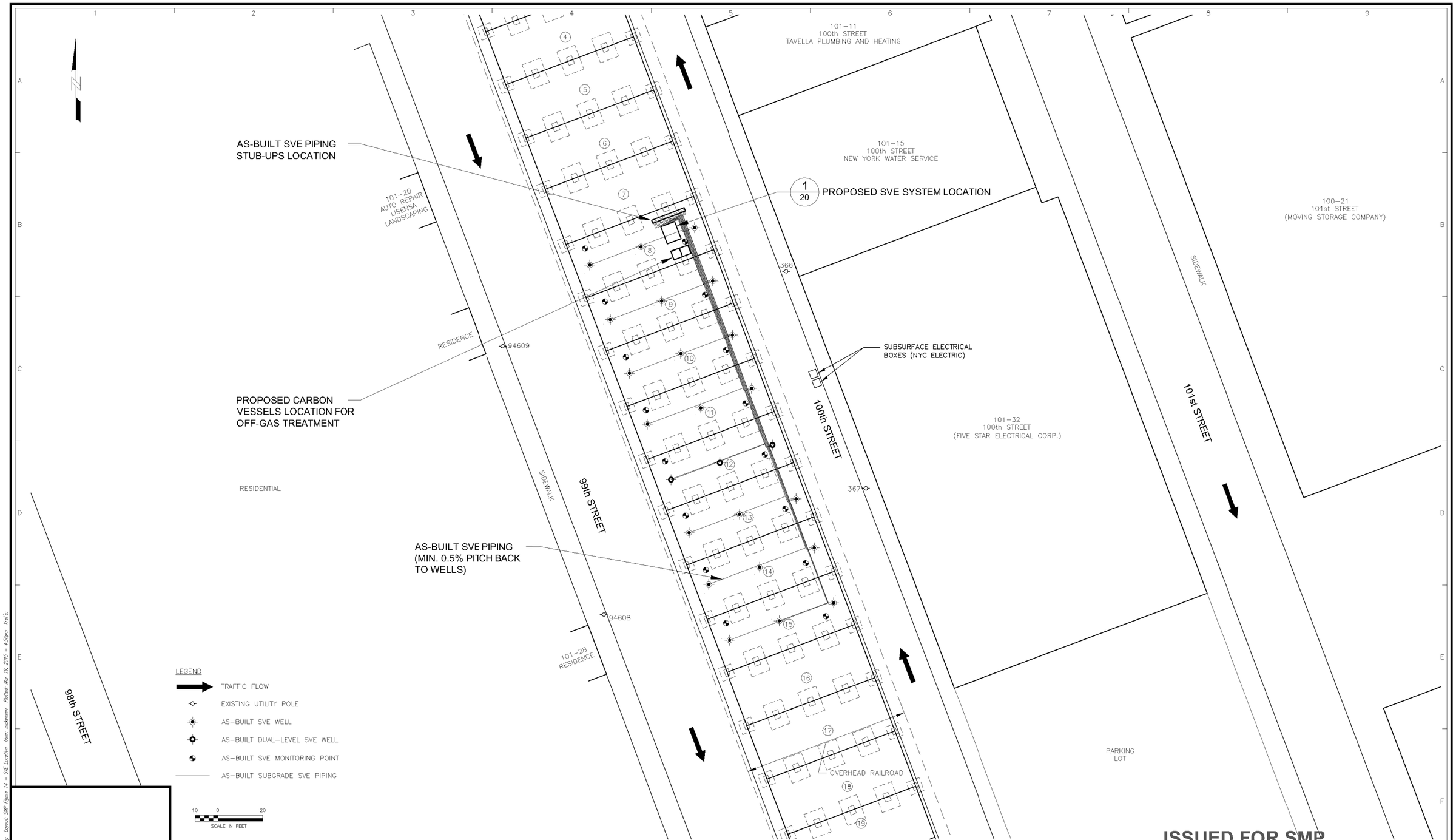
101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: 13

SHEET NUMBER:

REVISION 0

File: C:\Users\mckeever\Desktop\Ozone\SMP\Figures\Figure 13 - Post Exc. Soil Sampling Locations\Post Exc. Sampling Locations.dwg Layout: Post Exc. Sampling Locations User: mckeever Plotted: Jun 06, 2014 - 5:45pm Xref's:



ISSUED FOR SMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0	RWM	03/18/15	ISSUED FOR SMP	RM	03/19/15	SAC	03/19/15

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DATE: 03/18/15

LOCATION OF SOIL VAPOR EXTRACTION REMEDIAL TREATMENT SYSTEM

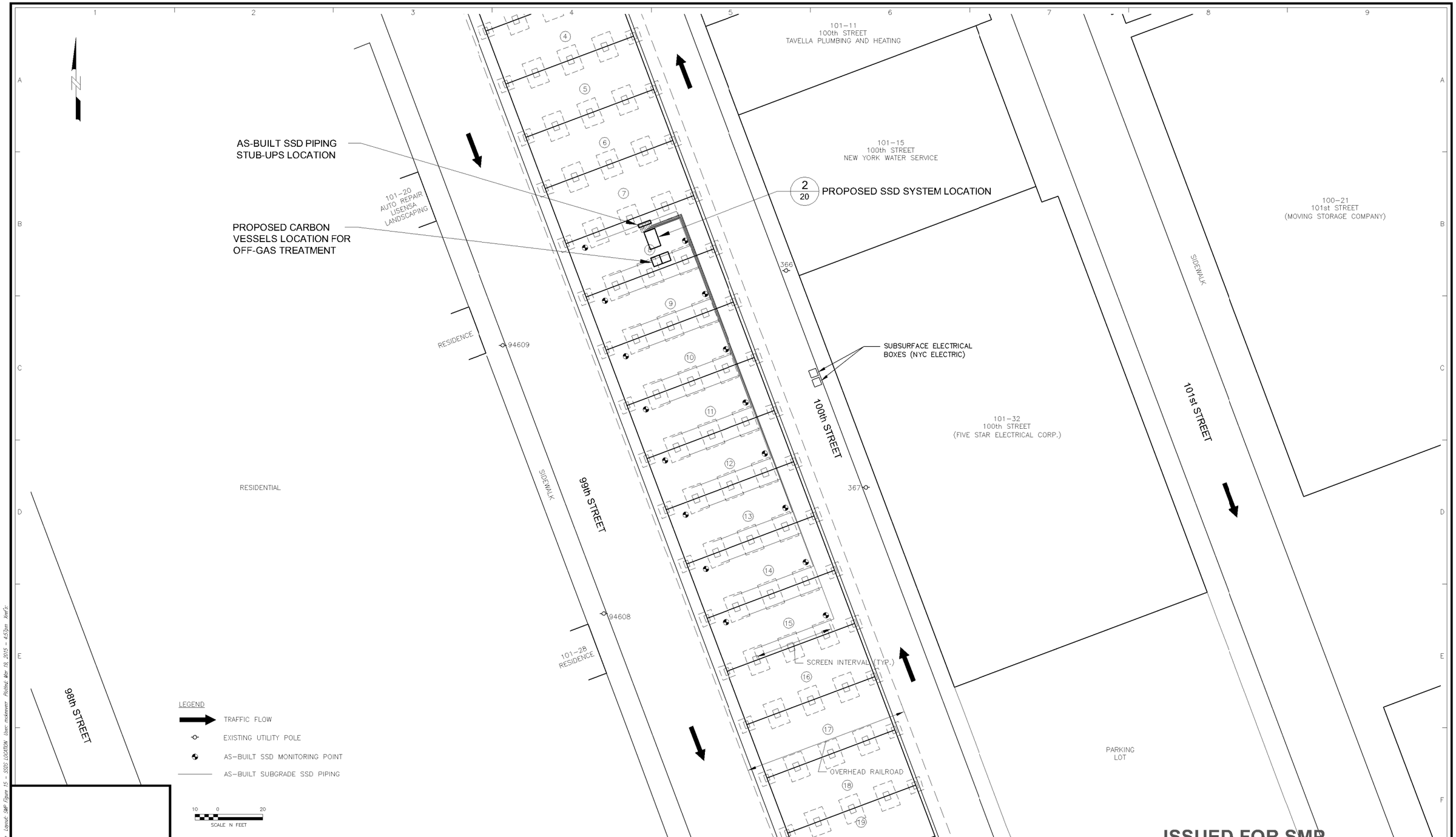
101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: 14

SHEET NUMBER: 14 of 22

REVISION 0

File: C:\Users\mckeown\Desktop\NEW OZONE.dwg Layout: SMP Plane: M = SVE Location User: mckeown Plotted: Mar 19, 2015 - 4:58pm Wed



ISSUED FOR SMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0	RWM	03/18/15	ISSUED FOR SMP	RM	03/19/15	SAC	03/19/15

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PROJ. NUMBER: 60221764

DATE: 03/18/15

LOCATION OF SUB-SLAB DEPRESSURIZATION REMEDIAL TREATMENT SYSTEM

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: 15

SHEET NUMBER: 15 of 22

REVISION 0

File: C:\Users\mckeown\Desktop\NEW OZONE.dwg Layout: SMP Plane 15 = SSDS LOCATION Xref: Mon, mckeown Plotted: Mar 18, 2015 - 4:37pm

POST-EXC SAMPLE DESIGNATION KEY:

BASE(B) SAMPLE:
[BAY][SIDE]-[MATRIX]-B-[TYPE]
EX: [8][E]-[SB]-B-[A] = 8E-SB-B-A

SIDEWALL(SW) SAMPLE (BAYS WITH 1 SW SAMPLE PER SIDE):
[BAY][SIDE]-[MATRIX]-SW[EAST/WEST ADJACENT]-[TYPE]
EX: [8][E]-[SB]-SW[S]-[A]= 8E-SB-SWS-A

SIDEWALL(SW) SAMPLE (BAYS WITH 2 SW SAMPLE PER SIDE):
[BAY][SIDE]-[MATRIX]-SW[EAST/WEST ADJACENT][NORTH/SOUTH CLOSEST ADJACENT]-[TYPE]
EX: [9][E]-[SB]-SW[S][0]-[A] = 9E-SB-SWS0-A

SIDEWALL(SW) SAMPLE (FROM CORNERS(C); BAY'S 8 AND 15 ONLY)
[BAY][SIDE]-[MATRIX]-SW[C]-[TYPE]
EX: [8][E]-[SB]-SW[C]-[A] = 8E-SB-SWC-A

DEFINITIONS:
[SIDE]: E=EAST, W=WEST
[MATRIX]: SB=SUBSURFACE SOIL, SS=SURFACE SOIL, GW=GROUNDWATER
[TYPE]: A=INVESTIGATIVE SAMPLE, B=FIELD DUPLICATE, C=EQUIPMENT RINSATE BLANK
[EAST/WEST ADJACENT]: S=STREET, 7=BAY 7, 16=BAY 16
[NORTH/SOUTH CLOSEST ADJACENT]: 7=BAY 7, 8=BAY 8, 9=BAY 9, 0=BAY 10, 1=BAY 11, 2=BAY 12, 3=BAY 13, 4=BAY 14, 5=BAY 15, 6=BAY 16

LEGEND

- COMPLETED COMPOSITE BOTTOM POST-EXC SAMPLING LOCATION WITH TCE CONCENTRATION (UG/KG)
- COMPLETED COMPOSITE SIDEWALL POST-EXC SAMPLING LOCATION WITH TCE CONCENTRATION (UG/KG)
- REMAINING SOIL CONTAMINATION (TCE) ABOVE NEW YORK UNRESTRICTED USE SOIL CLEANUP OBJECTIVES 375-6.8(a)

SCALE IN FEET: 10 0 20

101-11
100th STREET
TAVELLA PLUMBING AND HEATING

101-15
100th STREET
NEW YORK WATER SERVICE

100-21
101st STREET
(MOVING STORAGE COMPANY)

101-20
AUTO REPAIR
LISENSA
LANDSCAPING

RESIDENCE

94609

366

SUBSURFACE ELECTRICAL BOXES (NYC ELECTRIC)

100th STREET

101-32
100th STREET
(FIVE STAR ELECTRICAL CORP.)

101st STREET

SIDEWALK

99th STREET

367

94608

101-28
RESIDENCE

RESIDENTIAL

98th STREET

PARKING LOT

OVERHEAD RAILROAD

ISSUED FOR SMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0	RWM	03/18/15	ISSUED FOR SMP	RM	03/19/15	SAC	03/19/15

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PROJ. NUMBER: 60221764

DATE: 03/18/15

LOCATION OF REMAINING SOIL CONTAMINATION (TCE) ABOVE UNRESTRICTED LEVELS

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: 16

SHEET NUMBER: 16 of 22

REVISION: 0

File: C:\Users\mckeever\Desktop\Figure 16.dwg Layout: Figure 16 - Soil Contam Above Unrestricted User: mckeever Plotted: Mar 19, 2015 - 6:38pm Xref's:

POST-EXC SAMPLE DESIGNATION KEY:

BASE(B) SAMPLE:
[BAY][SIDE]-[MATRIX]-B-[TYPE]
EX: [8][E]-[SB]-B-[A] = 8E-SB-B-A

SIDEWALL(SW) SAMPLE (BAYS WITH 1 SW SAMPLE PER SIDE):
[BAY][SIDE]-[MATRIX]-SW[EAST/WEST ADJACENT]-[TYPE]
EX: [8][E]-[SB]-SW[S]-[A]= 8E-SB-SWS-A

SIDEWALL(SW) SAMPLE (BAYS WITH 2 SW SAMPLE PER SIDE):
[BAY][SIDE]-[MATRIX]-SW[EAST/WEST ADJACENT][NORTH/SOUTH CLOSEST ADJACENT]-[TYPE]
EX: [9][E]-[SB]-SW[S][0]-[A] = 9E-SB-SWS0-A

SIDEWALL(SW) SAMPLE (FROM CORNERS(C); BAY'S 8 AND 15 ONLY)
[BAY][SIDE]-[MATRIX]-SW[C]-[TYPE]
EX: [8][E]-[SB]-SW[C]-[A] = 8E-SB-SWC-A

DEFINITIONS:
[SIDE]: E=EAST, W=WEST
[MATRIX]: SB=SUBSURFACE SOIL, SS=SURFACE SOIL, GW=GROUNDWATER
[TYPE]: A=INVESTIGATIVE SAMPLE, B=FIELD DUPLICATE, C=EQUIPMENT RINSATE BLANK
[EAST/WEST ADJACENT]: S=STREET, 7=BAY 7, 16=BAY 16
[NORTH/SOUTH CLOSEST ADJACENT]: 7=BAY 7, 8=BAY 8, 9=BAY 9, 0=BAY 10, 1=BAY 11, 2=BAY 12, 3=BAY 13, 4=BAY 14, 5=BAY 15, 6=BAY 16

LEGEND

- COMPLETED COMPOSITE BOTTOM POST-EXC SAMPLING LOCATION WITH TCE CONCENTRATION (UG/KG)
- COMPLETED COMPOSITE SIDEWALL POST-EXC SAMPLING LOCATION WITH TCE CONCENTRATION (UG/KG)
- REMAINING SOIL CONTAMINATION (TCE) ABOVE NEW YORK RESTRICTED COMMERCIAL USE SOIL CLEANUP OBJECTIVES 375-6.8(b)

10 0 20
SCALE IN FEET

101-11
100th STREET
TAVELLA PLUMBING AND HEATING

101-15
100th STREET
NEW YORK WATER SERVICE

101-20
AUTO REPAIR
LISENSA
LANDSCAPING

100-21
101st STREET
(MOVING STORAGE COMPANY)

101-32
100th STREET
(FIVE STAR ELECTRICAL CORP.)

101-28
RESIDENCE

RESIDENTIAL

PARKING LOT

OVERHEAD RAILROAD

SUBSURFACE ELECTRICAL BOXES (NYC ELECTRIC)

SIDEWALK

99th STREET

98th STREET

100th STREET

101st STREET

94609

94608

366

367

ISSUED FOR SMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0	RWM	03/18/15	ISSUED FOR SMP	RM	03/19/15	SAC	03/19/15

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DATE: 03/18/15

LOCATION OF REMAINING SOIL CONTAMINATION (TCE) ABOVE SITE-SPECIFIC ACTION LEVELS

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: 17

SHEET NUMBER: 17 of 22

REVISION: 0

File: C:\Users\mckeever\Desktop\Figure 17.dwg Layout: Figure 17 - Soil Contam Above Res Com User: mckeever Plotted: Mar 19, 2015 - 6:45pm Xref's:

101–11
100th STREET
TAVELLA PLUMBING AND HEATING

101–15
100th STREET
NEW YORK WATER SERVICE

100–21
101st STREET
(MOVING STORAGE COMPANY)

101–20
AUTO REPAIR
LISENSA
LANDSCAPING

CONCRETE ENCASED CERAMIC CONDUIT LINES (6 TOTAL; EMPTY). 2'X2'. TOP @ ~2.5' BGS. BASE @ ~4.5' BGS. ENDS UNDETERMINED (CONTINUES INTO BOTH ADJACENT BAYS). REMOVED. 6" DEEP VOID SPACE FILLED AND COMPACTED WITH CLEAN BACKFILL (7/25/13).

14" WIDE POURED CONCRETE STRUCTURE. TOP @ ~2.5'BGS. BOTTOM UNDETERMINED. ENDS UNDETERMINED (PRESUMED TO RUN FULL LENGTH OF BAYS). EXCAVATED AROUND, EXPOSED ENTIRE STRUCTURE DOWN TO 4' BGS AND CLEANED (7–25–13). STRUCTURE TO BE LEFT IN PLACE AND BACKFILLED AROUND.

RESIDENCE

94609

366

SUBSURFACE ELECTRICAL BOXES (NYC ELECTRIC)

CONCRETE STRUCTURE 1' THICK. TOP @ ~2.5' BGS (FLUSH WITH THIRD STEPDOWN OF FOOTER). BASE UNDETERMINED. WEST SIDE FLUSH WITH THIRD STEPDOWN OF FOOTER. NORTH SIDE FLUSH WITH FOURTH STEPDOWN OF FOOTER. LEFT IN PLACE. (08/07/13).

101–32
100th STREET
(FIVE STAR ELECTRICAL CORP.)

SIDEWALK

99th STREET

100th STREET

101st STREET

367

RESIDENTIAL

CONCRETE STRUCTURE ~1' THICK. TOP @ ~3'2" BGS. TOP AND ENDS FLUSH WITH FOURTH STEPDOWN OF FOOTER. BASE UNDETERMINED. LEFT IN PLACE. (08/07/13).

94608

101–28
RESIDENCE

PARKING
LOT

OVERHEAD RAILROAD

98th STREET

LEGEND

OBSTRUCTIONS (REMOVED)

OBSTRUCTIONS (LEFT IN PLACE)

10 0 20
SCALE IN FEET

ISSUED FOR SMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0	RM	6/6/14	SUBSURFACE INFASTRUCTURE FOR SMP				

AECOM
250 APOLLO DRIVE
CHELMSFORD, MA 01824
www.aecom.com

FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 6/6/14

SUBSURFACE INFASTRUCTURE ENCOUNTERED DURING EXCAVATIONS

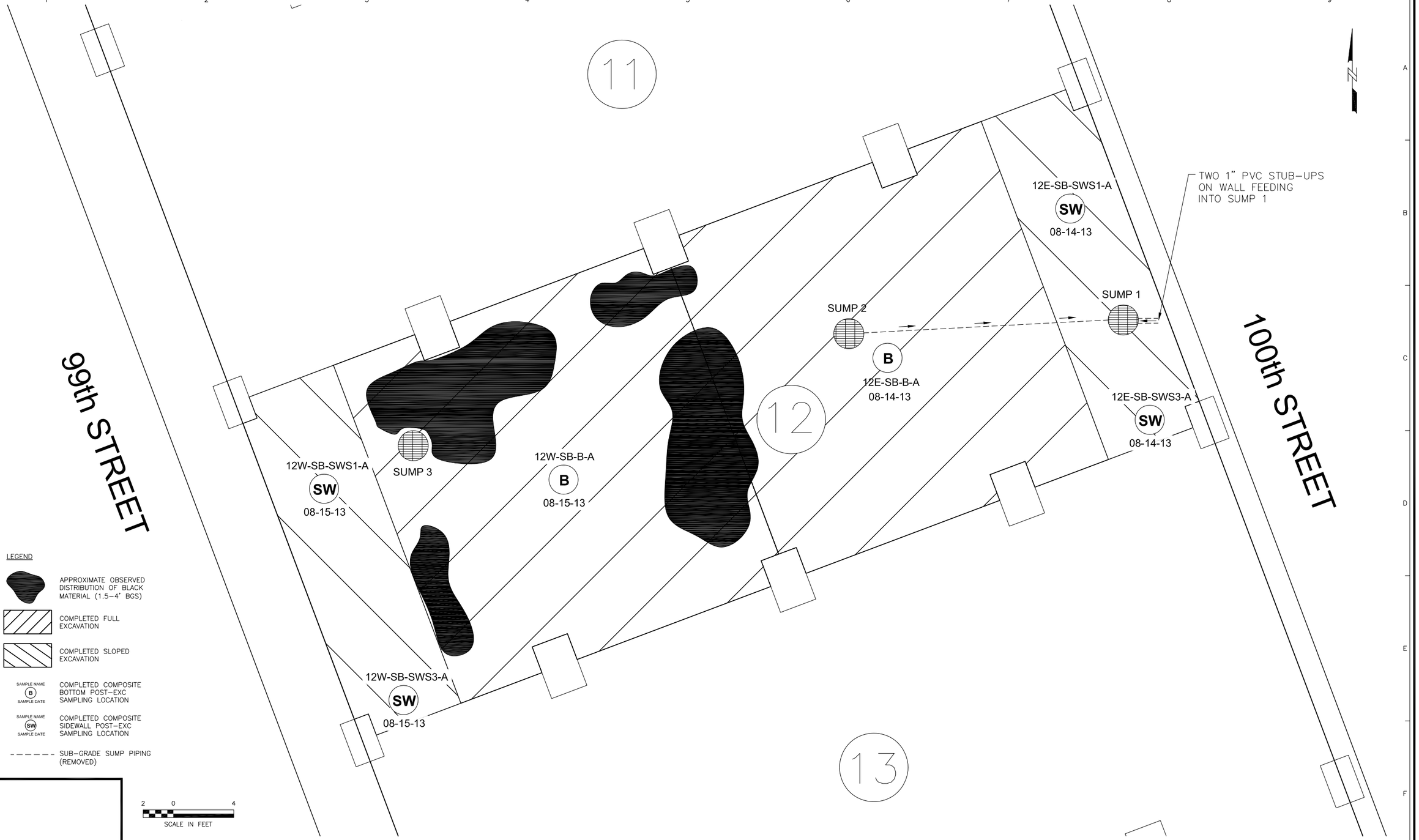
101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: 18

SHEET NUMBER:

REVISION 0

File: C:\Users\mckeever\Desktop\Ozone\SMP\Figures\Figure 18 - Subsurface Infrastructure\Subsurface Infastructure.dwg Layout: Subsurface Infastructure User: mckeever Plotted: Jun 06, 2014 - 5:55pm Xref's:



NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0							

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FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60270935

DATE: 09/09/13

BAY 12 SUMP MATERIAL SUBSURFACE DISTRIBUTION

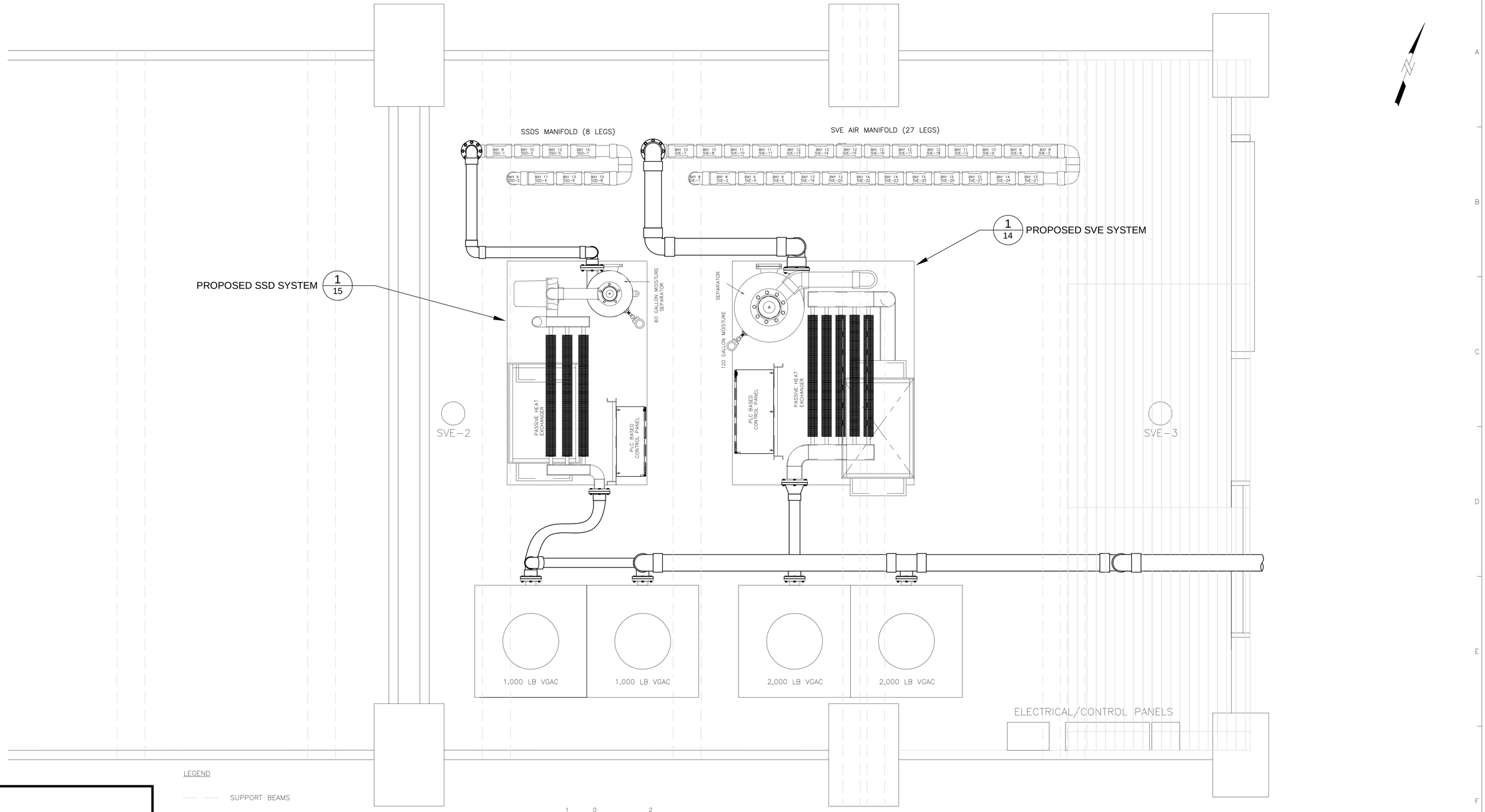
101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: 19

SHEET NUMBER:

REVISION 0

File: C:\Users\mckeever\Desktop\Ozone\SMP\Figures\Figure 19 - Bay 12 Sump Material Subsurface Distribution\BAY 12 SUMP MATERIAL SUBSURFACE DISTRIBUTION.dwg Layout: Figure 1 User: mckeever Plotted: Jun 06, 2014 - 6:02pm Xref's:



ISSUED FOR SMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0	RWM	03/23/15	ISSUED FOR SMP	RM	03/24/15	SAC	03/24/15

AECOM
AECOM
250 APOLLO DRIVE
CHELMSFORD, MA 01824
www.aecom.com

FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 03/23/15

REMEDIAL SYSTEM DETAILS (BAY 8)

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: 20

SHEET NUMBER: 20 of 22

REVISION 0

File: J:\Lat_Service\Project Files\Fixtures_Inc\Ozone - Queens, NY\SMP\Figures\Figure 20 - Bay 8 Details\System Drawings for SMP.dwg Layout: M-05 Proposed Treatment System Layout User: mckeown Plotted: Mar 23, 2015 - 12:42pm



LEGEND

- MONITORING WELL LOCATION
- SITE (12,000 Square Feet)

UTILITIES REFERENCES:

1 . COMMUNICATION LINES FROM VERIZON DRAWINGS.

2. GAS AND ELECTRIC LINES FROM KEYSPAN ENERGY DRAWINGS.

3. SANITARY AND STORM SEWER LINES FROM NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION.

0 30 60 Feet

Figure Number: 22

Sheet Number: 1

GROUNDWATER MONITORING WELL NETWORK

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

Scale:	Date:	Project Number:
1" = 60'	07/26/2016	60270935.7

AECOM Environment
250 APOLLO DRIVE
CHELMSFORD, MA 01824
(978) 905-2100
www.aecom.com

Designed By:	Revisions			
	No.:	Description:	Date:	By:
Drawn By:				
J.E.B.				
Checked By:				
R.M.				
Approved By:				
D.A.				

N W E S

Path: \\USCHL1FP001\Data\Projects\Jobs\Indl_Service\Project Files\Endzone, Inc\Ozone - Queens, NY\400 Technical\403 - GIS\Projects\SMP\Fig_22_GW_Monitoring_Well_Network.mxd

Tables

Table 1: Post-Excavation Soil Analyses Results (2013)

						LOCATION:		8E-SB-SW7-A		8E-SB-SWC-A		8E-SB-SWS9-A		8E-SB-B-A		8E-SB-B-A		9W-SB-SWS8-A		9W-SB-SWS0-A		9W-SB-B-A
						SAMPLING DATE:		7/25/2013		7/25/2013		7/25/2013		7/25/2013		7/25/2013		7/25/2013		7/25/2013		7/25/2013
						SAMPLE TYPE:		Composite		Composite		Composite		Composite		Composite		Composite		Composite		Composite
						SAMPLE DEPTH (ft.):		0.5-4		0.5-4		0.5-4		4		4		0.5-4		0.5-4		4
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**		**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**
Volatile Organics by 8260/5035 - Westborough Lab																						
Methylene chloride	75-09-2	1000	500	0.05	mg/kg	ND	1.2	ND	5.7	ND	22	ND	1.1	-	-	ND	3	ND	5.5	ND		
1,1-Dichloroethane	75-34-3	480	240	0.27	mg/kg	ND	0.18	ND	0.85	ND	3.3	ND	0.17	-	-	ND	0.45	ND	0.83	ND		
Chloroform	67-66-3	700	350	0.37	mg/kg	ND	0.18	ND	0.85	ND	3.3	ND	0.17	-	-	ND	0.45	ND	0.83	ND		
Carbon tetrachloride	56-23-5	44	22	0.76	mg/kg	ND	0.12	ND	0.57	ND	2.2	ND	0.11	-	-	ND	0.3	ND	0.55	ND		
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg	0.32	0.12	0.92	0.57	2.3	2.2	0.38	0.11	-	-	0.6	0.3	0.55	0.55	0.44		
Chlorobenzene	108-90-7	1000	500	1.1	mg/kg	ND	0.12	ND	0.57	ND	2.2	ND	0.11	-	-	ND	0.3	ND	0.55	ND		
1,2-Dichloroethane	107-06-2	60	30	0.02	mg/kg	ND	0.12	ND	0.57	ND	2.2	ND	0.11	-	-	ND	0.3	ND	0.55	ND		
1,1,1-Trichloroethane	71-55-6	1000	500	0.68	mg/kg	ND	0.12	ND	0.57	ND	2.2	ND	0.11	-	-	ND	0.3	ND	0.55	ND		
Benzene	71-43-2	89	44	0.06	mg/kg	ND	0.12	ND	0.57	ND	2.2	ND	0.11	-	-	ND	0.3	ND	0.55	ND		
Toluene	108-88-3	1000	500	0.7	mg/kg	ND	0.18	ND	0.85	ND	3.3	ND	0.17	-	-	ND	0.45	ND	0.83	ND		
Ethylbenzene	100-41-4	780	390	1	mg/kg	ND	0.12	ND	0.57	ND	2.2	ND	0.11	-	-	ND	0.3	ND	0.55	ND		
Vinyl chloride	75-01-4	27	13	0.02	mg/kg	ND	0.24	ND	1.1	ND	4.5	ND	0.22	-	-	ND	0.6	ND	1.1	ND		
1,1-Dichloroethene	75-35-4	1000	500	0.33	mg/kg	ND	0.12	ND	0.57	ND	2.2	ND	0.11	-	-	ND	0.3	ND	0.55	ND		
trans-1,2-Dichloroethene	156-60-5	1000	500	0.19	mg/kg	ND	0.18	ND	0.85	ND	3.3	ND	0.17	-	-	ND	0.45	ND	0.83	ND		
Trichloroethene	79-01-6	400	200	0.47	mg/kg	16	0.12	79	0.57	220	2.2	27	0.11	27	0.3	30	0.3	42	0.55	26		
1,2-Dichlorobenzene	95-50-1	1000	500	1.1	mg/kg	ND	0.59	ND	2.8	ND	11	ND	0.56	-	-	ND	1.5	ND	2.8	ND		
1,3-Dichlorobenzene	541-73-1	560	280	2.4	mg/kg	ND	0.59	ND	2.8	ND	11	ND	0.56	-	-	ND	1.5	ND	2.8	ND		
1,4-Dichlorobenzene	106-46-7	250	130	1.8	mg/kg	ND	0.59	ND	2.8	ND	11	ND	0.56	-	-	ND	1.5	ND	2.8	ND		
Methyl tert butyl ether	1634-04-4	1000	500	0.93	mg/kg	ND	0.24	ND	1.1	ND	4.5	ND	0.22	-	-	ND	0.6	ND	1.1	ND		
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg	0.085J	0.12	0.72	0.57	5	2.2	0.37	0.11	-	-	0.25J	0.3	0.55	0.55	0.3		
Acetone	67-64-1	1000	500	0.05	mg/kg	ND	1.2	ND	5.7	ND	22	ND	1.1	-	-	ND	3	ND	5.5	ND		
2-Butanone	78-93-3	1000	500	0.12	mg/kg	ND	1.2	ND	5.7	ND	22	ND	1.1	-	-	ND	3	ND	5.5	ND		
tert-Butylbenzene	98-06-6	1000	500	5.9	mg/kg	ND	0.59	ND	2.8	ND	11	ND	0.56	-	-	ND	1.5	ND	2.8	ND		
Naphthalene	91-20-3	1000	500	12	mg/kg	ND	0.59	ND	2.8	ND	11	ND	0.56	-	-	ND	1.5	ND	2.8	ND		
1,3,5-Trimethylbenzene	108-67-8	380	190	8.4	mg/kg	ND	0.59	ND	2.8	ND	11	ND	0.56	-	-	ND	1.5	ND	2.8	ND		
1,2,4-Trimethylbenzene	95-63-6	380	190	3.6	mg/kg	ND	0.59	ND	2.8	ND	11	ND	0.56	-	-	ND	1.5	ND	2.8	ND		
1,4-Dioxane	123-91-1	250	130	0.1	mg/kg	ND	12	ND	57	ND	220	ND	11	-	-	ND	30	ND	55	ND		

Notes:

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

RL exceeds **NY-UNRES**

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Result exceeds **NY-RESI**

Table 1: Post-Excavation Soil Analyses Results (2013)

					LOCATION:		**8W-SB-SW7-A**		**8W-SB-SWC-A**		**8W-SB-SWS9-A**		**8W-SB-B-A**		**9E-SB-SWS8-A**		**9E-SB-SWS0-A**		**9E-SB-B-A**
					SAMPLING DATE:		**7/29/2013**		**7/29/2013**		**7/29/2013**		**7/29/2013**		**7/29/2013**		**7/29/2013**		**7/29/2013**
					SAMPLE TYPE:		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**
					SAMPLE DEPTH (ft.):		**0.5-4**		**0.5-4**		**0.5-4**		**4**		**0.5-4**		**0.5-4**		**4**
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**
Volatile Organics by 8260/5035 - Westborough Lab																			
Methylene chloride	75-09-2	1000	500	0.05	mg/kg	2.8	ND	0.57	ND	0.52	ND	0.54	ND	0.53	ND	2.8	ND	2.5	ND
1,1-Dichloroethane	75-34-3	480	240	0.27	mg/kg	0.42	ND	0.085	ND	0.078	ND	0.081	ND	0.079	ND	0.43	ND	0.37	ND
Chloroform	67-66-3	700	350	0.37	mg/kg	0.42	ND	0.085	ND	0.078	ND	0.081	ND	0.079	ND	0.43	ND	0.37	ND
Carbon tetrachloride	56-23-5	44	22	0.76	mg/kg	0.28	ND	0.057	ND	0.052	ND	0.054	ND	0.053	ND	0.28	ND	0.25	ND
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg	0.28	0.082	0.057	0.24	0.052	0.076	0.054	0.083	0.053	0.5	0.28	0.54	0.25	0.043J
Chlorobenzene	108-90-7	1000	500	1.1	mg/kg	0.28	ND	0.057	ND	0.052	ND	0.054	ND	0.053	ND	0.28	ND	0.25	ND
1,2-Dichloroethane	107-06-2	60	30	0.02	mg/kg	0.28	ND	0.057	ND	0.052	ND	0.054	ND	0.053	ND	0.28	ND	0.25	ND
1,1,1-Trichloroethane	71-55-6	1000	500	0.68	mg/kg	0.28	ND	0.057	ND	0.052	ND	0.054	ND	0.053	ND	0.28	ND	0.25	ND
Benzene	71-43-2	89	44	0.06	mg/kg	0.28	ND	0.057	ND	0.052	ND	0.054	ND	0.053	ND	0.28	ND	0.25	ND
Toluene	108-88-3	1000	500	0.7	mg/kg	0.42	ND	0.085	ND	0.078	ND	0.081	ND	0.079	ND	0.43	ND	0.37	ND
Ethylbenzene	100-41-4	780	390	1	mg/kg	0.28	ND	0.057	ND	0.052	ND	0.054	ND	0.053	ND	0.28	ND	0.25	ND
Vinyl chloride	75-01-4	27	13	0.02	mg/kg	0.56	ND	0.11	ND	0.1	ND	0.11	ND	0.1	ND	0.57	ND	0.5	ND
1,1-Dichloroethene	75-35-4	1000	500	0.33	mg/kg	0.28	ND	0.057	ND	0.052	ND	0.054	ND	0.053	ND	0.28	ND	0.25	ND
trans-1,2-Dichloroethene	156-60-5	1000	500	0.19	mg/kg	0.42	ND	0.085	ND	0.078	ND	0.081	ND	0.079	ND	0.43	ND	0.37	ND
Trichloroethene	79-01-6	400	200	0.47	mg/kg	0.28	2.3	0.057	5.8	0.052	3	0.054	1.8	0.053	55	0.28	31	0.25	2.1
1,2-Dichlorobenzene	95-50-1	1000	500	1.1	mg/kg	1.4	ND	0.28	ND	0.26	ND	0.27	ND	0.26	ND	1.4	ND	1.2	ND
1,3-Dichlorobenzene	541-73-1	560	280	2.4	mg/kg	1.4	ND	0.28	ND	0.26	ND	0.27	ND	0.26	ND	1.4	ND	1.2	ND
1,4-Dichlorobenzene	106-46-7	250	130	1.8	mg/kg	1.4	ND	0.28	ND	0.26	ND	0.27	ND	0.26	ND	1.4	ND	1.2	ND
Methyl tert butyl ether	1634-04-4	1000	500	0.93	mg/kg	0.56	ND	0.11	ND	0.1	ND	0.11	ND	0.1	ND	0.57	ND	0.5	ND
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg	0.28	ND	0.057	ND	0.052	ND	0.054	ND	0.053	0.95	0.28	0.34	0.25	ND
Acetone	67-64-1	1000	500	0.05	mg/kg	2.8	ND	0.57	ND	0.52	ND	0.54	ND	0.53	ND	2.8	ND	2.5	ND
2-Butanone	78-93-3	1000	500	0.12	mg/kg	2.8	0.04J	0.57	ND	0.52	ND	0.54	ND	0.53	ND	2.8	ND	2.5	0.042J
tert-Butylbenzene	98-06-6	1000	500	5.9	mg/kg	1.4	ND	0.28	ND	0.26	ND	0.27	ND	0.26	ND	1.4	ND	1.2	ND
Naphthalene	91-20-3	1000	500	12	mg/kg	1.4	ND	0.28	ND	0.26	ND	0.27	ND	0.26	ND	1.4	ND	1.2	ND
1,3,5-Trimethylbenzene	108-67-8	380	190	8.4	mg/kg	1.4	ND	0.28	ND	0.26	ND	0.27	ND	0.26	ND	1.4	ND	1.2	ND
1,2,4-Trimethylbenzene	95-63-6	380	190	3.6	mg/kg	1.4	ND	0.28	ND	0.26	ND	0.27	ND	0.26	ND	1.4	ND	1.2	ND
1,4-Dioxane	123-91-1	250	130	0.1	mg/kg	28	ND	5.7	ND	5.2	ND	5.4	ND	5.3	ND	28	ND	25	ND

Notes:

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

RL exceeds **NY-UNRES**

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Result exceeds **NY-RESI**

Table 1: Post-Excavation Soil Analyses Results (2013)

					LOCATION:		**10W-SB-SWS-A**		**10W-SB-B-A**		**10E-SB-B-A**		**10E-SB-B-A**		**10E-SB-SWS-A**		**15E-SB-B-A**		**15E-SB-SW16-A**
					SAMPLING DATE:		**7/30/2013**		**7/30/2013**		**8/1/2013**		**8/1/2013**		**8/1/2013**		**8/2/2013**		**8/2/2013**
					SAMPLE TYPE:		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**
					SAMPLE DEPTH (ft.):		**0.5-4**		**4**		**4**		**4**		**0.5-4**		**4**		**0.5-4**
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**
Volatile Organics by 8260/5035 - Westborough Lab																			
Methylene chloride	75-09-2	1000	500	0.05	mg/kg	0.52	ND	0.55	ND	0.55	ND	0.57	-	-	ND	7.6	ND	1.1	ND
1,1-Dichloroethane	75-34-3	480	240	0.27	mg/kg	0.078	ND	0.083	ND	0.082	ND	0.086	-	-	ND	1.1	ND	0.16	ND
Chloroform	67-66-3	700	350	0.37	mg/kg	0.078	ND	0.083	ND	0.082	ND	0.086	-	-	ND	1.1	ND	0.16	ND
Carbon tetrachloride	56-23-5	44	22	0.76	mg/kg	0.052	ND	0.055	ND	0.055	ND	0.057	-	-	ND	0.76	ND	0.11	ND
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg	0.052	0.17	0.055	0.25	0.055	0.25	0.057	-	-	0.91	0.76	0.16	0.11	0.054J
Chlorobenzene	108-90-7	1000	500	1.1	mg/kg	0.052	ND	0.055	ND	0.055	ND	0.057	-	-	ND	0.76	ND	0.11	ND
1,2-Dichloroethane	107-06-2	60	30	0.02	mg/kg	0.052	ND	0.055	ND	0.055	ND	0.057	-	-	ND	0.76	ND	0.11	ND
1,1,1-Trichloroethane	71-55-6	1000	500	0.68	mg/kg	0.052	ND	0.055	ND	0.055	ND	0.057	-	-	ND	0.76	0.19	0.11	0.094
Benzene	71-43-2	89	44	0.06	mg/kg	0.052	ND	0.055	ND	0.055	ND	0.057	-	-	ND	0.76	ND	0.11	ND
Toluene	108-88-3	1000	500	0.7	mg/kg	0.078	ND	0.083	ND	0.082	ND	0.086	-	-	ND	1.1	ND	0.16	0.05J
Ethylbenzene	100-41-4	780	390	1	mg/kg	0.052	ND	0.055	ND	0.055	ND	0.057	-	-	ND	0.76	ND	0.11	ND
Vinyl chloride	75-01-4	27	13	0.02	mg/kg	0.1	ND	0.11	ND	0.11	ND	0.11	-	-	ND	1.5	ND	0.22	ND
1,1-Dichloroethene	75-35-4	1000	500	0.33	mg/kg	0.052	ND	0.055	ND	0.055	ND	0.057	-	-	ND	0.76	ND	0.11	ND
trans-1,2-Dichloroethene	156-60-5	1000	500	0.19	mg/kg	0.078	ND	0.083	ND	0.082	ND	0.086	-	-	ND	1.1	ND	0.16	ND
Trichloroethene	79-01-6	400	200	0.47	mg/kg	0.052	3.9	0.055	9.8	0.055	15	0.057	15	0.29	85	0.76	9.5	0.11	3
1,2-Dichlorobenzene	95-50-1	1000	500	1.1	mg/kg	0.26	ND	0.28	ND	0.27	ND	0.29	-	-	ND	3.8	ND	0.55	ND
1,3-Dichlorobenzene	541-73-1	560	280	2.4	mg/kg	0.26	ND	0.28	ND	0.27	ND	0.29	-	-	ND	3.8	ND	0.55	ND
1,4-Dichlorobenzene	106-46-7	250	130	1.8	mg/kg	0.26	ND	0.28	ND	0.27	ND	0.29	-	-	ND	3.8	ND	0.55	ND
Methyl tert butyl ether	1634-04-4	1000	500	0.93	mg/kg	0.1	ND	0.11	ND	0.11	ND	0.11	-	-	ND	1.5	ND	0.22	ND
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg	0.052	ND	0.055	0.15	0.055	0.24	0.057	-	-	1.8	0.76	0.34	0.11	0.06
Acetone	67-64-1	1000	500	0.05	mg/kg	0.52	ND	0.55	ND	0.55	ND	0.57	-	-	ND	7.6	ND	1.1	ND
2-Butanone	78-93-3	1000	500	0.12	mg/kg	0.52	ND	0.55	ND	0.55	ND	0.57	-	-	ND	7.6	ND	1.1	ND
tert-Butylbenzene	98-06-6	1000	500	5.9	mg/kg	0.26	ND	0.28	ND	0.27	ND	0.29	-	-	ND	3.8	ND	0.55	ND
Naphthalene	91-20-3	1000	500	12	mg/kg	0.26	ND	0.28	ND	0.27	ND	0.29	-	-	ND	3.8	0.12J	0.55	ND
1,3,5-Trimethylbenzene	108-67-8	380	190	8.4	mg/kg	0.26	ND	0.28	ND	0.27	ND	0.29	-	-	ND	3.8	ND	0.55	ND
1,2,4-Trimethylbenzene	95-63-6	380	190	3.6	mg/kg	0.26	ND	0.28	ND	0.27	ND	0.29	-	-	ND	3.8	ND	0.55	ND
1,4-Dioxane	123-91-1	250	130	0.1	mg/kg	5.2	ND	5.5	ND	5.5	ND	5.7	-	-	ND	76	ND	11	ND

Notes:

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

RL exceeds **NY-UNRES**

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Result exceeds **NY-RESI**

Table 1: Post-Excavation Soil Analyses Results (2013)

					LOCATION:		**15E-SB-SWC-A**		**15E-SB-SWS-A**		**15W-SB-B-A**		**15W-SB-SW16-A**		**15W-SB-SWC-A**		**15W-SB-SWS-A**	
					SAMPLING DATE:		**8/2/2013**		**8/2/2013**		**8/5/2013**		**8/5/2013**		**8/5/2013**		**8/5/2013**	
					SAMPLE TYPE:		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**	
					SAMPLE DEPTH (ft.):		**0.5-4**		**0.5-4**		**4**		**0.5-4**		**0.5-4**		**0.5-4**	
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
Volatile Organics by 8260/5035 - Westborough Lab																		
Methylene chloride	75-09-2	1000	500	0.05	mg/kg	0.56	ND	2.4	ND	2.9	ND	0.51	ND	1	ND	0.54	ND	0.56
1,1-Dichloroethane	75-34-3	480	240	0.27	mg/kg	0.084	ND	0.37	ND	0.44	ND	0.077	ND	0.15	ND	0.081	ND	0.084
Chloroform	67-66-3	700	350	0.37	mg/kg	0.084	ND	0.37	ND	0.44	ND	0.077	ND	0.15	ND	0.081	ND	0.084
Carbon tetrachloride	56-23-5	44	22	0.76	mg/kg	0.056	ND	0.24	ND	0.29	ND	0.051	ND	0.1	ND	0.054	ND	0.056
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg	0.056	0.24	0.24	0.23J	0.29	0.18	0.051	0.38	0.1	0.18	0.054	0.28	0.056
Chlorobenzene	108-90-7	1000	500	1.1	mg/kg	0.056	ND	0.24	ND	0.29	ND	0.051	ND	0.1	ND	0.054	ND	0.056
1,2-Dichloroethane	107-06-2	60	30	0.02	mg/kg	0.056	ND	0.24	ND	0.29	ND	0.051	ND	0.1	ND	0.054	ND	0.056
1,1,1-Trichloroethane	71-55-6	1000	500	0.68	mg/kg	0.056	0.26	0.24	0.38	0.29	0.011J	0.051	ND	0.1	ND	0.054	0.014J	0.056
Benzene	71-43-2	89	44	0.06	mg/kg	0.056	ND	0.24	ND	0.29	ND	0.051	ND	0.1	ND	0.054	ND	0.056
Toluene	108-88-3	1000	500	0.7	mg/kg	0.084	ND	0.37	ND	0.44	0.014J	0.077	ND	0.15	0.032J	0.081	0.14	0.084
Ethylbenzene	100-41-4	780	390	1	mg/kg	0.056	ND	0.24	ND	0.29	ND	0.051	ND	0.1	0.01J	0.054	0.01J	0.056
Vinyl chloride	75-01-4	27	13	0.02	mg/kg	0.11	ND	0.49	ND	0.58	ND	0.1	ND	0.2	ND	0.11	ND	0.11
1,1-Dichloroethene	75-35-4	1000	500	0.33	mg/kg	0.056	ND	0.24	ND	0.29	ND	0.051	ND	0.1	ND	0.054	ND	0.056
trans-1,2-Dichloroethene	156-60-5	1000	500	0.19	mg/kg	0.084	ND	0.37	ND	0.44	ND	0.077	ND	0.15	ND	0.081	ND	0.084
Trichloroethene	79-01-6	400	200	0.47	mg/kg	0.056	22	0.24	32	0.29	6.4	0.051	14	0.1	4	0.054	9	0.056
1,2-Dichlorobenzene	95-50-1	1000	500	1.1	mg/kg	0.28	ND	1.2	ND	1.4	ND	0.26	ND	0.5	ND	0.27	ND	0.28
1,3-Dichlorobenzene	541-73-1	560	280	2.4	mg/kg	0.28	ND	1.2	ND	1.4	ND	0.26	ND	0.5	ND	0.27	ND	0.28
1,4-Dichlorobenzene	106-46-7	250	130	1.8	mg/kg	0.28	ND	1.2	ND	1.4	ND	0.26	ND	0.5	ND	0.27	ND	0.28
Methyl tert butyl ether	1634-04-4	1000	500	0.93	mg/kg	0.11	ND	0.49	ND	0.58	ND	0.1	ND	0.2	ND	0.11	ND	0.11
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg	0.056	0.74	0.24	2.4	0.29	0.17	0.051	0.41	0.1	0.035J	0.054	0.16	0.056
Acetone	67-64-1	1000	500	0.05	mg/kg	0.56	ND	2.4	ND	2.9	ND	0.51	ND	1	ND	0.54	ND	0.56
2-Butanone	78-93-3	1000	500	0.12	mg/kg	0.56	ND	2.4	ND	2.9	ND	0.51	ND	1	ND	0.54	ND	0.56
tert-Butylbenzene	98-06-6	1000	500	5.9	mg/kg	0.28	ND	1.2	ND	1.4	ND	0.26	ND	0.5	ND	0.27	ND	0.28
Naphthalene	91-20-3	1000	500	12	mg/kg	0.28	ND	1.2	ND	1.4	0.057J	0.26	ND	0.5	0.07J	0.27	0.076J	0.28
1,3,5-Trimethylbenzene	108-67-8	380	190	8.4	mg/kg	0.28	ND	1.2	ND	1.4	ND	0.26	ND	0.5	ND	0.27	ND	0.28
1,2,4-Trimethylbenzene	95-63-6	380	190	3.6	mg/kg	0.28	ND	1.2	ND	1.4	ND	0.26	ND	0.5	ND	0.27	ND	0.28
1,4-Dioxane	123-91-1	250	130	0.1	mg/kg	5.6	ND	24	ND	29	ND	5.1	ND	10	ND	5.4	ND	5.6

Notes:

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

RL exceeds **NY-UNRES**

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Result exceeds **NY-RESI**

Table 1: Post-Excavation Soil Analyses Results (2013)

						LOCATION:		14E-SB-SWS5-A		14E-SB-SWS3-A		14E-SB-B-A		14W-SB-SWS5-A		14W-SB-SWS3-A		14W-SB-B-A		13E-SB-B-A	
						SAMPLING DATE:		8/7/2013		8/7/2013		8/7/2013		8/8/2013		8/8/2013		8/8/2013		8/8/2013	
						SAMPLE TYPE:		Composite		Composite		Composite		Composite		Composite		Composite		Composite	
						SAMPLE DEPTH (ft.):		0.5-4		0.5-4		4		0.5-4		0.5-4		4		4	
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**			**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
Volatile Organics by 8260/5035 - Westborough Lab																					
Methylene chloride	75-09-2	1000	500	0.05	mg/kg		0.77J	3.3	1.3J	5.3	0.27J	1	0.26J	1	0.25J	1	0.26J	1.1	ND	0.58	
1,1-Dichloroethane	75-34-3	480	240	0.27	mg/kg		ND	0.5	ND	0.79	ND	0.15	ND	0.15	ND	0.16	ND	0.16	ND	0.086	
Chloroform	67-66-3	700	350	0.37	mg/kg		ND	0.5	ND	0.79	ND	0.15	ND	0.15	ND	0.16	ND	0.16	ND	0.086	
Carbon tetrachloride	56-23-5	44	22	0.76	mg/kg		ND	0.33	ND	0.53	ND	0.1	ND	0.1	ND	0.1	ND	0.11	ND	0.058	
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg		0.56	0.33	0.59	0.53	0.24	0.1	0.43	0.1	0.51	0.1	0.43	0.11	0.072	0.058	
Chlorobenzene	108-90-7	1000	500	1.1	mg/kg		ND	0.33	ND	0.53	ND	0.1	ND	0.1	ND	0.1	ND	0.11	ND	0.058	
1,2-Dichloroethane	107-06-2	60	30	0.02	mg/kg		ND	0.33	ND	0.53	ND	0.1	ND	0.1	ND	0.1	ND	0.11	ND	0.058	
1,1,1-Trichloroethane	71-55-6	1000	500	0.68	mg/kg		ND	0.33	ND	0.53	ND	0.1	ND	0.1	ND	0.1	ND	0.11	ND	0.058	
Benzene	71-43-2	89	44	0.06	mg/kg		ND	0.33	ND	0.53	ND	0.1	ND	0.1	ND	0.1	ND	0.11	ND	0.058	
Toluene	108-88-3	1000	500	0.7	mg/kg		ND	0.5	ND	0.79	ND	0.15	ND	0.15	ND	0.16	ND	0.16	ND	0.086	
Ethylbenzene	100-41-4	780	390	1	mg/kg		ND	0.33	ND	0.53	ND	0.1	ND	0.1	ND	0.1	ND	0.11	ND	0.058	
Vinyl chloride	75-01-4	27	13	0.02	mg/kg		ND	0.67	ND	1	ND	0.2	ND	0.2	ND	0.21	ND	0.22	ND	0.12	
1,1-Dichloroethene	75-35-4	1000	500	0.33	mg/kg		ND	0.33	ND	0.53	ND	0.1	ND	0.1	ND	0.1	ND	0.11	ND	0.058	
trans-1,2-Dichloroethene	156-60-5	1000	500	0.19	mg/kg		ND	0.5	ND	0.79	ND	0.15	ND	0.15	ND	0.16	ND	0.16	ND	0.086	
Trichloroethene	79-01-6	400	200	0.47	mg/kg		44	0.33	44	0.53	9.5	0.1	14	0.1	13	0.1	13	0.11	2.1	0.058	
1,2-Dichlorobenzene	95-50-1	1000	500	1.1	mg/kg		ND	1.7	ND	2.6	ND	0.51	ND	0.51	ND	0.52	ND	0.55	ND	0.29	
1,3-Dichlorobenzene	541-73-1	560	280	2.4	mg/kg		ND	1.7	ND	2.6	ND	0.51	ND	0.51	ND	0.52	ND	0.55	ND	0.29	
1,4-Dichlorobenzene	106-46-7	250	130	1.8	mg/kg		ND	1.7	ND	2.6	ND	0.51	ND	0.51	ND	0.52	ND	0.55	ND	0.29	
Methyl tert butyl ether	1634-04-4	1000	500	0.93	mg/kg		ND	0.67	ND	1	ND	0.2	ND	0.2	ND	0.21	ND	0.22	ND	0.12	
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg		2.4	0.33	1.5	0.53	0.33	0.1	0.36	0.1	0.23	0.1	0.27	0.11	0.3	0.058	
Acetone	67-64-1	1000	500	0.05	mg/kg		ND	3.3	ND	5.3	ND	1	ND	1	ND	1	ND	1.1	ND	0.58	
2-Butanone	78-93-3	1000	500	0.12	mg/kg		ND	3.3	ND	5.3	ND	1	ND	1	ND	1	ND	1.1	ND	0.58	
tert-Butylbenzene	98-06-6	1000	500	5.9	mg/kg		ND	1.7	ND	2.6	ND	0.51	ND	0.51	ND	0.52	ND	0.55	ND	0.29	
Naphthalene	91-20-3	1000	500	12	mg/kg		ND	1.7	ND	2.6	ND	0.51	ND	0.51	ND	0.52	ND	0.55	ND	0.29	
1,3,5-Trimethylbenzene	108-67-8	380	190	8.4	mg/kg		ND	1.7	ND	2.6	ND	0.51	ND	0.51	ND	0.52	ND	0.55	ND	0.29	
1,2,4-Trimethylbenzene	95-63-6	380	190	3.6	mg/kg		ND	1.7	ND	2.6	ND	0.51	ND	0.51	ND	0.52	ND	0.55	ND	0.29	
1,4-Dioxane	123-91-1	250	130	0.1	mg/kg		ND	33	ND	53	ND	10	ND	10	ND	10	ND	11	ND	5.8	

Notes:

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

RL exceeds **NY-UNRES**

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Result exceeds **NY-RESI**

Table 1: Post-Excavation Soil Analyses Results (2013)

					LOCATION:	**13E-SB-SWS-A**		**13W-SB-SWS-A**		**13W-SB-B-A**		**12E-SB-B-A**		**12E-SB-SWS1-A**		**12E-SB-SWS3-A**		**12W-SB-B-A**	
					SAMPLING DATE:	**8/8/2013**		**8/12/2013**		**8/12/2013**		**8/14/2013**		**8/14/2013**		**8/14/2013**		**8/15/2013**	
					SAMPLE TYPE:	**Composite**		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**	
					SAMPLE DEPTH (ft.):	**0.5-4**		**0.5-4**		**4**		**4**		**0.5-4**		**0.5-4**		**4**	
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
Volatile Organics by 8260/5035 - Westborough Lab																			
Methylene chloride	75-09-2	1000	500	0.05	mg/kg	ND	5.3	0.67J	1.1	0.68J	1.1	0.74J	2.4	7.2J	22	1.7J	5.1	0.87J	2.3
1,1-Dichloroethane	75-34-3	480	240	0.27	mg/kg	ND	0.8	ND	0.16	ND	0.16	ND	0.37	ND	3.4	ND	0.76	ND	0.34
Chloroform	67-66-3	700	350	0.37	mg/kg	ND	0.8	ND	0.16	ND	0.16	ND	0.37	ND	3.4	ND	0.76	ND	0.34
Carbon tetrachloride	56-23-5	44	22	0.76	mg/kg	ND	0.53	ND	0.11	ND	0.11	ND	0.24	ND	2.2	ND	0.51	ND	0.23
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg	4	0.53	0.72	0.11	0.27	0.11	0.33	0.24	2.3	2.2	ND	0.51	0.5	0.23
Chlorobenzene	108-90-7	1000	500	1.1	mg/kg	ND	0.53	ND	0.11	ND	0.11	ND	0.24	ND	2.2	ND	0.51	ND	0.23
1,2-Dichloroethane	107-06-2	60	30	0.02	mg/kg	ND	0.53	ND	0.11	ND	0.11	ND	0.24	ND	2.2	ND	0.51	ND	0.23
1,1,1-Trichloroethane	71-55-6	1000	500	0.68	mg/kg	ND	0.53	ND	0.11	ND	0.11	ND	0.24	ND	2.2	ND	0.51	ND	0.23
Benzene	71-43-2	89	44	0.06	mg/kg	ND	0.53	ND	0.11	ND	0.11	ND	0.24	ND	2.2	ND	0.51	ND	0.23
Toluene	108-88-3	1000	500	0.7	mg/kg	ND	0.8	0.11J	0.16	0.046J	0.16	ND	0.37	ND	3.4	ND	0.76	ND	0.34
Ethylbenzene	100-41-4	780	390	1	mg/kg	ND	0.53	0.032J	0.11	ND	0.11	ND	0.24	ND	2.2	ND	0.51	ND	0.23
Vinyl chloride	75-01-4	27	13	0.02	mg/kg	ND	1.1	ND	0.21	ND	0.22	0.18J	0.49	ND	4.5	ND	1	ND	0.46
1,1-Dichloroethene	75-35-4	1000	500	0.33	mg/kg	ND	0.53	ND	0.11	ND	0.11	ND	0.24	ND	2.2	ND	0.51	ND	0.23
trans-1,2-Dichloroethene	156-60-5	1000	500	0.19	mg/kg	ND	0.8	ND	0.16	ND	0.16	ND	0.37	ND	3.4	ND	0.76	ND	0.34
Trichloroethene	79-01-6	400	200	0.47	mg/kg	74	0.53	16	0.11	7.7	0.11	20	0.24	160	2.2	37	0.51	26	0.23
1,2-Dichlorobenzene	95-50-1	1000	500	1.1	mg/kg	ND	2.6	ND	0.53	ND	0.54	ND	1.2	ND	11	ND	2.5	ND	1.1
1,3-Dichlorobenzene	541-73-1	560	280	2.4	mg/kg	ND	2.6	ND	0.53	ND	0.54	ND	1.2	ND	11	ND	2.5	ND	1.1
1,4-Dichlorobenzene	106-46-7	250	130	1.8	mg/kg	ND	2.6	ND	0.53	ND	0.54	ND	1.2	ND	11	ND	2.5	ND	1.1
Methyl tert butyl ether	1634-04-4	1000	500	0.93	mg/kg	ND	1.1	ND	0.21	ND	0.22	ND	0.49	ND	4.5	ND	1	ND	0.46
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg	12	0.53	0.36	0.11	0.26	0.11	7.5	0.24	17	2.2	10	0.51	3.9	0.23
Acetone	67-64-1	1000	500	0.05	mg/kg	ND	5.3	ND	1.1	ND	1.1	0.8J	2.4	7J	22	1.6J	5.1	0.75J	2.3
2-Butanone	78-93-3	1000	500	0.12	mg/kg	ND	5.3	ND	1.1	ND	1.1	ND	2.4	ND	22	ND	5.1	ND	2.3
tert-Butylbenzene	98-06-6	1000	500	5.9	mg/kg	ND	2.6	ND	0.53	ND	0.54	ND	1.2	ND	11	ND	2.5	ND	1.1
Naphthalene	91-20-3	1000	500	12	mg/kg	ND	2.6	0.099J	0.53	ND	0.54	ND	1.2	ND	11	ND	2.5	ND	1.1
1,3,5-Trimethylbenzene	108-67-8	380	190	8.4	mg/kg	ND	2.6	ND	0.53	ND	0.54	ND	1.2	ND	11	ND	2.5	ND	1.1
1,2,4-Trimethylbenzene	95-63-6	380	190	3.6	mg/kg	ND	2.6	ND	0.53	ND	0.54	ND	1.2	ND	11	ND	2.5	ND	1.1
1,4-Dioxane	123-91-1	250	130	0.1	mg/kg	ND	53	ND	11	ND	11	ND	24	ND	220	ND	51	ND	23

Notes:

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

RL exceeds **NY-UNRES**

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Result exceeds **NY-RESI**

Table 1: Post-Excavation Soil Analyses Results (2013)

					LOCATION:	**12W-SB-SWS1-A**		**12W-SB-SWS3-A**		**11E-SB-B-A**		**11E-SB-SWS0-A**		**11E-SB-SWS2-A**		**11W-SB-B-A**		**11W-SB-SWS0-A**
					SAMPLING DATE:	**8/15/2013**		**8/15/2013**		**8/19/2013**		**8/19/2013**		**8/19/2013**		**8/20/2013**		**8/20/2013**
					SAMPLE TYPE:	**Composite**		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**		**Composite**
					SAMPLE DEPTH (ft.):	**0.5-4**		**0.5-4**		**4**		**0.5-4**		**0.5-4**		**4**		**0.5-4**
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**
Volatile Organics by 8260/5035 - Westborough Lab																		
Methylene chloride	75-09-2	1000	500	0.05	mg/kg	0.21J	0.58	0.21J	0.54	ND	1.1	ND	21	ND	28	ND	0.58	ND
1,1-Dichloroethane	75-34-3	480	240	0.27	mg/kg	ND	0.087	ND	0.08	ND	0.16	ND	3.1	ND	4.1	ND	0.087	ND
Chloroform	67-66-3	700	350	0.37	mg/kg	ND	0.087	ND	0.08	ND	0.16	ND	3.1	ND	4.1	ND	0.087	ND
Carbon tetrachloride	56-23-5	44	22	0.76	mg/kg	ND	0.058	ND	0.054	ND	0.11	ND	2.1	ND	2.8	ND	0.058	ND
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg	0.41	0.058	0.5	0.054	0.62	0.11	3.3	2.1	12	2.8	0.13	0.058	0.18
Chlorobenzene	108-90-7	1000	500	1.1	mg/kg	ND	0.058	ND	0.054	ND	0.11	ND	2.1	ND	2.8	ND	0.058	ND
1,2-Dichloroethane	107-06-2	60	30	0.02	mg/kg	ND	0.058	ND	0.054	ND	0.11	ND	2.1	ND	2.8	ND	0.058	ND
1,1,1-Trichloroethane	71-55-6	1000	500	0.68	mg/kg	ND	0.058	ND	0.054	ND	0.11	ND	2.1	ND	2.8	ND	0.058	ND
Benzene	71-43-2	89	44	0.06	mg/kg	ND	0.058	ND	0.054	ND	0.11	ND	2.1	ND	2.8	ND	0.058	ND
Toluene	108-88-3	1000	500	0.7	mg/kg	ND	0.087	ND	0.08	ND	0.16	ND	3.1	ND	4.1	ND	0.087	ND
Ethylbenzene	100-41-4	780	390	1	mg/kg	ND	0.058	ND	0.054	ND	0.11	ND	2.1	ND	2.8	ND	0.058	ND
Vinyl chloride	75-01-4	27	13	0.02	mg/kg	ND	0.12	ND	0.11	ND	0.22	ND	4.2	ND	5.5	ND	0.12	ND
1,1-Dichloroethene	75-35-4	1000	500	0.33	mg/kg	ND	0.058	ND	0.054	ND	0.11	ND	2.1	ND	2.8	ND	0.058	ND
trans-1,2-Dichloroethene	156-60-5	1000	500	0.19	mg/kg	0.052J	0.087	ND	0.08	ND	0.16	ND	3.1	ND	4.1	ND	0.087	ND
Trichloroethene	79-01-6	400	200	0.47	mg/kg	8.2	0.058	3.8	0.054	11	0.11	140	2.1	230	2.8	2.6	0.058	2.7
1,2-Dichlorobenzene	95-50-1	1000	500	1.1	mg/kg	ND	0.29	ND	0.27	ND	0.55	ND	10	ND	14	ND	0.29	ND
1,3-Dichlorobenzene	541-73-1	560	280	2.4	mg/kg	ND	0.29	ND	0.27	ND	0.55	ND	10	ND	14	ND	0.29	ND
1,4-Dichlorobenzene	106-46-7	250	130	1.8	mg/kg	ND	0.29	ND	0.27	ND	0.55	ND	10	ND	14	ND	0.29	ND
Methyl tert butyl ether	1634-04-4	1000	500	0.93	mg/kg	ND	0.12	ND	0.11	ND	0.22	ND	4.2	ND	5.5	ND	0.12	ND
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg	4.7	0.058	1.3	0.054	0.28	0.11	4.5	2.1	9.9	2.8	ND	0.058	ND
Acetone	67-64-1	1000	500	0.05	mg/kg	0.2J	0.58	ND	0.54	ND	1.1	ND	21	ND	28	ND	0.58	ND
2-Butanone	78-93-3	1000	500	0.12	mg/kg	ND	0.58	ND	0.54	ND	1.1	ND	21	ND	28	ND	0.58	ND
tert-Butylbenzene	98-06-6	1000	500	5.9	mg/kg	ND	0.29	ND	0.27	ND	0.55	ND	10	ND	14	ND	0.29	ND
Naphthalene	91-20-3	1000	500	12	mg/kg	ND	0.29	ND	0.27	ND	0.55	ND	10	ND	14	ND	0.29	ND
1,3,5-Trimethylbenzene	108-67-8	380	190	8.4	mg/kg	ND	0.29	ND	0.27	ND	0.55	ND	10	ND	14	ND	0.29	ND
1,2,4-Trimethylbenzene	95-63-6	380	190	3.6	mg/kg	ND	0.29	ND	0.27	ND	0.55	ND	10	ND	14	ND	0.29	ND
1,4-Dioxane	123-91-1	250	130	0.1	mg/kg	ND	5.8	ND	5.4	ND	11	ND	210	ND	280	ND	5.8	ND

Notes:

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

RL exceeds **NY-UNRES**

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Result exceeds **NY-RESI**

Table 1: Post-Excavation Soil Analyses Results (2013)

					LOCATION:		**11W-SB-SWS2-A**	
					SAMPLING DATE:		**8/20/2013**	
					SAMPLE TYPE:		**Composite**	
					SAMPLE DEPTH (ft.):		**0.5-4**	
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**	**RL**	**Result**	**RL**
Volatile Organics by 8260/5035 - Westborough Lab								
Methylene chloride	75-09-2	1000	500	0.05	mg/kg	0.5	ND	0.57
1,1-Dichloroethane	75-34-3	480	240	0.27	mg/kg	0.074	ND	0.086
Chloroform	67-66-3	700	350	0.37	mg/kg	0.074	ND	0.086
Carbon tetrachloride	56-23-5	44	22	0.76	mg/kg	0.05	ND	0.057
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg	0.05	0.39	0.057
Chlorobenzene	108-90-7	1000	500	1.1	mg/kg	0.05	ND	0.057
1,2-Dichloroethane	107-06-2	60	30	0.02	mg/kg	0.05	ND	0.057
1,1,1-Trichloroethane	71-55-6	1000	500	0.68	mg/kg	0.05	ND	0.057
Benzene	71-43-2	89	44	0.06	mg/kg	0.05	ND	0.057
Toluene	108-88-3	1000	500	0.7	mg/kg	0.074	ND	0.086
Ethylbenzene	100-41-4	780	390	1	mg/kg	0.05	ND	0.057
Vinyl chloride	75-01-4	27	13	0.02	mg/kg	0.099	ND	0.11
1,1-Dichloroethene	75-35-4	1000	500	0.33	mg/kg	0.05	ND	0.057
trans-1,2-Dichloroethene	156-60-5	1000	500	0.19	mg/kg	0.074	ND	0.086
Trichloroethene	79-01-6	400	200	0.47	mg/kg	0.05	6.3	0.057
1,2-Dichlorobenzene	95-50-1	1000	500	1.1	mg/kg	0.25	ND	0.28
1,3-Dichlorobenzene	541-73-1	560	280	2.4	mg/kg	0.25	ND	0.28
1,4-Dichlorobenzene	106-46-7	250	130	1.8	mg/kg	0.25	ND	0.28
Methyl tert butyl ether	1634-04-4	1000	500	0.93	mg/kg	0.099	ND	0.11
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg	0.05	0.16	0.057
Acetone	67-64-1	1000	500	0.05	mg/kg	0.5	ND	0.57
2-Butanone	78-93-3	1000	500	0.12	mg/kg	0.5	ND	0.57
tert-Butylbenzene	98-06-6	1000	500	5.9	mg/kg	0.25	ND	0.28
Naphthalene	91-20-3	1000	500	12	mg/kg	0.25	ND	0.28
1,3,5-Trimethylbenzene	108-67-8	380	190	8.4	mg/kg	0.25	ND	0.28
1,2,4-Trimethylbenzene	95-63-6	380	190	3.6	mg/kg	0.25	ND	0.28
1,4-Dioxane	123-91-1	250	130	0.1	mg/kg	5	ND	5.7

Notes:

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

RL exceeds **NY-UNRES**

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Result exceeds **NY-RESI**

Table 2: Summary of Remaining Soil Contamination Above Unrestricted Levels

					LOCATION:	**8E-SB-SW7-A**	**8E-SB-SWC-A**	**8E-SB-SWS9-A**	**8E-SB-B-A**	**9W-SB-SWS8-A**	**9W-SB-SWS0-A**	**9W-SB-B-A**	**8W-SB-SW7-A**	**8W-SB-SWC-A**	**8W-SB-SWS9-A**	**8W-SB-B-A**	**9E-SB-SWS8-A**	**9E-SB-SWS0-A**	**9E-SB-B-A**	**10W-SB-SWS-A**	**10W-SB-B-A**	**10E-SB-B-A**	**10E-SB-SWS-A**	**15E-SB-B-A**
					SAMPLING DATE:	**7/25/2013**	**7/25/2013**	**7/25/2013**	**7/25/2013**	**7/25/2013**	**7/25/2013**	**7/25/2013**	**7/29/2013**	**7/29/2013**	**7/29/2013**	**7/29/2013**	**7/29/2013**	**7/29/2013**	**7/29/2013**	**7/29/2013**	**7/30/2013**	**7/30/2013**	**8/1/2013**	**8/1/2013**	**8/2/2013**
					SAMPLE TYPE:	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**
					SAMPLE DEPTH (ft.):	**0.5-4**	**0.5-4**	**0.5-4**	**4**	**0.5-4**	**0.5-4**	**4**	**0.5-4**	**0.5-4**	**0.5-4**	**4**	**0.5-4**	**0.5-4**	**4**	**0.5-4**	**4**	**4**	**0.5-4**	**4**
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg	0.32	0.92	2.3	0.38	0.6	0.55	0.44	0.082	0.24	0.076	0.083	0.5	0.54	0.043J	0.17	0.25	0.25	0.91	0.16
Trichloroethene	79-01-6	400	200	0.47	mg/kg	16	79	220	27	30	42	26	2.3	5.8	3	1.8	55	31	2.1	3.9	9.8	15	85	9.5
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg	0.085J	0.72	5	0.37	0.25J	0.55	0.3	ND	ND	ND	ND	0.95	0.34	ND	ND	0.15	0.24	1.8	0.34

Notes:

Volatile Organics by 8260/5035 - Westborough Lab

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Table 2: Summary of Remaining Soil Contamination Above Unrestricted Levels

					LOCATION:	**15E-SB-SW16-A**	**15E-SB-SWC-A**	**15E-SB-SWS-A**	**15W-SB-B-A**	**15W-SB-SW16-A**	**15W-SB-SWC-A**	**15W-SB-SWS-A**	**14E-SB-SWS5-A**	**14E-SB-SWS3-A**	**14E-SB-B-A**	**14W-SB-SWS5-A**	**14W-SB-SWS3-A**	**14W-SB-B-A**	**13E-SB-B-A**	**13E-SB-SWS-A**	**13W-SB-SWS-A**	**13W-SB-B-A**	**12E-SB-B-A**
					SAMPLING DATE:	**8/2/2013**	**8/2/2013**	**8/2/2013**	**8/5/2013**	**8/5/2013**	**8/5/2013**	**8/5/2013**	**8/7/2013**	**8/7/2013**	**8/7/2013**	**8/8/2013**	**8/8/2013**	**8/8/2013**	**8/8/2013**	**8/8/2013**	**8/12/2013**	**8/12/2013**	**8/14/2013**
					SAMPLE TYPE:	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**
					SAMPLE DEPTH (ft.):	**0.5-4**	**0.5-4**	**0.5-4**	**4**	**0.5-4**	**0.5-4**	**0.5-4**	**0.5-4**	**0.5-4**	**4**	**0.5-4**	**0.5-4**	**4**	**4**	**0.5-4**	**0.5-4**	**4**	**4**
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg	0.054J	0.24	0.23J	0.18	0.38	0.18	0.28	0.56	0.59	0.24	0.43	0.51	0.43	0.072	4	0.72	0.27	0.33
Trichloroethene	79-01-6	400	200	0.47	mg/kg	3	22	32	6.4	14	4	9	44	44	9.5	14	13	13	2.1	74	16	7.7	20
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg	0.06	0.74	2.4	0.17	0.41	0.035J	0.16	2.4	1.5	0.33	0.36	0.23	0.27	0.3	12	0.36	0.26	7.5

Notes:

Volatile Organics by 8260/5035 - Westborough Lab

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Table 2: Summary of Remaining Soil Contamination Above Unrestricted Levels

					LOCATION:	**12E-SB-SWS1-A**	**12E-SB-SWS3-A**	**12W-SB-B-A**	**12W-SB-SWS1-A**	**12W-SB-SWS3-A**	**11E-SB-B-A**	**11E-SB-SWS0-A**	**11E-SB-SWS2-A**	**11W-SB-B-A**	**11W-SB-SWS0-A**	**11W-SB-SWS2-A**
					SAMPLING DATE:	**8/14/2013**	**8/14/2013**	**8/15/2013**	**8/15/2013**	**8/15/2013**	**8/19/2013**	**8/19/2013**	**8/19/2013**	**8/20/2013**	**8/20/2013**	**8/20/2013**
					SAMPLE TYPE:	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**
					SAMPLE DEPTH (ft.):	**0.5-4**	**0.5-4**	**4**	**0.5-4**	**0.5-4**	**4**	**0.5-4**	**0.5-4**	**4**	**0.5-4**	**0.5-4**
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg	2.3	ND	0.5	0.41	0.5	0.62	3.3	12	0.13	0.18	0.39
Trichloroethene	79-01-6	400	200	0.47	mg/kg	160	37	26	8.2	3.8	11	140	230	2.6	2.7	6.3
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg	17	10	3.9	4.7	1.3	0.28	4.5	9.9	ND	ND	0.16

Notes:

Volatile Organics by 8260/5035 - Westborough Lab

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Table 3: Summary of Remaining Soil Contamination Above Site-Specific Action Levels

					LOCATION:	**8E-SB-SWS9-A**	**11E-SB-SWS2-A**
					SAMPLING DATE:	**7/25/2013**	**8/19/2013**
					SAMPLE TYPE:	**Composite**	**Composite**
					SAMPLE DEPTH (ft.):	**0.5-4**	**0.5-4**
Contaminant	**CasNum**	**NY-RESI**	**NY-RESC**	**NY-UNRES**	**Units**	**Result**	**Result**
Tetrachloroethene	127-18-4	300	150	1.3	mg/kg	2.3	12
Trichloroethene	79-01-6	400	200	0.47	mg/kg	220	230
cis-1,2-Dichloroethene	156-59-2	1000	500	0.25	mg/kg	5	9.9

Notes:

Volatile Organics by 8260/5035 - Westborough Lab

ND = Not Detected

RL = Reporting Limit

NY-UNRES = New York Unrestricted Use Soil Cleanup Objectives 375-6.8(a)

NY-RESC = New York Restricted Commercial Use Soil Cleanup Objectives 375-6.8(b)

NY-RESI = New York Restricted Industrial Use Soil Cleanup Objectives 375-6.8(b)

Result exceeds **NY-UNRES**

Result exceeds **NY-RESC**

Appendix A

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, 101-61 99 ST, QUEENS, NY
SOIL EXCAVATION, SOIL VAPOR EXTRACTION AND SUB-SLAB DEPRESSURIZATION REMEDIAL DESIGN



Copyright 2013 The City of New York

NOTE:

To the best of my knowledge, belief and professional judgement, all work under this application is exempt from the NYCECC. The scope of work is entirely in an unconditioned low-energy space.

PREPARED BY:

AECOM
250 APOLLO DRIVE
CHELMSFORD, MA 01824
www.aecom.com

PROJ. NUMBER: 60221764

Block: 9106
Lot: 70
Zoning Map: 18A
Zoning District: R5
Construction Classification: NON-FIREPROOF STRUCTURES

ISSUED FOR ISMP

SHEET	SHEET TITLE	REVISION	DATE
T-001.00	TITLE SHEET	REV 1	09/28/15
M-001.00	AS-BUILT SOIL VAPOR EXTRACTION SYSTEM LAYOUT	REV 1	09/28/15
M-002.00	AS-BUILT SUB-SLAB DEPRESSION SYSTEM LAYOUT	REV 1	09/28/15
M-003.00	AS-BUILT PIPING DETAILS	REV 1	09/28/15
M-004.00	PROPOSED BAY 8A LAYOUT	REV 1	09/28/15
M-005.00	PROPOSED SVE & SSD SYSTEM PIPE MANIFOLD DETAILS	REV 1	09/28/15
M-006.00	PROPOSED INTERIOR AND EXTERIOR PIPING DETAILS	REV 1	09/28/15
M-007.00	SVE SYSTEM PROCESS AND INSTRUMENTATION DIAGRAM	REV 1	09/28/15
M-008.00	SSD SYSTEM PROCESS AND INSTRUMENTATION DIAGRAM	REV 1	09/28/15
M-009.00	PROCESS AND INSTRUMENTATION DIAGRAM LEGEND	REV 1	09/28/15

SHEET	SHEET TITLE	REVISION	DATE

NOTE:

Installation of Soil Vapor Extraction System and Sub-Slab Depression system and associated internal and external piping. Building reconstruction permitted separately. No change in use, egress, or occupancy.

TR1 INSPECTIONS:

a) Mechanical Systems

CURRENT DATE	09/28/15	DRAWING NUMBER	T-001.00	SHEET NUMBER	1 of 10	REVISION	1

File: P:\Jobs\VaCC_Service\Project Files\Ozone - Queens, NY\Remediation Implementation\Phase III System Installation\Drawing\Mechanical Spec Drawing 9-28-15.dwg Layout: T-001 User: mckeever Plotted: Sep 28, 2015 - 12:40pm VanC

NOTE:

1) MECHANICAL DRAWINGS SHALL NOT BE USED FOR STRUCTURAL, ARCHITECTURAL, UTILITY, OR OTHER REFERENCE EXCEPT FOR INSTALLATION OF PIPING OR EQUIPMENT ASSOCIATED WITH THE SVE AND SSDS SYSTEM.

2) BELOW GRADE PORTIONS OF THE SYSTEM WERE PREVIOUSLY INSTALLED.

3) PIPING AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE NEW YORK CITY MECHANICAL CODE.

4)CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING AND ENSURING THE COMPLETION OF ALL INSPECTIONS AS SPECIFIED IN SECTION 107 OF THE NYC MECHANICAL CODE.

5) SEE PROCESS DRAWINGS (M-007.00 THROUGH M-009.00) FOR DELINEATION OF VENDOR SUPPLIED EQUIPMENT VS. EXISTING COMPONENTS AND THAT TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.



LEGEND

- TRAFFIC FLOW
- EXISTING UTILITY POLE
- AS-BUILT SVE WELL
- AS-BUILT DUAL-LEVEL SVE WELL
- AS-BUILT MONITORING POINT
- AS-BUILT SUBGRADE SVE PIPING

10 0 20
SCALE IN FEET

ISSUED FOR ISMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1	RWM	09/28/15	ISSUED FOR CONSTRUCTION	RM	09/28/15	SAC	09/28/15
0	MRP	06/10/15	ISSUED FOR BID	RM	06/10/15	SAC	06/10/15

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FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 09/28/15

AS-BUILT SOIL VAPOR EXTRACTION SYSTEM LAYOUT

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: M-001.00

SHEET NUMBER: 2 of 10

REVISION: 1

File: C:\Users\rockwevr\Desktop\Mechanical Spec. Drawing 9-28-15.dwg Layout: M-001 AS-BUILT SVE System Layout User: rockwevr Plotted: Sep 28, 2015 - 6:12pm

NOTE:

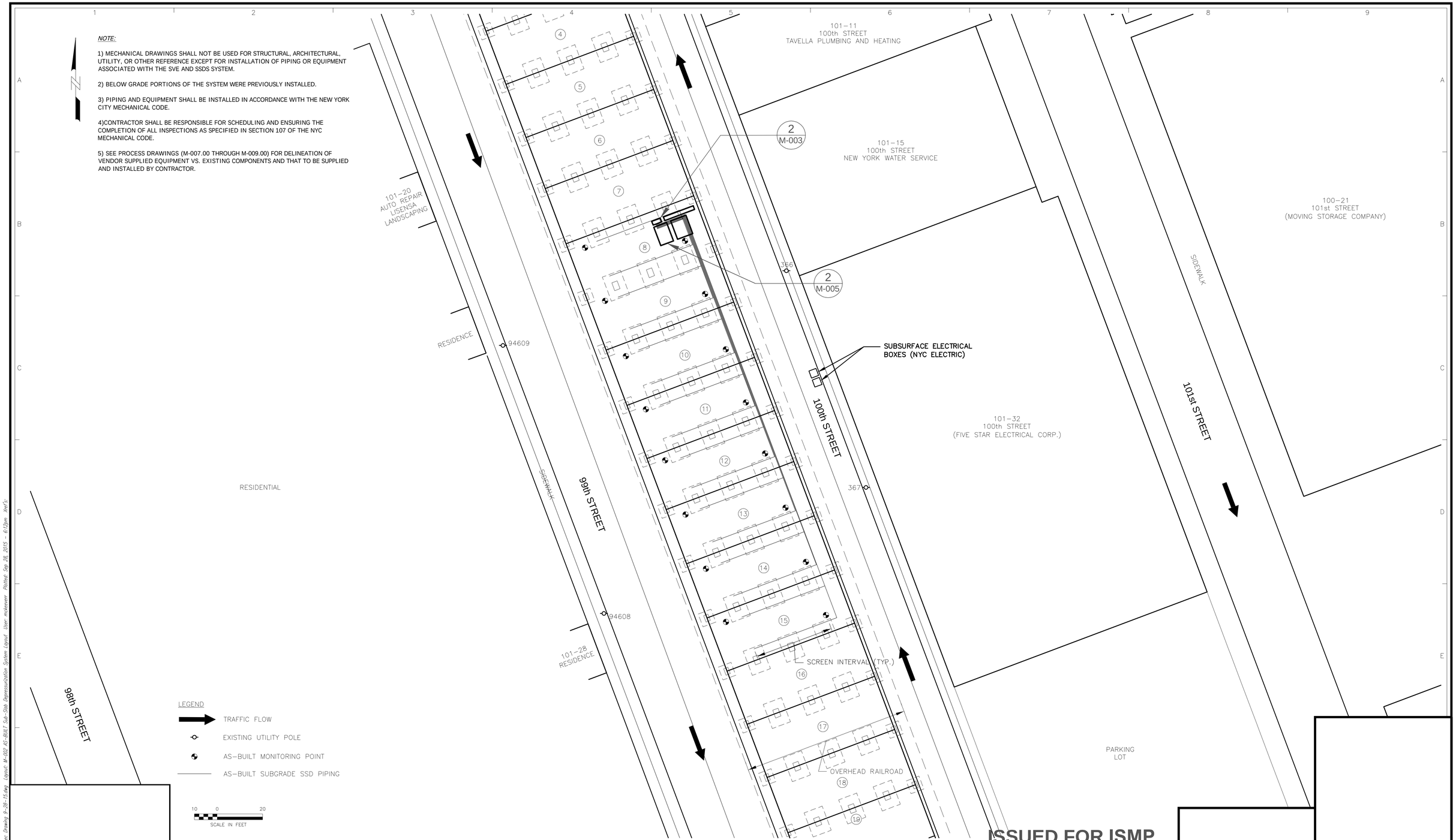
1) MECHANICAL DRAWINGS SHALL NOT BE USED FOR STRUCTURAL, ARCHITECTURAL, UTILITY, OR OTHER REFERENCE EXCEPT FOR INSTALLATION OF PIPING OR EQUIPMENT ASSOCIATED WITH THE SVE AND SSDS SYSTEM.

2) BELOW GRADE PORTIONS OF THE SYSTEM WERE PREVIOUSLY INSTALLED.

3) PIPING AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE NEW YORK CITY MECHANICAL CODE.

4)CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING AND ENSURING THE COMPLETION OF ALL INSPECTIONS AS SPECIFIED IN SECTION 107 OF THE NYC MECHANICAL CODE.

5) SEE PROCESS DRAWINGS (M-007.00 THROUGH M-009.00) FOR DELINEATION OF VENDOR SUPPLIED EQUIPMENT VS. EXISTING COMPONENTS AND THAT TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.



ISSUED FOR ISMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1	RWM	09/28/15	ISSUED FOR CONSTRUCTION	RM	09/28/15	SAC	09/28/15
0	MRP	06/10/15	ISSUED FOR BID	RM	06/10/15	SAC	06/10/15

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FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 09/28/15

AS-BUILT SUB-SLAB DEPRESURIZATION SYSTEM LAYOUT

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: M-002.00

SHEET NUMBER: 3 of 10

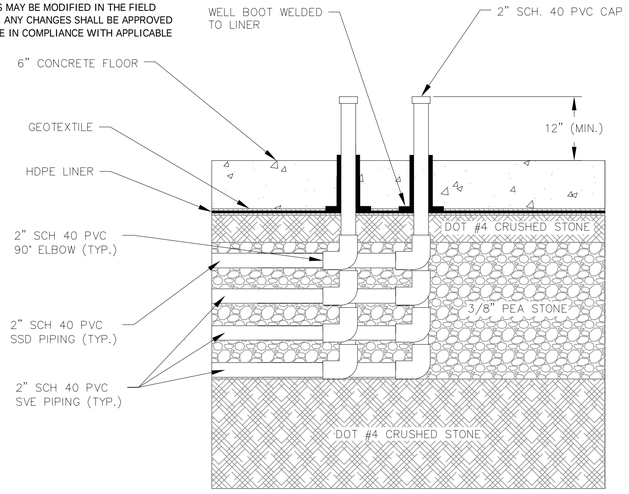
REVISION: 1

Plot: C:\Users\mckeever\Desktop\Mechanical Spec Drawing 9-28-15.dwg Layout: M-002 AS-BUILT Sub-Slab Depressurization System Layout User: mckeever Plotted: Sep 28, 2015 - 6:12pm

NOTE:

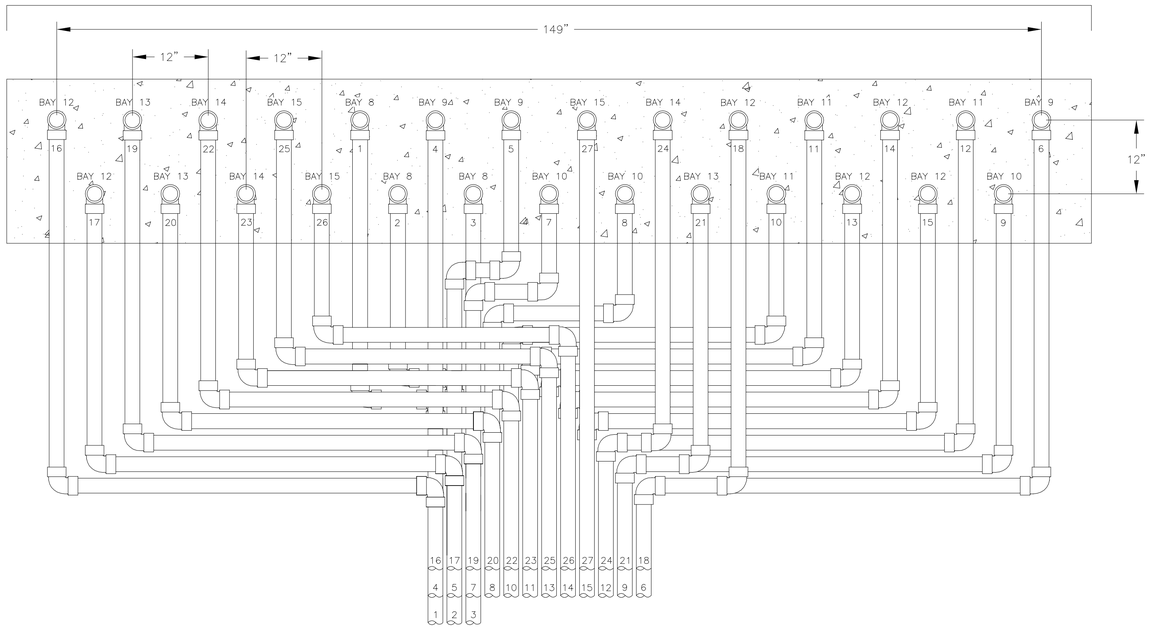
1) PVC MANIFOLD PROVIDED AS INTEGRAL UNIT WITH SYSTEM COMPONENTS BY VENDOR. PVC MEETS THE INTENT OF THE CODE FOR THIS APPLICATION SINCE THE ROOM IS ISOLATED, VENTILATED, AND NOT DESIGNED FOR CONTINUOUS OCCUPANCY.

2) ORIENTATION AND FITTINGS MAY BE MODIFIED IN THE FIELD FOR BEST FIT OF COMPONENTS. ANY CHANGES SHALL BE APPROVED BY THE ENGINEER AND SHALL BE IN COMPLIANCE WITH APPLICABLE NYC CODES.



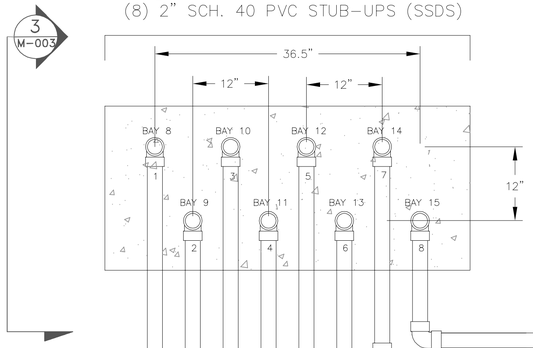
3 M-003 TYPICAL STUB-UP PROFILE
SCALE: NTS

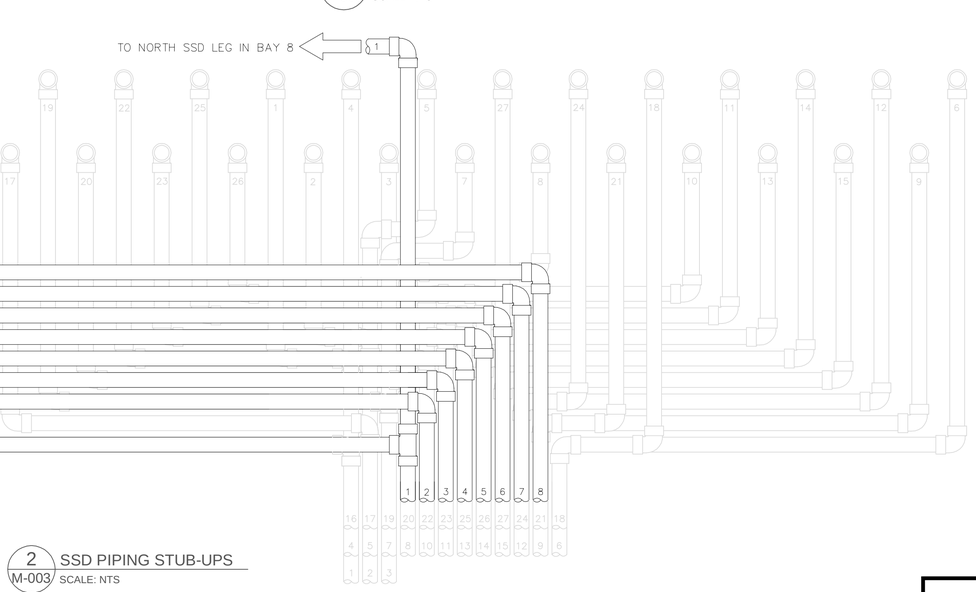
(27) 2" SCH. 40 PVC STUB-UPS (SVE)



1 M-003 SVE PIPING STUB-UPS
SCALE: NTS

(8) 2" SCH. 40 PVC STUB-UPS (SSDS)





2 M-003 SSD PIPING STUB-UPS
SCALE: NTS

ISSUED FOR ISMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1	RWM	09/28/15	ISSUED FOR CONSTRUCTION	RM	09/28/15	SAC	09/28/15
0	MRP	08/09/13	ISSUED FOR BID	RM	06/10/15	SAC	06/10/15

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FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 09/28/15

AS-BUILT PIPING DETAILS

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: M-003.00

SHEET NUMBER: 4 of 10

REVISION 1

File: P:\Jobs\Inst_Service\Project Files\Environ, Inc\Ozone – Queens, NY\Remediation Implementation\Phase # System Installation\Drawing\Mechanical Spec Drawing 9-28-15.dwg Layout: M-003 AS-BUILT Piping Details User: mckeever Plotted: Sep 28, 2015 - 12:42pm Xref's:

NOTE:

1) PVC MANIFOLD PROVIDED AS INTEGRAL UNIT WITH SYSTEM COMPONENTS BY VENDOR. PVC MEETS THE INTENT OF THE CODE FOR THIS APPLICATION SINCE THE ROOM IS ISOLATED, VENTILATED, AND NOT DESIGNED FOR CONTINUOUS OCCUPANCY.

2) ORIENTATION AND FITTINGS MAY BE MODIFIED IN THE FIELD FOR BEST FIT OF COMPONENTS. ANY CHANGES SHALL BE APPROVED BY THE ENGINEER AND SHALL BE IN COMPLIANCE WITH APPLICABLE NYC CODES.

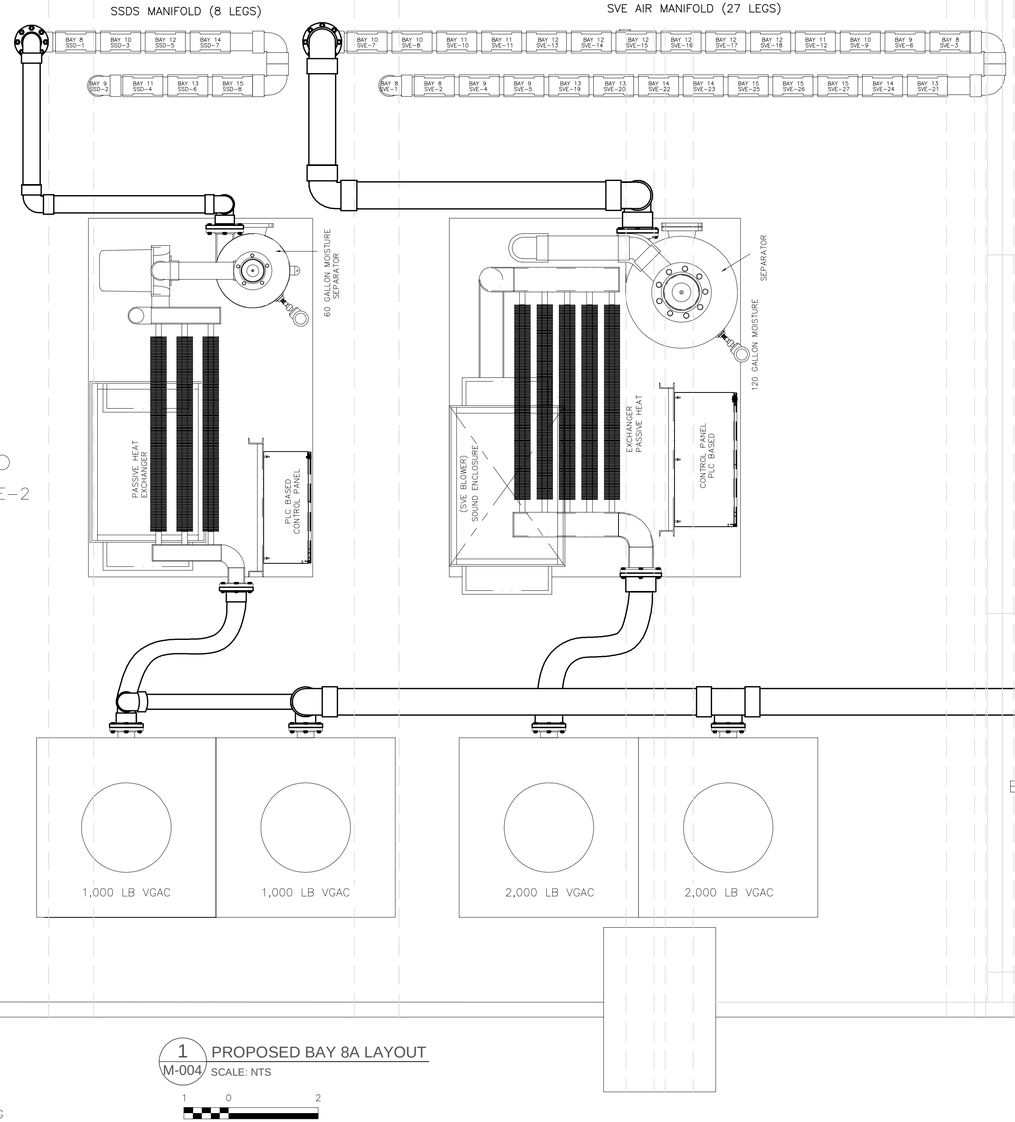
3) PIPING SHALL HAVE A MINIMUM SLOPE OF 1% TO GROUND THROUGH THE SYSTEM.

4) ALL INSTALLED ABOVE-GRADE PIPING SHALL BE LABELED FOR USE AS SSD-VENT OR SVE-VENT.

5) PIPE SUPPORTS SHALL BE PROVIDED AS NECESSARY WITH MAXIMUM HORIZONTAL SPANS OF 4 FEET FOR PVC PIPING AND 12 FEET FOR STEEL PIPING. VERTICAL SUPPORTS SHALL SPAN A MAXIMUM OF 10 FEET FOR BOTH PVC AND STEEL PIPING.

6) THE EFFLUENT STACK SHALL TERMINATE A MINIMUM OF 6 INCHES ABOVE THE ROOF LINE AND AT LEAST 10 FEET FROM ANY OPERABLE OPENINGS OR INTAKES.

7) SEE M-007.00 AND M-008.00 FOR MATERIAL DESIGNATIONS.



LEGEND

SUPPORT BEAMS

ABOVE-GRADE SYSTEM PIPING, FITTINGS, HOSE AND DUCTING TO BE SUPPLIED AND INSTALLED BY CONTRACTOR

1 M-004 PROPOSED BAY 8A LAYOUT
SCALE: NTS

1 0 2
SCALE IN FEET

ISSUED FOR ISMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1	RWM	09/28/15	ISSUED FOR CONSTRUCTION	RM	09/28/15	SAC	09/28/15
0	MRP	06/10/15	ISSUED FOR BID	RM	06/10/15	SAC	06/10/15

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FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 09/28/15

PROPOSED BAY 8A LAYOUT

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: M-004.00

SHEET NUMBER: 5 of 10

REVISION 1

File: C:\Users\mcleaver\Desktop\Mechanical Spec Drawing 9-28-15.dwg Layout: M-004 Proposed Bay 8A Layout User: mcleaver PltStat: Sep 28, 2015 - 6:10pm

NOTE:

1) PVC MANIFOLD PROVIDED AS INTEGRAL UNIT WITH SYSTEM COMPONENTS BY VENDOR. PVC MEETS THE INTENT OF THE CODE FOR THIS APPLICATION SINCE THE ROOM IS ISOLATED, VENTILATED, AND NOT DESIGNED FOR CONTINUOUS OCCUPANCY.

2) ORIENTATION AND FITTINGS MAY BE MODIFIED IN THE FIELD FOR BEST FIT OF COMPONENTS. ANY CHANGES SHALL BE APPROVED BY THE ENGINEER AND SHALL BE IN COMPLIANCE WITH APPLICABLE NYC CODES.

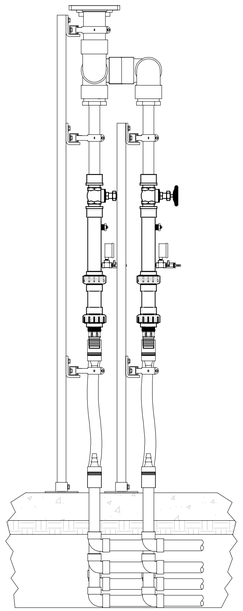
3) PIPING SHALL HAVE A MINIMUM SLOPE OF 1% TO GROUND THROUGH THE SYSTEM.

4) ALL INSTALLED ABOVE-GRADE PIPING SHALL BE LABELED FOR USE AS SSD-VENT OR SVE-VENT.

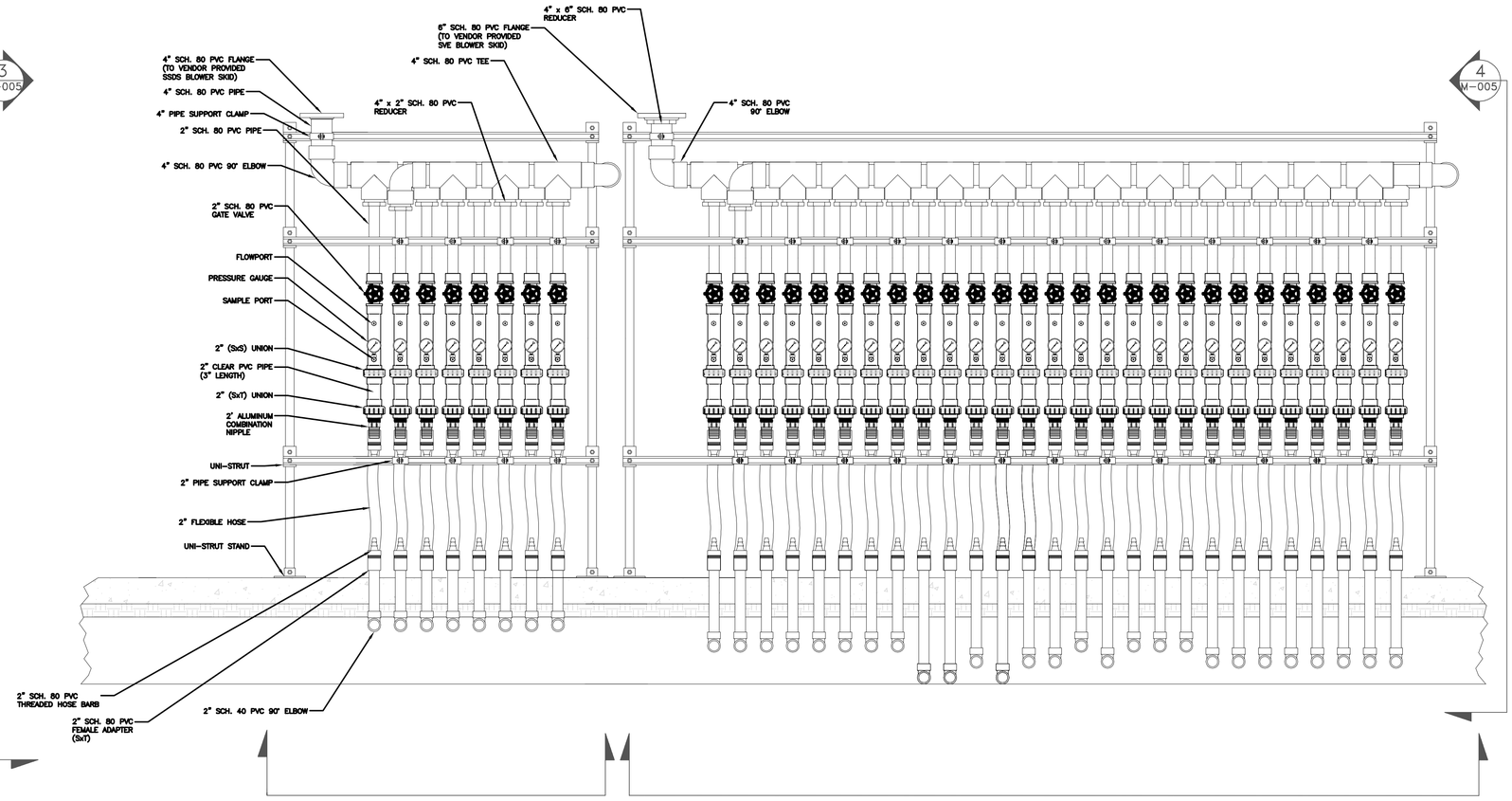
5) PIPE SUPPORTS SHALL BE PROVIDED AS NECESSARY WITH MAXIMUM HORIZONTAL SPANS OF 4 FEET FOR PVC PIPING AND 12 FEET FOR STEEL PIPING. VERTICAL SUPPORTS SHALL SPAN A MAXIMUM OF 10 FEET FOR BOTH PVC AND STEEL PIPING.

6) THE EFFLUENT STACK SHALL TERMINATE A MINIMUM OF 6 INCHES ABOVE THE ROOF LINE AND AT LEAST 10 FEET FROM ANY OPERABLE OPENINGS OR INTAKES.

7) SEE M-007.00 AND M-008.00 FOR MATERIAL DESIGNATIONS.

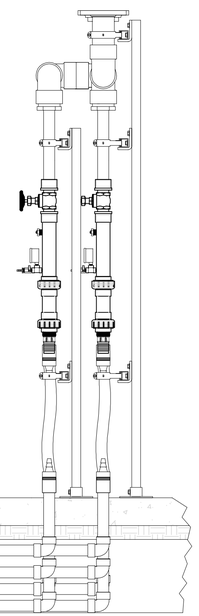


3 M-005 MANIFOLD PROFILE (SSD SIDE)
SCALE: NTS



2 M-005 PROPOSED SSD PIPING MANIFOLD
SCALE: NTS

1 M-005 PROPOSED SVE SYSTEM PIPING MANIFOLD
SCALE: NTS



4 M-005 MANIFOLD PROFILE (SVE SIDE)
SCALE: NTS

ISSUED FOR ISMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1	RWM	09/28/15	ISSUED FOR CONSTRUCTION	RM	09/28/15	SAC	09/28/15
0	MRP	06/10/15	ISSUED FOR BID	RM	06/10/15	SAC	06/10/15

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FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 09/28/15

PROPOSED SVE & SSD SYSTEM PIPE MANIFOLD DETAILS

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: M-005.00
SHEET NUMBER: 6 of 10
REVISION 1

File: C:\Users\mckeown\Desktop\Mechanical Spec Drawing 9-28-15.dwg Layout: M-005 Manifold Details User: mckeown Plotted: Sep 28, 2015 - 6:12pm

NOTE:

1) PVC MANIFOLD PROVIDED AS INTEGRAL UNIT WITH SYSTEM COMPONENTS BY VENDOR. PVC MEETS THE INTENT OF THE CODE FOR THIS APPLICATION SINCE THE ROOM IS ISOLATED, VENTILATED, AND NOT DESIGNED FOR CONTINUOUS OCCUPANCY.

2) ORIENTATION AND FITTINGS MAY BE MODIFIED IN THE FIELD FOR BEST FIT OF COMPONENTS. ANY CHANGES SHALL BE APPROVED BY THEN ENGINEER AND SHALL BE IN COMPLIANCE WITH APPLICABLE NYC CODES.

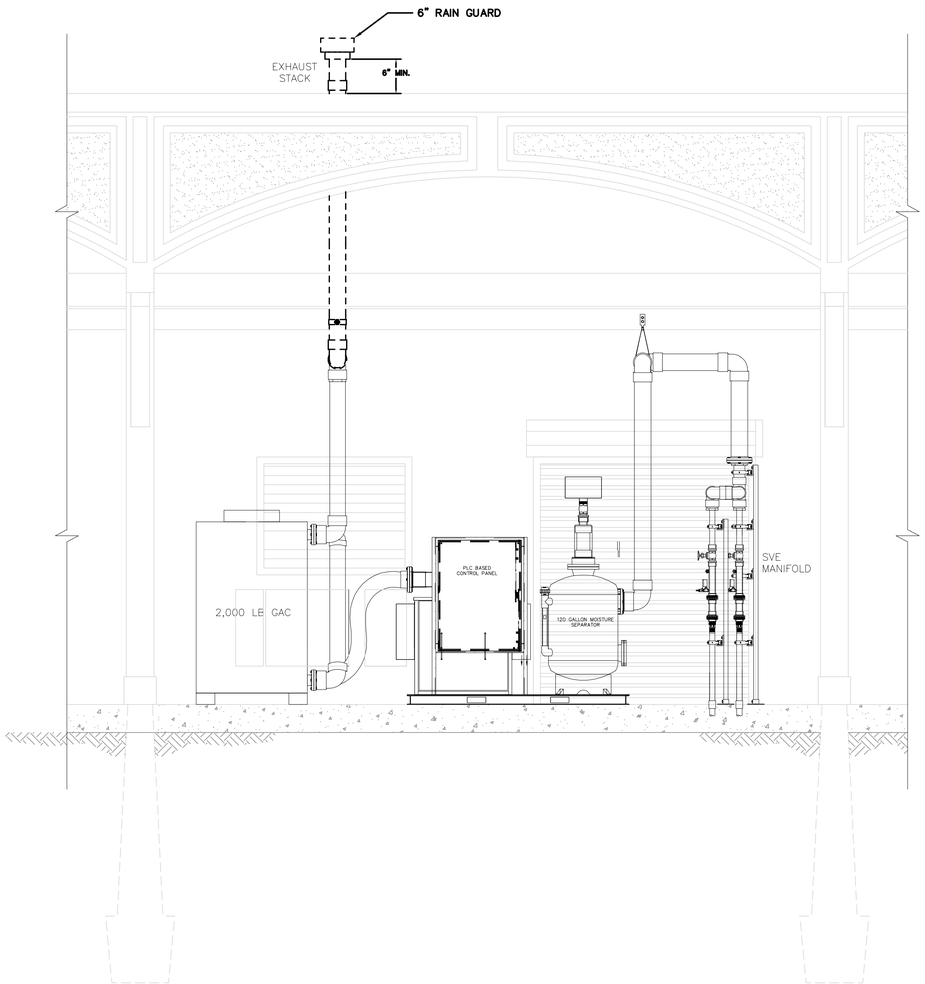
3) PIPING SHALL HAVE A MINIMUM SLOPE OF 1% TO GROUND THROUGH THE SYSTEM.

4) ALL INSTALLED ABOVE-GRADE PIPING SHALL BE LABELED FOR USE AS SSD-VENT OR SVE-VENT.

5) PIPE SUPPORTS SHALL BE PROVIDED AS NECESSARY WITH MAXIMUM HORIZONTAL SPANS OF 4 FEET FOR PVC PIPING AND 12 FEET FOR STEEL PIPING. VERTICAL SUPPORTS SHALL SPAN A MAXIMUM OF 10 FEET FOR BOTH PVC AND STEEL PIPING.

6) THE EFFLUENT STACK SHALL TERMINATE A MINIMUM OF 6 INCHES ABOVE THE ROOF LINE AND AT LEAST 10 FEET FROM ANY OPERABLE OPENINGS OR INTAKES.

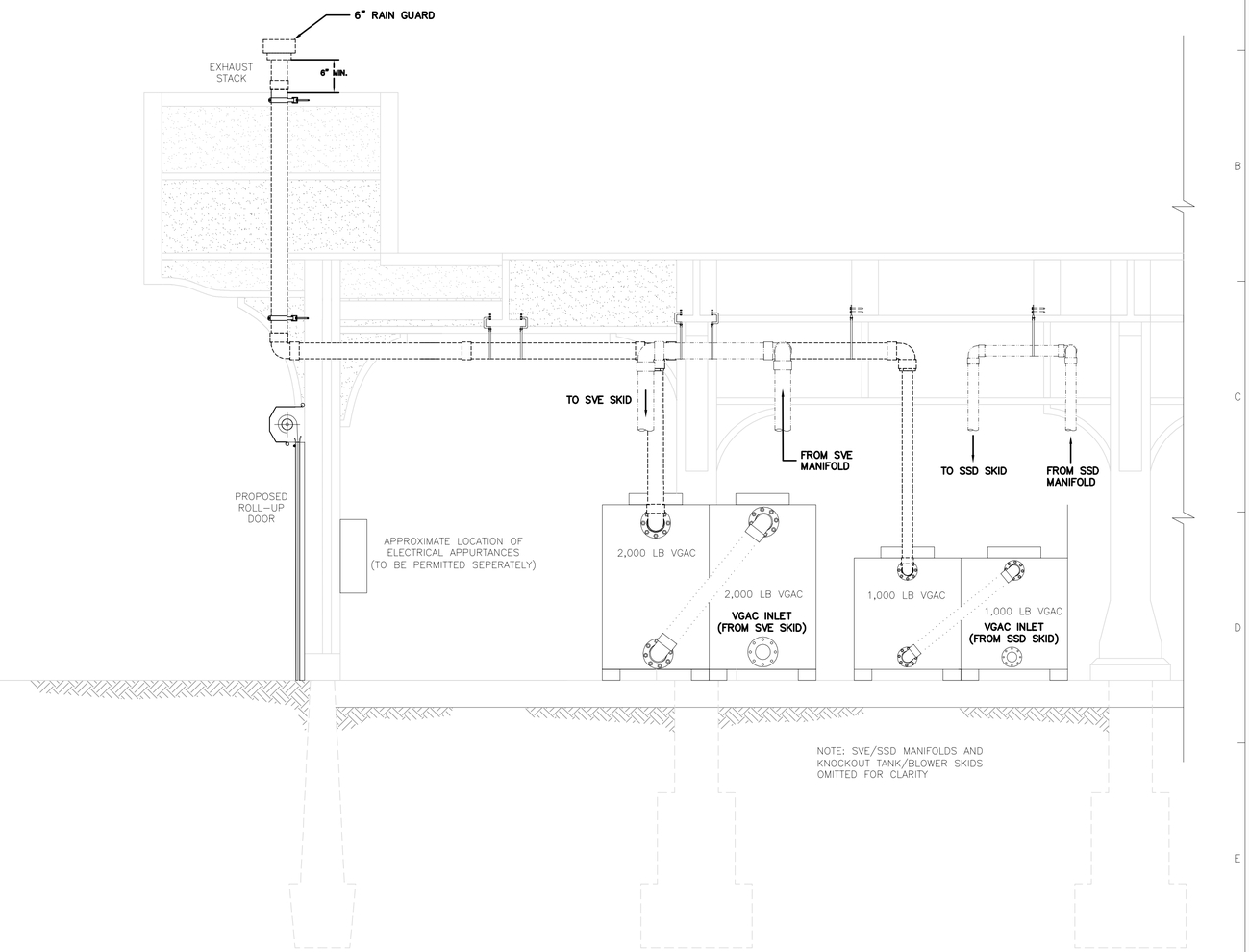
7) SEE M-007.00 AND M-008.00 FOR MATERIAL DESIGNATIONS.



1 M-006 BAY 8A SYSTEM PROFILE VIEW (FROM 100TH ST)
SCALE: NTS

LEGEND 1

- - - - EXTERIOR PIPING, FITTINGS AND SUPPORTS



2 M-006 BAY 8A SYSTEM PROFILE VIEW (FROM BAY 7)
SCALE: NTS

LEGEND 2

———— SCH. 40 STEEL
..... STAINLESS STEEL BRAIDED HOSE
— · — SCH. 80 PVC

ISSUED FOR ISMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1	RWM	09/28/15	ISSUED FOR CONSTRUCTION	RM	09/28/15	SAC	09/28/15
0	MRP	06/10/15	ISSUED FOR BID	RM	06/10/15	SAC	06/10/15

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FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 09/28/15

PROPOSED INTERIOR AND EXTERIOR PIPING DETAILS

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: M-006.00

SHEET NUMBER: 7 of 10

REVISION: 1

File: C:\Users\mckeever\Desktop\Mechanical Spec Drawing 9-28-15.dwg Layout: M-006 Details on Internal Piping User: mckeever Plotted: Sep 28, 2015 - 6:43pm WinFx

NOTE:

1) PROCESS DRAWINGS ARE PROVIDED IN ORDER TO DETAIL PIPING MATERIALS AND GENERAL EQUIPMENT.

2) SOME COMPONENTS MAY DIFFER FROM THOSE SHOWN AND SHALL BE APPROVED BY THE ENGINEER.

3) ALL COMPONENTS SHALL BE IN COMPLIANCE WILL APPLICABLE NYC CODES FOR THEIR INTENDED USE AS ENVIRONMENTAL REMEDIATION EQUIPMENT.

D-1
MOISTURE KNOCKOUT
120 GAL
CARBON STEEL

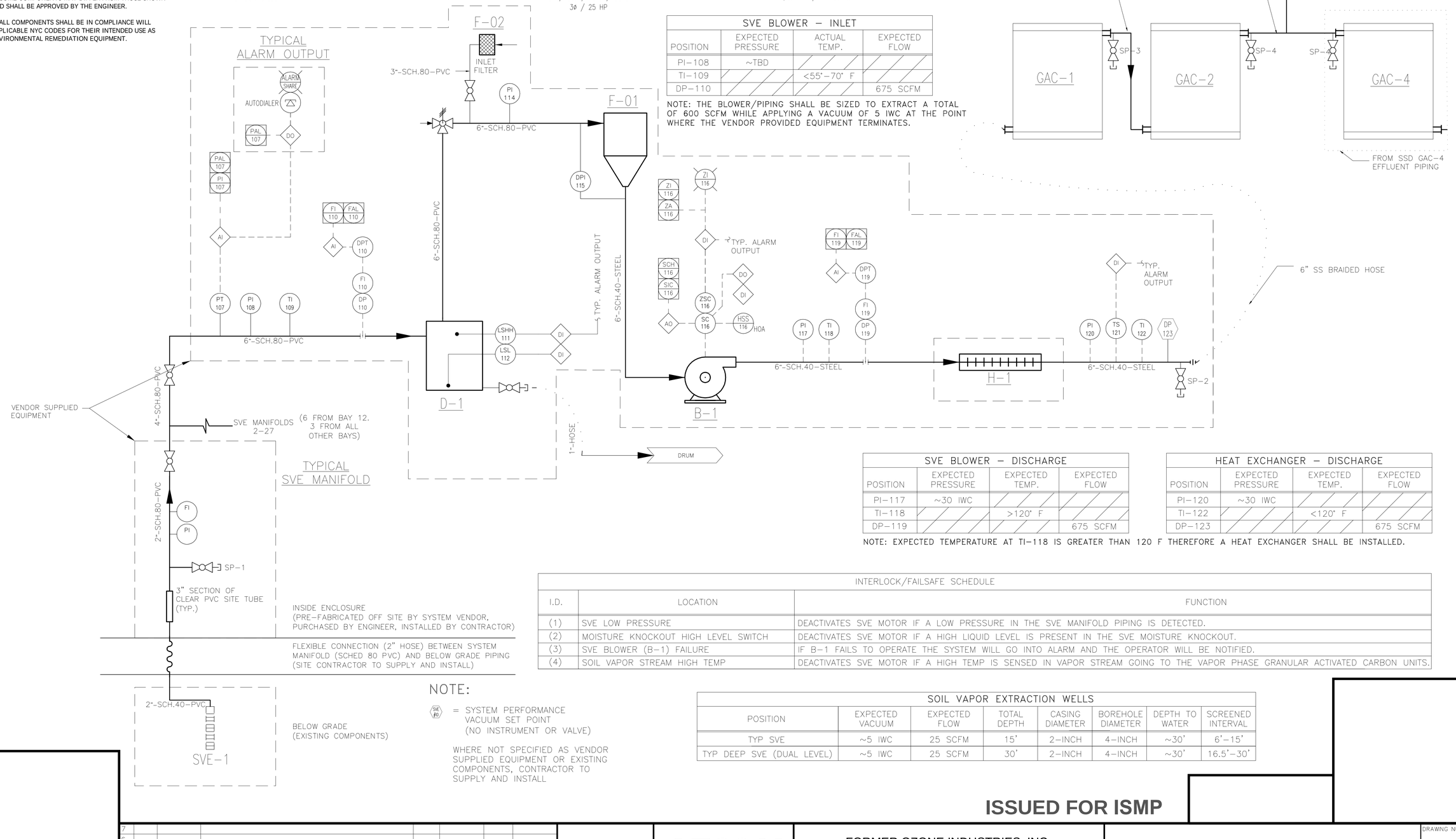
F-01
INLET FILTER
W/FILTER ELEMENT

F-02
IN-LINE AIR FILTER
W/FILTER ELEMENT

B-1
SVE BLOWER
675 SCFM @ 30 IWC-V
240/480V / TEFC / 60Hz
3ø / 25 HP

H-1
PASSIVE HEAT EXCHANGER
CARBON STEEL

GAC-1&2
VAPOR PHASE
GRANULAR ACTIVATED CARBON
2,000 LB. / CARBON STEEL



SVE BLOWER – INLET			
POSITION	EXPECTED PRESSURE	ACTUAL TEMP.	EXPECTED FLOW
PI-108	~TBD		
TI-109		<55°-70° F	
DP-110			675 SCFM

NOTE: THE BLOWER/PIPING SHALL BE SIZED TO EXTRACT A TOTAL OF 600 SCFM WHILE APPLYING A VACUUM OF 5 IWC AT THE POINT WHERE THE VENDOR PROVIDED EQUIPMENT TERMINATES.

SVE BLOWER – DISCHARGE			
POSITION	EXPECTED PRESSURE	EXPECTED TEMP.	EXPECTED FLOW
PI-117	~30 IWC		
TI-118		>120° F	
DP-119			675 SCFM

HEAT EXCHANGER – DISCHARGE			
POSITION	EXPECTED PRESSURE	EXPECTED TEMP.	EXPECTED FLOW
PI-120	~30 IWC		
TI-122		<120° F	
DP-123			675 SCFM

NOTE: EXPECTED TEMPERATURE AT TI-118 IS GREATER THAN 120 F THEREFORE A HEAT EXCHANGER SHALL BE INSTALLED.

INTERLOCK/FAILSAFE SCHEDULE		
I.D.	LOCATION	FUNCTION
(1)	SVE LOW PRESSURE	DEACTIVATES SVE MOTOR IF A LOW PRESSURE IN THE SVE MANIFOLD PIPING IS DETECTED.
(2)	MOISTURE KNOCKOUT HIGH LEVEL SWITCH	DEACTIVATES SVE MOTOR IF A HIGH LIQUID LEVEL IS PRESENT IN THE SVE MOISTURE KNOCKOUT.
(3)	SVE BLOWER (B-1) FAILURE	IF B-1 FAILS TO OPERATE THE SYSTEM WILL GO INTO ALARM AND THE OPERATOR WILL BE NOTIFIED.
(4)	SOIL VAPOR STREAM HIGH TEMP	DEACTIVATES SVE MOTOR IF A HIGH TEMP IS SENSED IN VAPOR STREAM GOING TO THE VAPOR PHASE GRANULAR ACTIVATED CARBON UNITS.

NOTE:

SVE/AE = SYSTEM PERFORMANCE VACUUM SET POINT (NO INSTRUMENT OR VALVE)

WHERE NOT SPECIFIED AS VENDOR SUPPLIED EQUIPMENT OR EXISTING COMPONENTS, CONTRACTOR TO SUPPLY AND INSTALL

SOIL VAPOR EXTRACTION WELLS							
POSITION	EXPECTED VACUUM	EXPECTED FLOW	TOTAL DEPTH	CASING DIAMETER	BOREHOLE DIAMETER	DEPTH TO WATER	SCREENED INTERVAL
TYP SVE	~5 IWC	25 SCFM	15'	2-INCH	4-INCH	~30'	6'-15'
TYP DEEP SVE (DUAL LEVEL)	~5 IWC	25 SCFM	30'	2-INCH	4-INCH	~30'	16.5'-30'

ISSUED FOR ISMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1	RWM	09/28/15	ISSUED FOR CONSTRUCTION	RM	09/28/15	SAC	09/28/15
0	RWM	06/10/15	ISSUED FOR BID	RM	06/10/15	SAC	06/10/15

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FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 09/28/15

PROPOSED SOIL VAPOR EXTRACTION SYSTEM PROCESS AND INSTRUMENTATION DIAGRAM

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: M-007.00

SHEET NUMBER: 8 of 10

REVISION: 1

File: P:\Jobs\Fed_Services\Project Files\Ozone - Queens, NY\Remediation Implementation\Phase III System Installation\Drawing\Mechanical Spec Drawing 9-28-15.dwg Layout: M-007 SVE System PMD User: mckeever Plotted: Sep 28, 2015 - 12:40pm

NOTE:

1) PROCESS DRAWINGS ARE PROVIDED IN ORDER TO DETAIL PIPING MATERIALS AND GENERAL EQUIPMENT.

2) SOME COMPONENTS MAY DIFFER FROM THOSE SHOWN AND SHALL BE APPROVED BY THE ENGINEER.

3) ALL COMPONENTS SHALL BE IN COMPLIANCE WILL APPLICABLE NYC CODES FOR THEIR INTENDED USE AS ENVIRONMENTAL REMEDIATION EQUIPMENT.

D-2
MOISTURE KNOCKOUT
80 GAL
CARBON STEEL

F-03
INLET FILTER
W/FILTER ELEMENT

F-04
IN-LINE AIR FILTER
W/FILTER ELEMENT

B-2
SSDS BLOWER
240 SCFM @ 30 IWC-V
240/480V / TEFC / 60Hz
3ø / 10 HP

H-2
PASSIVE HEAT EXCHANGER
CARBON STEEL

GAC-3&4
VAPOR PHASE
GRANULAR ACTIVATED CARBON
1,000 LB. / CARBON STEEL

TYPICAL ALARM OUTPUT

ALARM SHARE
AUTODIALER
PAL 207
DO

F-04
INLET FILTER
3"-SCH.80-PVC
PI 214
4"-SCH.80-PVC
F-03
DPI 215

SSDS BLOWER - INLET			
POSITION	EXPECTED PRESSURE	ACTUAL TEMP.	EXPECTED FLOW
PI-208	~TBD		
TI-209		<55°-70° F	
DP-210			240 SCFM

NOTE: THE BLOWER/PIPING SHALL BE SIZED TO EXTRACT A TOTAL OF 240 SCFM WHILE APPLYING A VACUUM OF 15 IWC AT THE POINT WHERE THE VENDOR PROVIDED EQUIPMENT TERMINATES.

TO ATMOSPHERE
EXTERIOR ROOF
4"-SS BRAIDED HOSE
4"-SCH.40-STEEL
6"-SCH.40-STEEL
SP-3
SP-4
SP-5
GAC-3
GAC-4
GAC-2
FROM SVE GAC-2 EFFLUENT PIPING
4" SS BRAIDED HOSE

PAL 207
PI 207
FI 210
FAL 210
AI
DPT 210
PT 207
PI 208
TI 209
DP 210
4"-SCH.80-PVC
4"-SCH.80-PVC
TYP. ALARM OUTPUT
4"-SCH.40-STEEL
LSHH 211
LSL 212
DI
D-2
ZI 216
ZA 216
SCH 216
SIC 216
ZSC 216
SC 216
HSS 216 HOA
AO
TYP. ALARM OUTPUT
FI 219
FAL 219
DPT 219
PI 217
TI 218
DP 219
B-2
4"-SCH.40-STEEL
H-2
4"-SCH.40-STEEL
PI 220
TS 221
TI 222
DP 223
TYP. ALARM OUTPUT
SP-2

VENDOR SUPPLIED EQUIPMENT
4"-SCH.80-PVC
SSDS MANIFOLDS 2-8
1"-HOSE
DRUM

TYPICAL SSDS MANIFOLD

2"-SCH.80-PVC
FI
PI
SP-1
3" SECTION OF CLEAR PVC SITE TUBE (TYP.)

INSIDE ENCLOSURE
(PRE-FABRICATED OFF SITE BY SYSTEM VENDOR, PURCHASED BY ENGINEER, INSTALLED BY CONTRACTOR)

FLEXIBLE CONNECTION (2" HOSE) BETWEEN SYSTEM MANIFOLD (SCHED 80 PVC) AND BELOW GRADE PIPING (SITE CONTRACTOR TO SUPPLY AND INSTALL)

2"-SCH.40-PVC
SSDS-1
LEG-1
LEG-2
BELOW GRADE
(EXISTING COMPONENTS)

SSDS BLOWER - DISCHARGE			
POSITION	EXPECTED PRESSURE	EXPECTED TEMP.	EXPECTED FLOW
PI-217	TBD IWC		
TI-218		>120° F	
DP-219			240 SCFM

HEAT EXCHANGER - DISCHARGE			
POSITION	EXPECTED PRESSURE	EXPECTED TEMP.	EXPECTED FLOW
PI-220	~35 IWC		
TI-222		<120° F	
DP-223			240 SCFM

NOTE: EXPECTED TEMPERATURE AT TI-218 IS GREATER THAN 120 F THEREFORE A HEAT EXCHANGER SHALL BE INSTALLED.

INTERLOCK/FAILSAFE SCHEDULE		
I.D.	LOCATION	FUNCTION
(1)	SSDS LOW PRESSURE	DEACTIVATES SSDS MOTOR IF A LOW PRESSURE IN THE SVE MANIFOLD PIPING IS DETECTED.
(2)	MOISTURE KNOCKOUT HIGH LEVEL SWITCH	DEACTIVATES SSDS MOTOR IF A HIGH LIQUID LEVEL IS PRESENT IN THE SVE MOISTURE KNOCKOUT.
(3)	SSDS BLOWER (B-2) FAILURE	IF B-2 FAILS TO OPERATE THE SYSTEM WILL GO INTO ALARM AND THE OPERATOR WILL BE NOTIFIED.
(4)	SUB-SLAB DEPRESSURIZATION STREAM HIGH TEMP	DEACTIVATES SSDS MOTOR IF A HIGH TEMP IS SENSED IN VAPOR STREAM GOING TO THE VAPOR PHASE GRANULAR ACTIVATED CARBON UNITS.

NOTE:

SVE #0 = SYSTEM PERFORMANCE VACUUM SET POINT (NO INSTRUMENT OR VALVE)

WHERE NOT SPECIFIED AS VENDOR SUPPLIED EQUIPMENT OR EXISTING COMPONENTS, CONTRACTOR TO SUPPLY AND INSTALL

SUB-SLAB DEPRESSURIZATION PIPING						
POSITION	EXPECTED VACUUM	EXPECTED FLOW	TOTAL DEPTH	PIPE DIAMETER	LEG LENGTH	SCREENED INTERVAL
TYP SSDS	~15 IWC	15 SCFM	1'	2-INCH	40-FEET	0'-40'

ISSUED FOR ISMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1	RWM	09/28/15	ISSUED FOR CONSTRUCTION	RM	09/28/15	SAC	09/28/15
0	MRP	06/10/15	ISSUED FOR BID	RM	06/10/15	SAC	06/10/15

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FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764
DATE: 09/28/15

PROPOSED SUB-SLAB DEPRESURIZATION SYSTEM PROCESS AND INSTRUMENTATION DIAGRAM

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: M-008.00
SHEET NUMBER: 9 of 10
REVISION: 1

File: P:\Job\Invt_Service\Project Files\Fixtures_for\Ozone - Queens, NY\Remediation Implementation\Phase 3\ System Installation\Drawing\Mechanical Spec. Drawing\ M-008 SSD System P&ID layout M-008.dwg, 9/28/2015 - 12:42pm, lrwf

INSTRUMENT LEGEND

First-Letter	Initiating or Measured Variable *2	Primary Element	Transmitters: Indicator	Transmitters: Blind	Readout Devices: Recorder	Readout Devices: Indicator	Readout Devices: Integrating Indicator	Controllers: Recorder	Controllers: Indicator	Controllers: Blind	Alarm Devices: HIGH	Alarm Devices: LOW	Alarm Devices: HIGH & LOW	Control Valve	Self Actuated Control Valve	Switch
A	Analysis (*3)	AE	AIT	AT	AR	AI		ARC	AIC	AC	AAH	AAL	AAHL			AS
B	Burner/Combustion	BE	BIT	BT	BR	BI		BRC	BIC	BC	BAH	BAL	BAHL			BS
C	User's Choice															
D	User's Choise															
E	Voltage	EE	EIT	ET	ER	EI		ERC	EIC	EC	EAH	EAL	EAHL			ES
F	Flow Rate	FE	FIT	FT	FR	FI	FQI	FRC	FIC	FC	FAH	FAL	FAHL	FV	FCV	FS
G	User's Choice															
H	Hand								HIC	HC			HA	HV		HS
I	Current	IE	IIT	IT	IR	II	IQI	IRC	IIC		IAH	IAL	IAHL			IS
J	Power	JE	JIT	JT	JR	JI	JQI	JRC	JIC		JAH	JAL	JAHL			JS
K	Time	KE	KIT	KT	KR	KI	KQI	KRC	KIC	KC	KAH	KAL	KAHL		KCV	KS
L	Level	LE	LIT	LT	LR	LI		LRC	LIC	LC	LAH	LAL	LAHL	LV	LCV	LS
M	TORQUE	ME	MI	MT	MR	MI		MRC	MIC	MC	MAH	MAL	MAHL			
N	User's Choice															
O	User's Choice															
P	Pressure or Vacuum	PE	PIT	PT	PR	PI		PRC	PIC	PC	PAH	PAL	PAHL	PV	PCV	PS
Q	Quantity or Event	QE	QIT	QT	QR	QI	QQI	QRC	QIC		QAH	QAL	QAHL			QS
R	Radiation	RE	RIT	RT	RR	RI		RRC	RIC	RC	RAH	RAL	RAHL			RS
S	Speed or Frequency	SE	SIT	ST	SR	SI	SQI	SRC	SIC	SC	SAH	SAL	SSHL		SCV	SS
T	Temperature	TE	TIT	TT	TR	TI		TRC	TIC	TC	TAH	TAL	TAHL	TV	TCV	TS
U	Multivariable				UR	UI										
V	Vibration/Mach. Anal	VE	VIT	VT	VRC	VI					VAH	VAL	VAHL			VS
W	Weight or Force	WE	WIT	WT	WR	WI	WQI	WRC	WIC	WC	WAH	WAL	WAHL		WCV	WS
X	Unclassified															
Y	Event State Presence	YE		YT	YR	YI			YIC	YC	YAH	YAL		YZ		YS
Z	Position or Dimension	ZE	ZIT	ZT	ZR	ZI		ZRC	ZIC	ZC	ZAH	ZAL	ZAHL		ZCV	ZS

SPECIAL NOTES:

1. Process equipment symbols may vary to show a better resemblance to equipment being used.
2. To simplify routing of process flow lines, some pieces of equipment may appear in more than one place on the flow diagram. Equipment so duplicated will be indicated by dashed lines.

*NOTES:

* NOTES:
1. The instrument legend is based on ISA STANDARD S5.1–1984

2. Any "First Letter" may be modified by the following letters,

D=	Differential	PD=	Pressure Differential
J=	Scan	TJR=	Scanning Temperature Recorder
Q=	Integrate or Totalize	FQI=	Flow Integrating Indicator
A=	Auto Mode	FO=	Flow Restriction Orifice
FF=	Flow Ratio	FFC=	Flow Ratio Controller
SS=	Speed Ratio	SSC=	Speed Ratio Controller
LL=	Level Ratio		

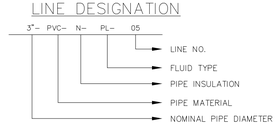
3. The letter "A" is to be used for all analysis variables. The following terms are placed outside the instrument circle of a loop to denote the specific variable.

CO	Carbon Monoxide	H2 S	Hydrogen Sulfide
CO_2	Carbon Dioxide	O_2	Gaseous Oxygen
Comb	Combustible	pH	pH
OP	Opacity	Smoke	Smoke Density
		FID	Flame Ionization Detector

TAG CONSTRUCTION



LINE DESIGNATION



MATERIAL
- CS: CARBON STEEL
- SS: STAINLESS STEEL
- PVC : Rigid Poly–Vinyl –Chloride
- ABS : Acrylonitrile Butadiene Styrene

INSULATION TYPE
- N: None
- I: Insulation Hot
- C: Insulation Cold
- T: Steam Tracing

PIPE RATING
- RF: Raised Face Flange
- FF: Flat Face Flange
- T: Threaded

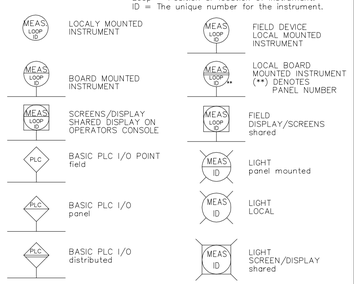
FLUID TYPE
- PW: Potable Water
- PL: Process Liquid
- S: Sludge
- PG: Process Gas
- A: Compressed Air
- IA: Instrument Air
- NG: Natural Gas
- C: Chemical

ABBREVIATIONS

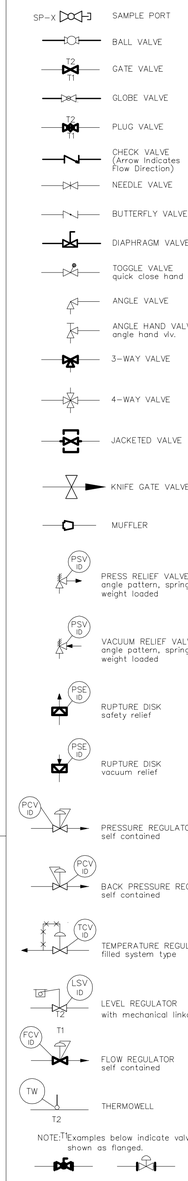
CSO	Carr Seal Open	IAS	Iinstrument Air Supply
CSC	Carr Seal Closed	Iac	Insulation Acoustic
BF	Blind Flange	Ic	Insulation Cold
CO	Chain Operated	Ih	Insulation Hot
CW	Cooling Water	Is	Insulation Safety
CS	Carbon Steel	LC	Locked Closed
DE	De–Energize	LO	Locked Opened
(F)	Furnish	L.Pt	Low Point
FC	Fail Closed	NC	Normally Closed
FI	Fail Indeterminate	NDE	Normally De–Energized
FL	Fail Locked	NE	Normally Energized
FO	Fail Open	RW	Refrigerated Water
FP	Full Port	SO	Steam Out
FV	Full Vacuum	SP	Set Point
HOA	Hand–Off–Auto	SS	Stainless Steel
H.Pt	High Point	VB	Vortex Breaker
IAS	Instrument Air Supply		

INSTRUMENTATION SYMBOLS

INSTRUMENT TAGGING — Measurement = instrument name. Loop = Position or location of instrument. ID = The unique number for the instrument.

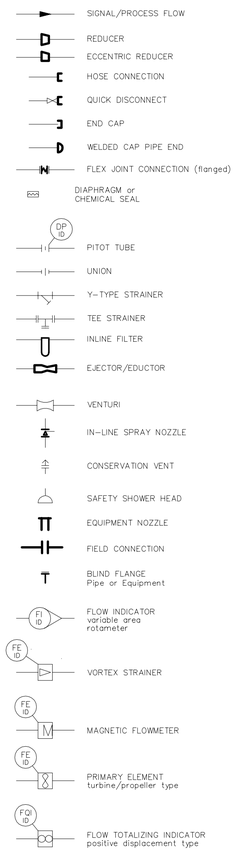


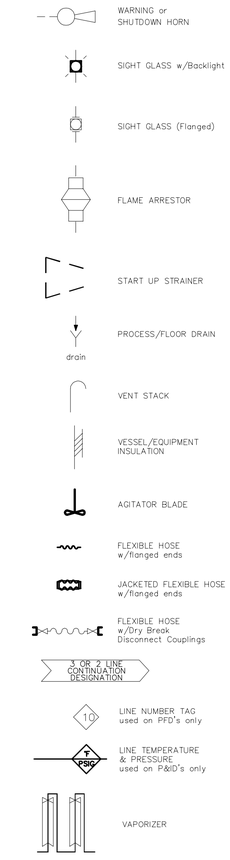
VALVE SYMBOLS

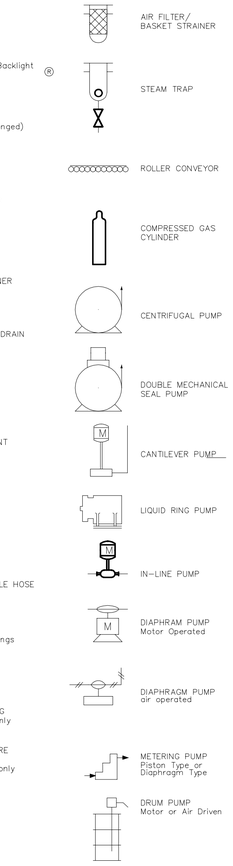


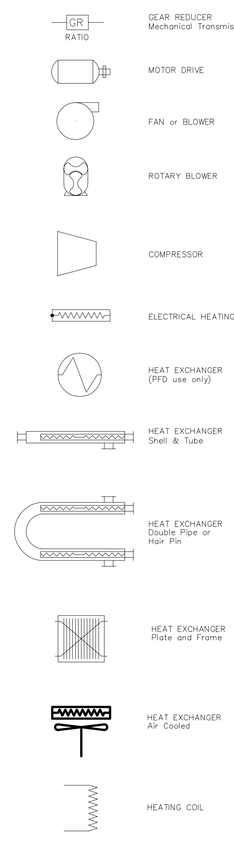
NOTE: Examples below indicate valve shown as flanged.

GRAPHIC SYMBOLS

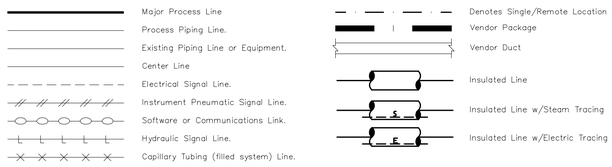




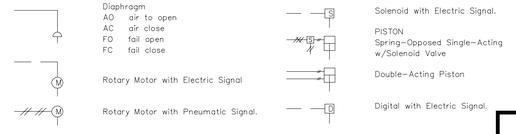




LINE SYMBOLS



VALVE ACTUATOR SYMBOLS



ISSUED FOR ISMP

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1	RWM	09/28/15	ISSUED FOR CONSTRUCTION	RM	09/28/15	SAC	09/28/15
0	MRP	06/10/15	ISSUED FOR BID	RM	06/10/15	SAC	06/10/15

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FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 09/28/15

SVE AND SSDS SYSTEM P&ID LEGEND

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: M-009.00

SHEET NUMBER: 10 of 10

REVISION 1

File: P:\Lake Well_Service\Project Files\Endicott, the\Ozone - Queens, NY\Remediation Implementation\Phase II System Installation\Drawing\Mechanical Spec Drawing 9-28-15.dwg Layout: M-009 P&ID Legend User: mckeown1 Plotted: Sep 28, 2015 - 12:48pm VanE

Appendix B

MAINTENANCE SCHEDULE A - SOIL VAPOR EXTRACTION SYSTEM

COMPONENT	TAG	QTY	MFT	MODEL	SERIAL NUMBER	ACTION	FREQUENCY			
							WEEKLY	MONTHLY	YEARLY	OTHER
BLOWER ENCLOSURE ACCESSORIES										
EXHAUST FAN, 12"", 1286 CFM @ 0" S.P., 115 VAC, 1-PHASE	EF-1	1	DAYTON	10D963	13987006	CLEAN FAN PROPELLER AND HOUSING				AS NEEDED
						INSPECT AND TIGHTEN SET-SCREWS		@3		
PROCESS EQUIPMENT & VALVES										
REGENERATIVE BLOWER (675 SCFM @ 30"W.C. MANIFOLD INLET)	B-1	1	FPZ	SCL K09-TS-25-3	F03927 2015	REPLACE MECHANICAL SEALS AND BEARINGS			@4	[OR] 25,000 WORKING HOURS
BLOWER MOTOR, 25 HP 208 VAC, 3-PHASE, TEFC			LAFERT	AM160LXA2	1126288					
MOISTURE SEPARATOR, TANK STYLE, 120 GALLONS	D-1	1	NES	120 GAL	N/A	CHECK SUMP FOR COLLECTED LIQUID/SOLIDS		X		
						DRAIN LIQUID AND/OR REMOVE SOLIDS				AS NEEDED
VACUUM RELIEF VALVE, 3" FNPT, ADJUSTABLE	VRV-01	1	FPZ	VRL8	N/A	FUNCTIONALITY CHECK		X		
INLINE FILTER, T-STYLE, 6"	F-01	1	SOLBERG	CT-275P-600 C	N/A	CLEAN		X		
						REPLACE		@3		[OR] AS NEEDED
DILUTION FILTER SILENCER, 3"	F-02	1	SOLBERG	FS-235P-300	N/A	CLEAN		X		
						REPLACE		@3		[OR] AS NEEDED
HEAT EXCHANGER, PASSIVE, PARALLEL STEEL FINNED	H-1	1	NES	CUSTOM	N/A	NO ROUTINE MAINTENANCE REQUIRED				
VAPOR PHASE CARBON VESSELS, 2000 LB MEDIA (BY OTHERS)	GAC-1, 2	2				REPLACE SPENT CARBON				AS NEEDED
PROCESS INSTRUMENTATION										
MS HIGH LEVEL SWITCH, 1-FLOAT STYLE, SS FLOATS, 0.6 SG	LSHH-111	1	FPI	L500-1POS	N/A	FUNCTIONALITY CHECK		X		
MANIFOLD VACUUM GAUGES, (-)100-0" WC VAC.	PI-SVE1/SVE27	27	DWYER	LPG4-D7722N	N/A	NO ROUTINE MAINTENANCE REQUIRED				
INLET VACUUM GAUGES, (-)100-0" WC VAC.	PI-108, 114	2	DWYER	LPG4-D7722N	N/A	NO ROUTINE MAINTENANCE REQUIRED				
INLET PRESSURE TRANSMITTER, 0-15 PSIA	PT-107	1	DWYER	626-00-GH-P1-E3-S1	N/A	NO ROUTINE MAINTENANCE REQUIRED				
INLET LOW VACUUM SWITCH, 4 - 20 IWC	VSL-107	1	DWYER	1950-20-2F	N/A	ROTATE VENT DRAIN PLUG AND RETURN TO ORIGINAL POSITION TO DISLODGE DEPOSITS		@3		[OR] AS NEEDED
INLET FLOWSENSOR PITOT TUBE, 6"	DP-110	1	DWYER	DS-300-6	N/A	NO ROUTINE MAINTENANCE REQUIRED				
PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	FI & DPT-110	1	DWYER	605-10	N/A	NO ROUTINE MAINTENANCE REQUIRED				
INLINE FILTER DIFFERENTIAL PRESSURE GAUGE, 0-10" WC DP	DPI-115	1	DWYER	2010	N/A	NO ROUTINE MAINTENANCE REQUIRED				
DISCHARGE FLOWSENSOR PITOT TUBE, 6"	DP-119	1	DWYER	DS-300-6	N/A	NO ROUTINE MAINTENANCE REQUIRED				
PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	FI & DPT-119	1	DWYER	605-10	N/A	NO ROUTINE MAINTENANCE REQUIRED				
TEMPERATURE INDICATORS, 0-250 DEGF	TI-109, 118, 123	3	AV	1NFY4	N/A	NO ROUTINE MAINTENANCE REQUIRED				
DISCHARGE PRESSURE GAUGES, 0-100" WC PRESS.	PI-117, 121	2	DWYER	LPG4-D8622N	N/A	NO ROUTINE MAINTENANCE REQUIRED				
DISCHARGE TEMPERATURE SWITCH, 0-225 DEGF ADJUSTABLE	TS-122	1	UNITED ELECTRIC	B54-103	N/A	NO ROUTINE MAINTENANCE REQUIRED				

MAINTENANCE SCHEDULE B - SUB-SLAB DEPRESSURIZATION SYSTEM

COMPONENT	TAG	QTY	MFT	MODEL	SERIAL NUMBER	ACTION	FREQUENCY			
							WEEKLY	MONTHLY	YEARLY	OTHER
BLOWER ENCLOSURE ACCESSORIES										
EXHAUST FAN, 12"', 1286 CFM @ 0" S.P., 115 VAC, 1-PHASE	EF-2	1	DAYTON	10D963	13986999	CLEAN FAN PROPELLER AND HOUSING				AS NEEDED
						INSPECT AND TIGHTEN SET-SCREWS		@3		
PROCESS EQUIPMENT & VALVES										
REGENERATIVE BLOWER (240 SCFM @ 30"W.C. MANIFOLD INLET)	B-2	1	FPZ	SCL K08-MS-10-3	U13457 2015	REPLACE MECHANICAL SEALS AND BEARINGS			@4	[OR] 25,000 WORKING HOURS
BLOWER MOTOR, 10 HP 208 VAC, 3-PHASE, TEFC			LAFERT	AM112MCA2	1105673					
MOISTURE SEPARATOR, TANK STYLE, 80 GALLONS	D-2	1	NES	80 GAL	N/A	CHECK SUMP FOR COLLECTED LIQUID/SOLIDS		X		
						DRAIN LIQUID AND/OR REMOVE SOLIDS				AS NEEDED
VACUUM RELIEF VALVE, 2" FNPT, ADJUSTABLE	VRV-02	1	FPZ	VRL6	N/A	FUNCTIONALITY CHECK		X		
INLINE FILTER, T-STYLE, 4"	F-03	1	SOLBERG	CT-235P-400C	N/A	CLEAN		X		
						REPLACE		@3		[OR] AS NEEDED
DILUTION FILTER SILENCER, 3"	F-04	1	SOLBERG	FS-235P-300	N/A	CLEAN		X		
						REPLACE		@3		[OR] AS NEEDED
HEAT EXCHANGER, PASSIVE, PARALLEL STEEL FINNED	H-2	1	NES	CUSTOM	N/A	NO ROUTINE MAINTENANCE REQUIRED				
VAPOR PHASE CARBON VESSELS, 2000 LB MEDIA (BY OTHERS)	GAC-3, 4	2				REPLACE SPENT CARBON				AS NEEDED
PROCESS INSTRUMENTATION										
MS HIGH LEVEL SWITCH, 1-FLOAT STYLE, SS FLOATS, 0.6 SG	LSHH-211	1	FPI	L500-1POS	N/A	FUNCTIONALITY CHECK		X		
MANIFOLD VACUUM GAUGES, (-)100-0" WC VAC.	PI-SSD1 / SSD8	8	DWYER	LPG4-D7722N	N/A	NO ROUTINE MAINTENANCE REQUIRED				
INLET VACUUM GAUGES, (-)100-0" WC VAC.	PI-208, 214	2	DWYER	LPG4-D7722N	N/A	NO ROUTINE MAINTENANCE REQUIRED				
INLET PRESSURE TRANSMITTER, 0-15 PSIA	PT-207	1	DWYER	626-00-GH-P1-E3-S1	N/A	NO ROUTINE MAINTENANCE REQUIRED				
INLET LOW VACUUM SWITCH, 4 - 20 IWC	VSL-207	1	DWYER	1950-20-2F	N/A	ROTATE VENT DRAIN PLUG AND RETURN TO ORIGINAL POSITION TO DISLODGE DEPOSITS		@3		[OR] AS NEEDED
INLET FLOWSENSOR PITOT TUBE, 4"	DP-210	1	DWYER	DS-300-4	N/A	NO ROUTINE MAINTENANCE REQUIRED				
PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	FI & DPT-210	1	DWYER	605-10	N/A	NO ROUTINE MAINTENANCE REQUIRED				
INLINE FILTER DIFFERENTIAL PRESSURE GAUGE, 0-10" WC DP	DPI-215	1	DWYER	2010	N/A	NO ROUTINE MAINTENANCE REQUIRED				
DISCHARGE FLOWSENSOR PITOT TUBE, 4"	DP-219	1	DWYER	DS-300-4	N/A	NO ROUTINE MAINTENANCE REQUIRED				
PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	FI & DPT-219	1	DWYER	605-10	N/A	NO ROUTINE MAINTENANCE REQUIRED				
TEMPERATURE INDICATORS, 0-250 DEGF	TI-209, 218, 223	3	AV	1NFY4	N/A	NO ROUTINE MAINTENANCE REQUIRED				
DISCHARGE PRESSURE GAUGES, 0-100" WC PRESS.	PI-217, 221	2	DWYER	LPG4-D8622N	N/A	NO ROUTINE MAINTENANCE REQUIRED				
DISCHARGE TEMPERATURE SWITCH, 0-225 DEGF ADJUSTABLE	TS-222	1	UNITED ELECTRIC	B54-103	N/A	NO ROUTINE MAINTENANCE REQUIRED				

Appendix C

AECOM
250 Apollo Drive
Chelmsford, MA 01824

978.905.2100 tel
978.905.2101 fax

Project: _____ **Date:** _____

Location: _____ **Time:** _____

Performed By: _____

Site Wide Assessment Form

Checklist	Yes/No/NA	Comments:
Wells:		
• **Monitoring wells are intact, road boxes secured with bolts/gaskets**		
• **Monitoring well caps are on and locked.**		
Any physical signs of concrete/asphalt cracking or liner damage		
Remediation Equipment Piping free of cracks or obvious leaks		
No obvious signs of indoor contaminant leaks, odor's/screen with PID in each bay.		
Site entrances and building doors are locked and secured.		
Building is intact. No signs of forced entry.		
Site equipment is locked away and secured (i.e., equipment, field instruments, etc.)		
Slip, trip and fall hazards have been removed and/or marked out and made visible.		
Proper signage throughout site (speed limit, licenses, project information, contacts etc.)		
Decontamination liquids and solids are properly contained.		
Waste material is properly contained and secured.		
Equipment decontamination pad and berms are functioning and are in good condition.		
No hazardous spills/debris observed outside of the exclusion zone.		
Personnel decontamination stations are functioning and present.		
Exclusion zone adequately delineated and construction fencing is intact.		
Site is clean of debris/garbage.		
Other Comments:		

Reviewed By:_____ Date:_____

O&M System Data Sheet

Client/Location: Ozone Park, NY **AECOM JOB # :** 60221764

SSDS System **Date:**

Status On Arrival: **Up** **Down** **Off** **Status On Departure:** **Up** **Down** **Off**

System Well	Valve Position (% Open)		Pressure ("H_2O)		Temp. (°F)		Flow Rate (ft^3/min or ft/min)		Δ Pressure ("H_2O)		PID 10.6 EV ppm or ppb	
ID	A	D	A	D	A	D	A	D	A	D	A	D
SSD-1												
SSD-2												
SSD-3												
SSD-4												
SSD-5												
SSD-6												
SSD-7												
SSD-8												
SSD-SP01												
SSD-SP02												
SSD-DIL												
SSD-SP03												

Well ID	Vac	DTW	VOC's

TECHNICIAN COMMENTS

Type of Check: Full Quick Other

TECHNICAL REVIEW Date:

By:

Motor ID	% Load A	% Load D	Blower Frequency (HZ) A	Blower Frequency (HZ) D	Hour Meter (hr's) A
SSD-B					@
					@
					@
Electric Meter Reading					@

Carbon	PID A	PID D
Midfluent		
Effluent		
Total Off Gas		

O&M System Data Sheet

Client/Location: Ozone Park, NY **AECOM JOB # :** 60221764

SOIL VAPOR EXTRACTION SYSTEM **Date:**

Status On Arrival: **Up** **Down** **Off** **Status On Departure:** **Up** **Down** **Off**

System Well ID	Valve Position (% Open)		Pressure ("H_2O)		Temp. (°F)		Flow Rate (ft^3/min or ft/min)		Δ Pressure ("H_2O)		PID 10.6 EV ppm or ppb		Well ID	Vac	DTW	VOC's
	A	D	A	D	A	D	A	D	A	D	A	D				
SVE-1																
SVE-2																
SVE-3																
SVE-4																
SVE-5																
SVE-6																
SVE-7																
SVE-8																
SVE-9																
SVE-10																
SVE-11																
SVE-12																
SVE-13																
SVE-14																
SVE-15																
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SVE-23																
SVE-24																
SVE-25																
SVE-26																
SVE-27																
SVE-SP01																
SVE-SP02																
SVE-DIL																
SVE-SP03																

TECHNICIAN COMMENTS

Type of Check: Full Quick Other

TECHNICAL REVIEW Date:

By:

Motor ID	% Load		Blower Frequency (HZ)		Hour Meter (hr's)
	A	D	A	D	A
SVE-B					@
					@
					@
Electric Meter Reading					@

Carbon	PID A	PID D
Midfluent		
Effluent		
Total Off Gas		

Office-White, Field-Yellow

APPENDIX D

Contractor's Technical Execution Plan

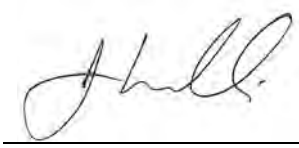
SUBMITTAL COVER SHEET

CONTRACTOR: OP-TECH Environmental Services, Inc.
SUBMITTAL NO.: 006
ADDRESS: PO Box 633 – 3851 Western Turnpike
DATE OF SUBMITTAL: 6/5/13
Duanesburg, New York

CONTRACT NO.: 40623ACM
MANUFACTURER:
NAME OF PROJECT: Former Ozone Industries Site Remediation Project

SUBMITTAL DESCRIPTION: Contractor Technical Execution Plan

REFERENCES:
Specification Section(s) 013300 Paragraph(s) 1.02
Contract Drawing(s)

CONTRACTOR SIGNATURE 

NATIONAL GRID REVIEW

AECOM

DOCUMENT REVIEW STATUS

STATUS NO:

1 ☐ NO EXCEPTION TAKEN
2 ☒ MAKE CORRECTIONS NOTED
RESUBMITTAL NOT REQUIRED
3 ☐ REVISE AND RE-SUBMIT
RESUBMITTAL REQUIRED
4 ☐ REJECTED – SEE REMARKS

REVIEWED BY: SC TITLE: Engineer

DATE: 6/6/13

REMARKS: Revise based on notes about excavation sequencing, and compaction. Plan changes will need to be documented with modifications and re-submittal of the TEP as necessary.

TECHNICAL EXECUTION PLAN

SOIL EXCAVATION, SOIL VAPOR EXTRACTION, AND SUB-SLAB DEPRESSURIZATION INSTALLATION PROJECT

FORMER OZONE INDUSTRIES SITE
NEW YORK, NEW YORK

Prepared for:

AECOM
250 APOLLO DRIVE
CHELMSFORD, MA 01824

Prepared by:

OP-TECH ENVIRONMENTAL SERVICES, INC.
3851 WESTERN TURNPIKE
DUANESBURG, NEW YORK 12056

MAY 14, 2013

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EXHIBITS

EXHIBIT A: KEY PERSONNEL RESUMES

Introduction

OP-TECH Environmental Services, Inc (OP-TECH) is pleased to present the following Technical Execution Plan (Plan) to AECOM for the completion of remedial actions to be performed at the former Ozone Industries Site in New York, New York (Site). OP-TECH understands that AECOM will utilize a contractor to facilitate the removal, management, transport and disposal of VOC impacted soils during the summer of 2013. This document details OP-TECH's approach to achieve the project goals as requested. This Plan is based on the Request for Proposal (RFP) drafted by AECOM and dated February, 2012, responses to questions in April 2012, and supporting plans and specifications.

A. Project Coordination

OP-TECH has carefully chosen the members of the proposed project team based on their requisite skill sets and level of experience in performing projects of a similar nature. OP-TECH is committed to a partnership with AECOM and will participate in all required project meetings, submittals and coordination efforts. At a minimum, full level project coordination meetings will be conducted weekly and will be integrated into AECOM's management efforts.

1.0 Project Superintendent Resume

See **Exhibit A**.

2.0 Project Staffing Plan

Based on the scope of work presented in this proposal and the prior experience of OP-TECH's team, the following key personnel are proposed for this project:

Quality Control Manager	Bill Hunter
Project Manager	Joe Naselli
Site Superintendent	Dave Curran
Health and Safety Manager	Aaron Farrell

Each team member will have specific, well defined duties on the project and will interact successfully with corresponding members of AECOM's team. The following outlines the major roles and responsibilities of OP-TECH's team for the project. Resumes of key personnel can be found in **Exhibit A**.

Quality Control Manager - Bill Hunter

Mr. Hunter provides direct contact with corporate resources in Syracuse, New York to expedite the resolution of any issues that may arise during the project to assure that the project exceeds the expectations of AECOM.

Project Manager – Joe Naselli

Mr. Naselli will provide the interface between the OP-TECH site management team and all OP-TECH support systems, assuring that the necessary resources, both human and equipment, are readily available when needed. In addition, he will act as a technical resource to the site management team in the development and implementation of all aspects of the project.

Mr. Naselli will be responsible for implementing OP-TECH's Quality Control Program (QC) for this project. This program tracks an activity from the submittal stage to completion. The program utilizes a submittal register maintained at the site and periodic QC audits/reports performed by either Mr. Naselli or corporate personnel. Mr. Naselli will then review the reports with both the project team and corporate management and take appropriate action as required. Mr. Naselli will also be the primary liaison between the OP-TECH management team and the AECOM management team.

Mr. Naselli will also ensure that all activities performed by OP-TECH will be in compliance with all laws, regulations, and permit requirements.

Site Superintendent – Dave Curran

Mr. Curran has over 20 years of experience as a Project Superintendent with projects of similar scope including building demolition, excavation of impacted soils, subsurface demolition, drilling, piping installation, union relations, and coordinating truck transportation of soil and debris. He will be assigned full time to this project and will be present on the Project Site at all times when work is being performed by OP-TECH or its Subcontractors.

Mr. Curran will be responsible for the following:

- Completion of the Work in accordance with the Drawings and Specifications.
- All aspects of Project Health and Safety including assuring that all activities at the site are performed in accordance with the Site Health and Safety Plan.
- Maintaining the Project Schedule.
- Performance of day to day site activities.
- Coordination and Scheduling of all labor and equipment onsite including Subcontractors.
- The primary point of contact with the Engineer and Owner.

- Follow AECOM's Communication Protocol.
- Participate in all planning associated with the project including all meetings and provide the OP-TECH Project Manager with daily reports of activities planned and completed.

Health and Safety Manager– Aaron Farrell

Mr. Farrell will be primarily responsible for the implementation of the Site Specific Health and Safety Plan (SSHASP) for the Project. He will work closely with both the Site Superintendent and AECOM's staff to insure that job hazard analyses are completed prior to each major task and are adjusted as conditions dictate.

2.0 Union Relations Plan

OP-TECH is an open shop company. However, typically retains union labor resources through St. Lawrence Industrial Services (SLIS), a union human resources provider. OP-TECH and SLIS have a 20 year relationship working together on projects where union labor is required and/or beneficial. OP-TECH is capable and receptive to performing this project with a completely union labor work force. OP-TECH successfully operates daily with both union and non-union employees working together and believes that our local core group of employees (union & non-union) are some of the best in the industry. In general, we propose to perform the vast majority of site work with union personnel along with a few of our highly trained personnel. Through SLIS, OP-TECH has already spoke to the local union halls and is currently negotiating a collective bargaining agreement with the International Union of Operating Engineers (IUOE) local 15. The subcontractor that OP-TECH has selected for the project will also utilize operating engineers from the IUOE local 15 and laborers from the laborers union (local 731). Although, other subcontracts are currently being negotiated for the building portion of the contract, OP-TECH will make sure that local union labor is utilized, where possible.

3.0 Subcontractors

OP-TECH intends to retain the services of several subcontractors to complete the project. Below is a list of subcontractor's that OP-TECH plans on using throughout the project.

Subcontractor Name	**Scope of Services**
Nexus Expediting, Inc.	NYC Permit Expediting and Filing
GENRUS Corp, Inc. (MBE/DBE/LBE)	Bay Demolition
Aquifer Drilling and Testing	Well Installation
American Engineering and L.S.	Surveying
Independent Testing Laboratories, Inc.	Material and Compaction Testing
Atlantic Lining Company	Geomembrane Installation

Krystal Environmental Services.	Transportation of Impacted Soil
Cumberland County Landfill	Disposal Facility
Maccarone Plumbing, Inc.	Plumbing Contractor
TBD	Concrete Installation
TBD	Wall Installation
City Gates	Door Installation

4.0 Equipment

Upon approval from and in concert with AECOM, OP-TECH will mobilize all necessary personnel, equipment, and materials to the site. Upon arrival, OP-TECH will inspect all equipment and materials and maintain a log of project equipment received. Equipment will be staged in a designated staging area agreed upon by AECOM. The following equipment (or equal) will be mobilized to the site for the duration of the project.

- CAT 305 excavator
- 3 ½ CY rubber tire loader
- Skid steer loader
- Plate tamper
- Pick-up trucks
- Hand tools
- Generators

Other miscellaneous material and equipment will be mobilized to the site as needed throughout the course of the project.

5.0 NYC Permits

O-TECH will retain the services of an expeditor to obtain all the necessary NYC permits to perform the project. OP-TECH will obtain a DOT permit to close a portion of, work, and stage materials on both 99th and 100th Streets. In addition, a DOB permit will also be obtained for the demolition and general construction phases of the project. The DOB permit will be obtained in two phases. The first for demolition only so work can commence. Once the project starts, AECOM will revise their construction drawings to meet all applicable NYC, NYS and federal codes. Once the final drawings are reviewed, OP-TECH will obtain the second phase of the DOB permit. In addition, any necessary supplemental permits associated with closing any utilities identified during the demolition phase of the project will be obtained, as necessary.

B. Progress Schedule

OP-TECH will focus daily on the management of the project's progress schedule. OP-TECH's superintendent and key foremen will meet with AECOM's team each morning to

summarize planned operations activities and estimate productivity goals for the day. At the end of the day, this same group will reconvene to compare planned versus actual productivity and progress. Both positive and negative variances will be analyzed and emphasis will be focused on items along the critical path. Any necessary actions will be discussed and implemented immediately. This micromanagement of the schedule will lead to early identification of potential schedule slippage and any potential changes in the work.

A copy of OP-TECH's baseline progress schedule can be found in **Exhibit B** and will be updated and submitted weekly throughout the project.

C. Construction Facilities and Temporary Controls

1.0 Site Security / Traffic Control

The entire work area will be surrounded by a 6 foot tall chain link fence, equipped with privacy fabric as shown on the Sheet C-02 of the project drawings. Project signs, traffic signs, high visibility traffic cones, barrels, and/or barricades will also be posted. Site access and exit shall be restricted to 99th Street near bay 12. Non project related traffic will be temporarily restricted through the designated project area for the duration of this project to maintain control of the work area and to meet the goals of the Health and Safety initiative of the project. The contaminant reduction zone (CRZ) and exclusion zone will be established and maintained throughout the projects.

It is our understanding that AECOM will be responsible for notifying the local community of the work activities and coordinating the transfer of materials and/or vehicles, belonging to others, out of our designated work area which is defined on the contract drawings.

2.0 Erosion Controls

Prior to the start of any intrusive activities, areas subject to erosion and sedimentation will be addressed. At a minimum, storm drainage structures will be protected with filter fabric and hay bales. If necessary, straw wattle will be installed along the perimeter fence line on 99th Street. Erosion and sediment controls will be installed in accordance with the project specifications and with the NYSDEC guidelines for soil erosion and sediment control. The project entrance and exit will be maintained in a condition that prevents the translocation of sediment onto the city streets. OP-TECH's onsite site superintendent will perform daily inspections of these erosion controls and as needed during and immediately following significant precipitation events. The Site Superintendent will report damaged or dysfunctional controls immediately to AECOM's representative and affect immediate repair of the inoperable media or removal of sediment from areas outside of the exclusion zone.

In concert with AECOM, several designated staging areas will be established onsite including a construction equipment staging area, an equipment decontamination area, a contaminated soil staging area, personal decontamination area and a clean soil staging area.

- The equipment staging area will be chosen in a convenient location in concert with AECOM

- The contaminated soil stockpile area inside bay 12 of the subject building, will be lined with a 20 mil liner and surrounded by hay bales. Sandbags will be utilized to secure the cover.

3.0 Decontamination Procedures

Construction of the Decontamination Pad will be completed during the mobilization/site preparation stage and will be located inside the fenced in area on 99th St. The equipment decontamination (decon) pad will have a minimum size of 12 feet x 20 feet, a poly sheeting lined bottom and berms made of hay bales. The decon pad will be equipped with a 3,000 psi hot pressure washer which will be used to decontaminate equipment. Equipment utilized in the management of contaminated materials shall be dry- decontaminated when possible and shall include, but not limited to; cleaning debris from tires, tracks, framework, and truck boxes prior to leaving the site. Equipment that becomes heavily contaminated will be gross decontaminated prior to movement to the decontamination pad. If further decontamination is required to remove the debris, the equipment will be positioned on the decontamination pad and it shall be wet decontaminated using a hot water pressure washer prior to leaving the site. The water and soil will be collected in the lined sump. All wash water and/or PPE shall be recovered and stored in 55-gallon drums for subsequent disposal at a NYDDEC Part 360 permitted facility.

The personal decontamination area will be lined with 6 millimeter polyethylene sheeting and contain boot wash and eye wash stations, and waste consolidation containers for spent PPE. The following supplies will be available on site for the decontamination of personnel and equipment:

- Plastic drop cloths
- Appropriate containers to collect disposable PPE
- Plastic wash tubs
- Soft bristled long-handle brushes
- Appropriate containers to collect wash and rinse water
- Hand spray units for decontamination
- Soap, water and towels to wash hands and faces
- Appropriate PPE

- Hand tools: shovels, scrapers, brushes, brooms, etc.
- Hot water pressure washer
- Pumps

D. Excavation Sequence

OP-TECH's execution of the remediation activities will be performed in strict accordance with the contract documents. As the general construction contractor, OP-TECH will be responsible for all phases of work including the implementation of the project health and safety plan, the project schedule and the project budget.

The following describes OP-TECH's general sequential approach to the completion of the excavation:

1. Excavate then backfill Bay 8 to within 2.0 feet below finish grade (fbfg)
2. Excavate then backfill Bay 9 to within 2.0 fbfg
3. Excavate then backfill Bay 10 to within 2.0 fbfg
4. Excavate then backfill Bay 11 to within 2.0 fbfg
5. Excavate then backfill Bay 15 to within 2.0 fbfg
6. Excavate then backfill Bay 14 to within 2.0 fbfg
7. Excavate then backfill Bay 13 to within 2.0 fbfg
8. Excavate then backfill Bay 12 to within 2.0 fbfg

The bay will be excavated down to its terminal depth as determined by field measurements and soil conditions. Following the completed excavation the bay will be backfilled to a minimum depth of 2.0 fbfg. Then the same procedure will be started at the next bay.

In the event excavation depths are required at depths greater than 4.0 fbfg, OP-TECH will use a trench box for structural support to perform the deeper excavation. Each area inside the trench box will be excavated and backfilled prior to moving on to the next section.

The project sequence may be altered by OP-TECH throughout the project based on site specific conditions.

SC)Note that the Structural Engineers report includes a sequencing plan that varies slightly from this, and must be followed. See specs and structural report. No more than one side of any column shall shall be exposed to full

E. Pre-Demolition and Demolition Sequence

OP-TECH will remove the sediments present in the sumps within Bay 12 via manual methods. After the area around the sump is cordoned-off, OP-TECH will enter the sumps in level C PPE (with the ability to upgrade to level B) and in complete accordance with the site specific safety plan. PID readings of the ambient air around the sump will be taken continuously and a ventilation system will be utilized to vent the bays in which the sump work is occurring. The solid material inside the sumps will be removed manually

(with non-sparking shovels and/or wet/dry vacuum); sludge and liquid waste will be removed with a wet/dry vacuum equipped with a carbon filter to control fugitive emissions. All resulting waste will be consolidated into DOT-compliant, 55 gallon drums pending disposal. Based on the disposal facility chosen by OP-TECH, it is expected that it will be acceptable for this material to be consolidated with the bulk soils, and shipped off site for disposal.

Once on site, OP-TECH will investigate for the presence of existing active utilities (i.e, electrical, water, and sanitary). If identified, OP-TECH will obtain the necessary closure permits with the proper NYC departments and use a NYC licensed subcontractor to close the aforementioned utilities.

Prior to the excavation of soils, OP-TECH will demolish the concrete and asphalt floors within Bays 8-15. Several interior partition walls will be demolished as part of this task. In general, the concrete and asphalt will be neatly saw cut, broken and sized with a demolition hammer and removed with a hydraulic excavator. All resulting construction and demolition debris will be disposed of offsite at an approved facility. OP-TECH will sufficiently water the demolition/soil excavation areas, access points and stockpiles to prevent fugitive dust emissions. If needed, OP-TECH will apply a vapor control agent such as biosolve, as needed, to prevent VOC emissions should they be detected, and also cover the soil stockpile with tarps and/or 6-mil polyethylene sheeting.

F. Debris Removal and Disposal

All construction and demolition debris will be disposed of offsite at an approved facility. OP-TECH will sufficiently water the demolition/soil excavation areas, access points and stockpiles to prevent fugitive dust emissions. If needed, OP-TECH will apply a vapor control agent such as BIO SOLVE®, as needed, to control fugitive VOC odors should they be detected, and also cover the soil stockpile with tarps and/or 6-mil polyethylene sheeting. OP-TECH will provide fans to supply fresh outside air into the work areas when necessary. Negative air handlers equipped with vapor phase activated carbon filters will also be available on site to remove any fugitive VOC odors from inside the work area.

G. Impacted Soil Removal

After the concrete and asphalt has been removed from the bay, OP-TECH will utilize a mini excavator, skid steer, and wheel loader to excavate and stage impacted soils in the soil stockpile area (SSA). The SSA will be lined with two (2) 6-mil layers of polyethylene sheeting. The SSA will be securely covered at the end of each day with 6-mil polyethylene sheeting that will be sufficiently anchored in place to resist being dislodged.

The excavation will proceed to a depth of 4 feet below grade surface (BGS) and to the horizontal extents shown on the project drawings. OP-TECH will cooperate with AECOM for field screening of the soil during the removal and for closure sampling at the 4 foot BGS level. During the excavation, OP-TECH will control fugitive orders by applying BIO SOLVE®, venting, and filtering the air.

H. Soil Handling and Disposal

Contaminated soil generated by the remedial effort will be temporarily stockpiled in bay 12 until enough soil is generated to load trucks. If needed, OP-TECH will apply a vapor control agent such as BIO SOLVE®, as needed, to control fugitive VOC odors should they be detected, and also cover the soil stockpile and open excavations with 6-mil polyethylene sheeting. Negative air handlers equipped with vapor phase activated carbon filters will also be available on site to remove any fugitive VOC odors from inside the work area, as necessary. The soil will then be loaded from the soil stockpile area into permitted 10 wheel dump trucks via a front-end loader. The trucks will be lined with polyethylene sheeting prior to loading and covered in accordance with the project specifications. The soil will be transported to a permitted Subtitle D landfill and disposed of in complete accordance with all local, state and federal regulations. OP-TECH will provide weight tickets for all materials disposed. When possible, the trucks will be given specific loading times to minimize their time standing on 99th Street waiting to be loaded.

C&D debris will be placed into either rolloff containers or walking floor trailers that will be temporarily staged in the fenced in area along 99th Street and transported to a permitted transfer station as soon as they are filled.

I. Backfill Placement

OP-TECH will use three different types of backfill throughout the project (i.e., common borrow, pea stone, and subbase). Each backfill source will be sampled for soil classification (per ASTM D2487), standard proctor (per ASTM D698), and chemical analysis per NYS DEC DER-10 requirements.

The first layer of backfill is the common borrow which will be placed at the bottom of the excavation. The common borrow will be installed in 12-inch lifts and compacted to with 90% of its maximum dry density, as determined by the standard proctor. A pea stone layer consisting of 3/8-inch washed stone will be placed on top of the common borrow in uniform layers not exceeding 12-inch lifts. Aggregate subbase shall be installed and compacted over the top of the entire excavation area in lifts not to exceed 8-inches. All compaction testing will be performed by an independent third party testing company. All results will be submitted to AECOM for their records.

SC) Compaction to be 95%, with testing completed 2 tests for each 1-foot lift in each bay.

J. Well Installation

OP-TECH will utilize the services of a specialty drilling subcontractor to install 16 monitoring wells in the locations shown on sheets M-01 and M-02. The wells will be installed in complete accordance with the specifications shown on Detail 9 of Sheet M-03 and capped with 8-inch road boxes at grade. OP-TECH understands that the only deep wells (30-feet BGS) are the two wells scheduled for Bay 12. The exhaust of the drilling equipment will be controlled by venting the exhaust outside of the building and supplying the work area with fresh air from the outside. Carbon Monoxide detectors will be placed in several location both inside and outside of the work area.

OP-TECH will install twenty-one (21) SVE wells in the locations shown on sheet M-01. Each well will extend to 15 feet BGS and consist of six feet of 2" schedule 40 PVC pipe and nine feet of 2" slotted, PVC well screen. The well screen portion of the well will be surrounded by filter sand pack while the upper portions will be finished with grout, bentonite and common borrow as shown on Detail 7 of Sheet M-03. Each well will be fitted with an 8-inch road box.

In Bay 12, three (3) dual level SVE wells will be installed. They will be installed with the same subsurface aggregate components as the other, 21 single wells but will include one well that will extend to 15 feet BGS and another well that will extend to 30 feet BGS. Both wells will be housed in an 8" road box.

All well penetrations through the HDPE liner and geotextile material will be fitted with a well boot welded to the liner and a neoprene gasket with stainless steel clamp.

K. Piping Installation

Lateral piping from each SVE well and the SSD piping shall be 2" schedule PVC, and will run from each well back to a common trench as shown on Sheet M-01. The pipe trench will be no deeper than 2 feet BGS, approximately 3 feet wide and contain sub grade/bedding material of 3/8" pea stone. All lateral piping including 8SSD pipes and 27 SVE pipes will be stubbed up in Bay 8 and spaced per the detail shown on Detail 1 on Sheet M-04. All stub ups will extend 12 inches above the finished concrete floor elevation and penetrate through the liner via a well boot.

L. Disposal Facilities

Impacted soil will be transported using NYS part 364 permitted trucks to the Cumberland County Solid Waste Complex located in Millville, NJ. The generated soil meets the criteria for non-hazardous I.D. 27 soil and will be used as daily cover.

All C&D debris will be transported to a solid waste transfer station and properly disposed of in a permitted landfill.

All PPE and water generated during the decontamination activities will be containerized on site in NYSDOT shippable containers and transported to a NYSDEC Part 360 permitted facility for subsequent disposal.

The sumps and associated sludge generated during the demolition activities will be containerized on site in NYSDOT shippable containers and transported to a NYSDEC Part 360 permitted facility for subsequent disposal.

M. Site Restoration

Following the installation of the SSD and SVE piping, OP-TECH will restore the bays with a new, 6" concrete floor. The floor will be underlain by compacted aggregate sub grade, and an HDPE liner with a layer of geotextile material on either side. The floor will be reinforced #4 grade 40 rebar installed at 12 inches on center, each way. Concrete contraction joints will be installed every 12 feet both ways.

In bay 8, OP-TECH will install two, 3-foot standard man doors (one adjacent to 99th street and one adjacent to 100th street) and one 8-foot overhead garage doors adjacent to 100th street.

N. Survey

OP-TECH will utilize existing survey data provided by AECOM to establish survey control at the site. Initial, layout, structural monitoring, post excavation, and final surveys will be performed by a local, NYS licensed professional surveyor. The survey will provide verification of existing conditions, establishment of Horizontal Datum New York State Plane NAD 83 (Zone NY East 3101) and Vertical Datum NAVD88. The surveyor will also establish a temporary bench mark and horizontal control for the work. The surveyor will install tilt angle gages and vertical control points on one half of all the interior columns and one quarter of all exterior columns in accordance with the project specifications. Throughout the demolition and excavation activities, the surveyor will monitor the structural controls and report their measurements within 24 hours of data collection.

Following the demolition work and prior to excavation activities, the surveyor will document the ground elevations of each bay. Measurements will be collected throughout the excavation activities, by OP-TECH field personnel using a laser level and rod. The measurements will be utilized to determine the vertical extent of the excavation. The licensed land surveyor will survey the bottom of each excavation, prior to backfilling. It is anticipated that the licensed land surveyor will document the elevations of the bottom

of each bay excavation in 1-2 site visits per bay. Upon completion of each bay, the surveyor will submit the calculated soil volumes as per the project specifications. Backfilling elevations will be calculated based on field measurements taken by OP-TECH personnel in conjunction with AECOM's on site representative.

The licensed land surveyor will return to the site upon completion of the project to survey the as-built conditions of the site.

Exhibit A

Key Personnel Resumes

Joseph Naselli
Project Manager

Joseph brings extensive experience in providing project management services for a variety of complex, multi-disciplinary and technically challenging environmental projects, including soil and groundwater remediation projects, subsurface investigations, sediment remediation projects, MGP site remediation projects, decontamination and demolition projects, and CERCLA site remediation and construction. Joseph's diverse technical background allows him to provide cost conscious solutions to regulatory and/or environmental issues to OP-TECH's project management team.

Professional Experience

OP-TECH Environmental Services Inc.
Project Manager
November 2006 – Present

- Provide project management and technical consulting services for a variety of complex, multi-disciplinary and technically challenging environmental projects, including soil and groundwater remediation projects, subsurface investigations, sediment remediation projects, MGP site remediation projects, decontamination and demolition projects, and CERCLA site remediation and construction. Duties include, but not limited to; project estimating, work plan and HASP development, P&L Management, business development, financial analysis, contract management, and invoicing.
- Managed daily operations of multiple environmental remediation and construction projects.
- Responsible for technical support, health and safety, account management client relations and business development.
- Manage emergency response and spill containment projects. Responsibilities include scheduling, health and safety, reporting, and direct contact with clients. Design and implement site-specific spill response and containment procedures.

Northeastern Environmental Technologies Corporation
Project Manager
2003 – 2006

- RCRA and TSCA hazardous waste management.
- Phase 1 Environmental Site Assessments and Environmental Audits.
- Design and management of complex subsurface investigation projects. Computer modeling of comingled contaminant plumes and complex groundwater systems.
- Geophysical survey data interpolation and computer modeling.
- Installation of groundwater treatment and product recovery systems.
- Underground storage tank (UST) and abovegrond storage tank (AST) removals
- In-situ and Ex-situ bioremediation.

ATC Associates, Inc.
Environmental Scientist
2001 – 2003

- RCRA and TSCA hazardous waste management.
- Phase 1 Environmental Site Assessments and Environmental Audits.
- Design and management of complex subsurface investigation projects. Computer modeling of comingled contaminant plumes and complex groundwater systems.
- Geophysical survey data interpolation and computer modeling.
- Underground storage tank (UST) and abovegrond storage tank (AST) removals
- In-situ and Ex-situ bioremediation.
- Operation, maintenence and monitoring of in situ soil and groundwater remediation systems.

PSI
Environmental Technician
1999 – 2001

- Project oversight of underground storage tank (UST) and abovegrond storage tank (AST) removals
- Operation, maintenence and monitoring of in situ soil and groundwater remediation systems.
- Project oversight of asbestos abatement and building demolition and decontamination projects.

Education/Training

B.S. Environmental Science, State University of New York, Plattsburgh, N.Y., 1999.
OSHA HAZWOPER-40-Hour Initial
OSHA HAZWOPER-8-Hour refresher Annual
Confined Space Entry Trained
Excavation Safety Trained
AAI/Phase 1 ESA Certification (ASTM-2006)

Key Projects

2012: MGP Site Remediation ($2,100,000) Schenectady, N.Y. - Project Manager – Selective demolition of existing structures and underground utilities. Install six 24'x47' cells with temporary steel sheeting 40 feet below grade to support the excavation adjacent to roadways, structures and underground utilities. Excavation dewatering and onsite water treatment. Excavation, transportation and thermal treatment of 7,500 tons of coal tar impacted soil. Instituted dust and fugitive emission controls and monitoring. Backfill and compaction of 9,000 tons of select aggregate materials. New construction of storm water collection and distribution system, electrical utilities, concrete sidewalks, and asphalt pavement.

2011: Drum Grave Remediation ($120,000) Malta, NY - Project Manager - Setup up site boundaries and contaminant control zones to keep unauthorized personnel and equipment at a safe distance from the area of concern. Performed reconnaissance and sampling under Level A PPE of the drums encountered during construction activities. Once the flash hazard was eliminated, PPE was down graded to Level B. Mr. Naselli performed a geophysical ground penetrating radar (GPR) survey of the immediate area surrounding the encountered drums to identify other suspect buried anomalies. Utilizing Level B PPE, OP-TECH surgically exposed the buried drums identified during the initial construction activities as well as those identified during the GPR survey using excavating equipment. Empty drum carcasses were removed and properly disposed of off site. Drums containing unknown liquids and/or solids were over packed, sampled, inventoried, and subsequently transported to a permitted hazardous waste disposal facility. Excavate and dispose of approximately 150 tons of hazardous soil. Remove, over pack, inventory, and dispose of 50 drums of various hazardous solids and liquids.

2011: CERCLIS site Remedial Construction ($1,200,00) Elyria, OH - Project Manager - The objective of this project was to install temporary and permanent erosion and sedimentation controls as well as build construction roads down the steep slope of the landfill to gain access to areas scheduled for remediation. This project also included the construction of a permanent 300 LF cement-slag-bentonite slurry wall, excavation of approximately 4000 tons of PCB and chlorinated VOC impacted soil and sediment from areas along the Black River in Ohio, construction of a sedimentation basin with controlled outfall structures, construction of a steep slope soil buttress

along the toe of the existing landfill, dewatering and onsite water treatment, and river bank construction. The majority of work completed in this phase of the remedial project was performed to get the site ready for additional capping work scheduled to be performed at a later date.

2011: Sediment Remediation and Wetland Restoration Project ($600,000) Holliston, MA Project Manager - The objective of this project was to excavate and stabilize approximately 2000 tons of TPH, PAH, PCB and heavy metal impacted sediment from within four wetland areas adjacent to an existing solid waste transfer station. The scope of work included the dewatering and on site treatment of approximately 1 million gallons of surface and groundwater throughout the course of the project. The excavation, dewatering and stabilization of sediment using a network of swamp mats and low ground pressure earthmoving equipment. Upon completion of the wetland remediation, the wetland areas were restored to a natural setting using native wetland plant species and leaf and organic litter collected during the setup phase of the project.

2011: Site Remediation Project ($800,000) Syracuse, N.Y. - Project Manager - The objective of this project was to excavate, transport, and dispose of 9,000 tons of petroleum impacted soil. The project scope also included excavation dewatering, UST removal, backfill and compaction of select aggregate materials. Installation of several product recovery wells and groundwater monitoring wells. Installation of a soil vapor extraction system, treatment system building, perimeter fencing and the establishment of grass across the site.

2010: MGP Site – Sediment Remediation Project ($1,000,000) Holyoke, MA - Project Manager - The project involved the diversion of an active Raceway Channel which drains a portion of the City's canal system into the Connecticut River, installation of a down stream dam to prevent the CT River from backing up and flooding the site during rain events. The main objective of this project was the re-grading and construction of an in-situ subaqueous cap of the underlying MGP waste impacted sediment of the Raceway Channel. The scope of work included the management of coal tar contaminated sediment, installation of DNAPL recovery and heating wells, and groundwater management and treatment, and the demolition of an abandoned train trestle. Successfully designed and constructed a water diversion and on site water treatment plant that successfully diverted over 1 billion gallons of water from an active river and treated over 1 million gallons of MGP waste contaminated water from the work area. Restoration of the site included the construction of an additional 14,000 square feet of new wetland areas outside of the main channel of the Raceway.

2010: Fuel Tank and Fueling Station Construction Project ($500,000) Gilboa N.Y. - Project Manager - The objective of this project was to remove a total of five (5) existing underground storage tanks and replace them with four (4) new aboveground storage tanks, as well as the construction of a new fueling station at the facility. The scope of work included the demolition of the five (5) existing USTs and fueling station, construction of new AST foundations, installation of the new ASTs, construction of the electrical and mechanical systems for the new ASTs and fueling station, and the design and installation of a fire suppression system for the new fueling station. Additional work performed during this project included the excavation and management of petroleum impacted soil and groundwater encountered during the existing UST removals.

2009:- Environmental Restoration / Shoreline Stabilization Project ($800,000) Peekskill, N.Y. Project Manager - The main objective of this project was to fully restore a 4.5 acre parcel of land

which was a former Brownfield to increase the property's potential for future development. The project included the environmental restoration of the entire property including the removal of VOC and SVOC impacted sediment and the installation of cap across the site. The project also involved the construction of approximately 1700 linear feet of shoreline revetment along a tidal portion of the Hudson River.

2009: Former MOSF – Soil Remediation Project ($2,800,000) Utica, N.Y. - Project Manager - This project included the excavation, transportation, and disposal of 50,000 tons of grossly contaminated soil from a former major oil storage facility. An additional 20,000 tons of petroleum-impacted soil was excavated and stockpiled on site for onsite ex-situ treatment. This project was completed in seven weeks. The outcome of this project was successful in removing approximately 80 percent of the soil contaminant mass which was contributing to the release of petroleum compounds into the Mohawk River.

2009: Soil Remediation Project ($1,300,000) Malden, N.Y. - Project Manager - The project involved the excavation of 14,000 tons of petroleum impacted soil at an active retail fuel filling station. The project also included site restoration and station upgrades including the installation of granite curb, chain-link fence, electrical utilities, fuel dispenser lines, fuel dispensers, and asphalt pavement.

2008: 10,000-gallon petroleum spill ($1,000,000) Amsterdam, N.Y. - Project Manager - The project involved the emergency response and containment of 10,000 gallons of No. 2 fuel oil within an unnamed tributary of the Mohawk River. The project included the installation and 24 hour maintenance of several containment dams positioned at strategic locations throughout the tributary for the purpose of recovering the spilled fuel oil. This project also included the excavation of approximately 8,000 tons of petroleum-impacted soil. The containment dams installed within the tributary were monitored and maintained for a period of 7 months until administrative closure of the petroleum spill was granted by the regulatory government agency. The outcome of this project was successful in preventing the petroleum release from migrating to the Mohawk River.

2007: Crosby Hill Recyclers Site Remediation ($3,200,000) Fulton, NY - Project Manager - This project, performed under the NYSDEC response contract included field waste characterization, field screening, decontamination and soil removal in a federally designated wetland. Overall, this two-year project included the excavation of over 14,000 tons of gasoline and diesel fuel contaminated soil, removal of hundreds of buried containers containing unknown hazardous liquids and solids, and the removal of over 10,000 spent tires.

2006-2008: Town of Watson Subsurface Investigation Watson, NY - Project Scientist - After doing historical and geologic research of the entire area to investigate multiple potential sources, we performed a complete subsurface investigation including the complete bedrock and surficial geologic characterization of a residential community. During the course of the project, we installed 24 cluster wells (4-7 wells per cluster screened at different depths ranging from 16-60 feet below grade). The cluster wells were monitored for two (2) years using geologic information, groundwater flow data, horizontal and vertical VOC 3-D plume mapping to identify the source of MTBE impacting local residential supply wells. We prepared all documentation including work plans, investigation reports; risked based corrective action plan, and a remedial alternatives plan.

David Curran
Superintendent

Mr. David Curran joined OP-TECH in November 1991 and was previously employed as a Supervisor/Equipment Operator/Mechanic with Fourth Coast Pollution Control. David is one of the longest tenured supervisors and a favorite among clients and crews alike. Mr. Curran is an extremely versatile and capable supervisor and has gained his experience from filling nearly every role in the environmental services industry from field technical to equipment operator to truck driver and supervisor.

Dave's primary responsibilities include but are limited to the following:

- Project estimating and quantity take-offs
- Scheduling
- Management of work crews for OP-TECH and subcontractors.
- Create daily jobs reports
- Conduct daily health & safety toolbox talks
- Supervise on site testing and sampling of various materials and substances
- Enforce safety protocols, regulations, rules and proper use of safety equipment to ensure a safe work environment for all labor crews

Education/Training

- 80-Hour Hazardous Materials Training
- 40-Hour Hazardous Waste Training
- NYSDOL 40-Hour Asbestos Certified Supervisor
- Emergency Response Operations Level Training
- DOT Hazardous Materials Training 126F
- Confined Space Entry / Supervisor
- Adult CPR and Red Cross Standard First Aid
- Class A Drivers License

Relevant Experience

Superintendent: RCRA Regulated Waste Soil Remediation Project Farmington, CT

Installation of slide rail shoring and surgical excavation of several areas of concern containing heavy metals and chlorinated VOC contamination. This work was conducted in a manner to maintain uninterrupted operations of the facility.

Superintendent: CERCLIS site Remedial Construction Elyria, OH

The objective of this project was to install temporary and permanent erosion and sedimentation controls as well as build construction roads down the steep slope of the landfill to gain access to areas scheduled for remediation. This project also included the construction of a permanent 300 LF cement-slag-bentonite slurry wall, excavation of approximately 4000 tons of PCB and chlorinated VOC impacted soil and sediment from areas along the Black River in Ohio, construction of a sedimentation basin with controlled outfall structures, construction of a steep slope soil buttress along the toe of the existing landfill, dewatering and onsite water treatment, and river bank construction. The majority of work completed in this phase of the remedial project was performed to get the site ready for additional capping work scheduled to be performed at a later date.

Superintendent: Crucible Materials

Supervisor and primary operator of all activities related to removal of sediments contaminated with various organic or inorganic materials from an active waterway and wetlands. The project

included bypass pumping approximately 25,000 GPM around 700 linear feet of streambed for 4 weeks.

Superintendent: Vishay

Decontamination and demolition of a closed semi-conductor manufacturing facility. The work included decommissioning and removal of process equipment and piping. Decontamination and demolition of portions of building and restoration of the leased property for release to the owner.

Supervisor / Foreman Chevron Texaco Baltimore, Maryland

Responsible for supervision and coordination of the cleaning and dismantlement of a former petroleum refinery involving #6 oil tanks, #4 oil tanks and asphalt tanks ranging in size from 10' to 117' in diameter. The project was successfully completed on time and within Chevron's budget. Coordinating of subcontractor, waste transporters and 15 field personnel. Responsible for all on site health and safety activities resulting in an injury free project.

Superintendent: Northeast Environmental Services, Inc. Canastota, New York

Supervision and coordination of filter pressing approximately 200,000 gallons of industrial sludge. UST & AST tank cleaning, basin cleaning. Responsible for preparations and paperwork. Coordination of subcontractors. Liaison to client.

Superintendent: Reynolds Metals Massena, New York

Responsible for supervision and coordination of cleaning (2) 220,000 gallon clarifier tanks, coordination of subcontractors and liaison to client.

Foreman / Equipment Operator: NYSDEC Brownfield Project – St. Lawrence Co. Willow Island Project Canton, New York

Primary equipment operator during the source removal of approximately 12,000 tons of gasoline impacted soil utilizing a CAT 320 Excavator. Performed complete site restoration utilizing a CAT D5 dozer. Performed building demolition utilizing a Kobelco 200 w/ grapple attachment

Foreman / Equipment Operator: Avis Car Rental Poughkeepsie, NY

Installed approximately 3,000 sf of steel sheet piling via hydraulic excavator w/ a vibratory hammer attachment. Performed the source removal of approximately 25,000 tons of gasoline contaminated soil via hydraulic excavator. Utilized loaders, dozers and vibrator compactors to backfill and restored the site.

Employment History

Forth Coast Environmental: 1983-1991

Michael T. Piercey
Site Superintendent

Mr. Piercey has over 15 years of construction and environmental experience with responsibilities increasing over the years from Site Foreman to Site Supervisor to Project Manager to Emergency Response Manager to Site Superintendent. Responsibilities have included supervising and participating in projects involving large scale earthwork with dewatering, UST removal, trenching, and installation of concrete structures. He participated in projects for private sector clients such as United Technologies, Northrupp Grumman, Lockheed Martin, Genentec as well as work for the Lawrence Livermore National Labs, US Army Corps of Engineers, and state and federal agencies.

Responsibilities

As a Site Superintendent Michael's primary responsibilities are as follows:

- Schedule daily activities, directing field activities to maximize production and maintain project schedule and budget.
- Scheduling and managing subcontractors.
- Ordering materials that are compliant with project specifications.
- Cost and scheduling management.
- Revenue projections
- Reviewing invoices, documenting daily production.
- Implementing company safety programs and communicating effectively with all project personnel.

Education/Training

- B.S., Nova Southeastern University, Ft. Lauderdale, FL
- Voice Interceptor/Interrogator – Defense Language Institute, Presidio of Monterey, CA
- Hazardous Waste Operations and Emergency Response
- OSHA 40-hr HAZWOPER
- Confined Space Supervisor
- CPR and Red Cross First Aid Training
- NRC Oil Spill Response Supervisor
- Boating Safety and Boom Deployment
- RCRA 40 CFR 256.16
- USCG Qualified Individual

Relevant Experience

Field Project Manager-Contra-Costa County ACME Landfill, Martinez, CA.

Supplied air excavation and management of buried drums, cylinders and unknown material project. Surgically excavate unknown drums from the most challenging environments. Provide complete drum management service including, Haz-Cat screening, sampling, profiling, manifesting and transportation and disposal of hazardous or non-hazardous waste. This project required careful investigation due to a large number of anomalies and the complexity of coordinating heavy equipment operations, drum handling and final site closure.

Incident Commander- CAL-TRANS Emergency Response, Gilroy, CA

Responsible for locating, categorizing, and recovering damaged and undamaged drums from a roadside ravine following a two vehicle accident on route 152. With the use of a Skid-steer with drum handling attachment, a tele handler and small excavator and ground crews, 12 Drums containing sulfuric acid, 10 drums of hydrogen peroxide, fertilizer and a small amount of flammable powder were recovered. All work in the contaminated zone performed under SCBA and level B supplied air systems, downgraded only after all chemicals were accounted for and properly contained.

Project Supervisor – Honeywell, Trib 5A Semet Residue Ponds – Solvay, NY

Relocation of over 10,000 cubic yards of contaminated sediment. A groundwater collection trench of two groundwater pump stations will be installed to facilitate the relocation of overland flow within the tributary to an existing onsite treatment system via 2,600 linear feet of new fiberglass (FRP) pipe. Installation of approximately 180,000 square ft of LDPE Liner and restoration of the Tributary.

Site Supervisor – Honeywell Harbor Brook Waste Bed Soil Excavation Project – Syracuse, NY

Project included clearing out and grubbing of 12 acres and excavation and relocation of approximately 35,000 cubic yards of Solvay waste material. The waste was stockpiled in a central location and covered with topsoil and seed. After excavation OP-TECH constructed a working platform consisting of geotextile fabric and 4" crushed stone.

Site Superintendent – Atlantic Wire- New Haven, CT

The project encompassed a 500,000 square foot facility closure under direction of the USEPA and CT DEP, included tank cleaning and removal, facility decontamination and closure. Mr. Piercey also acted as the assigned site safety officer, responsible for implementation of site specific health and safety plan.

Site Superintendent – New York Thruway

Project involved the excavation of 12,000 tons of contaminated soil, backfilling with clean fill, installation of an under drain system, and surface restoration of a tractor trailer drive lane.

Project Manager / Site Superintendent – Apton Properties LLC – Milpitas, CA

Project involved the excavation of 24,000 tons of soil contaminated with arsenic. , Site restoration included storm water runoff system, city water, sewer, and oil water separator for a 2000 stall municipal parking area. Also acted as the assigned site safety officer, responsible for implementation of the HASP, dust control plan, and dust monitoring.

Project Manager – Pacific Gas & Electric – South San Francisco, CA

Facility closure including AST cleaning and demolition, asbestos abatement, demolition, and remediation of 2500 tons of soil contaminated with JP5 jet fuel. Remediation included design and installation of a bentonite slurry wall measuring 140'L X 17'H X 3'W. Installed steel coffer dam using 3'X50' sheets over 140' to allow dewatering and remediation activity in the plant cooling pond.

Project Manager – Pacific Gas & Electric – San Berardino CTY, CA

Install Ground Water Extraction System for PG&E at the Topock Compressor Station. System installed to recover and treat water contaminated with hexavalentchromium. Under the oversight of DTSC, PG&E is pumping the contaminated groundwater away from the Colorado River and into a treatment system located near the Station.

Site Superintendent – UTC/Pratt Whitney – San Jose, CA

Excavate and stockpile 70,000 ton of soil contaminated with arsenic, selenium and chromium. Categorize waste and load out for disposal. Worked with CA fish and game to preserve or relocate nesting native rattlesnakes throughout the excavation area. Also acted as the assigned site safety officer, responsible for implementation of a site specific safety plan.

Site Superintendent – Cookson Electronics – Jersey City, NJ

Full facility closure including asbestos abatement, lead paint abatement, lead dust decontamination, soil and concrete contaminated with PCB's, and demolition of a 25000 square foot building. Full decontamination of 1 million square foot facility formerly used for the production of lead solder paste.

Site Superintendent – Covanta Energy – Hartford, CT

Remediation of 2000 tons of PCB contaminated soil. Remediation in a live switch yard with limitations due to 11kV, 17kV and 27kV lines through the work area. Utilized vacuum excavation, hydraulic excavation and mechanical excavation with specialized equipment. Site restoration included back fill with self compacting material.

APPENDIX E

New York City Building Permit

NYC Buildings

EF1: eFiling Job Application Cover Sheet

Generated by the eFiling application.

DEPT BLDGS. 421090456 Job Number

SC130430032 Scan Code

You are almost done!

All documents generated by this eFiling must be signed and sealed appropriately and submitted with all other filing requirements to the borough office.

1 Key Application Information *This key information was generated based on information provided by the user during the eFiling process.*

Filing At: QUEENS - 101-61 99 STREET

Validated On: 03/10/2015 4:31 PM Forms Generated: PW1

Filing Type: ALTERATION 2 (A2) - INITIAL

2 Filing Fee Estimation *The following fee estimation is based on information provided by the applicant.*

ALTERATION 2 COSTS
OTHER 242000
TOTAL ALTERATION 2 COSTS
242000
COST FEE + ((242 - 5)* 10.3 + 225 + (2* 20)) = 2706.1
EQUIPMENT FEE + 160

Building Type: OTHER

Fee Status EXEMPT

Directive 14: YES

Computed Total Filing Fee $2,866.10

Minimum Required Payment $2,866.10

Computed Civil Penalty $0.00

Records Management Fee. $165.00

PROFESSIONAL CERTIFY JOB/PLANS

Work Type(s) -

☐ PL ☐ MH ☐ BL ☐ FB ☐ FS

☐ FP ☐ SD ☐ SP ☐ FA ☒ EQ

☐ CC ☒ OT- GENERAL CONSTRUCTION

3 Other Important Information

- The applicant is responsible for reviewing all documentation generated by eFiling for completeness and accuracy. The submitted documents are the official filing record upon being accepted for filing at the Department.
- It is the applicant's responsibility to ensure that the forms generated by eFiling are accompanied by all other required plans and documentation and that all filing submissions are in compliance with applicable codes, laws, rules and regulations.
- Though eFiling checks all applications for errors, other issues may prevent the Department from accepting this filing.

4 Where to File *This application must be filed in-person in the borough where the proposed work is to occur, or electronically.*

Office Location: 120-55 QUEENS BLVD
KEW GARDENS, NY 11424

Phone: (718) 286-0600

Hours: 8:30 AM - 4:30 PM

T000011721580000044

Fee Exempt (City owned)

DOB Reference Number: T000011721580-000044

User Ref ID: 10161 99

12/14

NYC Buildings

PW3: Cost Affidavit

Must be typewritten.

DEPT BLDGS 421090456 Job Number

SC130430033 Scan Code

1 Reason For Filing *Required for all applications.*

Reason for filing cost affidavit:	Cost information provided must be based on:
☒ Initial Filing *2-7*	Estimated cost of construction
☐ Prior to Approval Actions *1A, 2-7*	Estimated cost of construction
☐ Post Approval Amendment (PAA) *1A, 2-7*	Estimated cost of construction
☐ To obtain Sign-off *2-3, 5, 7*	Actual construction cost of completed work

1A Indicate existing document number affected by filing:

2 Location Information *Required for all applications.*

House No(s) 101-61 Street Name 99 STREET

Borough QUEENS Block 9106 Lot 70 BIN 4458633 C.B. No. 409

3 Cost Details *Required for all applications.*

Cost estimates shall include total value of work proposed per § 28-112.3 of the NYC Administrative Code and shall be direct work costs based upon material, equipment and labor, work shall include all construction elements including, but not limited to, construction equipment, wall and floor finishes, built-in cabinets, and kitchen appliances. Indirect costs, including but not limited to general conditions, insurance, and an allowance for profit and overhead shall be added to direct work costs and shall be reflected in the unit costs shown. If in the opinion of the Department, the valuation is underestimated on the application, the permit shall be denied, unless the applicant can show detailed estimates to meet the approval of the Department The initial, amended and final building permit valuation shall be set by the department. ***"Yes" or "No" must be specified for each "Category of Work" listed below.***

Categories of Work *(Must match all applicable categories indicated on PW1.)*

Yes	No		Yes	No		Yes	No	
☐	☒	Boiler (BL)	☐	☒	Standpipe (SD)	☒	☐	General Construction (OT)
☐	☒	Fire Alarm (FA)	☐	☒	Sprinkler (SP)		☐	Partial Demolition
☐	☒	Fuel Burning (FB)	☐	☒	Signs (SG)		☐	Non-Structural Demolition
☐	☒	Fuel Storage (FS)	☐	☒	Other (OT)		☐	Structural Work
☐	☒	Fire Suppression (FP)		☐	Antenna (OT/ANT)		☐	Interior Renovation
☐	☒	Mechanical (MH)		☐	Fire Protection Plan (OT/FPP)		☐	Exterior Renovation
☐	☒	Plumbing (PL)		☐	Marquee (OT/MAR)		☒	(Describe) wall,window,door
				☐	(Describe)			

Category of Work*	Description of Work	Area/Units	Unit Cost ($)	Total Cost ($)	Work Category Total Cost ($)
OT	CONCRETE CONSTRUCTION	1	150000	150000	
	INTERIOR WALL CONSTRUCTION	1	80000	80000	
	OVERHEAD DOOR AND WINDOW	1	12000	12000	242000
	LOUVER INSTALLATION				
				TOTAL JOB COST: $	242000.00

**List ALL Categories of Work specified "Yes" above. Use more than one line for Categories of Work that involve multiple unit costs. See PW3 Form Instructions for a sample of completed Section 3 Cost Details.*

PW3

4 Design Applicant Information

Last Name SHELDEN | First Name GEORGE | Middle Initial

Business Name AECOM | Business Phone 212.377.8456 | Business Fax

Business Address 125 BROAD STREET, SUITE 1500 | Mobile Phone

City NEW YORK | State NY | Zip 10004 | E-Mail

License Number 027505 | Choose One: ☐ P.E. ☒ R.A. ☐ Sign Hanger ☐ Other (specify) _____

5 Owner/Lease Holder Information

Last Name WAGNER | First Name JOSEPH | Middle Initial

Business Name DCAS | Business Phone 212.386.0481 | Business Fax

Business Address 1 CENTRE STREET | Mobile Phone

City NEW YORK | State NY | Zip 10007 | E-Mail

6 Design Applicant's Statements and Signatures

I hereby state the information on this form is correct and complete to the best of my knowledge I understand falsification of any statement is a misdemeanor and punishable by a fine, imprisonment, or both. I also understand it is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration Violation is punishable by imprisonment or fine or both I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department.

REGISTERED ARCHITECT GEORGE I. SHELDEN No. 027505 STATE OF NEW YORK

Name (print) GEORGE SHELDEN

Signature

Date 02/11/2015

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

7 Owner's/Lease Holder's Statements and Signatures NOTARY REQUIRED

I hereby state the information on this form is correct and complete to the best of my knowledge I ~~understand falsification~~ of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both I also understand it is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration Violation is punishable by imprisonment or fine or both I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department

Name (print)	Notarization	Notary Seal
JOSEPH WAGNER	State of New York, County of: New York	EDDEY FERNANDEZ Commissioner of Deeds City of New York No 4-6927 Certificate Filed in New York County Commission Expires 8/1/2016
Signature	Sworn to or affirmed under penalty of perjury	
Date 2/27/15	27 day of February 20 15	
	Notary Public Signature	

Internal Use Only

Work Area	PW3 Cost Details Validation	Comments (May include cost guidance.)	Initials
Plan Examination:	☐ Accept Original ☐ Revised Cost Needed		
C of O:	☐ Accept Original ☐ Revised Cost Needed		
Plan Examination/C of O:	☐ Accept Revised Submission (Resolved)		

NYC BUILDINGS

DEPT BLDGS. 421090456 Job Number

SC130430034 Scan Code

Professional and Owner Certification

Please file three (3) originals

1. Professional's Certification

"I hereby state that I have exercised a professional standard of care in certifying that the filed application is complete and in accordance with applicable laws, including the rules of the Department of Buildings, as of this date. I am aware the Commissioner will rely upon the truth and accuracy of this statement. I have notified the owner that this application has been professionally certified. If an audit or other exam discloses non-compliance, I agree to notify the owner of the remedial measures that must be taken to meet legal requirements. I further realize that any misrepresentation or falsification of facts made knowingly or negligently by me, my agents or employees, or by others with my knowledge, will render me liable for legal and disciplinary action by the Department of Buildings and other appropriate authorities, including termination of participation in the professional certification procedures at the Department of Buildings."

Professional's Seal

REGISTERED ARCHITECT GEORGE I. SHELDEN No. 027505 STATE OF NEW YORK

027505
Professional's License No.

02/11/2015
Professional's Signature & Date
GEORGE SHELDEN

2. Owner's Statement

"I have read and am fully aware of the applicant's above statement that this job will be professionally certified, and agree to bring into compliance any construction which is found not to comply with all applicable laws and regulations."

2/27/15
Owner's Signature & Date
JOSEPH WAGNER

3. Applicant's Contact Information

	Fax Numbers	Email Addresses
Applicant		
Owner		
Filing Representative	(718) 641-4626	JENNY@JENNYFLORES.COM

NYC Buildings

PC1: Required Items for Professional Certification

Must be typewritten. Must respond Y/N to all requirec

DEPT BLDGS. 421090456 Job Number

SC130430004 Scan Code

LOCATION INFORMATION *Required for all applications*

House No(s) 101-61
Borough QUEENS
Street Name 99 STREET

Block 9106
Lot 70
BIN 4458633
C.B. No. 409

Y	N	ITEMS REQUIRED PRIOR TO APPROVAL
	X	1ST ZONING REVIEW COMPLETE
	X	2008 CODE TR1 REQUIRED
	X	2ND ZONING REVIEW COMPLETE
	X	ACCESSIBILITY WAIVER (PEO1)
	X	ADDRESS. NEW HOUSE NUMBER APPROVED
	X	ADULT ACTIVITY APPROVAL
	X	ADULT ESTABLISHMENT APPROVAL
	X	AI1 OBJECTIONS RESPONSE
	X	ANTI-HARASSMENT AREA CHECKLIST
	X	APPLICANT TO SELF CERTIFY OBJECTIONS
X		ASBESTOS· CERTIFICATION (DEP ACP5)
	X	BPP CATCH BASIN/MANHOLE REQUIRED
	X	BPP: CHECKLIST IN LIEU OF PLANS-ALT3
	X	BPP· CONTRACTOR BOND-INSTALL ROADWAY
	X	BPP: DISTINCT SIDEWALK-LEGAL AGREEMENT
	X	BPP: DISTINCT SIDEWALK-STONE TEST REPORT
	X	BPP: DOT PERMISSION TO MOVE FRANCHISE
	X	BPP· FIELD VISITS RESULTS NEEDED
	X	BPP: FILING REQUIRED
	X	BPP: GRADE STUDY
	X	BPP: INFRASTRUCTURE AND SITE SKETCH
	X	BPP· NOTES REQUIRED ON PLAN
	X	BPP: PHOTOS-SIGNED/SEALED BY APPLICANT
	X	BPP: SITE PLAN-NEW R.O.W INSTALLATION
	X	BPP: STREET DRAINAGE APPLICATION
	X	BPP. STREET TREES SITE PLAN
	X	BPP: TOPOGRAPHIC SURVEY
	X	BPP: TRAFFIC ENG STDY-CC IN INTERSECTION
	X	BPP: WAIVER OF GRADE FILING
	X	BPP-BSA REQUIREMENTS
	X	BPP-CPC REQUIREMENTS
	X	BPP-DEP: NON-STD DRAINAGE STRUCTURE
	X	BPP-NYS DEC: DRAIN STREET TO WETLAND
	X	BPP-PARKS· REMOVE MATURE TREE
	X	BPP-TA RELOCATE BUS STOP
	X	BPP-UTILITY APPROVAL TO RELOCATE POLE
	X	BROOKLYN PARKING RESTRICTIONS
	X	BSA VARIANCE
	X	BSA/CPC APPROVAL
	X	CALENDARED PROPERTY - 40-DAY HOLD
	X	CANTILEVER FIRE ANALYSIS APPROVED BY DOB & FDNY
	X	CLINTON DISTRICT· ANTI-HARASSMENT CHECKLIST
	X	CLINTON DISTRICT: RESTRICTIVE DEC
	X	COST AFFIDAVIT ESTIMATE: (PW3)
	X	CPC: HUDSON YARDS INITIAL CERTIFICATION
	X	CURB CUT. PROVIDE EXISTING NUMBER
	X	DEP SANITARY SEWER CERTIFICATION (HCP/SCP)
	X	DEP STORMWATER/SEWER CERTIFICATION (HCP/SCP)

Y	N	ITEMS REQUIRED PRIOR TO APPROVAL
	X	DESIGN COMM. APPROVAL· CITY-OWNED PRPTY (EXTERIOR)
	X	DESIGN COMM. APPROVAL DISTINCTIVE SIDEWALK
	X	DOB - CONSTRUCTION CODE DETERMINATION (CCD1)
	X	DOB - ZONING DIAGRAM (ZD1)
	X	DOB - ZONING RESOLUTION DETERMINATION (ZRD1)
	X	ECCCNYS ANALYSIS
	X	ENCROACHMENT ON SIDEWALK: DOT REVOCABLE CONSENT
	X	ENERGY CODE COMPLIANCE FEE
	X	ENERGY CODE COMPLIANCE REVIEW
	X	ENERGY CODE PROGRESS INSPS TECHNICAL REPORT (TR8)
	X	ENVIRON RESTRICTIONS - OER NOTICE TO PROCEED
	X	FDNY FIRE SUPPRESSION FEE PAYMENT RECEIPT
	X	FEE: CIVIL PENALTY FOR LEGALIZATION
	X	FIRE ALARM/SIGNAL SYSTEM (FA) SIGNOFF
	X	FIRE ALARM: FDNY RECEIVED & ACCEPTED PLANS
	X	FIRE APPARATUS ACCESS ROADS FOR DEV· FDNY APPROVAL
	X	FIRE PROTECTION PLAN(FPP): FDNY APPROVAL
	X	FLOOD ZONE DESIGN CERTIFICATION
	X	FOREIGN GOV'T PROPERTY: STATE DEPT LTR
	X	FOUNDATION PLAN APPROVAL
	X	HIGH LINE - PARKS APPROVAL REQUIRED
	X	HPD: INCLUSIONARY HOUSING LETTER
	X	HPD SRO MD CERTIFICATE OF NO HARASSMENT
	X	HUDSON YARDS PARKING AMENDMENT
	X	HYDRAULIC FLOW CALCULATIONS
	X	HYDRO FLOW TEST LETTER
	X	IDENTIFY THE PRIMARY JOB ON PW1
	X	LANDMARKS APPROVAL
	X	LANDMARKS SIGNOFF
	X	LOFT BOARD CERTIFICATE
	X	NYCECC ANALYSIS
	X	NYCECC EXEMPTION
	X	NYS DEC COASTAL EROSION HAZARD APPROVAL
	X	NYS DEC COASTAL EROSION HAZARD MAP
	X	NYS DEC FRESHWATER WETLANDS APPROVAL
	X	NYS DEC FRESHWATER WETLANDS MAP
	X	NYS DEC TIDAL WETLANDS APPROVAL
	X	NYS DEC TIDAL WETLANDS MAP
	X	OAC REGISTRATION
	X	OTHER (LIST): _____
	X	PREFAB/MODULAR CONSTR NYS COMPLIANCE STATEMENT
	X	PREFABRICATED/MODULAR CONSTR· OTCR APPROVALS
	X	PTA3: GREEN ROOF TAX ABATEMENT APPLIC (PRELIMINARY)
	X	PTA4: SOLAR TAX ABATEMENT APPLICATION (PRELIMINARY)
	X	RECORDS MGMT FEE PAYMENT RECEIPT
	X	RESOLVE ZONING DISCREPANCY
	X	RESOLVE ZONING DISCREPANCY (DATA CHANGE)
	X	RESTRICTION· DEED

Y	N	ITEMS REQUIRED PRIOR TO APPROVAL
	X	RESTRICTION: EASEMENT AGREEMENT
	X	RESTRICTION: RESTRICTIVE DECLARATION
	X	SEPTIC SYSTEM: SEPTIC COMPLIANCE UNIT APPROVAL
	X	SITE SURVEY: INITIAL
	X	SOIL REPORT
	X	SRO MD ANTI-HARASSMENT CHECKLIST
	X	STEEL AFFIDAVIT: PRELIMINARY
	X	STREET TREE CHECKLIST
	X	STREET: NEW STREET NAME APPROVED
	X	STREET: UNMAPPED-NOTIFY EMERG. AGENCIES
	X	STRUCTURAL PEER REVIEW REQUIRED
	X	SUBDIVISION SIGNOFF
	X	SUBSTANTIAL IMPROVEMENT CALCULATIONS
	X	TAX LOT: TENTATIVE LOT NUMBER ISSUED
	X	TEMPORARY FLOOD SHIELDS: EMERGENCY FLOOD PLAN
	X	TENANT/OCCUPANT PROTECTION PLAN 2008 CODE
	X	TRANSIT AUTHORITY/MTA/PANYNJ APPROVAL
	X	TRASH COMPACTOR REQUIREMENTS
	X	TREE REMOVAL: OUTSIDE PROP./PARKS APPR
	X	TREE REMOVAL: SPEC ZON. DIST./CPC APPR
	X	U S. ARMY CORPS OF ENGINEERS APPROVAL
	X	URBAN RENEWAL AREA: HPD APPROVAL
	X	VERIFY DOB PLAN NAMING STANDARD IS MET
	X	WATERFRONT AREA ZONING COMPLIANCE
	X	ZONING EXHIBIT I: CERTIFICATION
	X	ZONING EXHIBIT II: CERTIFICATION
	X	ZONING EXHIBIT III:DESC. & OWNRSHP.STMNT
	X	ZONING EXHIBIT IV: CERTIFICATION
	X	ZONING EXHIBIT V: CERTIFICATION

Y	N	ITEMS REQUIRED PRIOR TO PERMIT
	X	2008 TR1 REQUIRED FOR NEW/WAIVED INSPECTIONS
	X	ASBESTOS: COMPLETION OR CLOSEOUT (ACP20/21/5)
	X	ASBESTOS: VARIANCE (DEP FORM V5)
	X	CPC. HUDSON YARDS FINAL CERTIFICATION
X		DIR-14 ID OF RESPONSIBILITY (TR1)
	X	ELECTRICAL APPLICATION FOR SIDEWALK SHED LIGHTING
	X	EQUIPMENT (EQ) PERMITS
	X	EXCAVATION OR DEMOLITION: 5-DAY NOTICE
	X	HIC LICENSE OR AFFIDAVIT
X		INSURANCE: DISABILITY
X		INSURANCE: LIABILITY
	X	INSURANCE: WORKERS' COMP. WAIVER/AFFID
X		INSURANCE: WORKERS' COMPENSATION
	X	JAMAICA· DEP SEWER CONNECTION APPROVAL
	X	LPC-BSA ARCHEOLOGY RESTRICTIVE DECLARATION (INITIAL)
	X	MASONRY MANUFACTURER'S STATEMENT-FORM 10H
	X	MICROFILM/SCAN INITIAL
	X	MICROFILM/SCAN. ADDITIONAL REQUIRED
	X	OTHER (LIST)· _____
	X	PARTIAL DEMO PLAN & DS1 (FOR AL/EW-OT PERMITS)
	X	PROJECT-SPECIFIC GL INSURANCE
	X	RAISE/MOVE DOCS & DS1 (FOR AL/EW-OT PERMITS)

Y	N	ITEMS REQUIRED PRIOR TO PERMIT
	X	SCAFFOLD APPLICATION & PERMIT
	X	SIDEWALK SHED APPLICATION & PERMIT
	X	SITE SAFETY PLAN: BEST APPROVAL REQUIRED
	X	STANDPIPE ALARM DRAWINGS & AI1 (OR AI1 PROOF)
	X	STANDPIPE WORK PERMIT
	X	STREET TREES: RECEIPT OF STREET TREES SITE PLAN
	X	TEMPORARY FENCE APPLICATION & PERMIT
	X	TR3: CONCRETE DESIGN MIX TECHNICAL REPORT

Y	N	ITEMS REQUIRED PRIOR TO C/O OR SIGNOFF
	X	ADDRESS: NEW HOUSE NUMBER APPROVED
	X	APPLICANT CONCRETE EVALUATION REPORT
	X	APPLICANT CONCRETE RETESTING REPORT
	X	AS-BUILT ENERGY ANALYSIS (EN2)
	X	BOILER (BL) SIGNOFF
	X	BOILER APPROVAL . 900A
	X	BPP: AS-BUILT SIDEWALK SURVEY
	X	BPP: ENGINEERS AFFIDAVIT
	X	BPP: FIELD INSPECTION
	X	BPP: FINAL AS-BUILT PHOTOGRAPHS
	X	BPP: FINAL SIGNOFF
	X	BPP: MAINTENANCE AGREEMENT - RETAINING WALL
	X	BPP: SIDEWALK & ROADWAY THICKNESS CORES
	X	BPP: SIDEWALK CONCRETE STRENGTH REPORT
	X	BPP-DEP: INSTALL/MODIFY DRAINAGE STRUCTURE
	X	BPP-DEP: INSTALL/RELOCATE FIRE HYDRANT
	X	BPP-DESIGN COMM APPROVAL· DISTINCTIVE SIDEWALK
	X	BPP-DOT· RELOCATE STREET LIGHT
	X	BPP-DOT: SIDEWALK ENCROACHMENT
	X	BPP-DOT. SIDEWALK/CURB/ROAD WORK PERMITS
	X	BPP-PARKS· PLANT NEW TREE
	X	BPP-TA: INSTALL SIDEWALK OVER STATION
	X	BSA VARIANCE
	X	CAP & CLEAN FORM
	X	CERTIFICATE OF OCCUPANCY
	X	CLINTON DIST: HPD CERT COMPLETION LOW-INCOME HOUSE
	X	CONSTRUCTION (OT) SIGNOFF
	X	COST AFFIDAVIT (FINAL): PW3
	X	CURB CUT (CC) SIGNOFF
	X	DEMOLITION (DM) JOB SIGNOFF
	X	DEP SANITARY SEWER CERTIFICATION (HCP/SCP)
	X	DESIGN COMM. SIGNOFF: CITY-OWNED PROPTY (EXTERIOR)
	X	DETECTOR:CARBON MONOXIDE-CERT.OF INSTALL
	X	DETECTOR:SMOKE-CERT. OF INSTALLATION
	X	DOB - ZONING DIAGRAM (ZD1)
	X	DOB FINAL INSPECTION REQUIRED
	X	DRY PIPE VALVE TEST · FP-10
	X	ELEVATOR JOB SIGNOFF
	X	ENVIRO RESTRICTIONS - OER NOTICE OF SATISFACTION
	X	EQUIPMENT USE PERMITS
	X	FA - FDNY APPROVAL . FD-FAA
	X	FA LETTER OF DEFECT · FD-FALD
	X	FA SELF CERT DEFECT FD-FASC

PC1

Y	N	ITEMS REQ. PRIOR TO C/O OR SIGNOFF
	X	FEES: PAY DEFERRED FEES
	X	FEMA ELEVATION CERT (086-0-33)/ FLOODPRF CERT (086-0-34)
	X	FIRE ALARM/SIGNAL SYSTEM (FA) SIGNOFF
	X	FIRE ALARM: AS-BUILT PLANS
	X	FIRE PROTECTION PLAN (FPP). FDNY APPROVAL
	X	FIRE RETARDANT TREATED WOOD· FDNY CERTIFICATE
	X	FIRE SUPP ANSUL APPROVL· FD-FSS
	X	FIRE SUPPRESSION SYSTEM (FP) SIGNOFF
	X	FUEL BURNING (FB) SIGNOFF
	X	FUEL STORAGE (FS) SIGNOFF
	X	GAS WELDER ANNUAL CERT : GAS-WELD
	X	GASOLINE TANK SIGNOFF
	X	HOUSE CONNECTION SIGNOFF
	X	HPD. INCLUSIONARY HOUSING ELIG. CERT
	X	HPD: SRO MD CERTIFICATE OF NO HARASSMENT
	X	LANDMARKS APPROVAL
	X	LANDMARKS SIGNOFF
	X	LPC-BSA ARCHEOLOGY RESTRICTIVE DECLARATION (FINAL)
	X	MARQUEE (OT) SIGNOFF
	X	MASONRY SUPPLIER'S STATEMENT-FORM 10J
	X	MECHANICAL (MH) SIGNOFF
	X	MEDICAL GAS INST CERT : LETTER-MED
	X	MICROFILM/RECORDS MGMT: ADDL FEE REQUIRED
	X	OIL TANK REMOVAL CERT : LETTER-FO
	X	OTHER (LIST): _____
	X	PILES· FINAL PILE PLAN/CREOSOTE LETTER
	X	PLACE OF ASSEMBLY (PA) SIGNOFF
	X	PLUMBING (PL) SIGNOFF
	X	PRELIMINARY COMMISSIONING REPORT CERTIFICATION
	X	PTA3: GREEN ROOF TAX ABATEMENT APPLICATION (FINAL)
	X	PTA3: TAX ABATEMENT ELIGIBILITY APPROVAL
	X	PTA4. SOLAR TAX ABATEMENT APPLICATION (FINAL)
	X	PTA4: TAX ABATEMENT ELIGIBILITY APPROVAL
	X	RESTRICTION: DEED
	X	RESTRICTION: EASEMENT AGREEMENT
	X	RESTRICTION: RESTRICTIVE DECLARATION
	X	RPZ/DDCV TEST REPORT : GEN215B
	X	SD/SP FIRE PUMP TEST : FP-86
	X	SEPTIC ABANDONMENT CERT: LETTER-SCAV
	X	SEPTIC SYSTEM: SEPTIC COMPLIANCE UNIT APPROVAL
	X	SEWER/HOUSE CON SIGNOFF: DEP HC 021
	X	SITE SURVEY: FINAL
	X	SP/SD DEVICE CERT · LTR-LIC ELECT
	X	SPRINKLER (SP) SIGNOFF
	X	SPRINKLER INSP REPORT : FP-85
	X	SPRINKLER/STANDPIPE ELECTRICAL LETTER
	X	STANDPIPE (SD) SIGNOFF
	X	STANDPIPE INSP REPORT : FP-84
	X	STEEL AFFIDAVIT- FINAL
	X	STREET TREE SIGNOFF
	X	STREET TREES SITE PLAN
	X	STREET: NEW NAME APPROVED

Y	N	ITEMS REQ. PRIOR TO C/O OR SIGNOFF
	X	STREET: UNMAPPED- NOTIFY EMERG. AGENCIES
	X	SWIMMING POOL: DEP APPROVAL
	X	SWIMMING POOL· DOH APPROVAL
	X	TAP LETTER - DOM SVC : DEP-DOM
	X	TAP LETTER - FIRE SVC : DEP-FIRE
	X	TAX LOT: FINAL LOT NUMBER ISSUED
	X	TRANSIT AUTHORITY/MTA/PANYNJ APPROVAL
	X	TREE REMOVAL: OUTSIDE PROP./PARKS APPR
	X	TREE REMOVAL: SPEC ZON. DIST./CPC APPR
	X	URBAN RENEWAL AREA: HPD APPROVAL
	X	US ARMY CORPS OF ENGINEERS APPROVAL
	X	WATER METER PERMIT DEP-METER
	X	WATER SUPPLY (PRIVATE): DOH APPROVAL
	X	WELDERS AFFIDAVIT

STATEMENTS & SIGNATURES *Required for all applications*

Falsification of any statement is a misdimeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by imprisonment of not more

Is a TR1 form required? X Yes __ No

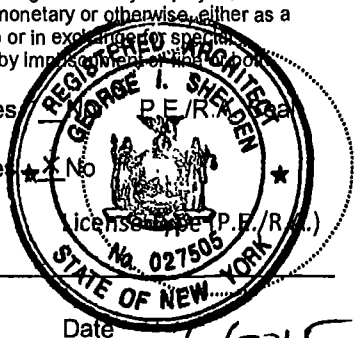
PAA only:

Is a ZD1 form required? __ Yes X No

Name (plase print) License type (P.E./R.A.)

GEORGE SHELDEN

Signature Date 07/01/2015



NYC BUILDINGS

AO1: Administrative Objections Form

DEPT BLDGS. 421090456 Job Number

SC130430035 Scan Code

Applicant Information Only *Application cannot be processed for the following reasons*

1 PW1 missing or inaccurate information (check all that apply)

- ☐ Ownership Information
- ☐ Premises Information
- ☐ Applicant Information
- ☐ Filing Representative
- ☐ Add. Considerations
- ☐ Job Description
- ☐ Work Type
- ☐ Plans Submitted
- ☐ Bldg. Characteristics
- ☐ Place of Assembly
- ☐ Signs
- ☐ Const. Equipment
- ☐ Fire Protection
- ☐ Metes and Bounds
- ☐ Fire Protection
- ☐ Seal/Signature
- ☐ Other

2 Schedule A ☐ document missing ☐ incorrect/missing information (see below) ☐ job type already signed-off

3 Schedule B ☐ document missing ☐ incorrect/missing information (see below) ☐ job type already signed-off

4 TR1 ☐ document missing ☐ incorrect/missing information (see below)

☐ Boring/Test Pits ☐ Soil Percolation Tests ☐ Boring for Drywell ☐ Other

5 Pre-Approval DEP forms - Forms missing or inaccurate/missing information (check all that apply)

☐ DEP Asbestos ASB-4 ☐ DEP Asbestos ACP-5 ☐ DEP ACP-7

6 Building Pavement Plan (BPP) ☐ document missing ☐ incorrect/missing information (see below)

7 Required Items (Pro-Cert Only) ☐ checklist missing/incomplete ☐ Stamp missing ☐ POC-1 Missing/Incomplete

8 Cashiering ☐ check missing ☐ incorrect/missing information (see below)

9 Other

NYC Buildings

PW1: Plan / Work Application

Must be typewritten.

DEPT BLDGS. 421090456 Job Number

SC130430031 Scan Code

1 Location Information *Required for all applications.*

House No(s) 101-61 Street Name 99 STREET

Borough QUEENS Block 09106 Lot 00070 BIN 4458633 C.B. No. 409

Work on Floor(s) 001 Apt. / Condo No(s)

2 Applicant Information *Required for all applications. Fax, mobile telephone and e-mail address are optional information.*

Last Name SHELDEN First Name GEORGE Middle Initial

Business Name AECOM Business Telephone (212)377-8456

Business Address 125 BROAD STREET, SUITE 1500 Business Fax

City NEW YORK State NY Zip 10004 Mobile Telephone

E-Mail GEORGE.SHELDEN@AECOM.COM License Number 027505

Choose one: ☐ P.E. ☒ R.A. ☐ Sign Hanger ☐ R.L.A. ☐ Other.

3 Filing Representative *Complete only if different from applicant specified in section 2. Fax, mobile phone, and e-mail are optional info.*

Last Name FL/SO/HY/GA/BO/GO/SI First Name J/GL/L/V/CH/D/A Middle Initial

Business Name JENNY FLORES EXPEDITING Business Telephone (718)641-6299

Business Address 84-14 PITKIN AVENUE Business Fax (718)641-4626

City OZONE PARK State NY Zip 11417 Mobile Telephone

E-Mail LHYDE@JENNYFLORES.COM Registration Number 002404

4 Filing Status *Required for all applications. Choose one and provide specified associated information.*

☒ **Initial Filing** *5, 7, 11, 12A, 25-26*
Choose only one:
- ☐ Standard Plan Examination or Review
- ☒ Professional Certification *PC1, POC1*
- ☐ Professional Certification of Objections *A1*

☐ **Prior to Approval Actions** *25-26*
- ☐ Amend Existing Filing *4A*
- ☐ Subsequent Filing *6-7, 8A (Alt-2 only), 11*

☐ **Post Approval Amendment (PAA)** *4A, 6, 24-25*
Will PAA affect filing fees? ☐ Yes ☐ No

☐ **New (Superseding) Applicant** *4A, 25-26*

☐ **Reinstatement** *24-26*

☐ **Withdrawal** *26*
- ☐ Specified in 4A and 6
- ☐ Entire Job

4A Indicate existing document number affected by filing:

5 Job/Project Types *Choose one and provide specified associated information.*

☐ **Alteration Type 1 or Alteration Type 1 required to meet New Building requirements (28-101.4.5)** *6A-E, 8B-C, 9-10, 12, 13C-F, 14, 18-20, 22 & PW1A, PD1*

☐ **Alteration Type 1, OT: "No Work"** *8C, 9-10 & 12, 13C-F, 14, 18-19, 22, PW1A, PD1*

☒ **Alteration Type 2** *5A, 6A-D, 8A-B, 9-10, 13C-E, & 14, 20, 22*

☐ **Alteration Type 3** *5A, 6B-F, 8C, 9-10, 13C-E, 20, 22*

☐ **New Building** *6A-E, 8F-G, 9A, 9C-K, 10, 12 & 13A-E, 14, 18-20, PW1A, PD1*

☐ **Sign** *5A, 6B-D, 9A, 9D, 22-23*

☐ **Full Demolition** *6B, 8D, 9A & 9C-D, 9K, 13D-E, 14, 21A, 22*

☐ **Subdivision** 9A, *9D, 12A-B*
☐ ☐ Condominium ☐ Improved *17*

5A Directive 14 acceptance requested?
☒ Yes ☐ No

6 Work Types *Select all that apply but no more than allowed by job and filing type. "OT" required on all NB and Alteration 1 initial applications.*

6A ☐ BL - Boiler *PW1C*
☐ FA - Fire Alarm
☐ FB - Fuel Burning *PW1C*
☐ FS - Fuel Storage *PW1C*
☐ FP - Fire Suppression
☐ MH - Mechanical
☐ PL - Plumbing *PW1B*
☐ SD - Standpipe *PW1B*
☐ SP - Sprinkler *PW1B*

6B ☒ EQ - Construction Equipment *15*

6C ☒ OT/GC - General Construction

6D ☐ OT - Other, *describe:*

6E ☐ CC - Curb Cut *16*
☐ OT/LAN - Landscape

6F ☐ OT/ANT - Antenna
☐ OT/BPP - Builders Pavement Plan *8D*
☐ OT/FPP - Fire Protection Plan
☐ OT/MAR - Marquee *8E, 26B*

DOB Reference Number: T00001172158-000044
User Ref ID: 10161 99 12/14

7 Plans/Construction Documents Submitted *Plans are required for most applications.*

Are plans being submitted with this PW1? [X] Yes [ ] No *If yes, do the plans include:* [ ] FO — Foundation [X] EN — Energy Analysis

8 Additional Information

8A	WT	Cost	WT	Cost	WT	Cost
	OT	242000				

8B Is a building enlargement proposed?
[X] No enlargement is proposed
[ ] Yes *12, PD1*
[ ] Horizontal [ ] Vertical
Additional Construction Floor Area: sq. ft.

8C Estimated Job Cost $ 242000
8D Street Frontage: linear ft.
8E Height: ft. Width: ft.
8F Total Construction Floor Area: sq. ft.

9 Additional Considerations, Limitations or Restrictions

9A Review is requested under which building code? [ ] 2014 [ ] 2008 [X] 1968 [ ] Prior to 1968

	Yes	No		Yes	No	
9B	[ ]	[X]	Alteration required to meet New Building requirements (28-101.4.5) *If yes, 13A-B*	[ ]	[X]	Change in number of dwelling units
	[ ]	[X]	Alteration is a major change to exits	[ ]	[X]	Change in occupancy / use
9C	[ ]	[X]	Façade Alteration	[ ]	[X]	Change is inconsistent with current certificate of occupancy
	[ ]	[X]	Adult Establishment *If yes, plot diagram (except DM)*	[ ]	[X]	Change in number of stories
	[ ]	[X]	Compensated Development (Inclusionary Housing)	[ ]	[X]	Infill Zoning
	[ ]	[X]	Low Income Housing (Inclusionary Housing)	[ ]	[X]	Loft Board
	[ ]	[X]	Single Room Occupancy (SRO) Multiple Dwelling	[ ]	[X]	Quality Housing
	[ ]	[X]	Filing includes Lot Merger / Reapportionment *If yes, 17*	[ ]	[X]	Site Safety Job/Project
9D	[ ]	[X]	Landmark	[ ]	[X]	Included in LMCCC
	[ ]	[X]	Little "E" or RD Site	[ ]	[X]	Filing to address violations *(list #s—max. 5)*:
	[ ]	[X]	Unmapped/CCO Street			
	[ ]	[X]	Requesting legalization of work where no work without a permit violations have been issued			
	[ ]	[X]	Other (please specify on line provided below):	[ ]	[X]	Filing to comply with Local Laws *(list #s—max. 2)*
	[ ]	[X]	CRFN(s) *Restrictive Declaration / Easement (max. 4):*			
	[ ]	[X]	CRFN(s) *Zoning Exhibit (I, II, III, etc. - max. 4):*			

Yes	No	Work Includes:
[ ]	[X]	Prefab wood I-joists
[ ]	[X]	Structural cold-formed steel
[ ]	[X]	Open-web steel joists

LL Number	Year

9E [ ] [X] BSA Calendar Numbers *(max. 5)*:

9F [ ] [X] CPC Calendar Numbers *(max. 5)*:

9G [ ] [X] Work includes lighting fixture and/or controls, installation or replacement. [ECC §404 and §505]

9H [ ] [X] Work includes modular construction under New York State jurisdiction
[ ] [X] Work includes modular construction under New York City jurisdiction

9I High Rise Team tracking #:

9J [ ] [X] Structural peer review required per BC 16. *If yes, provide NYS P.E. license number:*

9K [ ] [X] Work includes permanent removal of standpipe, sprinkler or fire suppression related systems

9L [ ] [X] Work includes partial demolition as defined in AC §28-101.5, or the raising/moving of a building *If yes, 21B*
[ ] [X] Structural stability affected by proposed work

10 NYCECC Compliance *New York City Energy Conservation Code*

[ ] To the best of my knowledge, belief and professional judgment, all work under this application is in compliance with the NYCECC*

Code Compliance Path *(choose one)*: [ ] NYCECC [ ] ASHRAE

Energy Analysis *(choose one)*: [ ] Tabular Analysis [ ] REScheck [ ] COMcheck [ ] Energy Modeling (EN1)

[X] To the best of my knowledge, belief and professional judgment, all work under this application is exempt from the NYCECC* in accordance with one of the following *(choose one)*:

[ ] The work is an alteration of a State or National historic building.
[X] The scope of the work is entirely in a "low-energy building" and is limited to the building envelope.
[ ] The entire scope of work involves a temporary structure and/or one or more of the following work types: FA, FP, SD, SP, FS, EQ, CC, OT/BPP, OT/FPP. Other work types are not exempt.
[ ] This is a post-approval amendment and exempt under a prior edition of the energy code. See statement of exemption on attached drawings.

11 Job Description

FILING APPLICATION FOR EXPLORATORY DEMOLITION,EXCAVATION WORK AND TEMPORARY FENCE INSTALLATION AS PER PLANS FILED. RECONSTRUCTION PHASE OF THE WORK TO BE FILED IN SEPERATE APPLICATION. NO CHANGE IN USE, EGRESS OR OCCUPANCY.

11A Related DOB Job Numbers

11B Primary application job no.

12 Zoning Characteristics

12A District(s) R5
Overlay(s)
Special Dist.(s)
Map Number 18A

12B Street legal width: ft.
Street Status: ☐ Public ☐ Private
If the zoning lot includes multiple tax lots, list all tax lots here ▶

12C *Proposed:*

Use*	Zoning Floor Area	District	FAR
	sq. ft.		
	sq. ft.		
	sq. ft.		
	sq. ft.		
	sq. ft.		
	sq. ft.		
Proposed Totals	sq. ft.		
Existing Total	sq. ft.		

Proposed Lot Details:
Lot Type: ☐ Corner ☐ Interior ☐ Through
Lot Coverage %
Lot Area sq. ft.
Lot Width ft.

Proposed Other Details:
Enclosed Parking? ☐ Yes ☐ No
If yes, no. of parking spaces:
Perimeter Wall Height ft.

Proposed Yard Details:
Check here if no yards: ☐ or
Front Yard ft.
Rear Yard ft.
Rear Yard Equivalent ft.
Side Yard 1 ft.
Side Yard 2 ft.

**Use can be one of the following: residential, commercial, manufacturing, or community facility. List only one use per line.*

13 Building Characteristics

**Main use/dominant occupancy per AC §28-101.5. **Use 2014 Code equivalents only. ‡Residential w/other use*

13A Primary structural system, *choose one:* ☐ Masonry ☐ Concrete (CIP) ☐ Concrete (Precast) ☐ Wood ☐ Steel (Structural) ☐ Steel (Cold-Formed) ☐ Steel (Encased in Concrete)

13B	Existing	2014 Code Designations?	Proposed	2014 Code Designations?
Structural Occupancy/Risk Cat.				
Seismic Design Cat.				
13C Occupancy Classification*	COM	☐ Yes ☒ No		☒ Yes**
Construction Classification	3	☐ Yes ☒ No		☐ Yes ☐ No
Multiple Dwelling Classification				

13D Building Type. ☐ 1, 2, or 3 Family ☒ Other
Mixed use building?‡ ☐ Yes ☒ No

13E	Existing	Proposed
Building Height	16 ft.	ft.
Building Stories	1	
Dwelling Units		

13F Building was originally erected pursuant to which Building Code: ☐ 2014 ☐ 2008 ☐ 1968 ☐ Prior to 1968
The earliest Code with which this building or any part of it is required to comply: ☐ 2014 ☐ 2008 ☐ 1968 ☐ Prior to 1968

14 Fill *Choose one.*

☒ Not Applicable ☐ On-Site ☐ Off-Site ☐ Under 300 cubic yards

15 Construction Equipment

☐ Chute ☐ Sidewalk Shed
☒ Fence Size: linear ft.
☐ Supported Scaffold ☐ Other:

Construction Material: CHAIN LINK
BSA/MEA Approval No.

16 Curb Cut Description

Size of cut (with splays): ft.
Distance to nearest corner: ft.
to street

17 Tax Lot Characteristics

Original tax lots being merged or reapportioned (if applicable):

Tentative tax lot numbers (new tax lots only):

18 Fire Protection Equipment

	Existing Yes	Existing No	Proposed Yes	Proposed No
Fire Alarm	☐	☐	☐	☐
Fire Suppression	☐	☐	☐	☐
Sprinkler	☐	☐	☐	☐
Standpipe	☐	☐	☐	☐

19 Open Spaces

	Existing	Proposed		Existing	Proposed
Plaza Area	sq. ft.	sq. ft.	Arcade Area	sq. ft.	sq. ft.
Parking Area	sq. ft.	sq. ft.	Parking Spaces		
Loading Berths	sq. ft.	sq. ft.	Loading Berths		

20 Site Characteristics

Yes	No		Yes	No	
☐	☒	Tidal Wetlands	☐	☒	Freshwater Wetlands
☐	☒	Coastal Erosion Hazard Area	☐	☒	Urban Renewal
☐	☒	Fire District	☐	☒	Flood Hazard Area *If yes, 20A*

20A Flood Hazard Area Information

Yes	No	
☐	☐	Substantial Improvement?
☐	☐	Substantially damaged?
☐	☐	Floodshields part of proposed work?

21 Demolition Details **Mechanical equipment other than handheld devices to be used for demolition or removal of debris (BC §3306.4).*

	Yes	No	
21A	☐	☐	Demo. filing is for a secondary structure? *If yes, specify structure being demolished:*
	☐	☐	Mechanical means* from out of building? *If yes, mechanical means will demolish:* ☐ entire structure or ☐ part of structure
	☐	☐	Mechanical means* from within building? *If yes, describe equipment proposed:*
21B	☐	☐	Demolition work affects the exterior building envelope
	☐	☐	The scope of work involves raising/moving of a building

22 Asbestos Abatement Compliance *Choose one.*

☐ The scope of work requires related asbestos abatement as defined in the regulations of the NYC Department of Environmental Protection (DEP).

☒ The scope of the work is **not** an asbestos project as defined in the regulations of the NYC DEP. *DEP Control # is required.*

DEP ACP-5 Control No. 4157556

☐ The scope of work is exempt from the asbestos requirement as defined in the regulations promulgated by the NYC DEP (15 RCNY 1-23(b)) or is an alteration to a building constructed pursuant to plans submitted for approval on or after April 1, 1987, in accordance with *§ 28-106 1.*

23 Sign

Purpose: ☐ Advertising ☐ Non-Advertising

Type: ☐ Illuminated *23A* ☐ Non-Illuminated

Location: ☐ Ground ☐ Roof *23B* ☐ Wall

Estimated Cost: $

Total Square Feet:

Height above Curb: ft. in.

Height above Roof: ft. in.

Yes	No		
☐	☐	Is sign inside building line? *If no, sign projects by:* ft. in.	
☐	☐	Designed for changeable copy? *If no, 23C*	
☐	☐	Does an OAC have an interest in this sign or location? *If yes, 23G*	
☐	☐	Within 900' and within view of an arterial highway? *If yes, 23D*	
☐	☐	Within 200' and within view of a park 1/2 acre or more? *If yes, 23E*	

→ *If answer is "yes" to either of the above two questions and this is an advertising sign, OAC sign number is required in section 23F*

23A Illuminated type: ☐ Direct ☐ Flashing ☐ Indirect

Yes	No	
☐	☐	If sign projects beyond building line, is owner billed for annual permit? *If no, specify in 26B*

23B ☐ ☐ Is roof sign tight, closed or solid?

23C Sign wording. *If extensive, provide only key wording.*

23D Distance from Arterial Highway: ft.

23E Distance from Park 1/2 acre or more: ft.

23F OAC Sign Number:

23G OAC Registration Number:

24 Comments *Place additional comments on an AI-1 form. See Guide for proper incorporation of professional certification statements.*

25 Applicant's Statements and Signatures *Required for all applications.*

Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by imprisonment or fine or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department. I prepared or supervised the preparation of the construction documents and specifications herewith submitted and to the best of my knowledge and belief, the construction documents and work shown thereon comply with the provisions of the NYC Administrative Code and other applicable laws and rules, ☐ *(←check here if)* except as set forth in the accompanying documents. I acknowledge that I have read and complied with all instructions pertaining to this application and supplementary schedules submitted. **Cluster Development Statement** (if applicable) I hereby affirm that specifications covering this job are identical to those previously filed under the group lead job number, except as specified herein.

For **Initial New Building and Alteration 1 applications filed under the 2008 or 2014 NYC Building Code only:** does this building qualify for high-rise designation? ☐ Yes ☐ No

Directive 14 Initial applications only: I certify that the construction documents submitted and all construction documents related to this application do not require a new or amended Certificate of Occupancy as there is no change in use, exits, or occupancy. ☒ Yes ☐ No

Name (print): GEORGE SHELDEN

Sign and Date: 02/11/2015

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

GEORGE J. SHELDEN — REGISTERED ARCHITECT — No. 027502 — STATE OF NEW YORK

26 Property Owner's Statements and Signatures

Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by imprisonment or fine or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department. Furthermore, I understand that I am responsible for insuring that a final inspection be performed when the permitted work is complete, and that a satisfactory report of final inspection be submitted, along with all required submittal documents, so that the NYC Department of Buildings may issue a letter of completion or certificate of occupancy within the time prescribed by law.

I have authorized the applicant to file this application for the work specified herein and all future amendments. I will not knowingly authorize any work that is not in compliance with all applicable laws, rules, and regulations.

Yes No

☐ ☐ **Fee Exemption Request (Non-Profit Owned and Operated)** In accordance with Administrative Code §28-112.1, Exception 1, I certify that the deed holder is a corporation or association organized and operated exclusively for the purposes indicated in such section, and that the property is used exclusively by such entity for such purposed. ★

☒ ☐ **Fee Exemption Request (NYCHA/HHC, NYC Agency, or Other Government Owned and Operated)** The building or any part thereof to be constructed, renovated, altered or demolished is owned and operated exclusively for the purposes of the NYC Agency, NYC Authority, NYS Agency, Federal Government or any other government entity ★

☐ ☒ **Owner's Certifications Regarding Occupied Housing** The site of the building to be altered or demolished, or the site of the new building to be constructed, contains one or more occupied dwelling units that will remain occupied during construction. These occupied dwelling units have been clearly identified on the submitted construction documents.

☐ ☒ The site of the building to be altered or demolished, or the site of the new building to be constructed, contains occupied housing accommodations subject to rent control or rent stabilization under Chapters 3 and 4 of Title 26 of the New York City Administrative Code. ***If yes, select one of the following:***

☐ The owner is not required to notify the New York State Homes and Community Renewal (NYSHCR) of the owner's intention to file because the nature and scope of the work proposed, pursuant to NYSHCR regulations, does not require notification.

☐ The owner has notified the New York State Homes and Community Renewal (NYSHCR) of its intention to file such construction documents/apply for such permit and has complied with all requirements imposed by the regulations of such agency as preconditions for such [filing/application].

Provide date NYSHCR notified: _____

☒ ☐ **Owner's Certification for Directive 14 Applications (if applicable)** I have read and am fully aware of the applicant's statement that the construction documents submitted and all construction documents related to this application will not require a new or amended Certificate of Occupancy as there is no change in use, exits, or occupancy and the work is not inconsistent with the current certificate of occupancy. Furthermore, I understand that I am responsible for retaining a qualified design professional to perform a final inspection when the permitted work is complete and this professional must submit a satisfactory final inspection report to the NYC Department of Buildings within the time following inspection prescribed by Department rule.

Notes for Section 26A: *Section required if unit owner signed Section 26 Signature required for authorized representative of Condo or Co-Op board*

★ *For fee waivers, please see the PW1 User Guide*

Owner Type: ☐ Individual ☐ Partnership ☐ NYCHA / HHC ☐ Corporation ☒ Other Government ☐ NYC Agency ☐ Condo Unit Owner or Co-Op Tenant-shareholder *26A*

Is the deed holder a non-profit organization? ☐ Yes ☐ No

Name (please print): JOSEPH WAGNER

Relationship to Owner: CHIEF ENGINEER

Business Name/Agency: DCAS

Street Address: 1 CENTRE STREET

City: NEW YORK State. NY Zip: 10007

Telephone Number: (212) 386-0481 Fax:

E-Mail Address: JWAGNER@DCAS.NYC.GOV

Signature and Date ▶ Joseph Wagner 2/27/15

26A Condo/Co-Op Board *See note in bottom left corner of page*

Name (please print):

Title:

Street Address:

City: State: Zip.

Telephone Number Fax:

E-Mail Address.

Signature and Date ▶

26B Lessee Responsible for Annual Sign or Marquee Permit

Name (please print):

Relationship to Owner:

Business Name/Agency:

Street Address:

City State: Zip.

Telephone Number. Fax:

E-Mail Address:

NYC Buildings

TR8: Technical Report Statement of Responsibility for Energy Code Progress Inspections

This form must be typewritten

DEPT BLDGS. 421090456 Job Number

SC130430003 Scan Code

1 Location Information *Required for all applications*

House No(s) 101-61 Street Name 99 STREET

Work on Floor(s) 001

2 Applicant Information *Required for all applications.*

Choose all that apply: ☒ Design Applicant *3A, 4* ☒ Progress Inspections Applicant *3B-D, 5-6*

Last Name SHELDEN First Name GEORGE Middle Initial

Business Name AECOM Business Telephone 212.377.8456

Business Address 125 BROAD STREET Business Fax

City NEW YORK State NY Zip 10004 Mobile Telephone

License Type *choose one:* ☐ P.E. ☒ R.A. License Number 027505

3 Energy Code Progress Inspection *Required for applications where Energy Code Compliance Progress Inspection is marked Yes on TR1*

3A ← Identification of Requirement		3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y N Progress Inspections	Table Reference in 1RCNY §5000-01(h) (1)and (2)	Initial & Date	Initial & Date	Initial & Date
☐ ☒ Protection of exposed foundation insulation	(IA1), (IIA1)			
☐ ☒ Insulation placement and R values	(IA2), (IIA2)			
☐ ☒ Fenestration u-factor and product rating	(IA3), (IIA3)			
☐ ☒ Fenestration air leakage	(IA4), (IIA4)			
☐ ☒ Fenestration areas	(IA5), (IIA5)			
☐ ☒ Air sealing and insulation — visual	(IA6), (IIA6)			
☐ ☒ Air sealing and insulation — testing	(IA7)			
☐ ☒ Projection factors	(IIA7)			
☐ ☒ Loading deck weather seals	(IIA8)			
☐ ☒ Vestibules	(IIA9)			
☐ ☒ Fireplaces	(IB1), (IIB1)			
☐ ☒ Shutoff dampers	(IB2), (IIB2)			
☐ ☒ HVAC and service water heating equipment	(IB3), (IIB3)			
☐ ☒ HVAC and service water heating system controls	(IB4), (IIB4)			
☐ ☒ HVAC insulation and sealing	(IB5), (IIB5)			
☐ ☒ Duct leakage testing	(IB6), (IIB6)			
☐ ☒ Electrical energy consumption	(IC1), (IIC1)			
☐ ☒ Lighting in dwelling units	(IIC2)			
☐ ☒ Interior lighting power	(IC2), (IIC3)			
☐ ☒ Exterior lighting power	(IIC4)			
☐ ☒ Lighting controls	(IIC5)			
☐ ☒ Exit signs	(IIC6)			
☐ ☒ Electrical motors	(IIC7)			
☐ ☒ Maintenance information	(ID1), (IID1)			
☐ ☒ Permanent certificate	(ID2)			

* For column 3C, indicate date when the actual final inspection was performed

4 Design Applicant's Statements and Signatures *P.E./R.A. responsible for plans must sign and seal.*

I have identified herein all of the progress inspections, and commissioning required for compliance and determined whether commissioning is required.

Commissioning is required for applications where C408 or ASHRAE 90.1 Section 6.7.2.4 requires commissioning. Check one:

☐ This project requires commissioning and a preliminary commissioning report certification will be provide prior to sign-off.

☒ This project does not require commissioning.

Name (please print) GEORGE SHELDEN

Signature Date 02/11/2015

REGISTERED ARCHITECT GEORGE I. SHELDEN No. 027605 STATE OF NEW YORK

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

5 Inspection Applicant's Identification of Responsibilities

Check all that apply below:

☐ For the **progress inspections** indicated above in section 3 and identified by me for responsibility, I certify that I am the principal/director of the progress inspection agency accepting responsibility for conducting the inspections as identified in section 3B. I further certify that I have read the applicable sections of the New York City Construction Codes and 1 RCNY 5000-01 in connection with progress inspections as well as 1 RCNY 101-07, which specifies the qualifications required for each progress inspector, and that this agency meets those qualifications for each and every progress inspection for which I/we take responsibility. I agree that both I and the agency will comply with all provisions of the New York City Construction Codes and the Rules. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ **Change of Applicant:** I am a newly designated individual responsible for the items specified herein and I hereby state that:

- ☐ None of the inspections/tests indicated herein have been performed to date by the previously designated individual.
- ☐ Some of the inspections/tests indicated herein have been performed by the previously designated individual, as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print)

Signature Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

6 Inspection Applicant's Certification of Completion

☐ I have completed the items specified herein and certify the following (check one only):

- ☐ All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Energy Conservation Code and other designated rules and regulations.
- ☐ All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Energy Conservation Code and other designated rules and regulations, except as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ **Withdrawal of Applicant:** I am withdrawing responsibility for the items of progress inspections and/or tests indicated herein and herewith submit the results or status of the work performed to date.

Name (please print)

Signature Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

NYC Buildings

TR1: Technical Report Statement of Responsibility

This form must be typewritten

DEPT BLDGS. 421090456 Job Number

SC130430002 Scan Code

1 Location Information *Required for all applications.*

House No(s) 101-61 Street Name 99 STREET

Work on Floor(s) 001

2 Applicant Information *Required for all applications.*

Choose all that apply. ☒ Design Applicant *3A, 4A, 5* ☐ Special Inspections Applicant *3B-D, 6-9* ☒ Progress Inspections Applicant *4B-D, 6-9*

Last Name SHELDEN First Name GEORGE Middle Initial

Business Name AECOM Business Telephone 212.377.8456

Business Address 125 BROAD STREET, SUITE 1500 Business Fax

City NEW YORK State NY Zip 10004 Mobile Telephone

License Type *choose one:* ☐ P.E. ☒ R.A. ☐ Other. License Number 027505

Special Inspection Agency Number

3 Special Inspection Categories *Required for all applications, continued on page 2;* ■ *indicates report required.*

3A ← Identification of Requirement			3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y N Special Inspections		Code/Section	Initial & Date	Initial & Date	Initial & Date
☐ ☒ Structural Steel – Welding		BC 1704.3.1			
☐ ☒ Structural Steel – Details		BC 1704 3.2			
☐ ☒ Structural Steel – High Strength Bolting		BC 1704 3.3			
☐ ☒ Structural Cold-Formed Steel		BC 1704.3.4			
☐ ☒ Concrete – Cast-In-Place		BC 1704.4			
☐ ☒ Concrete – Precast		BC 1704.4			
☐ ☒ Concrete – Prestressed		BC 1704.4			
☐ ☒ Masonry		BC 1704.5			
☐ ☒ Wood – Installation of High-Load Diaphragms		BC 1704.6.1			
☐ ☒ Wood – Installation of Metal-Plate-Connected Trusses		BC 1704.6 2			
☐ ☒ Wood – Installation of Prefabricated I-Joists		BC 1704 6.3			
☐ ☒ Subgrade Inspection		BC 1704.7.1			
☐ ☒ Subsurface Conditions – Fill Placement & In-Place Density		BC 1704.7.2 BC 1704 7.3			
☐ ☒ Subsurface Investigations (Borings/Test Pits)	■ TR4	BC 1704.7.4			
☐ ☒ Deep Foundation Elements	■ TR5	BC 1704.8			
☐ ☒ Helical Piles (BB # 2014-020)	■ TR5H	BC 1704.8.5			
☐ ☒ Vertical Masonry Foundation Elements		BC 1704.9			
☐ ☒ Wall Panels, Curtain Walls, and Veneers	■	BC 1704.10			
☐ ☒ Sprayed fire-resistant materials		BC 1704.11			
☐ ☒ Mastic and Intumescent Fire-resistant Coatings		BC 1704 12			
☐ ☒ Exterior Insulation and Finish Systems (EIFS)		BC 1704.13			
☐ ☒ Alternative Materials - OTCR Buildings Bulletin # _____		BC 1704.14			
☐ ☒ Smoke Control Systems		BC 1704.15			
☐ ☒ Mechanical Systems		BC 1704.16			
☐ ☒ Fuel-Oil Storage and Fuel-Oil Piping Systems		BC 1704 17			
☐ ☒ High-Pressure Steam Piping (Welding)		BC 1704.18			
☐ ☒ High Temperature Hot Water Piping (Welding)		BC 1704.18			
☐ ☒ High-Pressure Fuel-Gas Piping (Welding)		BC 1704.19			
☐ ☒ Structural Stability – Existing Buildings		BC 1704.20.1			
☐ ☒ Excavations—Sheeting, Shoring, and Bracing		BC 1704.20 2			
☐ ☒ Underpinning		BC 1704.20.3 BC 1814			
☐ ☒ Mechanical Demolition		BC 1704.20.4			

NYC Buildings

TR1: Technical Report
Statement of Responsibility

This form must be typewritten

SC130430001

3 Special Inspection Categories (continued) *Required for all applications, continued on page 2;* ■ *indicates report required.*

3A ← Identification of Requirement				3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y	N	Special Inspections	Code/Section	Initial & Date	Initial & Date	Initial & Date
☐	☒	Raising and Moving of a Building	BC 1704.20.5			
☐	☒	Soil Percolation Test - Private On-Site Storm Water Drainage Disposal Systems, and Detention Facilities ■	BC 1704.21 1.2			
☐	☒	Private On-Site Storm Water Drainage Disposal Systems, and Detention Facilities Installation	BC 1704.21.2			
☐	☒	Individual On-Site Private Sewage Disposal Systems Installation	BC 1704.22			
☐	☒	Soil Percolation Test - Individual On-Site Private Sewage Disposal Systems ■	BC 1704 22			
☐	☒	Sprinkler Systems	BC 1704 23			
☐	☒	Standpipe Systems	BC 1704.24			
☐	☒	Heating Systems	BC 1704.25			
☐	☒	Chimneys	BC 1704.26			
☐	☒	Fire-resistant Penetrations and Joints	BC 1704 27			
☐	☒	Aluminum Welding	BC 1704.28			
☐	☒	Flood Zone Compliance (attach FEMA elevation/dry floodproofing certificate where applicable)	BC 1704.29 BC G105			
☐	☒	Luminous Egress Path Markings ■ TR7	BC 1704.30 BC 1024.8			
☐	☒	Emergency and Standby Power Systems (Generators)	BC 1704.31			
☐	☒	Post-installed Anchors (BB# 2014-018, 2014-019)	BC 1704.32			
☐	☒	Seismic Isolation Systems	BC 1707.8			
☐	☒	Concrete Design Mix ■ TR3	BC 1905.3 BC 1913 5	Submit TR3 to complete this item		
☐	☒	Concrete Sampling and Testing ■ TR2	BC 1905.6 BC 1913.10	Submit TR2 to complete this item		

4 Progress Inspection Categories *Required for all applications.* ■ *indicates report required.*

4A ← Identification of Requirement				4B Identification of Responsibilities	4C Certificate of Complete Inspections / Tests	4D Withdraw Responsibilities
Y	N	Progress Inspections	Code/Section	Initial & Date	Initial & Date	Initial & Date
☐	☒	Preliminary	28-116.2 1, BC 110.2			
☐	☒	Footing and Foundation	BC 110 3.1			
☐	☒	Lowest Floor Elevation	BC 110.3.2			
☐	☒	Structural Wood Frame	BC 110.3.3			
☐	☒	Energy Code Compliance Inspections ■ TR8	BC 110.3 5	Submit TR8 to complete this item		
☐	☒	Fire-Resistance Rated Construction	BC 110.3.4			
☐	☒	Public Assembly Emergency Lighting	28-116.2.2			
☒	☐	Final*	28-116.2.4 2, BC 110.5, Directive 14 of 1975, and 1 RCNY §101-10	GP 2/11/15		

** For column 4C, indicate date when the actual final inspection was performed*

5 Design Applicant's Statements and Signatures *P.E./R.A. responsible for plans, choose both below and sign/seal.*

☒ I have identified all of the special inspections, progress inspections and tests required for compliance.

☒ I certify that the Special Inspection and Approved Agencies engaged by the owner to supervise the work specified above are acceptable. (BC 1704.1)

Name (please print) GEORGE SHELDEN

Signature: Date 2/11/2015

REGISTERED ARCHITECT GEORGE SHELDEN No. 027505 STATE OF NEW YORK

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

6 Owner's Statement and Signature for Progress/Special Inspector *Required when inspection applicant identifies responsibilities.*

I have reviewed the information provided herein and, to the best of my knowledge and belief, attest to its accuracy. I approve the identification of the responsible inspector. Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by a fine or imprisonment, or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department.

Name (print) JOSEPH WAGNER Title CHIEF ENGINEER

Signature Date 2/27/15

7 Inspection Applicant's Identification of Responsibilities

Check all that apply below:

☐ For the **special inspections** indicated above in section 3, I certify that I am the principal/director of the special inspection agency accepting responsibility for conducting the inspections. I further certify that I have read the applicable sections of the New York City Construction Codes in connection with special inspections as well as 1 RCNY 101-06 Rule, which specifies the qualifications required for each inspection and that this agency meets those qualifications for each and every special inspection for which I/we take responsibility. I agree that both I and the agency will comply with all provisions of the New York City Construction Codes and the Rule. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ For the **progress inspections** indicated above in section 4, except energy code inspections on the TR1EN form, and/or **concrete test items** indicated in section 3, I assume the responsibility and I personally, or where permitted by the New York City Construction Codes, qualified personnel under my direct supervision, will perform the required inspections and tests on such forms and in such matter as the Department requires or requests. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Final Inspection:

☒ I will make final inspection of the construction work, including those inspections during its progress necessary to my certification upon final inspection that all work substantially conforms to approved construction documents and applicable laws and rules. I will confirm that the performance of progress inspections and other inspections has been documented before I report the work complete. As prescribed by 1 RCNY 101-10, I will perform the final inspection within 1 year from the expiration of the last valid permit of the work.

Upon completion of the work and within 30 days of my final inspection, I will file a certification attesting to the fact that all work was performed and completed in accordance with the approved construction documents, laws and rules, except as reported otherwise.

☐ **I understand that my failure to file a certification of completion or to notify the Department of my withdrawal of responsibilities within one year from expiration of the last valid permit may result in the loss of my privileges to file under Directives 2 and 14 of 1975 or issuance of a violation. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.**

☐ **Change of Applicant:** I am a newly designated individual responsible for the items specified herein and I hereby state that:

☐ None of the inspections/tests indicated herein have been performed to date by the previously designated individual.

☐ Some of the inspections/tests indicated herein have been performed by the previously designated individual as noted in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print) GEORGE SHELDEN

Signature 02/11/2015 Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

8 Inspection Applicant's Certification of Partial Completion

☐ I have completed the items specified herein and certify that the all work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations, except as indicated in the attached report.

☐ **Withdrawal of Applicant:** I am withdrawing responsibility for the items of special/progress inspections and/or tests indicated herein and herewith submit the results or status of the work performed to date.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print)

Signature Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

9 Inspection Applicant's Certification of Full Completion

All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print)

Signature Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

SPECIAL INSPECTION

NYC Buildings

TR1: Technical Report Statement of Responsibility

This form must be typewritten

DEPT. BLDGS. 421090456 Job Number

SC130430017 Scan Code

1 Location Information *Required for all applications.*

House No(s) 101-61 Street Name 99 STREET

Work on Floor(s) 001

2 Applicant Information *Required for all applications.*

Choose all that apply: ☒ Design Applicant *3A, 4A, 5* ☒ Special Inspections Applicant *3B-D, 6-9* ☐ Progress Inspections Applicant *4B-D, 6-9*

Last Name ARRIGO First Name AUGUST Middle Initial

Business Name AECOM USA, INC. Business Telephone 212.377.8713

Business Address 125 BROAD STREET Business Fax

City NEW YORK State NY Zip 10004 Mobile Telephone

License Type *choose one:* ☒ P.E. ☐ R.A. ☐ Other: License Number 070843

Special Inspection Agency Number 004580

3 Special Inspection Categories *Required for all applications, continued on page 2,* ■ *indicates report required*

3A ← Identification of Requirement				3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y	N	Special Inspections	Code/Section	Initial & Date	Initial & Date	Initial & Date
☐	☒	Structural Steel – Welding	BC 1704.3.1			
☐	☒	Structural Steel – Details	BC 1704.3.2			
☐	☒	Structural Steel – High Strength Bolting	BC 1704.3.3			
☐	☒	Structural Cold-Formed Steel	BC 1704.3.4			
☐	☒	Concrete – Cast-In-Place	BC 1704.4			
☐	☒	Concrete – Precast	BC 1704.4			
☐	☒	Concrete – Prestressed	BC 1704.4			
☐	☒	Masonry	BC 1704.5			
☐	☒	Wood – Installation of High-Load Diaphragms	BC 1704.6.1			
☐	☒	Wood – Installation of Metal-Plate-Connected Trusses	BC 1704.6.2			
☐	☒	Wood – Installation of Prefabricated I-Joists	BC 1704.6.3			
☐	☒	Subgrade Inspection	BC 1704.7.1			
☐	☒	Subsurface Conditions – Fill Placement & In-Place Density	BC 1704.7.2 BC 1704.7.3			
☐	☒	Subsurface Investigations (Borings/Test Pits) ■ TR4	BC 1704.7.4			
☐	☒	Deep Foundation Elements ■ TR5	BC 1704.8			
☐	☒	Helical Piles (BB # 2014-020) ■ TR5H	BC 1704.8.5			
☐	☒	Vertical Masonry Foundation Elements	BC 1704.9			
☐	☒	Wall Panels, Curtain Walls, and Veneers ■	BC 1704.10			
☐	☒	Sprayed fire-resistant materials	BC 1704.11			
☐	☒	Mastic and Intumescent Fire-resistant Coatings	BC 1704.12			
☐	☒	Exterior Insulation and Finish Systems (EIFS)	BC 1704.13			
☐	☒	Alternative Materials - OTCR Buildings Bulletin # _____	BC 1704.14			
☐	☒	Smoke Control Systems	BC 1704.15			
☐	☒	Mechanical Systems	BC 1704.16			
☐	☒	Fuel-Oil Storage and Fuel-Oil Piping Systems	BC 1704.17			
☐	☒	High-Pressure Steam Piping (Welding)	BC 1704.18			
☐	☒	High Temperature Hot Water Piping (Welding)	BC 1704.18			
☐	☒	High-Pressure Fuel-Gas Piping (Welding)	BC 1704.19			
☐	☒	Structural Stability – Existing Buildings	BC 1704.20.1			
☐	☒	Excavations—Sheeting, Shoring, and Bracing	BC 1704.20.2			
☐	☒	Underpinning	BC 1704.20.3 BC 1814			
☐	☒	Mechanical Demolition	BC 1704.20.4			

NYC Buildings

TR1: Technical Report
Statement of Responsibility

This form must be typewritten

DEPT BLDGS. 421090456 Job Number

SC130430016 Scan Code

3 Special Inspection Categories (continued) *Required for all applications, continued on page 2; ■ indicates report required*

3A ← Identification of Requirement				3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y	N	Special Inspections	Code/Section	Initial & Date	Initial & Date	Initial & Date
☐	☒	Raising and Moving of a Building	BC 1704.20.5			
☐	☒	Soil Percolation Test - Private On-Site Storm Water Drainage Disposal Systems, and Detention Facilities ■	BC 1704.21.1.2			
☐	☒	Private On-Site Storm Water Drainage Disposal Systems, and Detention Facilities Installation	BC 1704.21.2			
☐	☒	Individual On-Site Private Sewage Disposal Systems Installation	BC 1704.22			
☐	☒	Soil Percolation Test - Individual On-Site Private Sewage Disposal Systems ■	BC 1704.22			
☐	☒	Sprinkler Systems	BC 1704.23			
☐	☒	Standpipe Systems	BC 1704.24			
☐	☒	Heating Systems	BC 1704.25			
☐	☒	Chimneys	BC 1704.26			
☒	☐	Fire-resistant Penetrations and Joints	BC 1704.27	AM 1/14/15		
☐	☒	Aluminum Welding	BC 1704.28			
☐	☒	Flood Zone Compliance (attach FEMA elevation/dry floodproofing certificate where applicable)	BC 1704.29 BC G105			
☐	☒	Luminous Egress Path Markings ■ TR7	BC 1704.30 BC 1024.8			
☐	☒	Emergency and Standby Power Systems (Generators)	BC 1704.31			
☐	☒	Post-Installed Anchors (BB# 2014-018, 2014-019)	BC 1704.32			
☐	☒	Seismic Isolation Systems	BC 1707.8			
☐	☒	Concrete Design Mix ■ TR3	BC 1905.3 BC 1913.5	Submit TR3 to complete this item		
☐	☒	Concrete Sampling and Testing ■ TR2	BC 1905.6 BC 1913.10	Submit TR2 to complete this item		

4 Progress Inspection Categories *Required for all applications. ■ indicates report required.*

4A ← Identification of Requirement				4B Identification of Responsibilities	4C Certificate of Complete Inspections / Tests	4D Withdraw Responsibilities
Y	N	Progress Inspections	Code/Section	Initial & Date	Initial & Date	Initial & Date
☐	☒	Preliminary	28-116.2.1, BC 110.2			
☐	☒	Footing and Foundation	BC 110.3.1			
☐	☒	Lowest Floor Elevation	BC 110.3.2			
☐	☒	Structural Wood Frame	BC 110.3.3			
☐	☒	Energy Code Compliance Inspections ■ TR8	BC 110.3.5	Submit TR8 to complete this item		
☐	☒	Fire-Resistance Rated Construction	BC 110.3.4			
☐	☒	Public Assembly Emergency Lighting	28-116.2.2			
☐	☒	Final*	28-116.2.4.2, BC 110.5, Directive 14 of 1975, and 1 RCNY §101-10			

** For column 4C, indicate date when the actual final inspection was performed*

5 Design Applicant's Statements and Signatures *P.E./R.A. responsible for plans, choose both below and sign/seal.*

☒ I have identified all of the special inspections, progress inspections and tests required for compliance.

☒ I certify that the Special Inspection and Approved Agencies engaged by the owner to supervise the work specified above are acceptable. (BC 1704.1)

Name (please print) GEORGE SHELDEN

Signature

Date 02/11/2015

REGISTERED ARCHITECT GEORGE I. SHELDEN No. 027505 STATE OF NEW YORK

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

6 Owner's Statement and Signature for Progress/Special Inspector *Required when inspection applicant identifies responsibilities.*

I have reviewed the information provided herein and, to the best of my knowledge and belief, attest to its accuracy. I approve the identification of the responsible inspector. Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by a fine or imprisonment, or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department.

Name (print) JOSEPH WAGNER Title CHIEF ENGINEER

Signature Joseph Wagner Date 2/27/15

7 Inspection Applicant's Identification of Responsibilities

Check all that apply below:

☒ For the **special inspections** indicated above in section 3, I certify that I am the principal/director of the special inspection agency accepting responsibility for conducting the inspections. I further certify that I have read the applicable sections of the New York City Construction Codes in connection with special inspections as well as 1 RCNY 101-06 Rule, which specifies the qualifications required for each inspection and that this agency meets those qualifications for each and every special inspection for which I/we take responsibility. I agree that both I and the agency will comply with all provisions of the New York City Construction Codes and the Rule. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ For the **progress inspections** indicated above in section 4, except energy code inspections on the TR1EN form, and/or **concrete test items** indicated in section 3, I assume the responsibility and I personally, or where permitted by the New York City Construction Codes, qualified personnel under my direct supervision, will perform the required inspections and tests on such forms and in such matter as the Department requires or requests. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Final Inspection:

☐ I will make final inspection of the construction work, including those inspections during its progress necessary to my certification upon final inspection that all work substantially conforms to approved construction documents and applicable laws and rules. I will confirm that the performance of progress inspections and other inspections has been documented before I report the work complete. As prescribed by 1 RCNY 101-10, I will perform the final inspection within 1 year from the expiration of the last valid permit of the work.

Upon completion of the work and within 30 days of my final inspection, I will file a certification attesting to the fact that all work was performed and completed in accordance with the approved construction documents, laws and rules, except as reported otherwise.

☐ **I understand that my failure to file a certification of completion or to notify the Department of my withdrawal of responsibilities within one year from expiration of the last valid permit may result in the loss of my privileges to file under Directives 2 and 14 of 1975 or issuance of a violation, and that I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.**

☐ **Change of Applicant:** I am a newly designated individual responsible for the items specified herein and I hereby state that:

☐ None of the inspections/tests indicated herein have been performed to date by the previously designated individual.

☐ Some of the inspections/tests indicated herein have been performed by the previously designated individual as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print) AUGUST ARRIGO

Signature 1/19/15 Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

8 Inspection Applicant's Certification of Partial Completion

☐ I have completed the items specified herein and certify that the all work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations, except as indicated in the attached report.

☐ **Withdrawal of Applicant:** I am withdrawing responsibility for the items of special/progress inspections and/or tests indicated herein and herewith submit the results or status of the work performed to date.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print)

Signature Date

P.E / R.A. Seal *(apply seal, then sign and date over seal)*

9 Inspection Applicant's Certification of Full Completion

All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print)

Signature Date

P.E / R.A. Seal *(apply seal, then sign and date over seal)*

NYC Environmental Protection

NYC DEPARTMENT OF ENVIRONMENTAL
Asbestos Control Program
59-17 Junction Boulevard, 8th Floor. Flushing
ASBESTOS ASSESSMENT REP(

DEPT BLDGS. 421090456 Job Number
SC130430018 Scan Code
FEE PAID

Control Number: 4157556

1 NYC DOB Job # (if applicable) _____

2 Premise No 10161 Street Name 99th street Borough Queens Zip 11416

3 AKA _____ Type of Facility Commercial BIN 4458633 Block 09106 Lot 0070

4 Building Owner DCAS Address 1 Centre Street, 20th fl. South

5 City New York State NY Zip 10007 Contact Person Joseph Wagner

6 Tel # (212) 386-0481 Fax # _____ Email jwagner@DCAS.NYC.GOV

7 Description of the Entire Scope of Work
architectural re-construction related to soil excavation, soil vapor extraction and sub-slab depressurization remedial design. Work to follow drawings A-001.00 dated 6/7/14; A-002.00, A-003.00 and A-004.00 dated 7/1/13; A-005.00 dated 6/7/14 prepared by AECOM as per plans submitted. No change to use, egress or occupancy.

8. I, ALAN YOUNG , have conducted an asbestos investigation on
Name of Certified Asbestos Investigator

05/23/2012, 11/24/2014 in accordance
Date(s)

with Sections 1-16 and 1-28 of the NYC DEP Asbestos Control Program Rules and declare that at said facility address, the

X a portion(s) of the premises affected by the work is free of asbestos containing material (ACM)

b premise (or portions thereof) affected by the work contains 10 square feet or less or 25 linear feet or less of ACM
Specify locations in section 9 Note This material must be abated as a minor project in accordance with relevant provisions of the DEP Asbestos Rules

c asbestos is present and will not be disturbed during construction activity Specify the quantity and area where asbestos is present Specify amount _____ sq ft _____ linear ft
Specify locations (attach additional documents as necessary):

d entire building is free of asbestos containing material (ACM)

9 RESULTS OF ASBESTOS BUILDING SURVEY

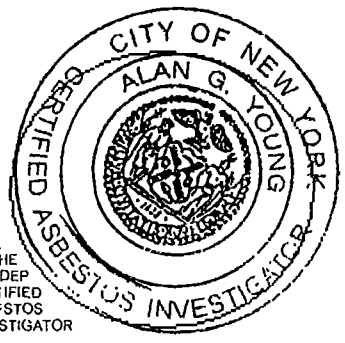
FLOOR	DESCRIBE SECTION OF FLOOR	ALL MATERIALS ASSUMED TO CONTAIN ACM AND/OR SAMPLED	NUMBER OF SAMPLES ANALYZED	ASBESTOS PRESENT	ASSUMED ACM
1	Bay #9, #11, #13, #14	gypsum wallboard, wall joint compound	8	No	
1	Outside Bay #6 and #9	Concrete Floor	2	No	

I hereby declare the information provided herein is true and complete

ALAN YOUNG	11/24/2014	112999	2/12/2015
DEP Certified Asbestos Investigator's Signature	*Date*	*Certificate Number*	*Expiration Date*

Tel # (914) 262-4180 Fax # _____ Email ayoung@hillmanngroup.com

The investigator shall assume that some or all of the areas investigated contain ACM, and for each area that is not assumed to contain ACM, collect and submit for analysis bulk samples in accordance with §§ 1-36, 1-37, and 1-44 of the DEP Asbestos Rules and EPA publications 560/5-85-024 and 560/5-85-030a and 40 CFR 763 86



SEAL OF THE NYC DEP CERTIFIED ASBESTOS INVESTIGATOR

NYC Environmental Protection

NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION
Asbestos Control Program
59-17 Junction Boulevard, 8th Floor, Flushing, NY 11373
ASBESTOS ASSESSMENT REPORT

RECEIVED
11/24/2014
DEP
ASBESTOS CONTROL
PROGRAM
FEE PAID

10 ANALYTICAL LABORATORY

NAME	ELAP # (NYS DOH CERTIFICATION)	DATE(S) SAMPLES ANALYZED
Hillmann Consulting, LLC	10926	3/12/2013

11 NYS DOL Asbestos Handling license # 62252 Company Name Hillmann Consulting, LLC

I hereby declare the information provided herein is true and complete

ALAN YOUNG	11/24/2014	112999	2/12/2015
DEP Certified Asbestos Investigator's Signature	*Date*	*Certificate Number*	*Expiration Date*

Tel # (914) 262-4180 Fax # _____ Email ayoung@hillmanngroup.com

The investigator shall assume that some or all of the areas investigated contain ACM, and for each area that is not assumed to contain ACM, collect and submit for analysis bulk samples in accordance with §§ 1-36, 1-37, and 1-44 of the DEP Asbestos Rules and EPA publications 560/5-85-024 and 560/5-85-030a and 40 CFR 763 86

SEAL OF THE NYC DEP CERTIFIED ASBESTOS INVESTIGATOR



NYC™ Buildings

Work Permit Department of Buildings

Permit Number: *421090456-01-EW-OT*

Issued: *04/28/2015* Expires: *03/16/2016*

Address: *QUEENS 101-61 99 STREET*

Issued to: MATTHEW BARD

Business: OP-TECH ENVIRONMENTAL SER

Contractor No: GC-604083

Description of Work:

ALTERATION TYPE 2 - GEN. CONSTR. FILING APPLICATION FOR EXPLORATORY DEMOLITION,EXCAVATION WORK AND TEMPORARY FENCE INSTALLATION AS PER PLANS FILED. RECONSTRUCTION PHASE OF THE WORK TO BE FILED IN SEPERATE APPLICATION. NO CHANGE IN USE, EGRESS OR OCCUPANCY.

Review is requested under Building Code: 1968

SITE FILL: NOT APPLICABLE

To see a Zoning Diagram (ZD1) or to challenge a zoning approval filed as part of a New Building application or Alteration application filed after 7/13/2009, please use "My Community" on the Buildings Department web site at www.nyc.gov/buildings.

Emergency Telephone Day or Night: 311

Borough Commissioner:

Commissioner of Buildings:

Tampering with or knowingly making a false entry in or falsely altering this permit is a crime that is punishable by a fine, imprisonment or both.

01 05/29/2015

OP-35A (5/10)

NYC™ Buildings

Work Permit Department of Buildings

Permit Number: *421090456-01-EQ-FN*

Issued: *04/28/2015* Expires: *04/27/2016*

Address: *QUEENS 101-61 99 STREET*

Issued to: MATTHEW BARD

Business: OP-TECH ENVIRONMENTAL SER

Contractor No: GC-604083

Description of Work:

ALTERATION TYPE 2 - CONSTRUCTION EQUIPMENT - FENCE FILING APPLICATION FOR EXPLORATORY DEMOLITION, EXCAVATION WORK AND TEMPORARY FENCE INSTALLATION AS PER PLANS FILED. RECONSTRUCTION PHASE OF THE WORK TO BE FILED IN SEPERATE APPLICATION. NO CHANGE IN USE, EGRESS OR OCCUPANCY.

Review is requested under Building Code: 1968

SITE FILL: NOT APPLICABLE

To see a Zoning Diagram (ZD1) or to challenge a zoning approval filed as part of a New Building application or Alteration application filed after 7/13/2009, please use "My Community" on the Buildings Department web site at www.nyc.gov/buildings.

Emergency Telephone Day or Night: 311

Borough Commissioner:

Commissioner of Buildings: Rick Chandler

Tampering with or knowingly making a false entry in or falsely altering this permit is a crime that is punishable by a fine, imprisonment or both.

01 05/29/2015

OP-35A (5/10)

NYC Buildings

PW2: Work Permit Application

Must be typewritten.

DEPT BLDGS. 421090456 Job Number

SC130430044 Scan Code

BIS Document No., *required:*

1 Reason For Filing *Required for all applications*

☒ Initial Permit *Complete all sections.* Expected work start date: _____

☐ No Work Permit

☐ Renewal Permit with changes *Complete all sections*

☐ Renewal Permit without changes *1, 3, 4, 7 - 12*

2 Location Information *Required for all applications.*

House No(s) 101-61 Street Name 99 STREET

Borough QUEENS Block 9106 Lot 70 BIN C.B. No.

Work on Floor(s) Apt. / Condo No(s)

3 Type of Permit *Choose one and complete any appropriate sub-choices or other information.*

☒ Alteration
☐ Filed as NB (28-101.4-5)
☐ Boiler
☐ Construction Equipment
☐ Chute ☐ Fence
☐ Sidewalk Shed *3A*
☐ Supported Scaffold
☐ Other: _____

☐ Curb Cut
☐ Demolition and Removal
☐ Fire Alarm
☐ Fire Suppression System
☐ Foundation / Earthwork
Area of site (sq. ft): _____
☐ Earthwork Only

☐ Fuel Burning
☐ Gas
☐ Oil
☐ Fuel Storage
☐ Mechanical / HVAC
☐ New Building *3B*

☐ Plumbing *3C*
☐ Sign
☐ Sprinkler *3C*
☐ Standpipe *3C*

3A Electrical application no. for shed lighting:

3B Related fence job no.

3C Secondary permit description (if applies):

3D ☐ Yes ☒ No Are you adding more than three stories?

☐ Yes ☒ No Are you performing work in 50% or more of the area of the building?

☐ Yes ☒ No Are you performing a vertical or horizontal enlargement adding more than 25% of the area of the building?

☐ Yes ☒ No Are mechanical means to be used?

☐ Yes ☒ No Are you removing one or more stories? *If yes, 8*

☐ Yes ☒ No Are you demolishing 50% or more of the area of the building? *If yes, 8*

☒ Yes ☐ No Does your approved work include concrete?
If yes, is your concrete work completed?
☐ Yes ☒ No *complete section 9*

4 Applicant / Contractor *Required for all applications. (* Indicates optional.)*

Last Name BARD First Name MATTHEW Middle Initial

Business Name OP-TECH ENVIRONMENTAL SER

Business Address 1 ADLER DRIVE

City EAST SYRACUSE State NY Zip 13057

*E-Mail

[redacted]

☒ General Contractor *4A, 4B*
☐ Fire Suppression Contractor *4C,4D*
☐ Master Plumber *4C,4D*
☐ Oil Burner Installer *4C,4D*
☐ Sign Hanger *4D*
☐ Professional Engineer *4C, 6*
☐ Registered Architect *4C, 6*
☐ Homeowner
DOB approval required.

4A *Provide registration or tracking number:* 60

4B Does work require a HIC license? ☐ Yes ☐

4C License Number:

4D Is applicant responsible for all work on this application? ☐ Yes ☐ No
If no, describe work responsibility:

Mechanical equipment other than handheld devices to be used for demolition or removal of debris (BC §3306.4)

5 Filing Representative *Complete if different from applicant specified in section 3. (* Indicates optional.)*

Last Name SOR/GAR/PAZ/MUR/COL/JI First Name GE/VA/JU/RO/TAR/GR Middle Initial

Business Name JENNY FLORES EXPEDITING Business Telephone 718-641-6299

Business Address 84-14 PITKIN AVENUE *Business Fax 718-641-4626

City QUEENS State NY Zip 11417 *Mobile Telephone

*E-Mail JENNYFLORES.COM Registration Number F66495

6 Insurance *P.E. / R.A. only (* indicates required for all permits)*

☐ Liability Insurance *(NB permits only)* ☐ Workers' Compensation Insurance* ☐ Disability Insurance *

7 Construction Superintendent, Site Safety Coordinator, Site Safety Manager *Required if applicable. (* Indicates optional.)*

I, the applicant / contractor, hereby declare the scope of work filed under this permit application requires: *(choose one)*

☐ Construction Superintendent ☐ Site Safety Coordinator ☐ Site Safety Manager

Last Name First Name Middle Initial

Business Name Telephone

Address *Fax

City State Zip *Mobile Telephone

*E-Mail Registration Number

I, the undersigned, will perform, on behalf of the Contractor, all of the functions required of a Construction Superintendent, or Site Safety Coordinator, or Site Safety Manager (identified above) as set forth in the Department of Buildings rules and regulations.

Name (print)	Notarization State of New York, County of:	Notary Seal
Signature	Sworn to or affirmed under penalty of perjury	
	day of 20	
Date	Notary Signature	

8 Demolition Subcontractor *Required if applicable. (* Indicates optional.)*

☐ Yes ☐ No Is the applicant/contractor named in section four performing the demolition work for this permit? If no, complete this section.

Last Name First Name Middle Initial

Business Name Telephone

Address *Fax

City State Zip *Mobile Telephone

*E-Mail Registration Number

I, the undersigned, will perform, on behalf of the Contractor, all of the functions required of a Demolition Subcontractor as set forth in the Department of Buildings rules and regulations.

Name (print)	Notarization State of New York, County of:	Notary Seal
Signature	Sworn to or affirmed under penalty of perjury	
	day of 20	
Date	Notary Signature	

PW2

9 Concrete Information *Choose and complete any appropriate sub-choices.*

9A ☐ Yes ☒ No Are you requesting to exclude concrete work at this time from this permit? *If no, 9B*

9B ☐ Yes ☒ No Does your approved work include 2,000 cubic yards or more of concrete? *If yes, 10 and 11*

10 Concrete Subcontractor *Required if applicable (* Indicates optional.)*

☐ Yes ☐ No Is the applicant/contractor named in section four performing the concrete work for this permit? If no, complete this section.

Last Name	First Name	Middle Initial
Business Name		Telephone
Address		*Fax
City	State Zip	*Mobile Telephone
*E-Mail		Registration Number

I, the undersigned, will perform, on behalf of the Contractor, all of the functions required of a Concrete Subcontractor as set forth in the Department of Buildings rules and regulations.

Name (print)	Notarization State of New York, County of: Sworn to or affirmed under penalty of perjury day of 20	Notary Seal
Signature		
Date	Notary Signature	

11 Concrete Safety Manager *Required if applicable. (* Indicates optional.)*

Last Name	First Name	Middle Initial
Business Name		Telephone
Address		*Fax
City	State Zip	*Mobile Telephone
*E-Mail		Registration Number

I, the undersigned, will perform, on behalf of the Contractor, all of the functions required of a Concrete Safety Manager (identified above) as set forth in the Department of Buildings rules and regulations.

Name (print)	Notarization State of New York, County of: Sworn to or affirmed under penalty of perjury day of 20	Notary Seal
Signature		
Date	Notary Signature	

12 Applicant / Contractor Statements and Signatures *Required for all applications.*

The information in this application is correct and complete to the best of my knowledge and I assume responsibility for all statements on this form. I understand that if I am found after hearing to have knowingly or negligently made a false statement on this or any other document submitted to the Department, I may be subject to fine, imprisonment, and/or barred from filing further documents with the Department. I also understand it is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration.

I will comply with all applicable laws, rules and regulations including all insurance requirements, and, in addition,

- I hereby state if a Construction Superintendent, Site Safety Coordinator, Site Safety Manager, Demolition Subcontractor, Concrete Subcontractor, or Concrete Safety Manager is required for this application I have hereby advised the individual listed herein he or she is designated as such and hereby certify he or she is registered and in good standing with the NYC Department of Buildings.
- I hereby state this renewal application with no change to Applicant, Filing Representative, Construction Superintendent, Site Safety Coordinator, Site Safety Manager, Subcontractors, Concrete Safety Manager or insurance is for the work as originally filed or as officially amended.
- In accordance with §28-104.8 of the Administrative Code, I hereby declare I am authorized by the owner of the above-referenced premises to make this application for a permit to perform the work described herein. In accordance with Rule 101-16, I will post the permit in a conspicuous and visible location.
- ☐ *Check here if the work authorized by this permit does NOT require adjacent property insurance.*

Name (print) Joe Naselli	Notarization (required if not licensee) State of New York, County of: Onondaga Sworn to or affirmed under penalty of perjury	Licensee Seal or Notary Seal
Signature Joe Naselli	23rd day of March 2015	HOLLY BETH SEYBOLD Notary Public State of New York Qualified in Onondaga County Reg. No. 01SE6249120 My Commission Expires 10/03/2015
Date 3/23/15	Notary Signature Holly B Seybold	

NYC Buildings

PW2: Work Permit Application

Must be typewritten.

DEPT BLDGS. 421090456 Job Number

SC130430045 Scan Code

BIS Document No., *required:*

1 Reason For Filing *Required for all applications.*

☒ Initial Permit *Complete all sections* Expected work start date: _____

☐ No Work Permit

☐ Renewal Permit with changes *Complete all sections.*

☐ Renewal Permit without changes *1, 3, 4, 7 - 12*

2 Location Information *Required for all applications.*

House No(s) 101-61 Street Name 99 STREET

Borough QUEENS Block 9106 Lot 70 BIN C.B. No.

Work on Floor(s) Apt. / Condo No(s)

3 Type of Permit *Choose one and complete any appropriate sub-choices or other information.*

☐ Alteration
☐ Filed as NB (28-101.4-5)
☐ Boiler
☒ Construction Equipment
☐ Chute ☒ Fence
☐ Sidewalk Shed *3A*
☐ Supported Scaffold
☐ Other: _____

☐ Curb Cut
☐ Demolition and Removal
☐ Fire Alarm
☐ Fire Suppression System
☐ Foundation / Earthwork
Area of site (sq. ft): _____
☐ Earthwork Only

☐ Fuel Burning
☐ Gas
☐ Oil
☐ Fuel Storage
☐ Mechanical / HVAC
☐ New Building *3B*

☐ Plumbing *3C*
☐ Sign
☐ Sprinkler *3C*
☐ Standpipe *3C*

3A Electrical application no. for shed lighting:

3B Related fence job no.

3C Secondary permit description (if applies):

3D ☐ Yes ☒ No Are you adding more than three stories?

☐ Yes ☒ No Are you performing work in 50% or more of the area of the building?

☐ Yes ☒ No Are you performing a vertical or horizontal enlargement adding more than 25% of the area of the building?

☐ Yes ☒ No Are mechanical means to be used?

☐ Yes ☒ No Are you removing one or more stories? *If yes, 8*

☐ Yes ☒ No Are you demolishing 50% or more of the area of the building? *If yes, 8*

☒ Yes ☐ No Does your approved work include concrete? If yes, is your concrete work completed? ☐ Yes ☒ No *complete section 9*

4 Applicant / Contractor *Required for all applications. (* Indicates optional.)*

Last Name BARD First Name MATTHEW Middle Initial

Business Name OP-TECH ENVIRONMENTAL SER

Business Address 1 ADLER DRIVE

City EAST SYRACUSE State NY Zip 13057

*E-Mail

[redacted]

☒ General Contractor *4A, 4B*
☐ Fire Suppression Contractor *4C,4D*
☐ Master Plumber *4C,4D*
☐ Oil Burner Installer *4C,4D*
☐ Sign Hanger *4D*
☐ Professional Engineer *4C, 6*
☐ Registered Architect *4C, 6*
☐ Homeowner
DOB approval required.

4A *Provide registration or tracking number:* 60

4B Does work require a HIC license? ☐ Yes ☐

4C License Number:

4D Is applicant responsible for all work on this application? ☐ Yes ☐ No

If no, describe work responsibility:

Mechanical equipment other than handheld devices to be used for demolition or removal of debris (BC §3306.4)

PW2

5 Filing Representative *Complete if different from applicant specified in section 3. (* Indicates optional.)*

Last Name SOR/GAR/PAZ/MUR/COL/JI First Name GE/VA/JU/RO/TAR/GR Middle Initial

Business Name JENNY FLORES EXPEDITING Business Telephone 718-641-6299

Business Address 84-14 PITKIN AVENUE *Business Fax 718-641-4626

City QUEENS State NY Zip 11417 *Mobile Telephone

*E-Mail JENNYFLORES.COM Registration Number F66495

6 Insurance *P.E. / R.A. only (* indicates required for all permits)*

☐ Liability Insurance *(NB permits only)* ☐ Workers' Compensation Insurance* ☐ Disability Insurance *

7 Construction Superintendent, Site Safety Coordinator, Site Safety Manager *Required if applicable. (* Indicates optional.)*

I, the applicant / contractor, hereby declare the scope of work filed under this permit application requires: *(choose one)*

☐ Construction Superintendent ☐ Site Safety Coordinator ☐ Site Safety Manager

Last Name First Name Middle Initial

Business Name Telephone

Address *Fax

City State Zip *Mobile Telephone

*E-Mail Registration Number

I, the undersigned, will perform, on behalf of the Contractor, all of the functions required of a Construction Superintendent, or Site Safety Coordinator, or Site Safety Manager (identified above) as set forth in the Department of Buildings rules and regulations.

Name (print)	Notarization State of New York, County of:	Notary Seal
Signature	Sworn to or affirmed under penalty of perjury day of 20	
Date	Notary Signature	

8 Demolition Subcontractor *Required if applicable. (* Indicates optional.)*

☐ Yes ☐ No Is the applicant/contractor named in section four performing the demolition work for this permit? If no, complete this section.

Last Name First Name Middle Initial

Business Name Telephone

Address *Fax

City State Zip *Mobile Telephone

*E-Mail Registration Number

I, the undersigned, will perform, on behalf of the Contractor, all of the functions required of a Demolition Subcontractor as set forth in the Department of Buildings rules and regulations.

Name (print)	Notarization State of New York, County of:	Notary Seal
Signature	Sworn to or affirmed under penalty of perjury day of 20	
Date	Notary Signature	

PW2

9 Concrete Information *Choose and complete any appropriate sub-choices*

9A ☐ Yes ☒ No Are you requesting to exclude concrete work at this time from this permit? *If no, 9B*

9B ☐ Yes ☒ No Does your approved work include 2,000 cubic yards or more of concrete? *If yes, 10 and 11*

10 Concrete Subcontractor *Required if applicable. (* Indicates optional.)*

☐ Yes ☐ No Is the applicant/contractor named in section four performing the concrete work for this permit? If no, complete this section.

Last Name	First Name		Middle Initial
Business Name			Telephone
Address			*Fax
City	State	Zip	*Mobile Telephone
*E-Mail			Registration Number

I, the undersigned, will perform, on behalf of the Contractor, all of the functions required of a Concrete Subcontractor as set forth in the Department of Buildings rules and regulations.

Name (print)	Notarization State of New York, County of:	Notary Seal
Signature	Sworn to or affirmed under penalty of perjury	
	day of 20	
Date	Notary Signature	

11 Concrete Safety Manager *Required if applicable. (* Indicates optional.)*

Last Name	First Name		Middle Initial
Business Name			Telephone
Address			*Fax
City	State	Zip	*Mobile Telephone
*E-Mail			Registration Number

I, the undersigned, will perform, on behalf of the Contractor, all of the functions required of a Concrete Safety Manager (identified above) as set forth in the Department of Buildings rules and regulations.

Name (print)	Notarization State of New York, County of:	Notary Seal
Signature	Sworn to or affirmed under penalty of perjury	
	day of 20	
Date	Notary Signature	

12 Applicant / Contractor Statements and Signatures *Required for all applications.*

The information in this application is correct and complete to the best of my knowledge and I assume responsibility for all statements on this form. I understand that if I am found after hearing to have knowingly or negligently made a false statement on this or any other document submitted to the Department, I may be subject to fine, imprisonment, and/or barred from filing further documents with the Department. I also understand it is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration.

I will comply with all applicable laws, rules and regulations including all insurance requirements, and, in addition,

- *I hereby state if a Construction Superintendent, Site Safety Coordinator, Site Safety Manager, Demolition Subcontractor, Concrete Subcontractor, or Concrete Safety Manager is required for this application I have hereby advised the individual listed herein he or she is designated as such and hereby certify he or she is registered and in good standing with the NYC Department of Buildings.*
- I hereby state this renewal application with no change to Applicant, Filing Representative, Construction Superintendent, Site Safety Coordinator, Site Safety Manager, Subcontractors, Concrete Safety Manager or Insurance is for the work as originally filed or as officially amended.
- In accordance with §28-104.8 of the Administrative Code, I hereby declare I am authorized by the owner of the above-referenced premises to make this application for a permit to perform the work described herein. In accordance with Rule 101-16, I will post the permit in a conspicuous and visible location.
- ☐ *Check here if the work authorized by this permit does NOT require adjacent property insurance.*

Name (print) Joe Naselli	Notarization (required if not licensee) State of New York, County of: Onondaga	Licensee Seal or Notary Seal
Signature	Sworn to or affirmed under penalty of perjury	
	23rd day of March 2015	
Date 3/23/15	Notary Signature Holly B Seybold	

HOLLY BETH SEYBOLD
Notary Public State of New York
Qualified in Onondaga County
Reg. No. 01SE6248120
My Commission Expires 10/03/2015

AECOM
250 Apollo Drive
Chelmsford, MA 01824

978.905.2100 tel
978.905.2101 fax

September 2, 2014

New York City
Department of Buildings
120-55 Queens Blvd.
Kew Gardens, NY 11424

Subject: Job # 420844714

To Whom It May Concern,

I would like to request that job #420844714 for 101-61 99th Street be signed off.

Feel free to contact me with any questions or if you require additional information.

Sincerely,

Yours sincerely,



Sean Crowell, P.E.
Senior Project Engineer
sean.crowell@aecom.com

NYC Buildings

TR1: Technical Report
Statement of Responsibility

This form must be typewritten

Orient and affix BIS job number label here

1 Location Information *Required for all applications.*

House No(s) 101-61 Street Name 99 Street

Work on Floor(s) 001

2 Applicant Information *Required for all applications.*

Choose all that apply: ☐ Design Applicant *3A, 4A, 5* ☒ Special Inspections Applicant *3B-D, 6-8* ☒ Progress Inspections Applicant *4B-D, 6-8*

Last Name Nestor First Name George Middle Initial

Business Name GNA Consulting Engineers Business Telephone (203) 981-3815

Business Address 986 Middle Turnpike Business Fax

City Storrs State CT Zip 06268 Mobile Telephone

License Type *choose one:* ☒ P.E. ☐ R.A. ☐ Other: License Number 084620

Special Inspection Agency Number 002991

3 Special Inspection Items *Required for all applications, continued on page 2; ■ indicates report required.*

3A ← Identification of Requirement			3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y N Special Inspections		Code/Section	Initial & Date	Initial & Date	Initial & Date
☐ ☒ Flood Zone Compliance		BC G105			
☐ ☒ Fire Alarm Test		BC 907, BC 1704.13			
☐ ☒ Photoluminescent Exit Path Markings	■ TR7	BC 1026.11			
☐ ☒ Emergency Power Systems (Generators)		BC 1704.13, BC 2702			
☐ ☒ Structural Steel - Welding		BC 1704.3.1			
☐ ☒ Structural Steel - Erection & Bolting		BC 1704.3.2, BC 1704.3.3			
☐ ☒ Structural Cold-Formed Steel		BC 1704.3.4			
☐ ☒ Concrete - Cast-In-Place		BC 1704.4			
☐ ☒ Concrete - Precast		BC 1704.4			
☐ ☒ Concrete - Prestressed		BC 1704.4			
☐ ☒ Masonry		BC 1704.5			
☐ ☒ Wood - Off-Site fabrication of Structural Elements		BC 1704.6			
☐ ☒ Wood - Installation of High-Load Diaphragms		BC 1704.6.1			
☐ ☒ Wood - Installation of Metal-Plate-Connected Trusses		BC 1704.6.3			
☐ ☒ Wood - Installation of Prefabricated I-Joists		BC 1704.6.4			
☐ ☒ Soils - Site Preparation		BC 1704.7.1			
☐ ☒ Soils - Fill placement & In-Place Density		BC 1704 .7.2, BC 1704.7.3			
☐ ☒ Soils - Investigations (Borings/Test Pits)	■ TR4	BC 1704.7.4			
☐ ☒ Pile Foundations & Drilled Pier Installation	■ TR5	BC 1704.8			
☐ ☒ Pier Foundations		BC 1704.9			
☐ ☒ Underpinning		BC 1704.9.1			
☐ ☒ Wall Panels, Curtain Walls, and Veneers	■	BC 1704.10			
☐ ☒ Sprayed Fire-Resistant Materials		BC 1704.11			
☐ ☒ Exterior Insulation Finish Systems (EIFS)		BC 1704.12			
☐ ☒ Alternative Materials - OTCR Buildings Bulletin # _____		BC 1704.13			
☐ ☒ Smoke Control Systems		BC 1704.14			
☐ ☒ Mechanical Systems		BC 1704.15			
☐ ☒ Fuel-Oil Storage and Fuel-Oil Piping Systems		BC 1704.16			
☐ ☒ High-Pressure Steam Piping (Welding)		BC 1704.17			
☐ ☒ Fuel-Gas Piping (Welding)		BC 1704.18			
☒ ☐ Structural Safety - Structural Stability		BC 1704.19		gm 2/25/14	
☐ ☒ Mechanical Demolition		BC 1704.19, BC 3306.6			

included

3 Special Inspection Items (continued) *Required for all applications;* ▮ *indicates report required.*

3A ← Identification of Requirement				3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y	N	Special Inspections	Code/Section	Initial & Date	Initial & Date	Initial & Date
☐	☒	*Excavation - Sheeting, Shoring, and Bracing*	BC 1704.19, BC 3304.4.1			
☐	☒	Soil Percolation Test - Drywell ▮	BC 1704.20.1			
☐	☒	Raising and Moving of a Building	BC 1704.19, BC 1704.27			
☐	☒	Soil Percolation Test - Septic ▮	BC 1704.20.1			
☐	☒	Site Storm Drainage Disposal and Detention System Installation	BC 1704.20			
☐	☒	Septic System Installation	BC 1704.20			
☐	☒	Sprinkler Systems	BC 1704.21			
☐	☒	Standpipe Systems	BC 1704.22			
☐	☒	Heating Systems	BC 1704.23			
☐	☒	Chimneys	BC 1704.24			
☒	☐	Firestop, Draftstop, and Fireblock systems	BC 1704.25		gm 2/25/14	
☐	☒	Aluminum Welding	BC 1704.26			
☐	☒	Seismic Isolation Systems	BC 1707.8			
☐	☒	Concrete Test Cylinders ▮ TR2	BC 1905.6	Submit TR2 to complete these items		
☐	☒	Concrete Design Mix ▮ TR3	BC 1905.3	Submit TR3 to complete these items		

4 Progress Inspection Items *Required for all applications.* ▮ *indicates report required.*

4A ← Identification of Requirement				4B Identification of Responsibilities	4C Certificate of Complete Inspections / Tests	4D Withdraw Responsibilities
Y	N	Progress Inspections	Code/Section	*Initial & Date*	*Initial & Date*	*Initial & Date*
☐	☒	Preliminary	28-116.2.1, BC 109.2			
☐	☒	Footing and Foundation	BC 109.3.1			
☐	☒	Lowest Floor Elevation (attach FEMA form)	BC 109.3.2			
☐	☒	Frame Inspection	BC 109.3.3			
☐	☒	Energy Code Compliance Inspections ▮ TR8	BC 109.3.5	Submit TR8 to complete this item		
☐	☒	Fire-Resistance Rated Construction	BC 109.3.4			
☐	☒	Public Assembly Emergency Lighting	28-116.2.2			
☒	☐	Final*	28-116.2.4.2, BC 109.5, Directive 14 of 1975, and 1 RCNY §101-10		gm 2/25/14	

** For column 4C, indicate date when the actual final inspection was performed*

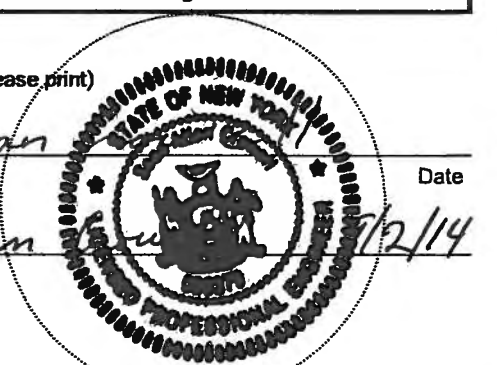
5 Design Applicant's Statements and Signatures *P.E./R.A. responsible for plans, choose both below and sign/seal.*

☑ I have identified all of the special inspections, progress inspections and tests required for compliance.

☑ I certify that the Special Inspection and Approved Agencies engaged by the owner to supervise the work specified above are acceptable. (BC 1704.1)

Name (please print) Sean

Signature Sean Date 2/12/14



P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

6 Owner's Statement and Signature for Progress/Special Inspector *Required when inspection applicant identifies responsibilities.*

I have reviewed the information provided herein and, to the best of my knowledge and belief, attest to its accuracy. I approve the identification of the responsible progress inspector. Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by a fine or imprisonment, or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department.

Name (print) Title

Signature Date

7 Inspection Applicant's Identification of Responsibilities

Check all that apply below:

☐ *For the **special inspections** indicated above in section 3, I certify that I am the principal/director of the special inspection agency accepting* responsibility for conducting the inspections. I further certify that I have read the applicable sections of the New York City Construction Codes in connection with special inspections as well as 1 RCNY 101-06 Rule, which specifies the qualifications required for each inspection and that this agency meets those qualifications for each and every special inspection for which I/we take responsibility. I agree that both I and the agency will comply with all provisions of the New York City Construction Codes and the Rule. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ I certify that I am conducting **Small Building Inspections** and assume the responsibility for the special inspections specified in section 3 above. I personally, or where permitted by the New York City Construction Codes, qualified personnel under my direct supervision, will perform the required inspections and tests. All inspection and test reports shall be **signed and made available to the Department. I understand that a qualified special inspection agency is required for Soils Investigation, Pier and Pile installation, Underpinning of structures and Protection of the sides of excavations greater than 10 feet in depth. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.**

☐ **For the progress inspections indicated above in section 4, except energy code inspections on the TR1EN form, and/or concrete test items indicated in section 3,** I assume the responsibility and I personally, or where permitted by the New York City Construction Codes, qualified personnel under my direct supervision, will perform the required inspections and tests on such forms and in such matter as the Department requires or requests. **I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.**

Final Inspection:

☐ **I will make final inspection of the construction work, including those inspections during its progress necessary to my certification upon final inspection that all work substantially conforms to approved construction documents and applicable laws and rules. I will confirm that the performance of progress inspections and other inspections has been documented before I report the work complete. As prescribed by 1 RCNY 101-10, I will perform the final inspection within 1 year from the expiration of the last valid permit of the work.**

Upon completion of the work and within 30 days of my final inspection, I will file a certification attesting to the fact that all work was performed and completed in accordance with the approved construction documents, laws and rules, except as reported otherwise.

I understand that my failure to file a certification of completion or to notify the Department of my withdrawal of responsibilities within one year from expiration of the last valid permit may result in the loss of my privileges to file under Directives 2 and 14 of 1975 or issuance of a violation, or both. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ **Change of Applicant: I am a newly designated individual responsible for the items specified herein and I hereby state that:**

☐ None of the inspections/tests indicated herein have been performed to date by the previously designated individual.

☐ Some of the inspections/tests indicated herein have been performed by the previously designated individual, as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print)

Signature Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

8 Inspection Applicant's Certification of Completion

☒ I have completed the items specified herein and certify the following (check one only):

☒ All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations.

☐ All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations, except as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ **Withdrawal of Applicant:** I am withdrawing responsibility for the items of special/progress inspections and/or tests indicated herein and herewith submit the results of tests of the work performed to date.

Name (please print)
George Nestor

Signature 2/25/14 Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

AECOM
250 Apollo Drive
Chelmsford, MA 01824

978.905.2100 tel
978.905.2101 fax

September 2, 2014

New York City
Department of Buildings
120-55 Queens Blvd.
Kew Gardens, NY 11424

Subject: Job # 420886081

To Whom It May Concern,

I would like to request that job #420886081 for 101-61 99th Street be signed off.

Feel free to contact me with any questions or if you require additional information.

Sincerely,

Yours sincerely,

Sean Crowell

Sean Crowell, P.E.
Senior Project Engineer
sean.crowell@aecom.com



NYC Buildings

TR1: Technical Report
Statement of Responsibility

This form must be typewritten

Orient and affix BIS job number label here

1 Location Information *Required for all applications.*

House No(s) 101-61 Street Name 99 Street

Work on Floor(s) 001

2 Applicant Information *Required for all applications.*

Choose all that apply: ☐ Design Applicant *3A, 4A, 5* ☒ Special Inspections Applicant *3B-D, 6-8* ☒ Progress Inspections Applicant *4B-D, 6-8*

Last Name Nestor First Name George Middle Initial

Business Name GNA Consulting Engineers Business Telephone (203) 981-3815

Business Address 986 Middle Turnpike Business Fax

City Storrs State CT Zip 06268 Mobile Telephone

License Type *choose one:* ☒ P.E. ☐ R.A. ☐ Other: License Number 084620

Special Inspection Agency Number 002991

3 Special Inspection Items *Required for all applications, continued on page 2;* ■ *indicates report required.*

3A ← Identification of Requirement			3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y N Special Inspections		Code/Section	Initial & Date	Initial & Date	Initial & Date
☐ ☒ Flood Zone Compliance		BC G105			
☐ ☒ Fire Alarm Test		BC 907, BC 1704.13			
☐ ☒ Photoluminescent Exit Path Markings	■ TR7	BC 1026.11			
☐ ☒ Emergency Power Systems (Generators)		BC 1704.13, BC 2702			
☐ ☒ Structural Steel - Welding		BC 1704.3.1			
☐ ☒ *Structural Steel - Erection & Bolting*		BC 1704.3.2, BC 1704.3.3			
☐ ☒ Structural Cold-Formed Steel		BC 1704.3.4			
☐ ☒ Concrete - Cast-In-Place		BC 1704.4			
☐ ☒ Concrete - Precast		BC 1704.4			
☐ ☒ Concrete - Prestressed		BC 1704.4			
☐ ☒ Masonry		BC 1704.5			
☐ ☒ Wood - Off-Site fabrication of Structural Elements		BC 1704.6			
☐ ☒ Wood - Installation of High-Load Diaphragms		BC 1704.6.1			
☐ ☒ Wood - *Installation of Metal-Plate-Connected Trusses*		BC 1704.6.3			
☐ ☒ Wood - Installation of Prefabricated I-Joists		BC 1704.6.4			
☐ ☒ Soils - Site Preparation		BC 1704.7.1			
☐ ☒ Soils - Fill placement & In-Place Density		BC 1704 .7.2, BC 1704.7.3			
☐ ☒ Soils - Investigations (Borings/Test Pits)	■ TR4	BC 1704.7.4			
☐ ☒ Pile Foundations & Drilled Pier Installation	■ TR5	BC 1704.8			
☐ ☒ Pier Foundations		BC 1704.9			
☐ ☒ Underpinning		BC 1704.9.1			
☐ ☒ Wall Panels, Curtain Walls, and Veneers	■	BC 1704.10			
☐ ☒ Sprayed Fire-Resistant Materials		BC 1704.11			
☐ ☒ Exterior Insulation Finish Systems (EIFS)		BC 1704.12			
☐ ☒ Alternative Materials - OTCR Buildings Bulletin #_____		BC 1704.13			
☐ ☒ Smoke Control Systems		BC 1704.14			
☒ ☐ *Mechanical Systems*		BC 1704.15		qm 2/25/14	
☐ ☒ Fuel-Oil Storage and Fuel-Oil Piping Systems		BC 1704.16			
☐ ☒ High-Pressure Steam Piping (Welding)		BC 1704.17			
☐ ☒ Fuel-Gas Piping (Welding)		BC 1704.18			
☐ ☒ Structural Safety - Structural Stability		BC 1704.19			
☐ ☒ Mechanical Demolition		BC 1704.19, BC 3306.6			

3 Special Inspection Items (continued) *Required for all applications; ■ indicates report required.*

3A ← *Identification of Requirement*				3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y N Special Inspections			Code/Section	Initial & Date	Initial & Date	Initial & Date
☐ ☒ Excavation - Sheeting, Shoring, and Bracing			BC 1704.19, BC 3304.4.1			
☐ ☒ Soil Percolation Test - Drywell	■		BC 1704.20.1			
☐ ☒ Soil Percolation Test - Septic	■		BC 1704.20.1			
☐ ☒ Site Storm Drainage Disposal and Detention System Installation			BC 1704.20			
☐ ☒ Septic System Installation			BC 1704.20			
☐ ☒ Sprinkler Systems			BC 1704.21			
☐ ☒ Standpipe Systems			BC 1704.22			
☐ ☒ Heating Systems			BC 1704.23			
☐ ☒ Chimneys			BC 1704.24			
☐ ☒ Firestop, Draftstop, and Fireblock systems			BC 1704.25			
☐ ☒ Aluminum Welding			BC 1704.26			
☐ ☒ Seismic Isolation Systems			BC 1707.8			
☐ ☒ Concrete Test Cylinders	■	TR2	BC 1905.6	Submit TR2 to complete these items		
☐ ☒ Concrete Design Mix	■	TR3	BC 1905.3	Submit TR3 to complete these items		

4 Progress Inspection Items *Required for all applications. ■ indicates report required.*

4A ← Identification of Requirement			4B Identification o Responsibilities	4C Certificate of Complete Inspections / Tests	4D Withdraw Responsibilities
Y N Progress Inspections		Code/Section	Initial & Date	Initial & Date	Initial & Date
☐ ☒ Preliminary		28-116.2.1, BC 109.2			
☐ ☒ Footing and Foundation		BC 109.3.1			
☐ ☒ Lowest Floor Elevation (attach FEMA form)		BC 109.3.2			
☐ ☒ Frame Inspection		BC 109.3.3			
☐ ☒ Energy Code Compliance Inspections	■ TR8	BC 109.3.5	Submit TR8 to complete this item		
☐ ☒ Fire-Resistance Rated Construction		BC 109.3.4			
☐ ☒ Public Assembly Emergency Lighting		28-116.2.2			
☒ ☐ Final*		28-116.2.4.2, BC 109.5, Directive 14 of 1975, and 1 RCNY §101-10		2/25/14	

** For column 4C, indicate date when the actual final inspection was performed*

5 Design Applicant's Statements and Signatures *P.E./R.A. responsible for plans, choose both below and sign/seal.*

☑ I have identified all of the special inspections, progress inspections and tests required for compliance.

☑ I certify that the Special Inspection and Approved Agencies engaged by the owner to supervise the work specified above are acceptable. (BC 1704.1)

Name (please print) Sean

Signature

Date 9/2/14

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

6 Owner's Statement and Signature for Progress/Special Inspector *Required when inspection applicant identifies responsibilities.*

I have reviewed the information provided herein and, to the best of my knowledge and belief, attest to its accuracy. I approve the identification of the responsible progress inspector. Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by a fine or imprisonment, or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department.

Name (print) Title

Signature Date

7 Inspection Applicant's Identification of Responsibilities

Check all that apply below:

☐ ***For the special inspections indicated above in section 3, I certify that I am the principal/director of the special inspection agency accepting*** responsibility for conducting the inspections. I further certify that I have read the applicable sections of the New York City Construction Codes in connection with special inspections as well as 1 RCNY 101-06 Rule, which specifies the qualifications required for each inspection and that this agency meets those qualifications for each and every special inspection for which I/we take responsibility. I agree that both I and the agency will comply with all provisions of the New York City Construction Codes and the Rule. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ I certify that I am conducting **Small Building Inspections** and assume the responsibility for the special inspections specified in section 3 above. I personally, or where permitted by the New York City Construction Codes, qualified personnel under my direct supervision, will perform the required inspections and tests. All inspection and test reports shall be **signed and made available to the Department. I understand that a qualified special inspection agency is required for Soils Investigation, Pier and Pile installation, Underpinning of structures and Protection of the sides of excavations greater than 10 feet in depth. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.**

☐ **For the progress inspections indicated above in section 4, except energy code inspections on the TR1EN form, and/or concrete test items indicated in section 3,** I assume the responsibility and I personally, or where permitted by the New York City Construction Codes, qualified personnel under my direct supervision, will perform the required inspections and tests on such forms and in such matter as the Department requires or requests. **I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.**

Final Inspection:

☐ **I will make final inspection of the construction work, including those inspections during its progress necessary to my certification upon final inspection that all work substantially conforms to approved construction documents and applicable laws and rules. I will confirm that the performance of progress inspections and other inspections has been documented before I report the work complete. As prescribed by 1 RCNY 101-10, I will perform the final inspection within 1 year from the expiration of the last valid permit of the work.**

Upon completion of the work and within 30 days of my final inspection, I will file a certification attesting to the fact that all work was performed and completed in accordance with the approved construction documents, laws and rules, except as reported otherwise.

I understand that my failure to file a certification of completion or to notify the Department of my withdrawal of responsibilities within one year from expiration of the last valid permit may result in the loss of my privileges to file under Directives 2 and 14 of 1975 or issuance of a violation, or both. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ **Change of Applicant:** I am a newly designated individual responsible for the items specified herein and I hereby state that:

☐ None of the inspections/tests indicated herein have been performed to date by the previously designated individual.

☐ Some of the inspections/tests indicated herein have been performed by the previously designated individual, as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print)

Signature Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

8 Inspection Applicant's Certification of Completion

☒ I have completed the items specified herein and certify the following (check one only):

☒ All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations.

☐ All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations, except as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ **Withdrawal of Applicant:** I am withdrawing responsibility for the items of special/progress inspections and/or tests indicated herein and herewith submit the results/details of the work performed to date.

Name (please print)
George Nestor

Signature 2/25/14 Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

STATE OF NEW YORK
GEORGE NESTOR
084620
LICENSED PROFESSIONAL ENGINEER

NYC Buildings

EN2: As Built Energy Analysis

This form must be typewritten and submitted in person to the Certificate of Occupancy Division's Borough Office where energy analysis was reviewed.

Orient and affix BIS job number label here

1 Progress Inspector Information *Required for all applications.*

Last Name Nestor | First Name George | Middle Initial

Business Name GNA Consulting Engineers | Business Telephone 203-981-3815

Business Address 986 Middle Turnpike | Business Fax

City Storrs | State CT | Zip 06268 | Mobile Telephone

License Type *choose one:* ☒ P.E. ☐ R.A.: | License Number 084620

2 Location Information *Required for all applications.*

House No(s) 101-61 | Street Name 99 Street

Borough Queens | Block 9106 | Lot 70 | BIN 4458633 | C.B. No. 409

Work on Floor(s) 001 | Apt. / Condo No(s) 4458633

3 As Built Information *P.E./R.A. responsible for progress inspections, choose one below and sign/seal.*

☒ The as-built conditions of the completed building conform to the originally approved energy analysis and do not require a revised energy analysis.

☐ The energy analysis has been revised according to *one* of the statements below:

- ☐ Attached is a revised energy analysis, prepared, signed and sealed by the registered design professional who prepared the previously submitted and approved energy analysis. The as-built conditions of the completed building conform to this revised energy analysis.
- ☐ The last revised energy analysis was submitted and approved as a post approval amendment on _____(date). The as-built conditions of the completed building conform to this revised energy analysis.

4 Progress Inspector's Statements and Signatures *P.E./R.A. responsible for progress inspections, choose both below and sign/seal.*

I have reviewed the information provided herein and, to the best of my knowledge and belief, attest to its accuracy. Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by a fine or imprisonment, or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department.

I, George Nestor, a registered design professional who performed or supervised the progress inspections for HVAC (envelope, or HVAC/service water heating, or electrical/lighting work), certify that, to the best of my knowledge and professional judgment, the above checked statement(s) are true with respect to the progress inspections I completed as indicated on my signed, sealed and submitted TR8.

Name (please print) George Nestor

Signature

STATE OF NEW YORK GEORGE NESTOR LICENSED PROFESSIONAL ENGINEER 084620

Date 2/25/14

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

OP-TECH
Environmental Services, Inc.

PO Box 633
3851 Western Turnpike
Duanesburg, NY 12056
Phone: 518-355-0197
Fax: 518-355-3256
www.op-tech.us

May 3, 2013

NYC Department of Buildings
120-55 Queens Blvd.
Kew Gardens, N.Y. 11424

To Whom It May Concern,

Please find attached the required permit applications for performing demolition services at the 10161 99th Street, Queens, NY site. The scope of work includes the partial demolition of interior, non-structural, partition walls, as well as concrete and asphalt floor coverings for the purpose of performing a soil remediation project throughout the ground floor of Bays 8-15 in the subject building. OP-TECH will be utilizing hand held equipment (i.e., concrete saws, jack hammers) to perform the demolition services. Also a skid steer, small excavator will be utilized to transport the C&D and impacted soil waste from the work areas to the waste loading area near Bay 12. A wheel loader will then load the soil into permitted trucks on 99th St. for transportation to the designated disposal facility. The trucks will be park far enough away from the excavation so they will not impact the structural integrity of the building. OP-TECH will also be utilizing labor from the local 731 laborers union and operating engineers from the local 15 IUOE.

Prior to any intrusive demolition activities, OP-TECH will notify dig safely NY to mark out any underground utilities in the subject area. Currently, no active water or sewer utilities exist at the subject site. However the presence of water and/or sewer utilities will be field verified prior to demolition activities. In the event that water or sewer utilities are encountered, the respective NYC departments will be notified and they will be properly capped and/or protected in accordance with local regulations. OP-TECH will also employ a licensed electrician to cut power to the subjective work areas prior to demolition activities.

Dust controls will be implemented and governed in accordance with the site's Community Air Monitoring Plan (CAMP) already on file and approved by NYS DEP. OP-TECH has provisions included that will prevent any water damage to the premises or adjoining properties.

Temporary elevators, stand pipe systems, or sprinkler systems to not exist in the building.

In closing, we have attached a structural engineering report that documents or proposed services will not compromise the structural integrity of the building. All demolition and remediation work will be conducted in a manner the meets or exceeds the geotechnical, structural and health and safety specifications of the project.

If you have any questions of the information presented herein, please contact our office at (518) 355-0197.

Respectfully Submitted,
OP-TECH ENVIRONMENTAL SERVICES, INC.



Joseph Naselli
Project Manager

Attachments:
Structural Engineer's Report
Form PW1
Form PW3
Form TR1
Form PC1
Form POC1
Asbestos ACP5
Insurance Workers Compensation/Disability
Project Drawings

Cc: file-EAEH0012
AECOM – Project Engineer

Attachment 1
Structural Evaluation Phase 1, 2, and 3

ARTECNICS RR 1 Box 1171
ENGINEERING CONSULTANTS Uniondale, PA 18470
PHONE (570) 222-2809
4 December 2009

AECOM Corporation
2 Technology Park Drive
Westford, MA 01886

ENSR/AECOM Project #10748-001-0502; Ozone Park, NY; Phase 1 Report

Purpose:

The following reports Phase 1 preliminary findings regarding structural considerations at the site of the referenced project. The scope of work is as specified by ENSR/AECOM drawings/figures 1, 4, and 5, dated 5/08 (as forwarded to ARTECNICS), and generally consists of evaluating the effects of future excavations in and around an existing elevated train structure, previously part of the New York City train and subway system and currently abandoned/not in use. This preliminary work consists of determining the layout of the existing structure, and assessing the sizes of existing footings, the depth of founding, and preliminary estimates of soil strength and properties. Some discussion of further investigations and engineering requirements for Phase 2 of the project is included herein.

Investigation Means & Methods:

Phase 1 investigations were limited to a single day's work; this limited the number of test pit excavations to only two. One interior and one exterior footing location (two excavation locations total) were chosen at areas convenient for operation of the mini-excavator provided for the work. Drawing AECOZN-1 following shows the location and approximate size of the test pits. Excavation methods were changed to hand digging when it was apparent that the bottom of footing was soon to be reached. The excavation at structural bay #12 was extended somewhat because the original size did not reach the corner of the interior column footing.

Structural column layout dimensions were determined by simple hand held tape measurements. Other inspections, e.g., regarding ancillary structures, were done by visual observation. A visual inspection of soil borings, done immediately after the borings were taken, was also conducted. Note that the ENSR/AECOM equipment could not take blow counts (SPT), or allow assessment of soil strength(s) by means other than visual/feel. Nevertheless, adequate determination of the shear strength of the granular soils present was made. Observations were made for borings to a depth of 15 feet below grade.

ARTECNICS RR 1 Box 1171
ENGINEERING CONSULTANTS Uniondale, PA 18470
PHONE (570) 222-2809

Findings:

A partial layout of the column support structure is shown, as previously stated, on drawing ACEOZN-1 following. Sections of both interior and exterior footings are shown on drawings ACEOZN-2 and ACEOZN-3. These sections include both horizontal and vertical dimensions of the assumed footings. It should be noted that only a quarter of these dimensions were actually discovered by excavation; the others were assumed based on the expectation of footing symmetry. Further, it is assumed, for preliminary purposes, that similar structural bays have similar footing sizes. The surmised footing size dimensions are considered reasonable for the structural type (see further discussion in the recommendations section).

Partition walls, particularly those of concrete block masonry units [CMU], were observed between structural bays (see drawing ACEOZN-1). The CMU wall footings were not investigated due to time constraints, and due to the fact that undermining them would require special underpinning procedures. Because they were apparently installed after the area was used as enclosed business rental space, it is anticipated that their footing depth is less then the main column footings which were founded approximately at the frost line elevation. It is not improbable that the CMU wall footings are only marginally below slab/grade elevation.

Inspection of soil borings revealed a graded granular material ranging from loose silty sand (at depths of from 0' to 5', to medium sand (at depths from 5' to 10'), to medium-to-stiff sand (from depths from 10' to 15'). Because the borings were taken at a location close to an existing drainage well (i.e., in order to assess a potential contamination source), *insitu* moisture content could not be assessed. Boring logs, accomplished at a previous ENSR/AECOM visit to the site, gave a ground water elevation at some 30' below existing grade. For preliminary purposes the soil can be considered as a strictly granular material, i.e., a σ (shear) only soil, without substantial ground water influence. As such, bearing capacities can be assessed in a straight forward fashion, and rebound elasticity need not be considered. For a founding depth of 5'-0" +/- as discovered, a shear angle from $\sigma \sim 32^{o}$ to $\sigma \sim 34^{o}$ is considered a reasonable value for use in Phase 2 calculations.

ARTECNICS RR 1 Box 1171
ENGINEERING CONSULTANTS Uniondale, PA 18470
PHONE (570) 222-2809

Recommendations & Comments :

The data/information collected under Phase 1 is sufficient for preliminary Phase 2 analyses of footing adequacy provided that final excavations do not go below the 4'-0" below grade maximum given in ENSR/AECOM figure 4 (see appendix herein). Nevertheless, both of the following are suggested for the final phase of the work, especially if the 4' maximum is to be exceeded:

1. Footing sizes and depth should be assessed in real time during excavations. Any deviation from the Phase 1 discovered cases may require a re-assessment of procedures.
2. "As Built" drawings should be requested from the "owner" (MTA/NYC).

Note that item 2 above may well include old soil borings data; such would also be very useful. If excavations go to or below the bottom of footing elevations (i.e., 5' or more below current grade), special support shoring and/or sequencing of excavation operations may be necessary. Sequencing may be necessary in any case.

The limits of excavation shown on ENSR/AECOM figure 1 (see appendix herein) seem to indicate that excavations need not take place extremely close to the active roadways of 99th and 100th Streets, i.e., not within 10' or so of the curb line (see graphic scale, ibid.). Nevertheless, during this investigation ENSR/AECOM personnel stated that these limits may need to be extended to almost the very edge of the curb line. If this is in fact the case, special retaining support of the roadway will be required. As an alternative, ENSR/AECOM may attempt to install the project fence far enough away from the excavation line to avoid the need for excavation shoring. This would require approval from the "owner", i.e., NYC authorities (esp. because it will require a partial shutdown of the roadway/roadside parking area), but is highly recommended as it will save considerable time, effort, and cost. ENSR/AECOM should be aware, then, that horizontal shoring procedures (i.e., retaining structures) along both street lines will be required if the excavation lines are closer then one and a half (1.50) to two (2.0) times the finally required depth of excavation from the active roadway area.

Demolition of CMU partition walls may not be straight forward. Their connectivity to the existing structure and their founding is unknown. Also of note is that the wall height is substantial. A simple "wrecking" demolition procedure, via a "means and methods" approach, may not be adequately safe. A specific procedure may need to be developed.

ARTECNICS RR 1 Box 1171
ENGINEERING CONSULTANTS Uniondale, PA 18470
PHONE (570) 222-2809

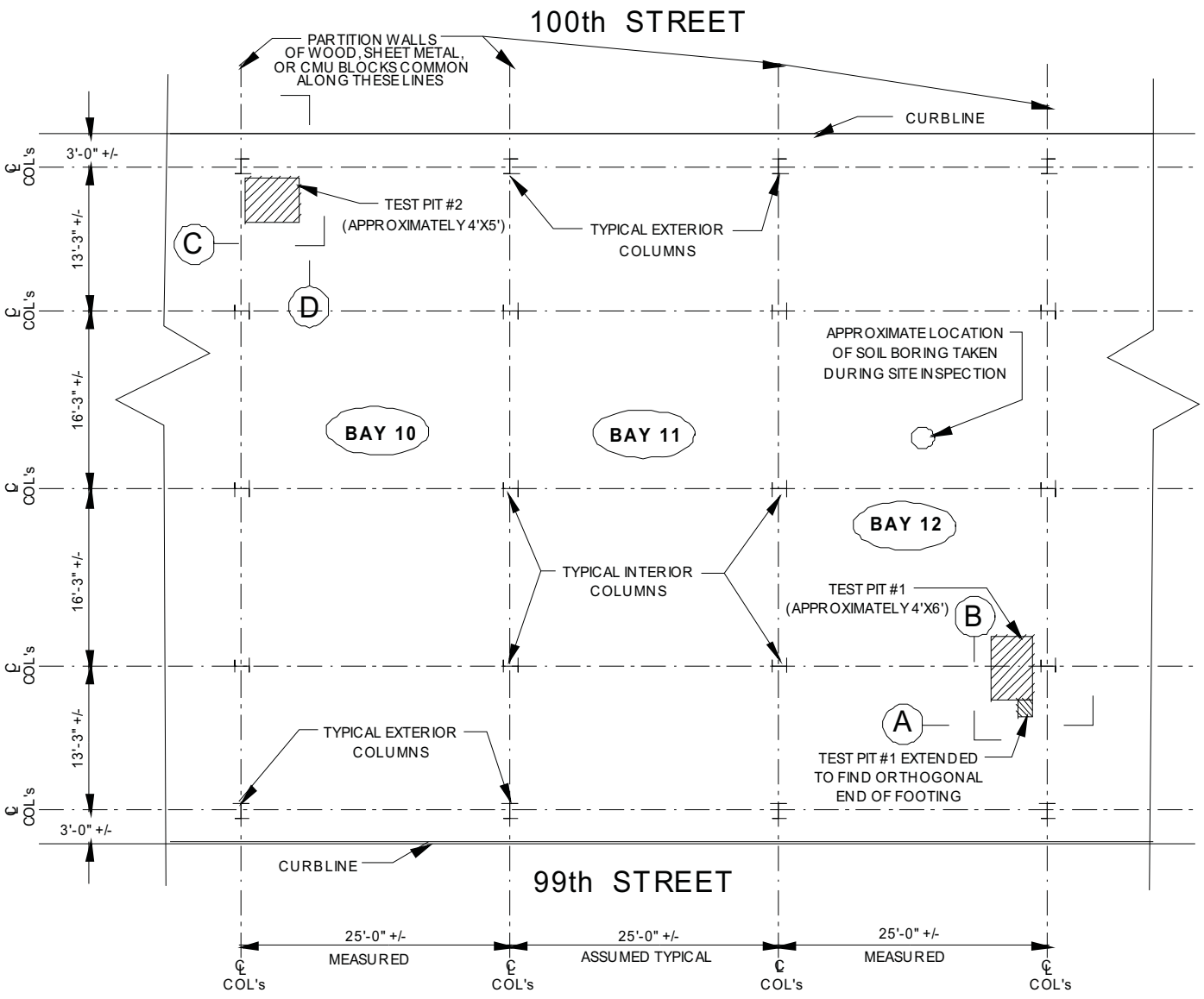
Recommendations & Comments : (cont'd)

It is not anticipated that the reduction in footing bearing capacity, due to reduced overburden, will exceed the live load capacity for which the elevated train structure was originally designed. Therefore the feasibility of operations is excellent so long as the existing footings are not undermined. It would behoove all parties to keep excavations above the bottom of footings unless absolutely necessary.

Sincere Regards,
ARTECNICS



Encl.: Drawings AECOZN-1, -2, & -3
Appendix: ENSR figures 1 & 4



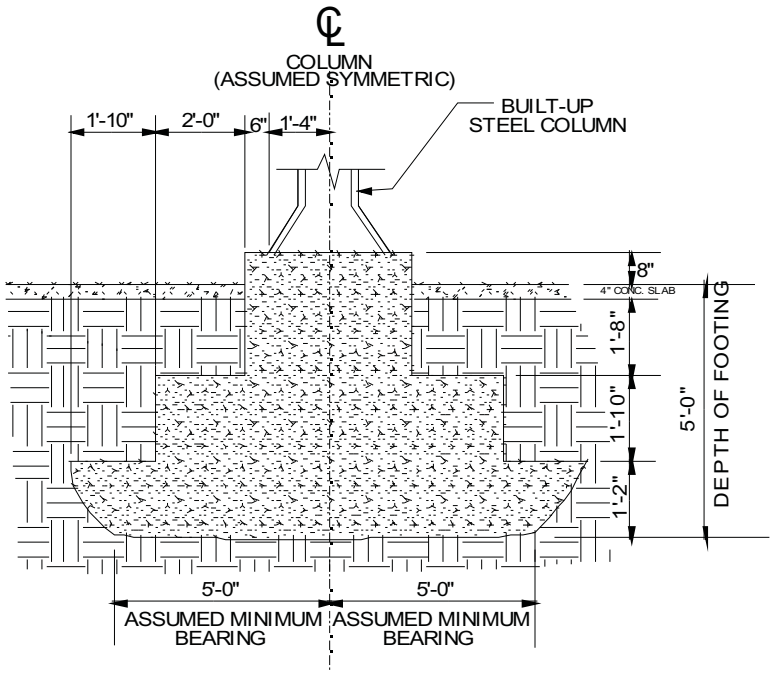
EXISTING COLUMNS; PLAN LAYOUT

0' 5' 15' 25'
GRAPHIC SCALE

NOTES:

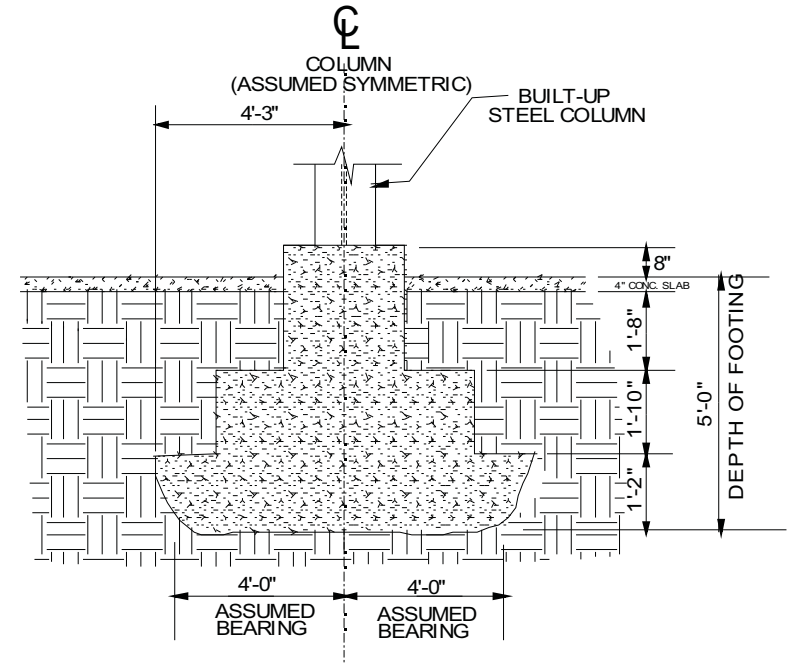
1. ALL INFORMATION IS PRELIMINARY AND APPROXIMATE.
2. BOTH TEST PITS (NUMBERS 1 & 2) WHERE EXCAVATED TO JUST ABOVE THE BOTTOM OF FOOTING ELEVATION AS VISUALLY ASSESSED. THIS ELEVATION WAS APPROXIMATELY 5'-0" BELOW THE TOP OF SLAB ELEVATION AT BOTH PIT LOCATIONS.
3. SOIL BORINGS WERE ACCOMPLISHED BY ENSR/AECOM EQUIPMENT FOR NON-STRUCTURAL PURPOSES. NEVERTHELESS, VISUAL INSPECTION OF SOILS TO A DEPTH OF 15' WAS CONDUCTED IN ORDER TO GET SOME ASSESSMENT OF SOIL STRENGTH AND OTHER PHYSICAL PROPERTIES.
4. FOR ANTICIPATED FOOTING SIZES AND FOUNDING DEPTH, SEE SECTIONS ON OTHER DRAWINGS.

FORMER OZONE INDUSTRIES, INC. OZONE PARK, NEW YORK, NY		
ENSR/AECOM PROJECT NO. 10748-001-0502		
ISSUE	ARTECNICS ENGINEERING	DRAWN BY D.L.
12/04/09		CHK'D BY ℄
ENSR/AECOM CORPORATION		
PART PLAN LAYOUT COLUMNS & TEST PITS		DWG. NO. AECOZN-1



INTERIOR COLUMN SECTION A

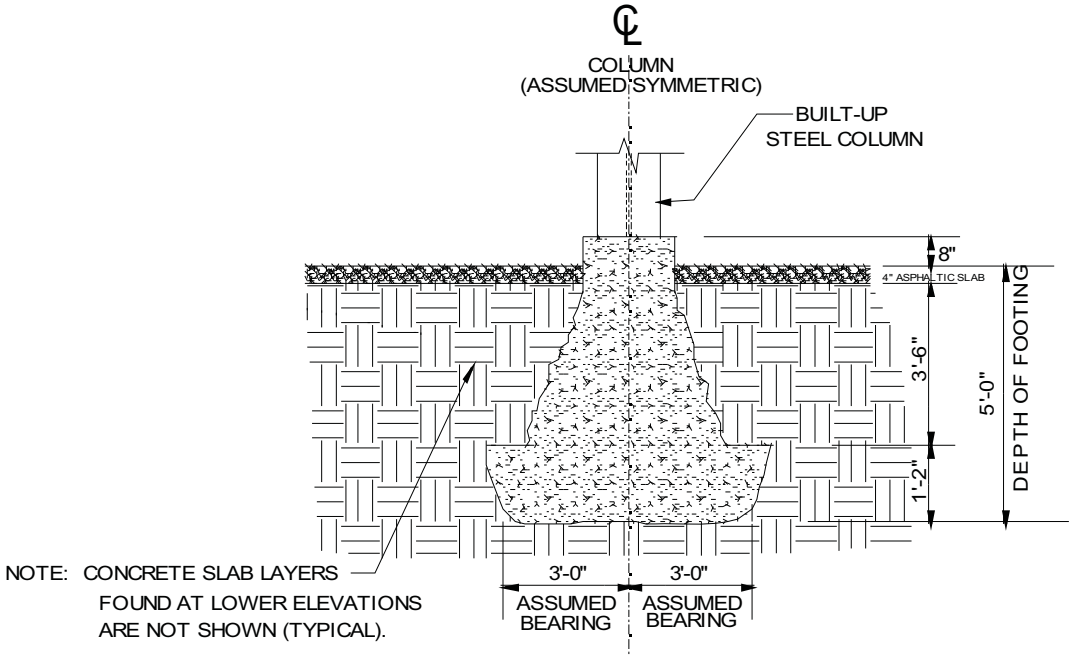
(PARALLEL TO ROADWAY)



INTERIOR COLUMN SECTION B

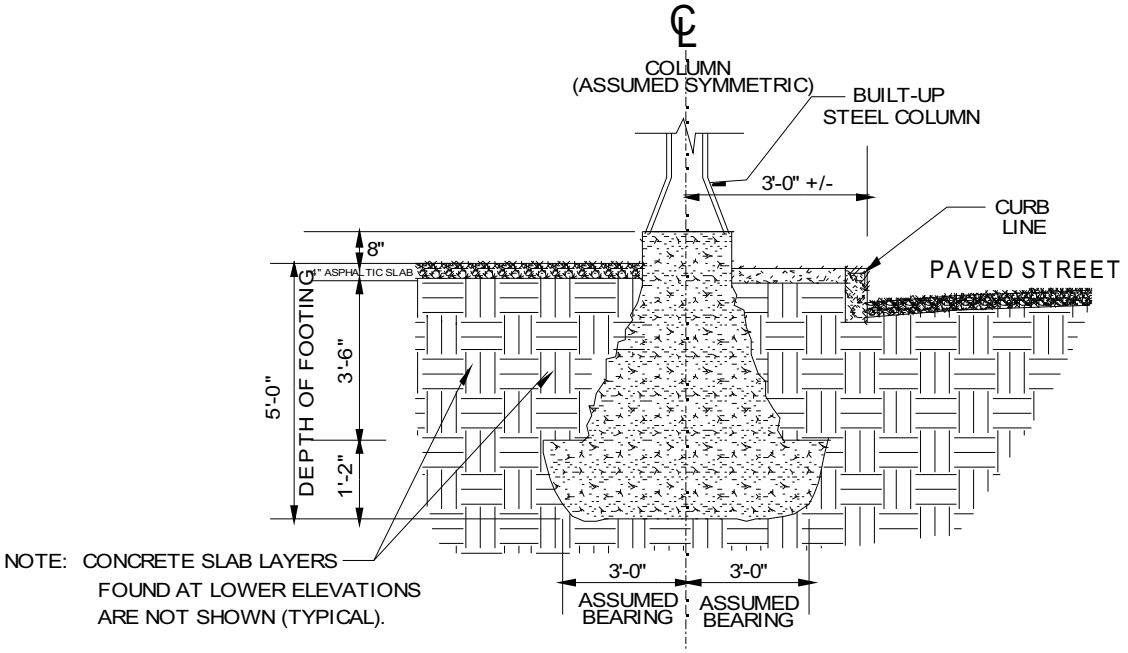
(PERPENDICULAR TO ROADWAY)

FORMER OZONE INDUSTRIES, INC. OZONE PARK, NEW YORK, NY ENSR/AECOM PROJECT NO. 10748-001-0502		
ISSUE	**ARTECNICS ENGINEERING**	DRAWN BY D.L.
12/04/09		CHK'D BY ℄
ENSR/AECOM CORPORATION		
INTERIOR COLUMN SECTIONS		DWG. NO. AECOZN-2



EXTERIOR COLUMN SECTION C

(PARALLEL TO ROADWAY)



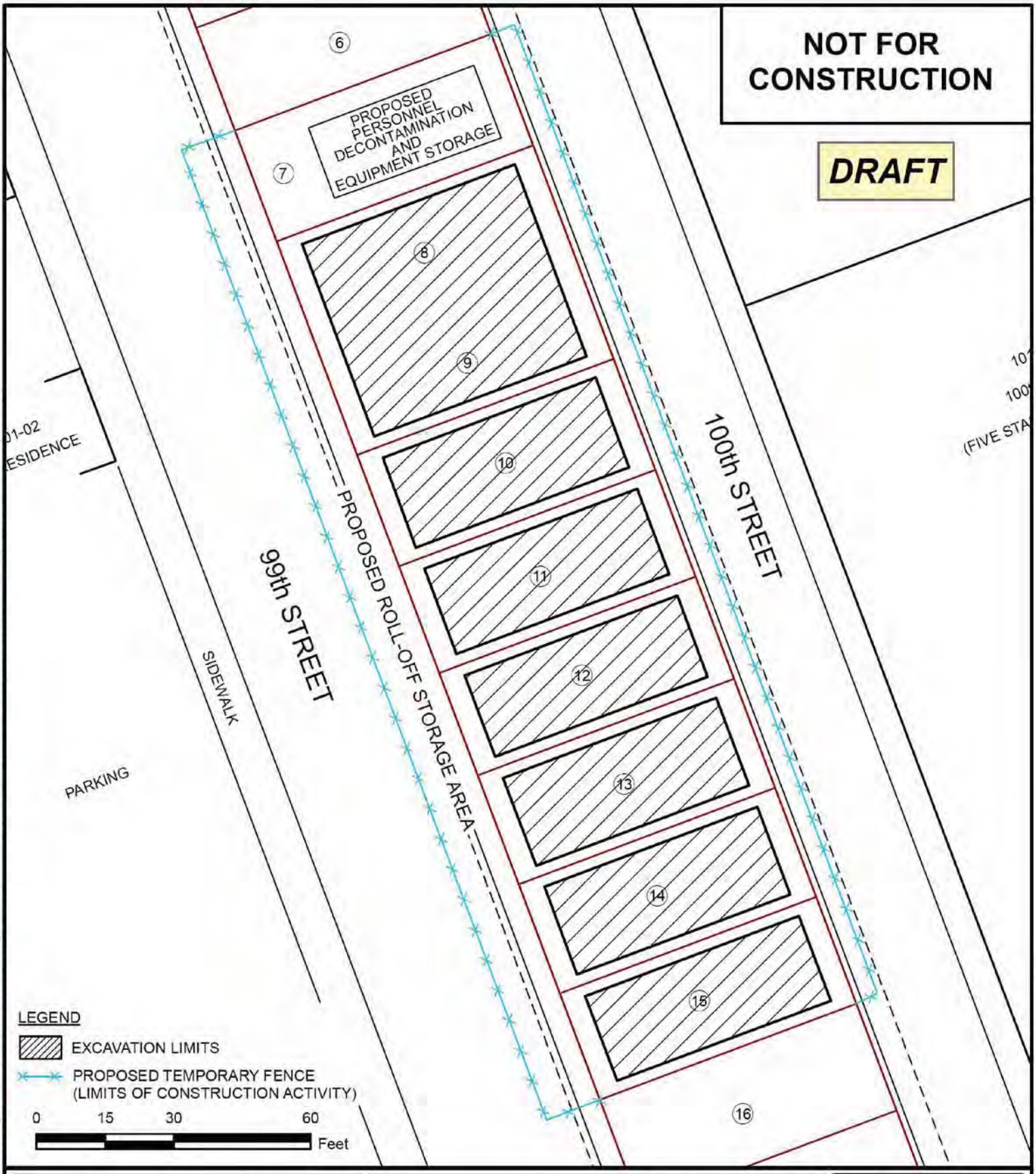
EXTERIOR COLUMN SECTION D

(PERPENDICULAR TO ROADWAY)

FORMER OZONE INDUSTRIES, INC. OZONE PARK, NEW YORK, NY ENSR/AECOM PROJECT NO. 10748-001-0502		
ISSUE	ARTECNICS ENGINEERING	DRAWN BY D.L.
12/04/09		CHK'D BY ℄
ENSR/AECOM CORPORATION		
EXTERIOR COLUMN SECTIONS		DWG. NO. AECOZN-3

APPENDIX

OZONE PARK
ENSR PROJECT 10748-001-0502



J:\Indl_Service\Project Files\BBA US Holdings\Ozone - Queens, NY\GIS\Projects\Interim Remedial Measure\Interim Remedial Measure - Conceptual Excavation Layout.mxd

ENSR | AECOM

ENSR CORPORATION
2 TECHNOLOGY PARK DRIVE
WESTFORD, MA 01886
PHONE: (978) 589-3000
WEB: WWW.ENSR.AECOM.COM

INTERIM REMEDIAL MEASURE CONCEPTUAL EXCAVATION LAYOUT

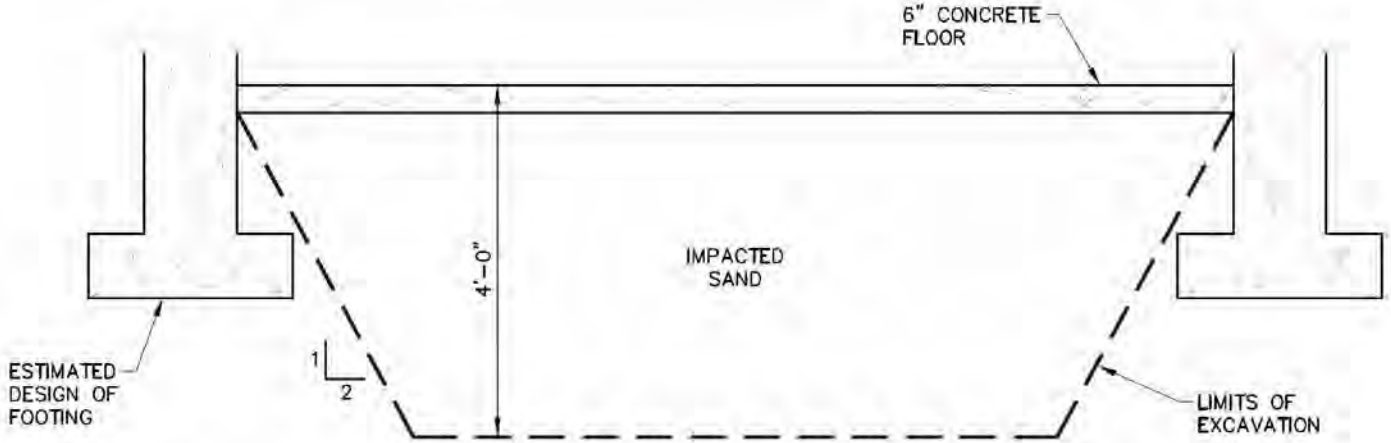
FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

Scale:	Date:	Project Number:
1' = 30'	5/08	10748-001-0502

Figure Number: **1**

Sheet Number: 1

FILENAME: 10748-001-01A.DWG



DRAFT
NOT FOR CONSTRUCTION

NOTES:

1. ALL DIMENSIONS ARE ESTIMATED AND WILL BE VERIFIED BY A STRUCTURAL ENGINEER.

NOT TO SCALE

ENSR | AECOM

ENSR CORPORATION
2 TECHNOLOGY PARK DRIVE
WESTFORD, MASSACHUSETTS 01886
PHONE: (978) 589-3000
FAX: (978) 589-3100
WEB: HTTP://WWW.ENSR.AECOM.COM

INTERIM REMEDIAL MEASURE
EXCAVATION CROSS-SECTIONAL AREA
FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

FIGURE NUMBER:
4

DRAWN BY:	DATE:	PROJECT NUMBER:	SHEET NUMBER:
K.P.B.	5/08	10748-001-0503	1

ARTECNICS
ENGINEERING CONSULTANTS
988 Tennessee Gas Road
Clifford Twp., PA 18470
PHONE (570) 909-8408

5 August 2011

AECOM Corporation
2 Technology Park Drive
Westford, MA 01886

AECOM Project #60138748.A.1; Ozone Park, NY; Phase 2 Report

Purpose:

The following reports Phase 2 findings regarding structural considerations of the referenced project. The scope of work is essentially defined as a structural effects review of AECOM draft drawings C-01 through C-03 , and M-01 through M-03, dated 6/30/2011 (as forwarded to ARTECNICS). Said review consists of evaluating the effects of the proposed excavations in and around an existing elevated train structure, previously part of the New York City train and subway system and currently abandoned/not in use. (It is significant to note that the structure is currently relieved of live load.) The engineering review assesses the capacity of structural columns, and the stability of excavation cuts subject to various anticipated loads. Also included as an attachment to this report is a suggested monitoring scheme to assess column movement and/or settlement.

Calculation Summary:

The general layout of the project site is taken per Phase 1 findings, and AECOM's drawings and information. (Dimensional information and CMU wall locations should be verified and shown on the AECOM final drawing set.) Soil properties are reduced from those assessed in Phase 1, i.e., in lieu of structural boring data. Surcharge loadings are assumed at "usual"/reasonable values. These include pedestrian assembly live loads [NYC Code] and equivalent HS-20 traffic loads [NYSDOT], but neither of these loadings end up as consequential. They either do not actually occur at the job site, or are at such a distance away from the excavation as to be of negligible effect. This conclusion is based on the construction fence line offsets shown on the AECOM drawings. Construction loads, both storage/equipment loads (200psf; see calc. set sheet #6, et c.) and construction vehicular loads (H-20, sheet #9, ibid.) are significant and are covered.

The bearing capacities of existing columns is assessed (sheet #14; ibid.) both in their current condition, and as they are anticipated to be during excavations (i.e., "worst case"; see Recommendations section for mitigation of "worst case" condition). Live load relief is calculated using the Cooper E80 loading (sheet #15; ibid.).

ARTECNICS 988 Tennessee Gas Road
ENGINEERING CONSULTANTS Clifford Twp., PA 18470
PHONE (570) 909-8408

Findings:

Interior column capacities are reduced by 49% due to the proposed depth of excavation (sheet #14, et c.; ibid.). This reduced capacity is offset by live load relief (i.e., there is no live load/train load currently imposed). The live load relief is assessed as approximately equal to the column capacity reduction (sheet #15; ibid.). Therefore the column capacity factor of safety on dead load (i.e., structural self weight) during operations is adequate and approximately equal to the LL+DL column capacity factor of safety of the original structure. Nevertheless, the recommended sequence of operations, i.e., backfilling the cut to 2' depth as the 4' excavation proceeds, is considered prudent (see Recommendations section). Exterior column capacities are reduced only by about 14% (sheet #16, et c.; ibid.). This is not considered a critical case.

Interior CMU partition wall footings were unavailable for inspection during Phase 1 and are not known. For reasonably assumed values of footing size and depth, their capacity is just adequate. Excavations "close" to these footings is not considered prudent. In lieu of a large volume of un-excavated material below and normal to these walls, they should be removed.

Excavation slopes were reviewed for stability with regard to assumed construction storage, equipment and vehicular loads. For the loads reviewed, the cut profile is more then adequate. AECOM should inform ARTECNICS if it anticipates loads higher then those assessed in the calculations.

Recommendations:

This is the final phase of structural review for this project. Therefore, recommendations are as specific as the available data permits. Our recommendations are as shown in the attached ARTECNICS drawings and as follows.

1. The maximum recommended excavation cuts are as shown on drawings AECOZN2-1 and AECOZN2-2 attached.
2. The recommended sequence of cuts and fills is noted on the drawing AECOZN2-1, and is intended to mitigate the 49% interior column capacity reduction derived in the calculations. Though the 51% remaining column capacity calculated is considered adequate, it is based on limited soils data. We see no reason not to take advantage of a simple procedure which can significantly increase the factor of safety for the work.
3. Reiterating a recommendation from the Phase 1 work, footing sizes and depths shall be assessed in real time during excavations. Any deviation from the footing

dimensions (including esp. depth and bearing area) shall be reported to an engineer for immediate review.

4. It is recommended that the CMU wall(s) be removed/demolished prior to excavations. The demolition contractor/sub-contractor shall be well experienced in such work, and shall submit a demolition procedure (including safety considerations, e.g., limited personnel in an active demolition area).

5. A program shall be set in place to monitor the movement of columns/footings effected by the work. A construction surveyor well experienced in such work shall setup and accomplish this work. A suggested minimum monitoring program is attached hereto.

6. A program for monitoring column movements shall be developed by the contractor's construction surveyor, and shall consist at a minimum of the following:

A) One half of all interior columns shall be fit with tilt-angle gages that indicate any rotations of the column. Two gages, one for each orthogonal direction, are required at each column monitored. Said gages should be set in a scribed and/or set orientation, i.e., so that it can be re-set in case of being accidentally moved or dislodged.

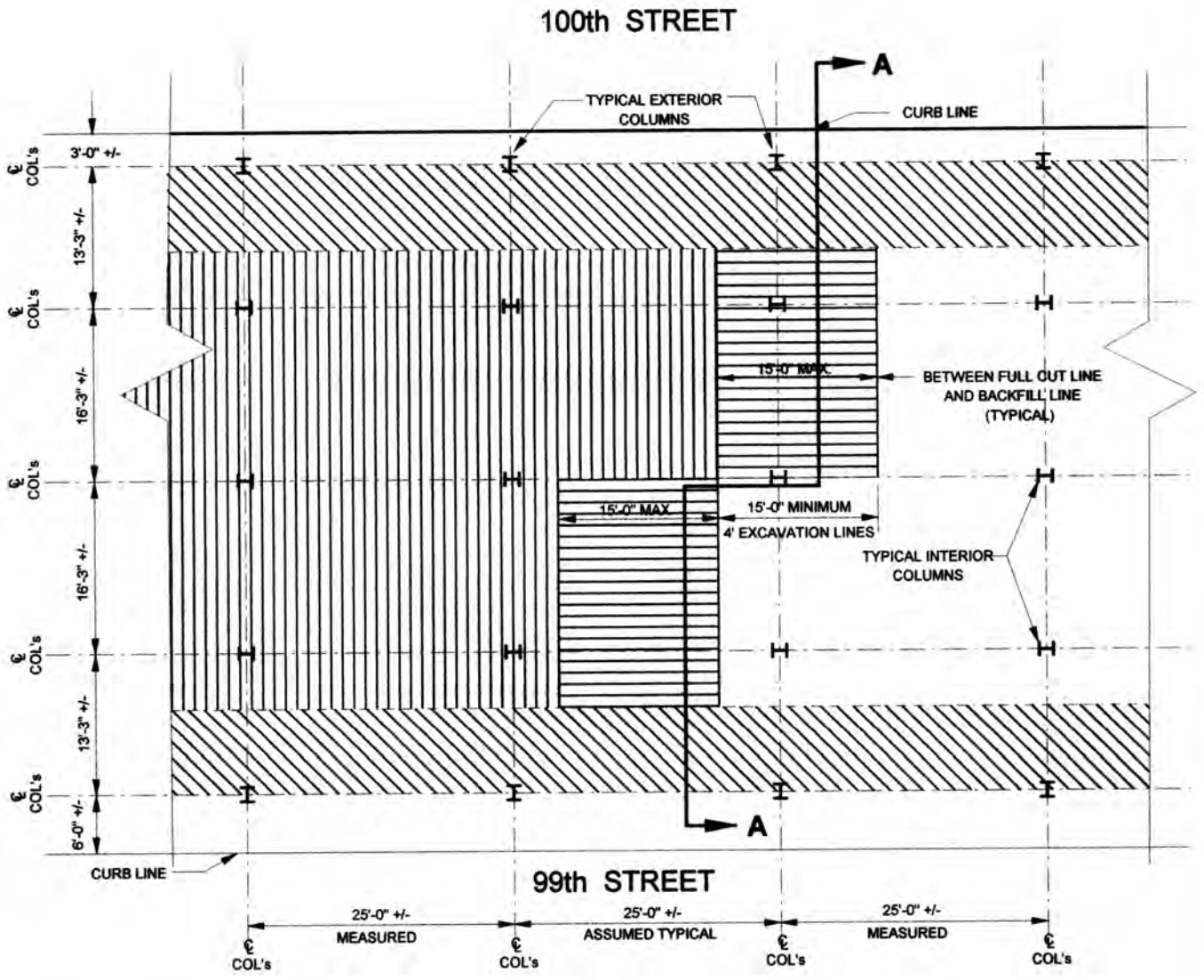
B) One quarter of exterior columns shall be similarly monitored.

C) The same number of interior and exterior columns shall be monitored for vertical (i.e., up and down) movement by standard surveying methods.

Sincere Regards,
ARTECNICS



Encl.'s: Calculations: Sheets 1-20
Drawings AECOZN2-1, & -2



TYPICAL EXCAVATION & BACKFILL SEQUENCING

0' 5' 15' 25'
GRAPHIC SCALE

UNEXCAVATED AREAS

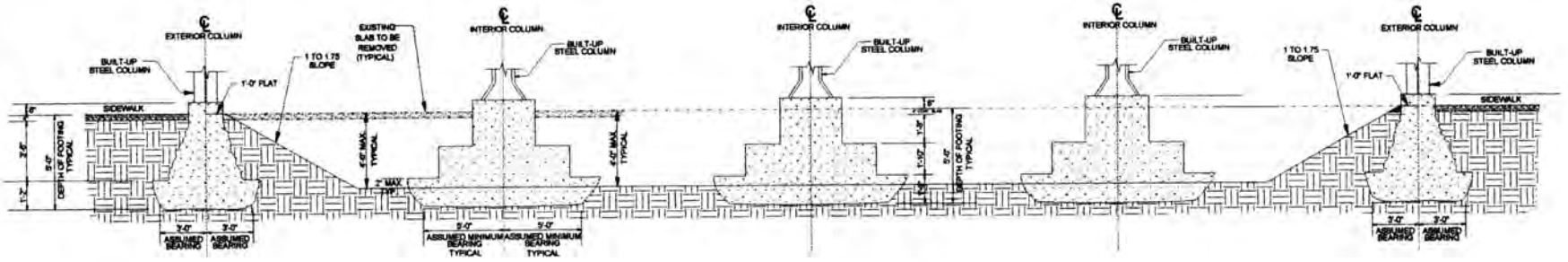
4'-0" MAX. EXCAVATION

4'-0" EXCAVATION WITH 2'-0" COMPACTED BACKFILL

"SLOPED" EXCAVATION (SEE OTHER DWG's)

LEGEND

FORMER OZONE INDUSTRIES, INC. **OZONE PARK, NEW YORK, NY** AECOM PROJECT NO. 60138748.A.1		
ISSUE 08/08/11	**ARTECNICS ENGINEERING**	DRAWN BY D.L. CHK'D BY ℄
AECOM CORPORATION		
CUT & FILL SEQUENCING		DWG. NO. AECOZN2-1



SECTION A-A

(NOTE THAT THIS SECTION IS NOT COLINEAR)

5' 15' 25'

GRAPHIC SCALE

NOTE THAT THE LONG SECTION (PROJECT NORTH TO SOUTH) IS SIMILAR. BE SURE TO WORK WITH THE SEQUENCING SCHEME SHOWN ON AECOZN1-1. EXCAVATION TO 4'-6" ALL AROUND ANY COLUMN IS NOT PERMITTED.

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

AECOM PROJECT NO. 60138748.A.1

ISSUE 08/08/11

ARTECNICS ENGINEERING

DRAWN BY D.L.

CHK'D BY

AECOM CORPORATION

SECTION A-A

DWG. NO. AECOZN2-2

BY E

OZONE PARK / AECOM
STRUCTURAL REVIEW

References:

1) AECOM Project # 60138748.A.1 Drawings T-01, C-01, C-02, C-03, M-01, M-02, & M-03
2) ARTECHICS Phase 1 Report Dated 1 Dec, 2009 [AECOM Proj # 10748-001-0502].

Purpose:

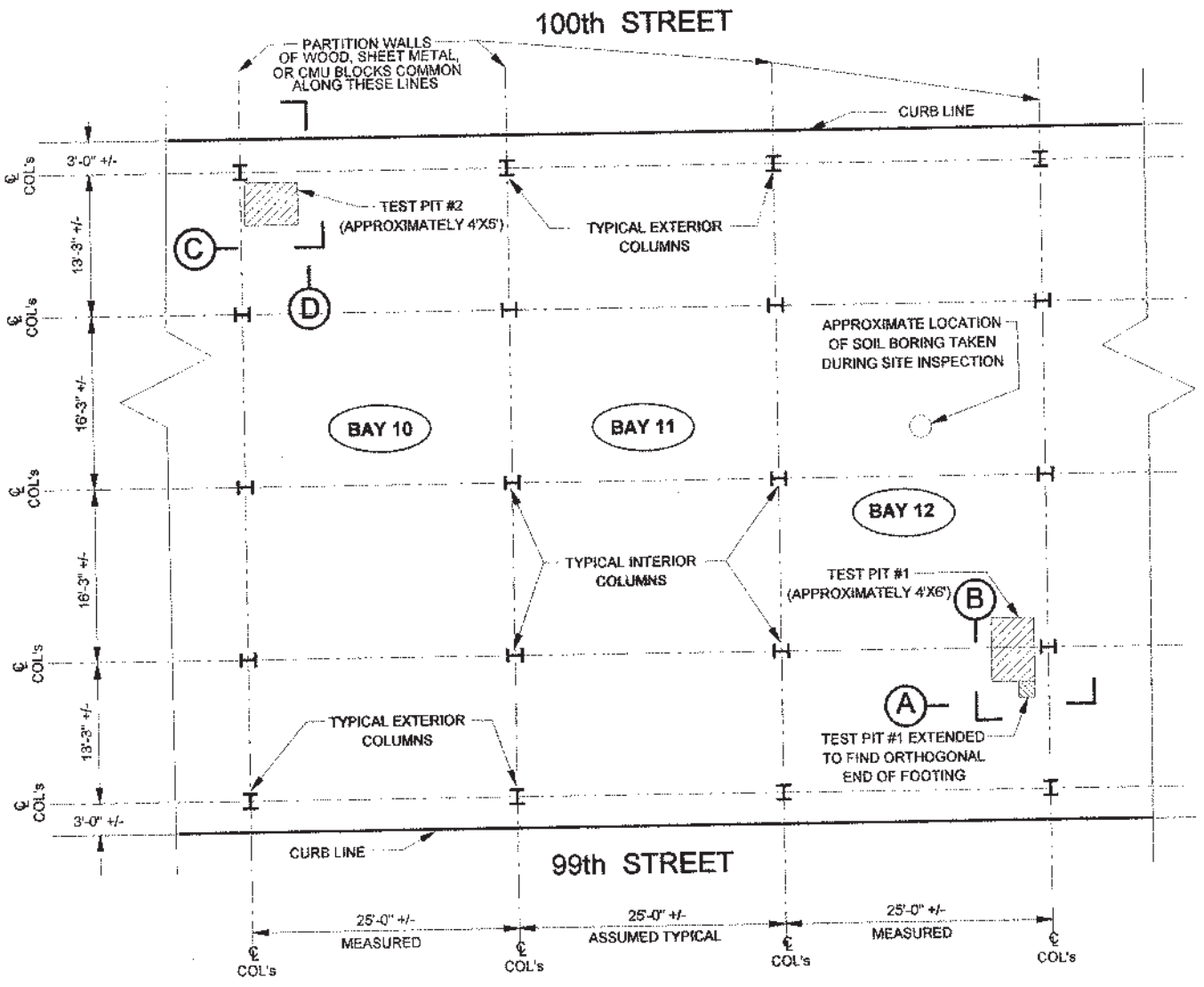
AECOM's Remedial Work Requires Excavations That Effect Structural Elements At "Former Ozone Industries, Inc." Project Site. The Following Reviews These Effects, Including Those On Existing Column Footings, Curbs & Sidewalks, Roadways, and CMU Wall(s). Recommendations For Excavation Extents Are Derived via The Analyses Presented.



General Layout

The General Structural Layout Is Assumed As Shown In Ref # 2, Drawings AECOZN-1 Thru AECOZN-3 [Incorporated Herein As Sheets 2-4], And Ref # 1 Drawing C-02 [Sheet # 5 Herein]. Note That The Project Fence Shown on Sheet # 5 Following Has Been Marked-Up To Show The Anticipated Offset Dimensions From The Exterior Column Lines & Curb Lines. AECOM Shall Verify The Fence Line Dimensions Relative To The Existing Structures.

Note That Excavations Are Limited To Bays (8) Through (15). Though Not Shown In Either Reference, Ref # 2 Notes That At least One CMU Wall Exists; This Wall (And Perhaps Others) Spans Between Exterior Columns [Project East-West Direction]. The Known Wall Is Between Bays (9) & (10).



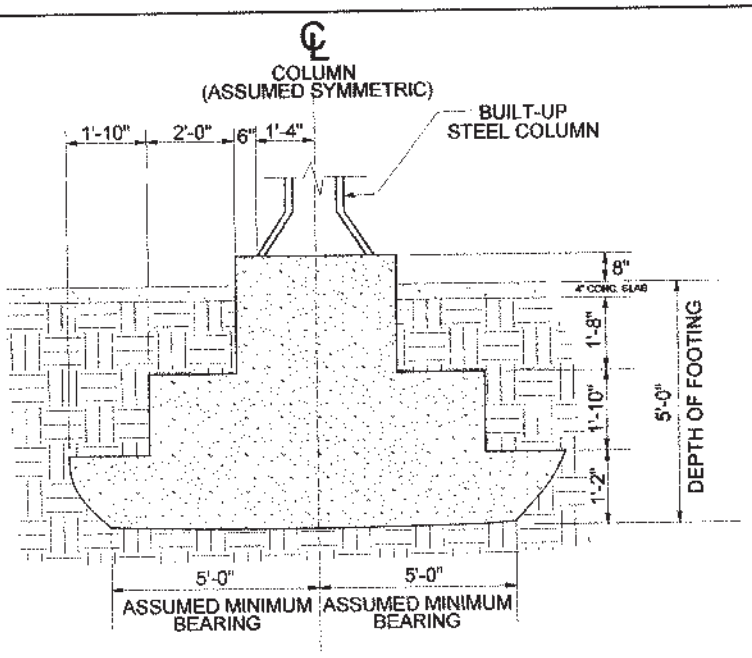
EXISTING COLUMNS; PLAN LAYOUT

0' 5' 15' 25'
GRAPHIC SCALE

NOTES:

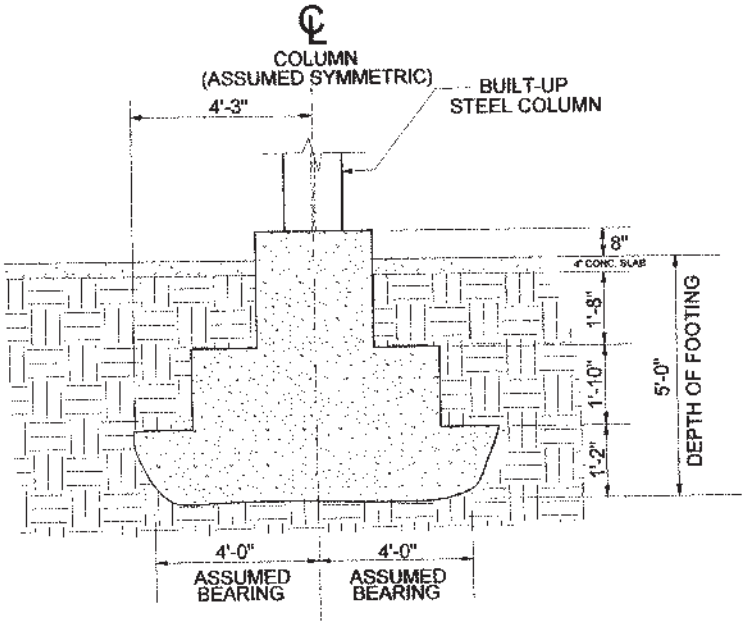
1. ALL INFORMATION IS PRELIMINARY AND APPROXIMATE.
2. BOTH TEST PITS (NUMBERS 1 & 2) WHERE EXCAVATED TO JUST ABOVE THE BOTTOM OF FOOTING ELEVATION AS VISUALLY ASSESSED. THIS ELEVATION WAS APPROXIMATELY 5'-0" BELOW THE TOP OF SLAB ELEVATION AT BOTH PIT LOCATIONS.
3. SOIL BORINGS WERE ACCOMPLISHED BY ENSR/AECOM EQUIPMENT FOR NON-STRUCTURAL PURPOSES. NEVERTHELESS, VISUAL INSPECTION OF SOILS TO A DEPTH OF 15' WAS CONDUCTED IN ORDER TO GET SOME ASSESSMENT OF SOIL STRENGTH AND OTHER PHYSICAL PROPERTIES.
4. FOR ANTICIPATED FOOTING SIZES AND FOUNDING DEPTH, SEE SECTIONS ON OTHER DRAWINGS.

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12/04/09		CHK'D BY ℄
ENSR/AECOM CORPORATION		
PART PLAN LAYOUT COLUMNS & TEST PITS		DWG. NO. AECOZN-1



INTERIOR COLUMN SECTION (A)

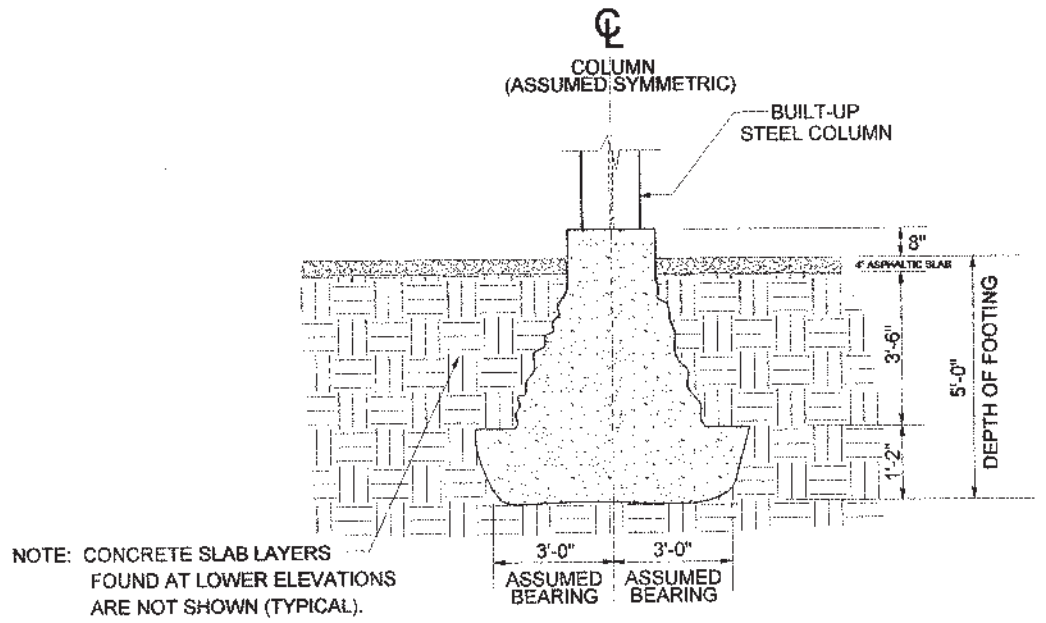
(PARALLEL TO ROADWAY)



INTERIOR COLUMN SECTION (B)

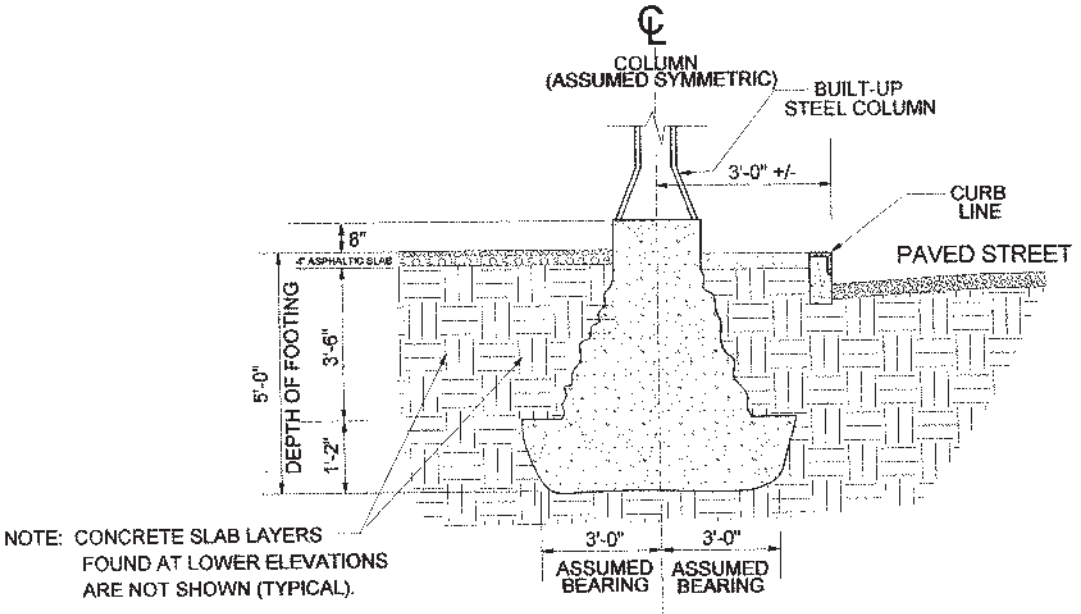
(PERPENDICULAR TO ROADWAY)

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ISSUE 12/04/09	ARTECNICS ENGINEERING	DRAWN BY D.L. CHK'D BY ℄
ENSR/AECOM CORPORATION		
INTERIOR COLUMN SECTIONS		DWG. NO. AECOZN-2



EXTERIOR COLUMN SECTION C

(PARALLEL TO ROADWAY)

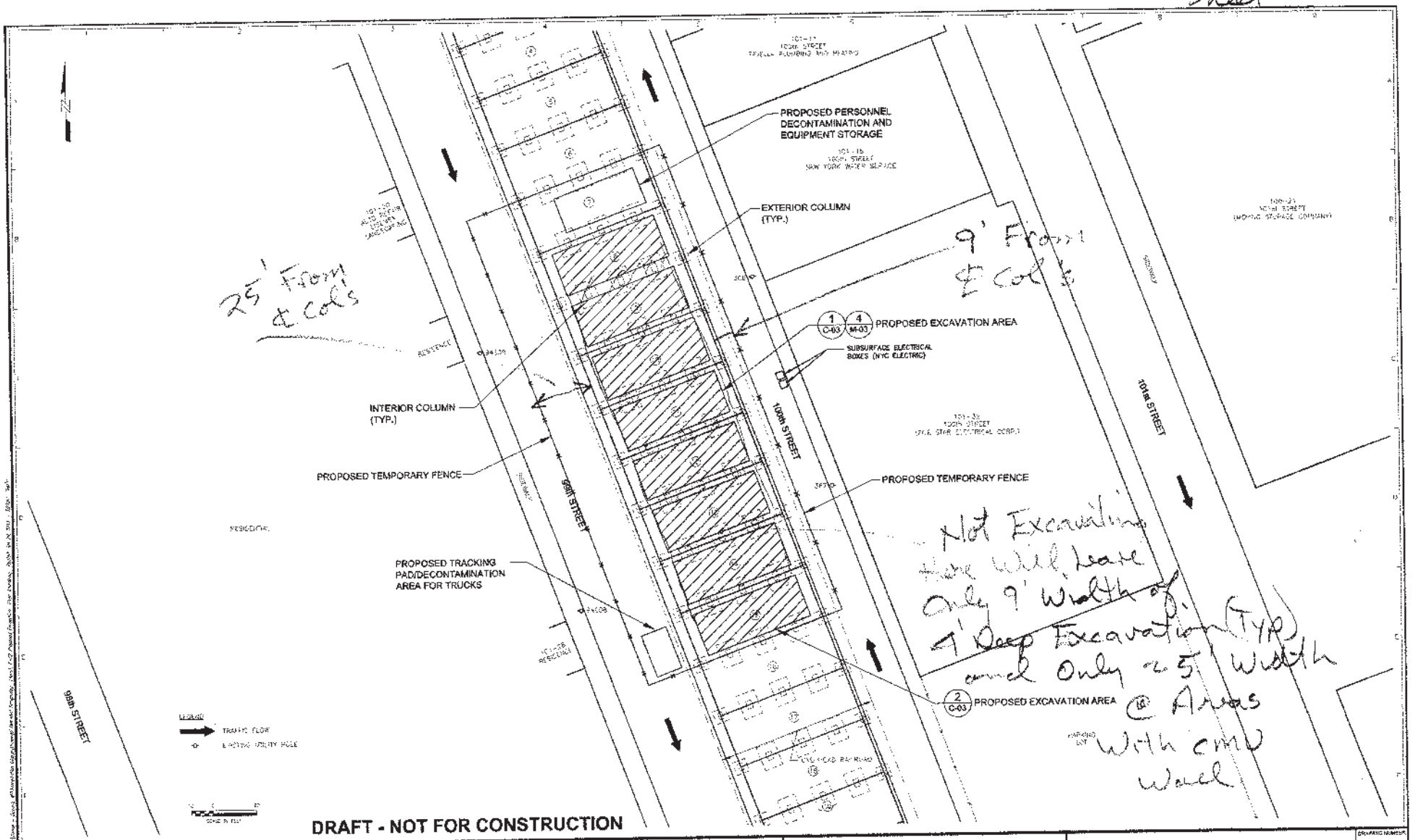


EXTERIOR COLUMN SECTION D

(PERPENDICULAR TO ROADWAY)

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ENSR/AECOM CORPORATION		
EXTERIOR COLUMN SECTIONS		DWG. NO. AECOZN-3

Sheet #5



DRAFT - NOT FOR CONSTRUCTION

NO.	DESCRIPTION	ISSUE DATE	APP'D DATE
0	SEE SOW/TO 13 ISSUED FOR DRAFT		

AECOM

AECOM
5 CENTERPOINTE DRIVE
LAKE SUCCESS, NEW YORK 11042-2300

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, NEW YORK, NY

PROJECT NUMBER 60136748.A.1 | DATE 08/30/2011

PROPOSED EXCAVATION PLAN

DRAWING NUMBER C-02

SHEET NUMBER

REVISION 0

General layout (Cont'd)

Note That The Maximum Depth Of Excavation Considered Herein Is 4'-0" Max. [c.f. Ref # 1].

Surcharge Loads

Sidewalk Loads:
Taken @ 100 psf [NYC Code]

Roadway Loads:
Taken @ 250 psf [NYSDOT "Typical" Equiv. Load For Slope Stability.]

Also, Wheel Loads Taken @ AASHTO HS-20 For Areas Where Traffic Is "Close" To Excavation Lines. "Close" Shall Mean Wheel Loads Within 6'-0" Of Any Excavation Line.

See Sheet #9 For Assumed Location Of Truck Wheel Loads

Construction Load: Storage/Equipment Load Surc. = 200 psf (AECOM To Verify)

Soil Properties

There Is Little Soils Data Available For The Project. The Approximate Values Noted In Ref # 2 Could Be Used, But, Due To Lack Of Confirming Data, The Following More Conservative Values Will Be Used...

Take:

$$\gamma_s = 120\ lb/ft^3$$

$$c = 0 \quad ; \quad \phi = 30^\circ$$

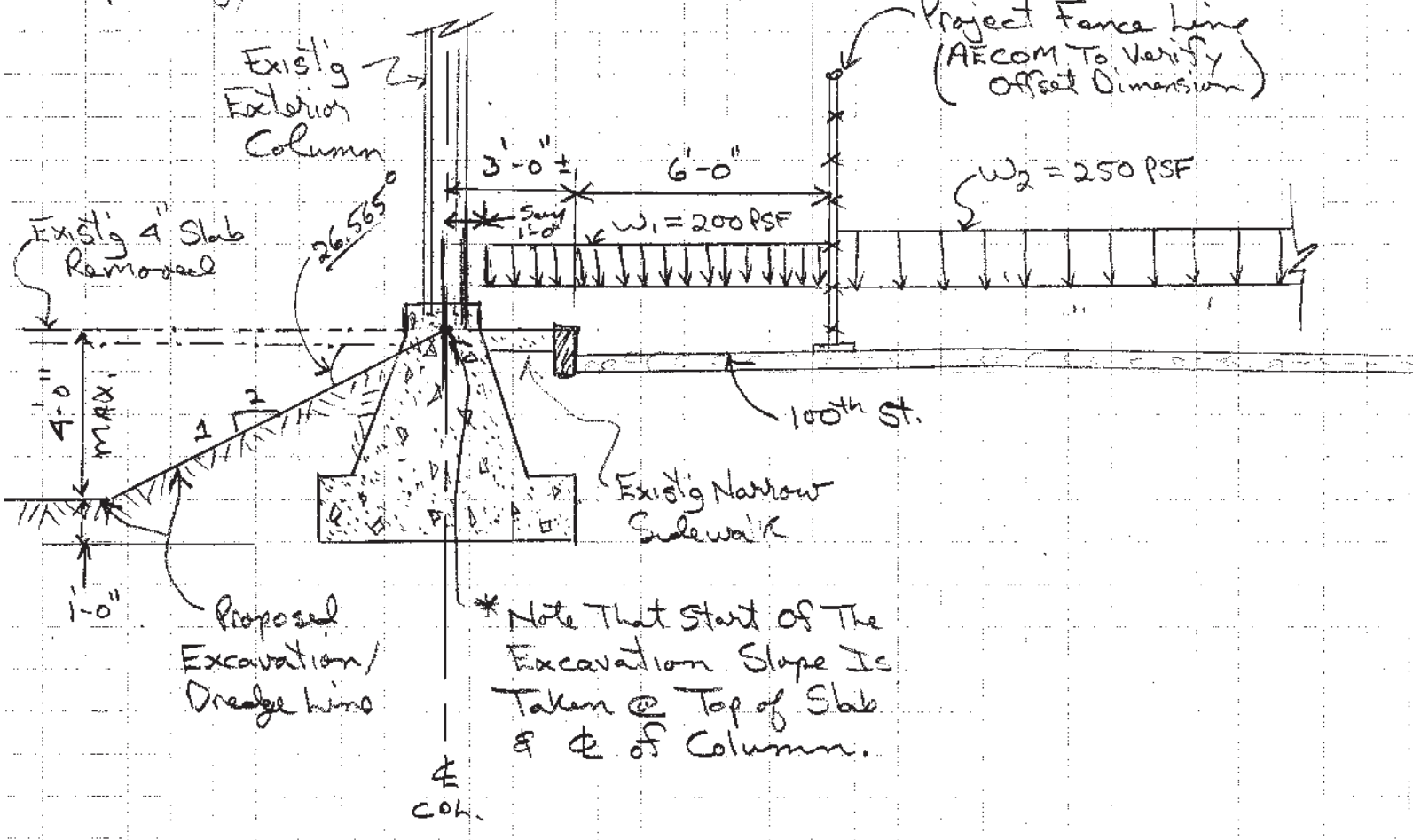
$$K_a = .333 \quad ; \quad K_p = 3.00 \quad [\text{Rankine}, \beta = 0^\circ]$$

∇ WT @ 30' Below Grade [For AECOM Info]

Slope Stabilities:

At 100th Street:

Loading Section:



W_1 = Construction Storage/Equipment Load (Starts @ 1'-0" From Col. ℄)

W_2 = HS 20 "Equivalent" Traffic Surcharge Load

Analysis:

For The Project Fence Line offset Assumed, The Traffic Surcharge Loading, w_2, Has Negligable Effect on The Stability Of The Excavation Slope.

For w_1 ...

Take $b/B = \frac{1}{8} = .125$

$\phi = 30°$; $c = 0$

$\beta = 26.565°$

$D/B = 0$

} And Treat as Equivalent Footing / Bearing Capacity Problem... (Simplified Approach)

Then, ... [About 60% of N_γ For Local Shear ok]

$N_{\gamma_7} \cong 3.0$ & $q_{ult} \cong \frac{1}{2}(.12)\,8\,(3) = \underline{1.44 \text{ KSF}}$

vs 0.20 KSF

Take "Actual" F.S. $\cong (0.5)\,\frac{1.44}{.2} = \underline{3.6}$ ok

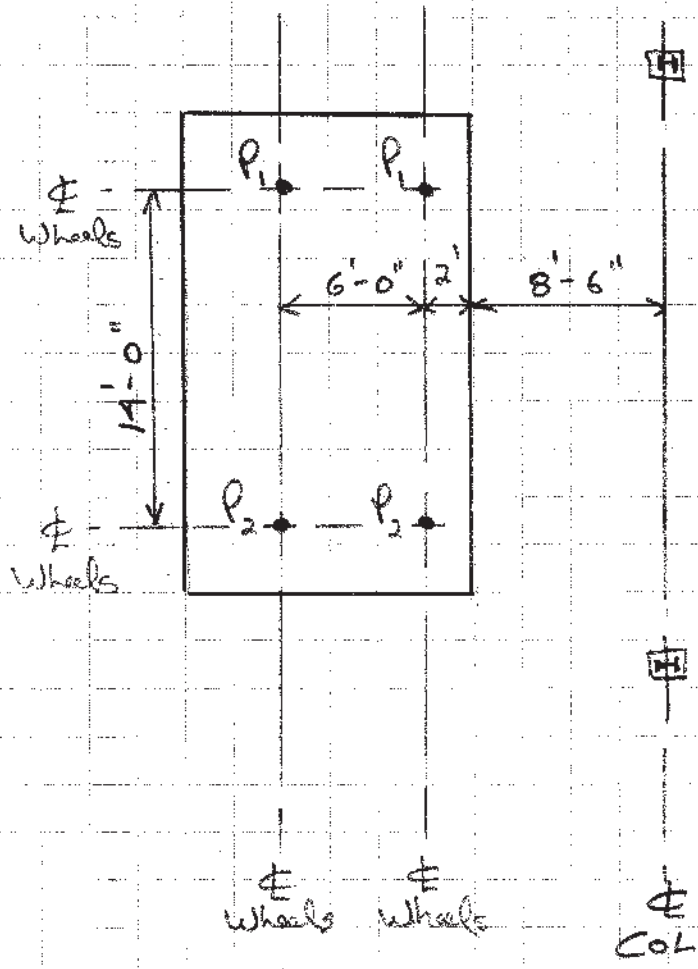
... And Considered Conservative

At 99th Street:

For The Storage Equipment Surcharge Load, The Analysis Results Are Similar To Those of 109th St. (Note That The Project Fence Offset Dimension Is Estimated @ 25'-0" ± From The ℄ of Exterior Columns In This Area - Please Verify.)

Ref# 1 Indicates An Area Where Construction Truck Loads ("Tracking Pad/Decontamination Area For Trucks", As Shown On Dwg C-02, ibid.) This Condition Must Be Treated Differently....

The "Pad" Shown In Ref# 1 Is Estimated @ ± 12' x 20', With Its "Near" Edge @ ± 3'-6" From The ℄ of Exterior Columns (i.e., ⊥ To Roadway Direction). Taking Wheel Loads As Point Loads, The Following Plan Layout Of Loads Is Assumed:



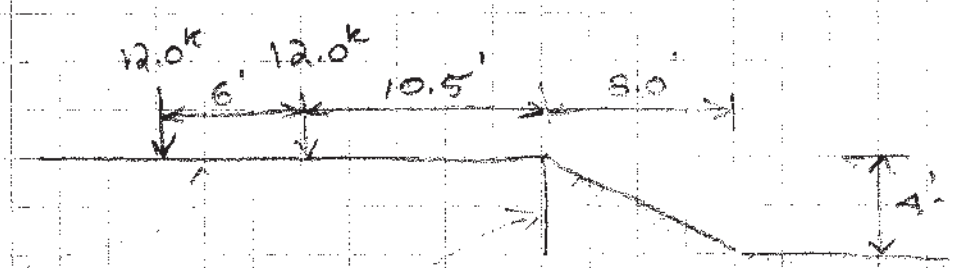
$P_1 = 4.0$ Kips
$P_2 = 12.0$ Kips
} AASHTO H-20 TRUCK

$\Sigma F_V = 2(4+12) = \underline{32.0^k}$

Note That The Location ⊥ To The Column Line Does Not Effect The Load On The Excavation Slope

* AECOM To Verify The Truck Wheel Loads Assumed esp. w/r/t The 24.0^k Axle.

...Calc. The Pressures In The Vertical Plane Colinear With The Column ℄'s. (Take ≤ P₂'s As Uniform)...



Calc Pressures On This Plane

Any Spread of Load Due To "Pad" Is Neglected - Conservative

For Pressures ⊥ To P_2's, $\sigma_h = \sigma_{h\,max}$

$$\sigma_{h_{max}} = \frac{1.77\,V}{H^2}\,\frac{m^2n^2}{(m^2+n^2)^3}$$

[Ref. Theory of Elasticity Solution See Foundations Analysis & Design J.E. Bowles 1968; "Unyielding" Plane]

For "Near" P_2:

@ $z = 0.5'$: $m = \frac{10.5}{4} = 2.625$

$n = \frac{.5}{4} = 0.125$ (1.3275 @)

$$\sigma_{h_{.5}} = \frac{1.77\,(12)}{4^2}\,\frac{(2.625)^2(.125)^2}{(2.625^2+.125^2)^3} = .00043\ KSF \ll$$

@ $z = 1.0'$; $m = 2.625$ & $n = 0.25$

$$\sigma_{h_{1.0}} = (1.3275)\,\frac{(2.625)^2(.25)^2}{(2.625^2+.25^2)^3} = .00170\ KSF$$

@ z = 2' ; m = 2.625 & n = 3/4 = .5

$$q^n_{h_{2.0}} = (1.3275)\frac{(2.625)^2(.5)^2}{(2.625^2+.5^2)^3} = .00628 \text{ ksf}$$

@ z = 3' ; m = 2.625 & n = 3/4 = .75

$$q^n_{h_{3.0}} = (1.3275)\frac{(2.625)^2(.75)^2}{(2.625^2+.75^2)^3} = .01243 \text{ ksf}$$

@ z = 4' ; m = 2.625 & n = 1.0

$$q^n_{h_{4.0}} = (1.3275)\frac{(2.625)^2}{(2.625^2+1)^3} = .01461 \text{ ksf}$$

For The "Fan" P_2:

@ z = 1.0 m = 16.5/4 = 4.125 & n = 0.25

$$q^f_{h_{1.0}} = (1.3275)\frac{(4.125)^2(.25)^2}{(4.125^2+.25^2)^3} = .00028 \text{ ksf}$$

@ z = 2.0 ; n = .5

$$q^f_{h_{2.0}} = (1.3275)\frac{(4.125)^2(.5)^2}{(4.125^2+.5^2)^3} = .00110 \text{ ksf}$$

@ z = 3.0 ; n = .75

$$q^f_{h_{3.0}} = (1.3275)\frac{(4.125)^2(.75)^2}{(4.125^2+.75^2)^3} = .00284 \text{ ksf}$$

@ z = 4.0 ; $n = 1.0$

$$\sigma_{h_{4.0}} = (1.3275)\frac{(4.125)^2}{(4.125^3+1)^3} = .00386 \text{ KSF}$$

CONSERVATIVE

... Considering Only The Maximum $\Sigma \sigma_h$ ⊥ To Point Loads P_2 ...

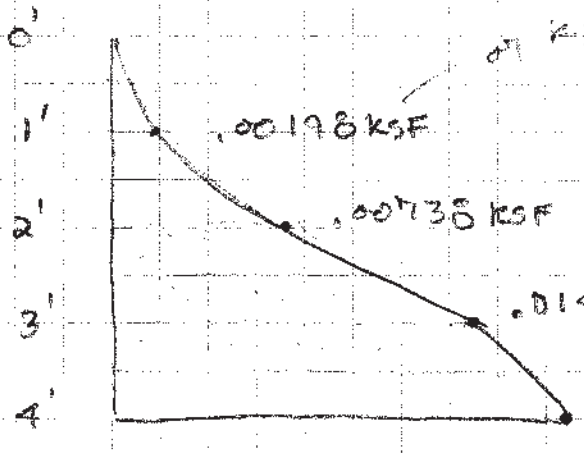
$$\Sigma \sigma_{h_{1.0}} = .00170 + .00028 = \underline{.00198 \text{ KSF}}$$

$$\Sigma \sigma_{h_{2.0}} = .00628 + .00110 = \underline{.00738 \text{ KSF}}$$

$$\Sigma \sigma_{h_{3.0}} = .01243 + .00234 = \underline{.01477 \text{ KSF}}$$

$$\Sigma \sigma_{h_{4.0}} = .01461 + .00386 = \underline{.01847 \text{ KSF}}$$

... OR ...



$$\Sigma p_h \leq \underline{0.010^K/ft}$$

Check vs $S = 8(4)\left(\frac{1}{2}\right)(0.12)\left(\tan\left[\frac{2\phi}{3}\right]\right) = \underline{0.699 \, K/ft} > .01^K$ ($\phi = 30°$)

... And The Excavation Slope Is Stable Under These Conditions

ok

* AECOM To Assure Nearest Wheel @ 10' From Columns

ok

Stability @ CMU Wall(s):

Take The CMU Wall As A Line Load

$$P_L = (.8)(.12)\,18 = \underline{1.73^k/_{ft}}$$

...Using The Method of Sheet #8 Herein, Take...

$$b/B = \frac{.5}{1} = 0.50$$

$$\phi = 30^\circ \; ; \; c = 0$$

$$\rho = 26.565^\circ$$

$$D/B = 0 \; ; \; B \approx 1.0$$

Then, ... $N_{\gamma q} = 7.0$ & $q_{ult} = \frac{1}{2}(.12)(1.0)(7) = 0.42\ ksf$

$0.42\ ksf < 1.73\ ksf$

X N.G.

...And It Is Recommended That Any CMU Walls Be Removed / Demolished By A Contractor Experienced In Such Work.

Bearing Capacity of Existing Columns

Reduction of Bearing Capacity Due To Excavation:

For Interior Footings [5'x10' Nom.], By Terzaghi Method.

Take, Prior To Excavation...

CONSERVATIVE → $N_c = 0$; $c = 0$

$\phi = 25°$ → $N_\gamma = 22.5$, $N_q = 19.7$

$D = 5.0$

$\gamma = .12^k/ft^3$

$q_{ult} = 5(.12)22.5 + .9(.12)9(19.7) = \underline{22.0\ ksf}$ (Ave.)

$q_a = \frac{22.0}{2.5} = \underline{8.80\ ksf}$ (F.S. ↗)

...And, After Excavation... (5'-4")

$q_{ult} = 1(.12)22.5 + .9(.12)9(19.7) = \underline{11.21\ ksf}$

$q_a = \frac{11.21}{2.5} = \underline{4.48\ ksf}$

or ≈ 51% of Pre-Excavation Value

Footing Capacity @ $\Sigma F_v = 4.48(80sf) = \underline{358.4^k}$

From Ref# 2, Take Contributing Load Area @

$A_f \cong 25(16.25) = 406.25\ ft^2$

Max Allowable Structural Wgt $\cong \frac{358.4}{406.25} = \underline{0.882^k/ft^2}$

or $882^{lb}/ft^2$

BY C

OZONE PARK / MECOM STRUCTURAL REVIEW

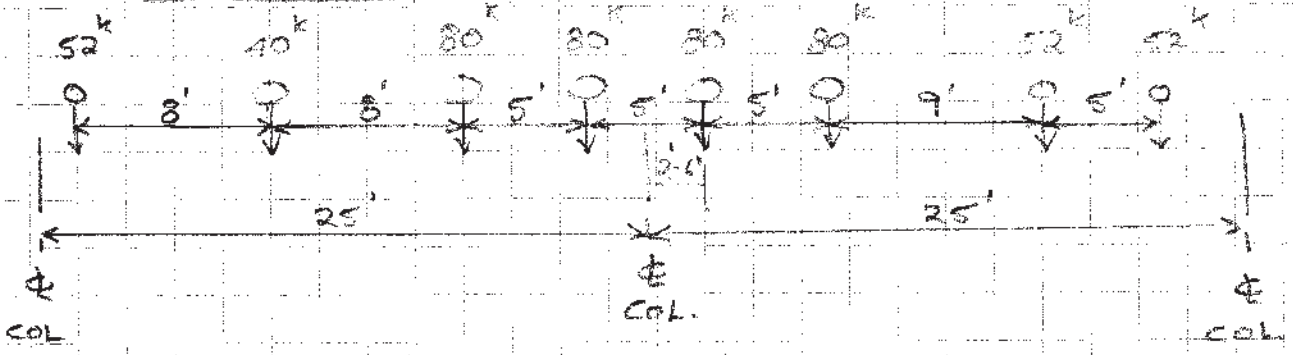
Sheet # 15

This Is A Rather High Allowable Value, And It Is Very Unlikely That The Existing Structure Exceeds This Value. It Cannot Reasonably Be Checked w/o As-Built Drawings. Monitoring Of Column Axial Loads & Settlements Is Required In Any Event.

Previous LL / LL Relief:

Assume A Full Cooper E80 Load Along Any / Every Interior Column Line ...

COOPER E80 LOAD (PARTIAL)



Take $R_{col\ max} = \left[2\left(\frac{25-2.5}{25}\right) + \left(\frac{25-7.5}{25}\right)2\right]80 + \left(\frac{25-15.5}{25}\right)40$

$+ \left[\left(\frac{25-23.5}{25}\right) + \left(\frac{25-16.5}{25}\right) + \left(\frac{25-21.5}{25}\right)\right]52 = 297.28^k$ w/o Impact

With Impact, Say 350^k to 400^k ...

Versus

$(8.8-4.8)80 = \underline{345.6^k}$ Column Capacity Reduction Due To Excavation

... And The Reduction Is ≈ To The LL Relief

Say Ok

For Exterior Footings [6'×6', Nom.]

Prior To Excavations:

$N_c = 0$; $c = 0$

$N_q = 22.5$

$N_\gamma = 19.7$; $\gamma = 120^{lb}/ft^3$

$D = 5'$

$\phi = 30°$

$q_{ult} = 5(.12)22.5 + .4(.12)6(19.7) = \underline{19.17 ksf}$

Say $q_a = \frac{19.17}{2.5} = \underline{7.67 ksf}$

After Excavation These Columns Still Have Full Overburden From Their ℄'s Toward The Roadway and ≈ Half Their Original Overburden In The Direction Away From The Roadway ....

Take $q_{ult_{exc}} \cong \left[1 + .75(4)\right](.12)22.5 + .4(.12)6(19.7) = 16.47 ksf$

& $q_{a_{exc}} \cong \frac{16.47}{2.5} = \underline{6.59 ksf}$ or ≈ 86% of The Original Value

It's DL Uniform Equivalent Loading ...

Take $A \cong (13.25 + 8)25 = 531.25 ft^2$ — cant'l

& $\Sigma F_{V_a} \cong \frac{6.59(36)}{531.25} = .446 k/ft^2$ ← Original LL

≈ Interior, But Still A Substantial Value

Also Note That If Is Clear Exterior Columns Are Not Overstressed More Than 10% By DL Alone (ie, They Would Only Be Overstressed By 14% if DL + LL Was Present). OK

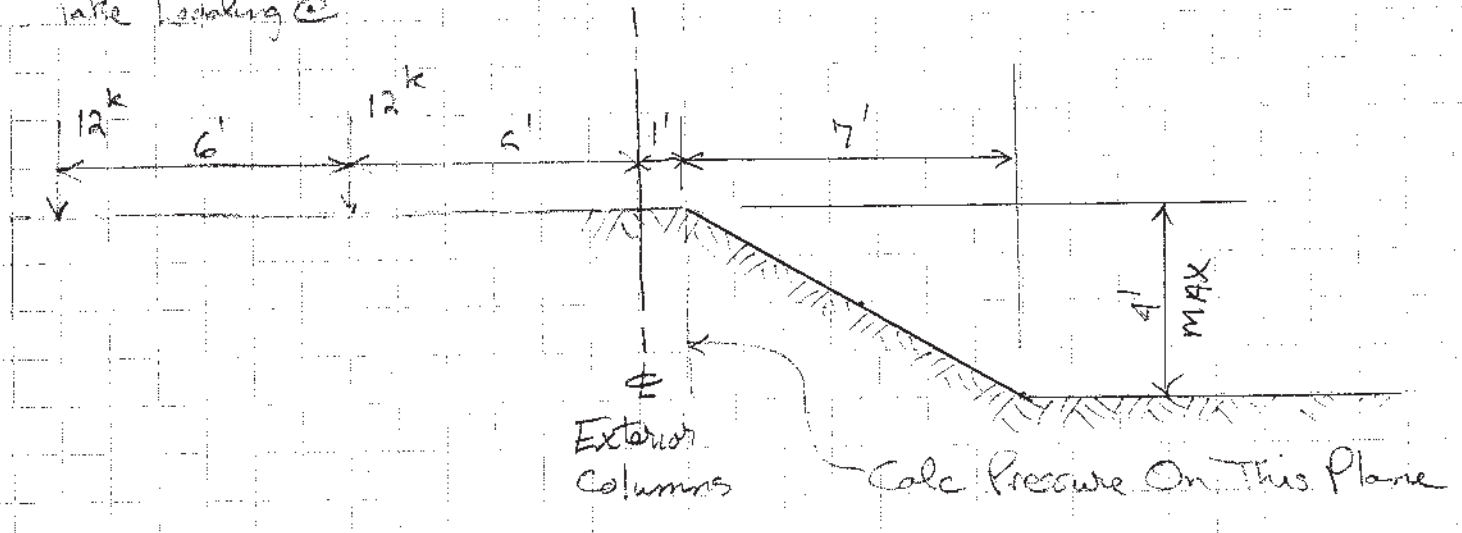
Calculations Affected by Detailing

Go Sheet #1/12

The Factor of Safety For H-20 Traffic @ 10' From The ℄'s of Exterior Columns May Be Considered Overly Conservative. Also, The 1' offset and 1 to 1.75 Slope' East To West Is Considered Easier To Implement And "Better" For Protection of The Existing Sidewalks & Curbs.

Check H-20 Truck @ 6' From ℄ of Exterior Columns And Assuming The 1' offset / 1 to 1.75 Slope As Shown On The Drawings.

Take Loading @



For "Near" P_v:

@ $z = 1$ $\quad m = \frac{7}{4} = 1.75$ (Throughout)

$n = \frac{1}{4} = 0.25$

$$P_{h\,1.0}^{n} = \underbrace{\frac{1.77\,(12)}{4^2}}_{1.3275} \frac{(1.75)^2 (.25)^2}{(1.75^2 + .25^2)^3} = .00833$$

@ z = 2 ; n = .5

$$\sigma^{n}_{h_{2.0}} = (1.3275)\frac{(1.75)^2(.5)^2}{(1.75^2+.5^2)^3} = .02796$$

@ z = 3 ; n = .75

$$\sigma^{n}_{h_{3.0}} = (1.3275)\frac{(1.75)^2(.75)^2}{(1.75^2+.75^2)^3} = .04801$$

@ z = 4 ; n = 1

$$\sigma^{n}_{h_{4.0}} = (1.3275)\frac{(1.75)^2}{(1.75^2+1)^3} = .06054$$

... For Soil P ...

$$m = \frac{13}{4} = 3.25$$

@ z = 1 ; n = .25

$$\sigma^{p}_{h_{1.0}} = (1.3275)\frac{(3.25)^2(.25)^2}{(3.25^2+.25^2)^3} = .00073$$

@ z = 2 ; n = .5

$$\sigma^{p}_{h_{2.0}} = (1.3275)\frac{(3.25)^2(.5)^2}{(3.25^2+.5^2)^3} = .00277$$

@ z = 3 ; n = .75

$$\sigma^{p}_{h_{3.0}} = (1.3275)\frac{(3.25)^2(.75)^2}{(3.25^2+.75^2)^3} = .00572$$

@ z = 4 ; n = 1.0

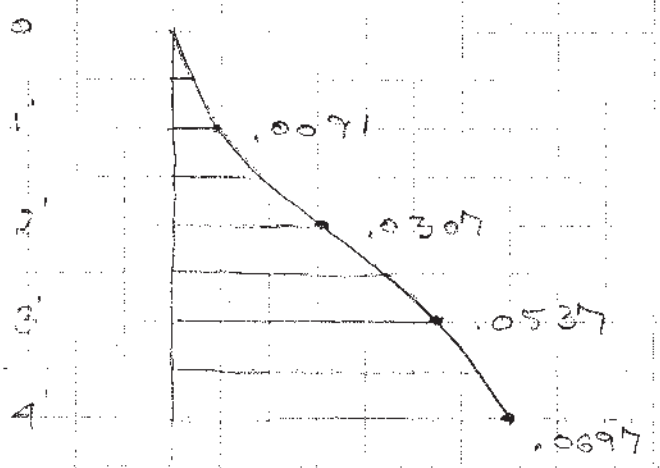
$$\sigma^{p}_{h_{4.0}} = (1.3275)\frac{(3.25)^2}{(3.25^2+1)^3} = .00907$$

$\Sigma \sigma_{h_{1.0}} = .00706$

$\Sigma \sigma_{h_{2.0}} = .02073$

$\Sigma \sigma_{h_{3.0}} = .05373$

$\Sigma \sigma_{h_{4.0}} = .06971$



$\therefore P_{h_{max}} \Sigma .07(4)\frac{1}{2} = 0.14^{k}/ft$

Check vs:

$$S = 7(4)\tfrac{1}{2}(.12)\tan\left(\frac{2\phi}{3}\right) = .6115^{k}/ft$$

$$F.S. \Sigma \frac{.6115}{.14} = 4.36 < 2.5$$

OK

$\therefore$ 24^{k} Axle Can Be Placed Within 6' of Exterior Column ℄ (As Shown On Drawings).

The Slope Change From 1:2 To 1:1.75 With A 1'-0" Flat/Offset Is Clearly OK For The Storage/Equipment & Traffic Surcharge Shown On Sheet # 7, ie, Note The The Soil Weight/Block over The Same 8' Run Is Greater (Albeit Very Slightly).

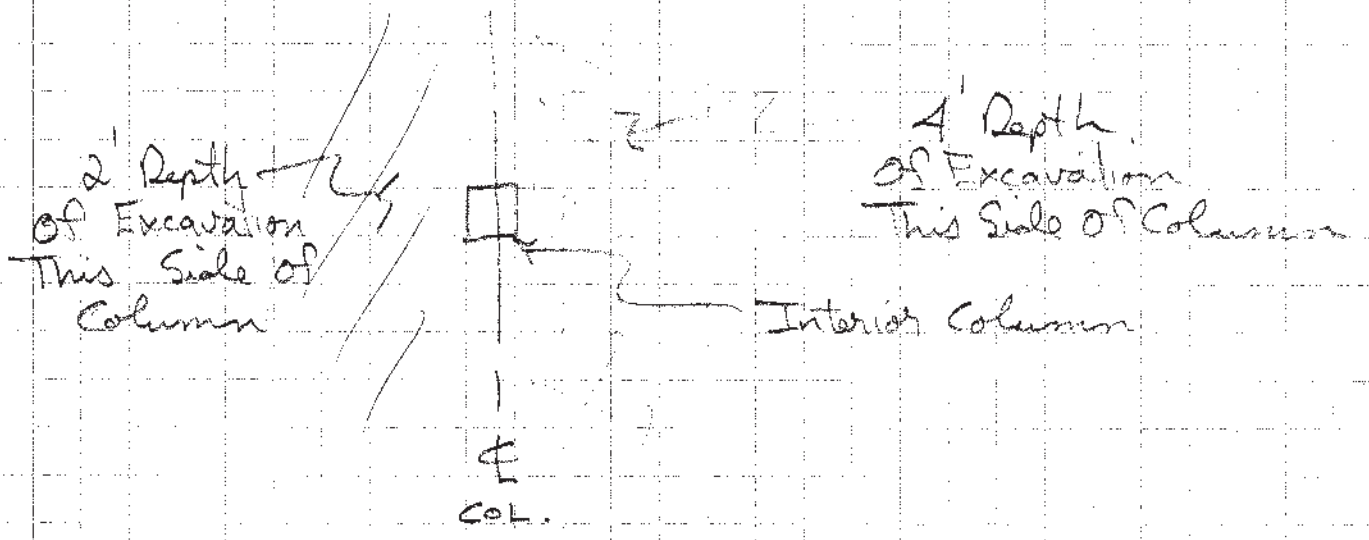
The Bearing Capacity Under The CMU Wall(s) Can Be Taken @ ... (Depth of Footing Assumed / Footing Width Assumed)

$$q_{ult} \Sigma 1.0(.12)22.5 + \frac{.12}{2}(1)19.7 = 3.882^{KSF}$$

$$w/\ F.S. \Sigma \frac{3.882}{1.75} = 2.21$$

... Though The Depth & Width of Footing May Both Be > Than Assumed, The F.S. Calcd Is Only Marginally OK. Without Precise Data The Recommendation To Remain Is Still Valid.

Drawings Show A Sequence Of Excavations vs Backfilling To 2' Below Original Grade. Following This Sequence Mitigates The "worst case" Column Capacity Reduction. The Resulting Better Worst Case Is ...



Effective Column Reduction Can Be Approximated By...

$$q'_{ult} \cong \left(\frac{4+2}{2}\right)(.12)22.5 + .4(.12)9(19.7) = \underline{16.61\ KSF}$$

[c.f. Sheet # 14 @ 22.0 KSF]

or $q_a = \frac{16.61}{2.5} = \underline{6.64\ KSF}$ Allowable @ F.S. = 2.5

This Is 75.5% of The Pre-Excavation Value (ie, a 24.5% Reduction vs a 49% Reduction)

... And Is $\left(\frac{16.61}{11.21}\right)100\% = 148.2\%$ of The Initially Calc'd Allowable During Excavations

— This Is A Significant Increase & The Engineering Paradigm Is Recommended

BY CL

OZONE PARK / AECOM
MODIFIED EXCAVATION

References:

1) AECOM Project # 60221764.0, Draft Contract Drawings As Previously Forwarded [Under Project # 60138748.A.1].
2) Field Modifications To Excavation Depths As Forwarded By Email [8' Maximum Depth Where "Possible"].
3) ARTECNICS Phase 1 Report & Drawings; Phase 2 Report, Drawings & Calculations.

Purpose:

Calculations Herein Reveal Assumed Site Conditions [See Ref's] To Assess Areas & Methods By Which An Excavation Of 8' Depth Below Existing Grade May Be Achieved.



7/15/2012
Sheets 1-13
w/Drawings
AE62N3-1 & -2

General Layout:

The General Layout Is Per Ref's #1 & 3. See Sheet # 2 Herein [Taken From Ref # 2] For Assumed Column Locations/Spacing. The Project Area Consists Of 8 Bays As Shown On Sheet # 3 [From Ref # 1].

Assumed Soil Properties:

Soil Properties Are Taken Per Ref # 3 [Phase 2]

$\gamma_d = 120^{\#}/ft^3$

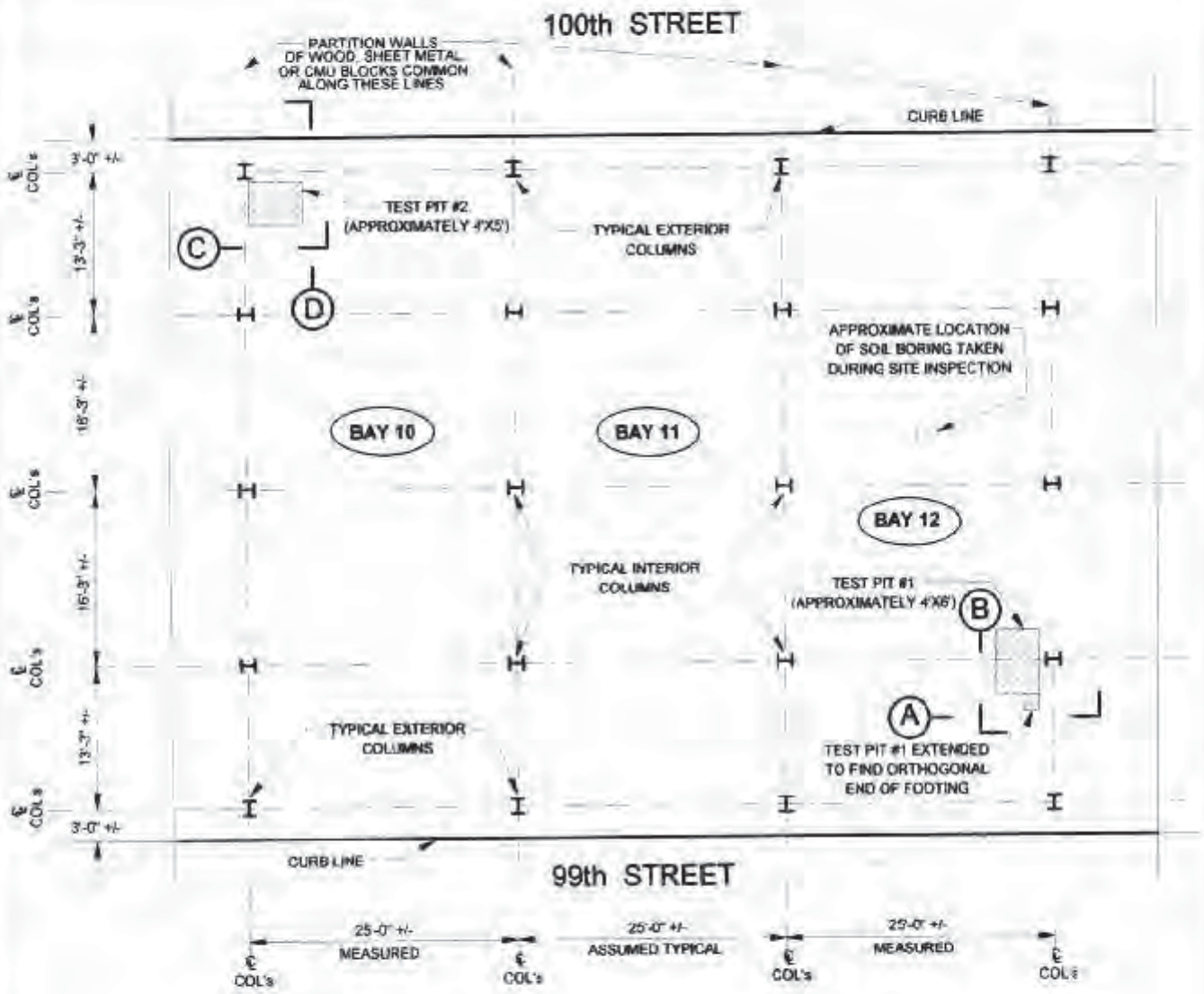
$c = 0$

$\phi = 30^\circ$

$\Big\}$ $K_a = .333$; $K_p = 3.00$ {Rankine Values @ $\beta = 0^\circ$}

∇ WT @ 30' Below Grade [Per AECOM Data Supplied].

Sheet #2



EXISTING COLUMNS; PLAN LAYOUT

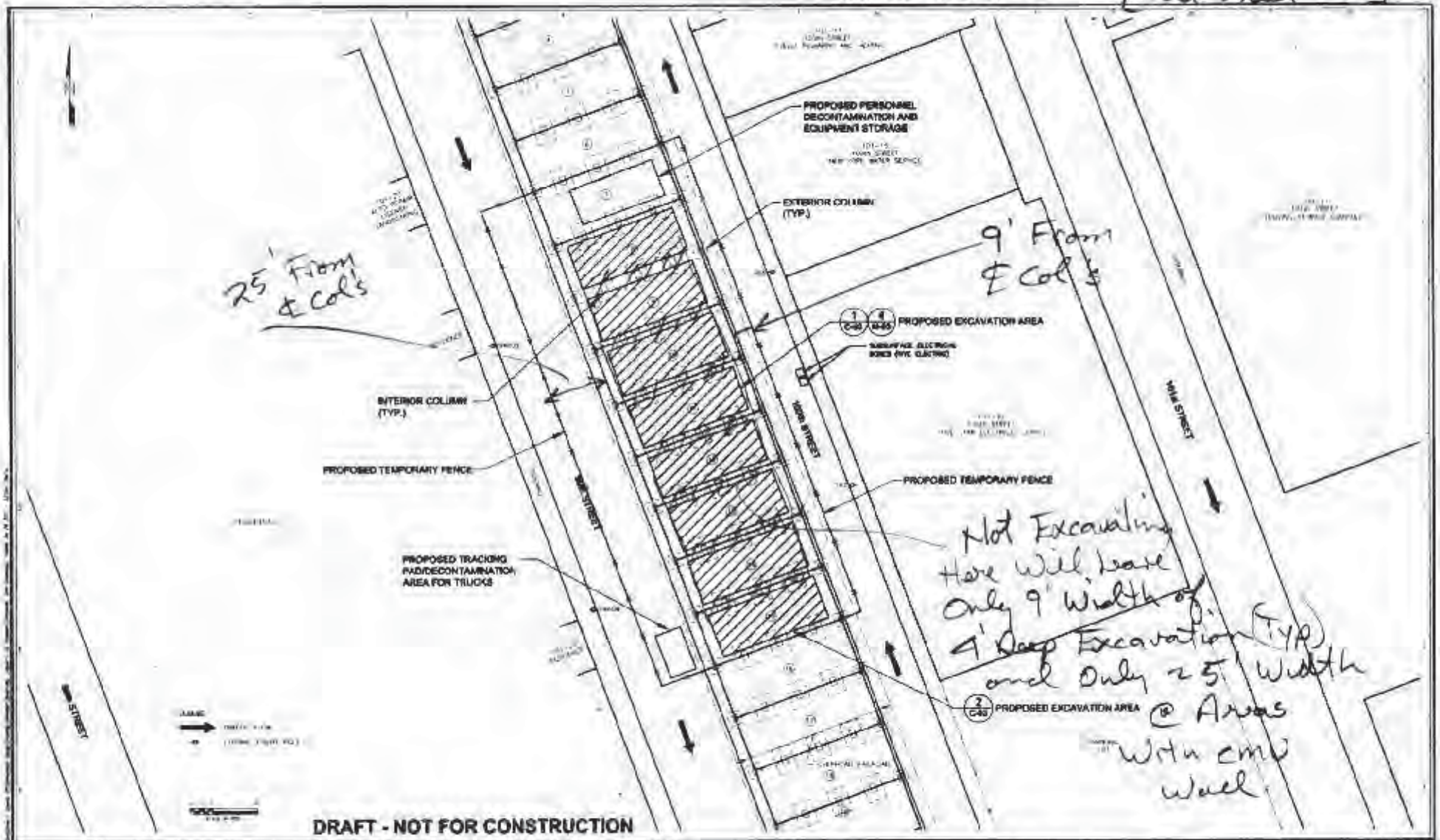
0' 5' 15' 25'
GRAPHIC SCALE

NOTES

1. ALL INFORMATION IS PRELIMINARY AND APPROXIMATE
2. BOTH TEST PITS (NUMBERS 1 & 2) WHERE EXCAVATED TO JUST ABOVE THE BOTTOM OF FOOTING ELEVATION AS VISUALLY ASSESSED. THIS ELEVATION WAS APPROXIMATELY 5'-0" BELOW THE TOP OF SLAB ELEVATION AT BOTH PIT LOCATIONS
3. SOIL BORINGS WERE ACCOMPLISHED BY ENSR/AECOM EQUIPMENT FOR NON-STRUCTURAL PURPOSES. NEVERTHELESS, VISUAL INSPECTION OF SOILS TO A DEPTH OF 15' WAS CONDUCTED IN ORDER TO GET SOME ASSESSMENT OF SOIL STRENGTH AND OTHER PHYSICAL PROPERTIES.
4. FOR ANTICIPATED FOOTING SIZES AND FOUNDING DEPTH, SEE SECTIONS ON OTHER DRAWINGS.

FORMER OZONE INDUSTRIES, INC. OZONE PARK, NEW YORK, NY		
ENSR/AECOM PROJECT NO. 10746-001-0502		
ISSUE	ARTECNICS ENGINEERING	DRAWN BY D.L.
12/04/09		CHK'D BY ℄
ENSR/AECOM CORPORATION		
PART PLAN LAYOUT COLUMNS & TEST PITS		DWG. NO. AECOZN-1

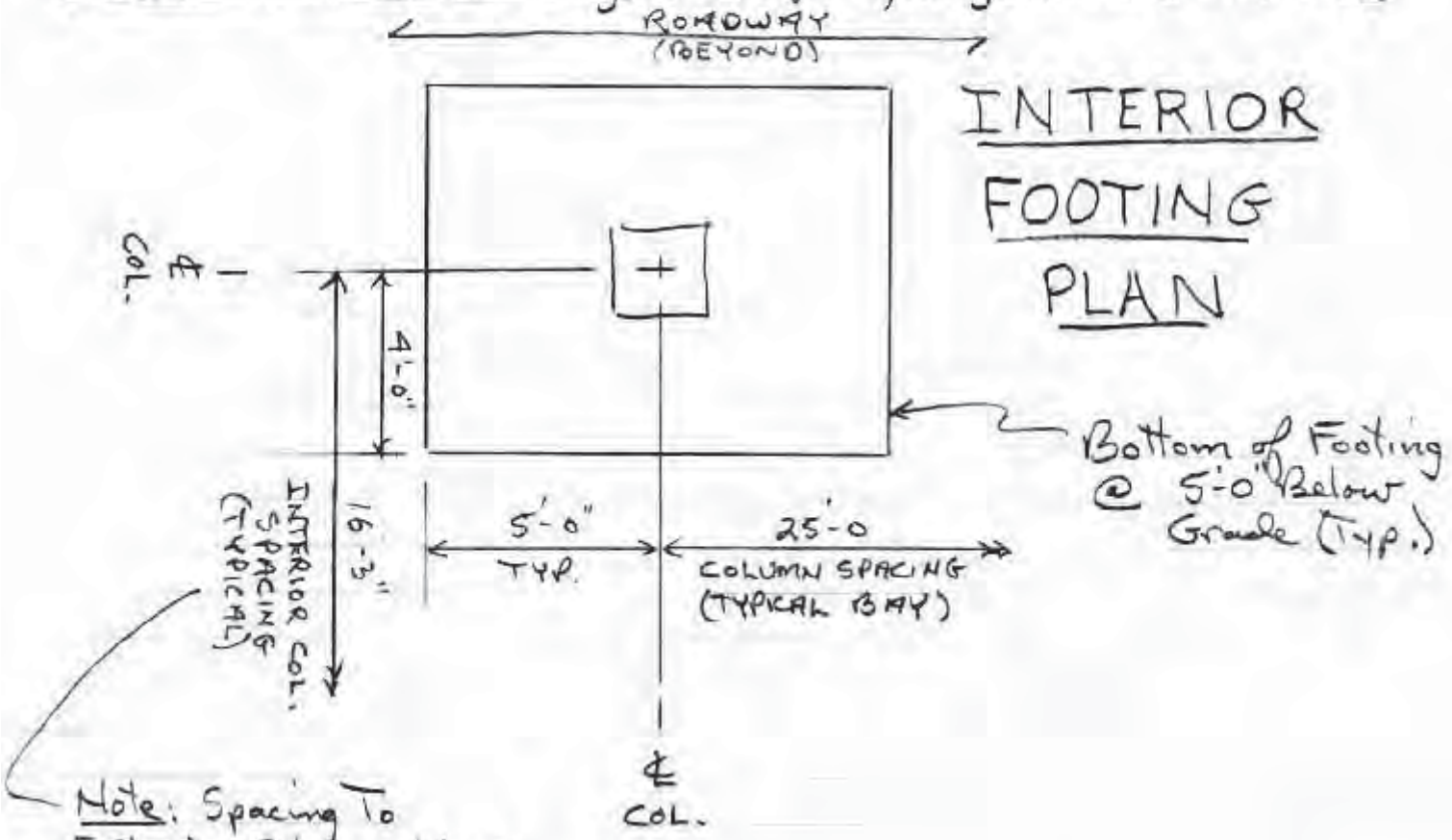
New Sheet #3 [add Sheet #5]



AECOM	FORMER OZONE INDUSTRIES, INC. OZONE PARK, NEW YORK, NY	PROPOSED EXCAVATION PLAN	C-02

MODIFIED EXCAVATION

Interior Columns & Footings: [Ref # 3; Dwg's AECONZ-2 & ...-3]

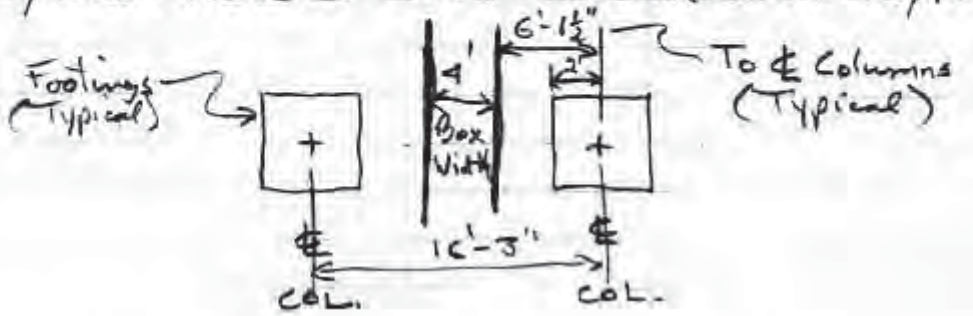


Note: Spacing To Exterior Column Lines Is 13'-3". Dimension Shown Is Int.-To-Int. Columns Only.

... Assess Soil Pressures Imposed On Digging Box For Various Distances From Column Footings. (8' Excavation Depth, Maximum, Assumed.)

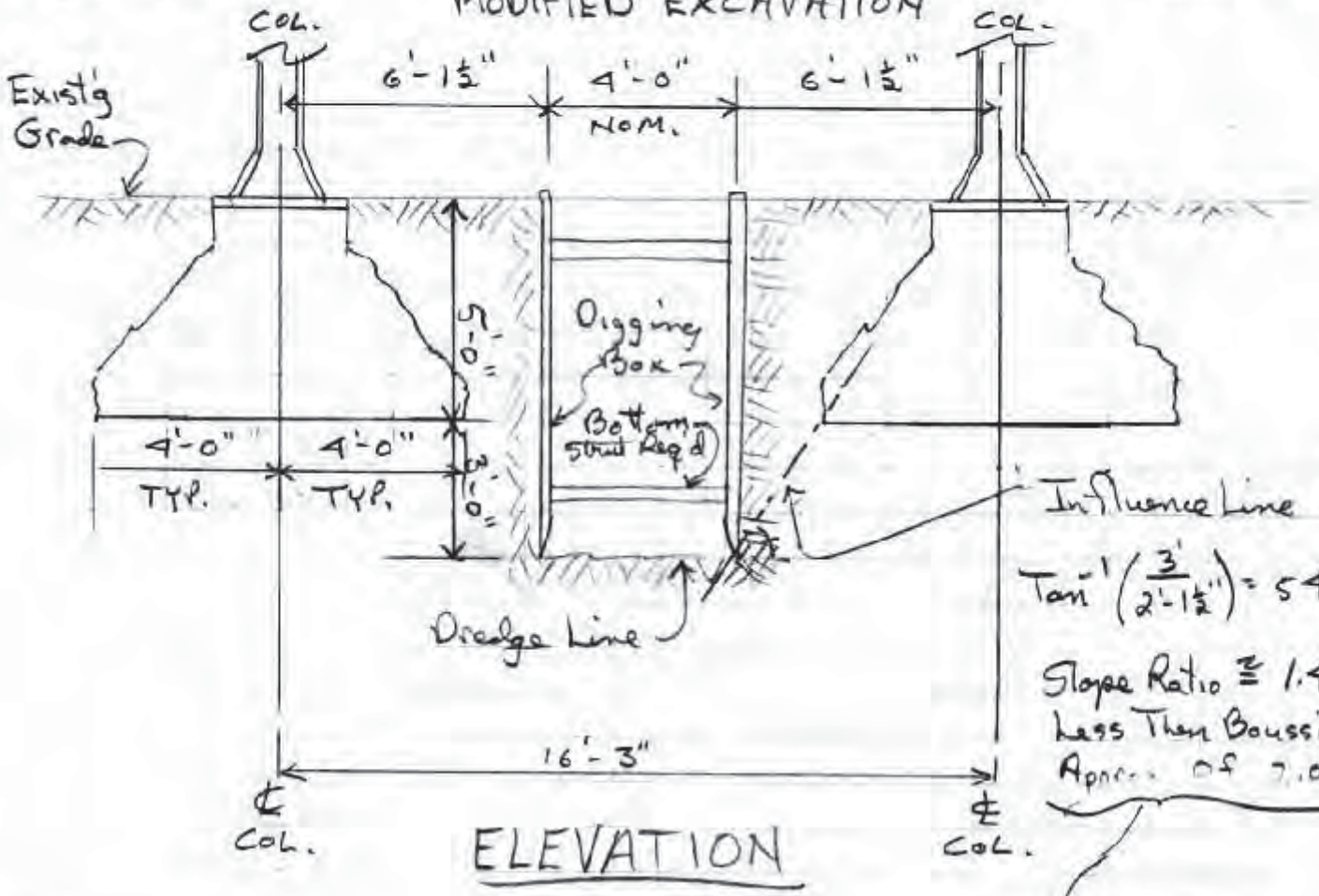
First: Assess Between Interior Columns @ 16'-3", Assume 4'-0" Wide Digging Box...

w/Box Placed @ Center Between Columns/Footings:



BY ℄ OZONE PARK / AECOM Sheet #5

MODIFIED EXCAVATION



ELEVATION

Revised To 6'-0" Max. Depth of Excavation ok [See Sheet #13]

Active Pressure Due To Soil Only ...

$$\left(P_{a_{max}}\right)_{Soil} = 8(.333)(.120) = \underline{0.320\ KSF}$$

Pressure From Column/Footing (Dead load Only):

From Ref. #3 Phase 2 Calculation Set, esp. Sheet #14:

Take $DL' \leq 300^{lb}/ft^2$; Then, ... [Where DL' Includes Snow & Wind]

$$\left(P_{DL'}\right)_{max} \cong \frac{300}{882}(4.48)(8')(10') = \underline{121.9^k}$$

Say $\left(P_{DL'}\right)_{Design} = \underline{150^k}$ {Considered Conservative w/ Structural DL ≅ $370^{lb}/ft^2$}

ok

OZONE PARK/AECOM
MODIFIED EXCAVATION

We Can Estimate A Maximum Pressure Due To Column Loads And Conservatively Take It As A Uniform Load (ie, Uniformly Maximum - Definitely Conservative).

Assume A Uniform Strip Load @ :

$$\bar{P} = \frac{150}{80} = 1.875^{k}/ft$$

And Take As Infinite Strip
(Conservative)

... We Can Make A Conservative Approximation Using Braced Excavation Methods With A Uniform Surcharge of .234 KSF Over An Infinite Half Space ...

Take Latteral Pressure Due To Column load @ :

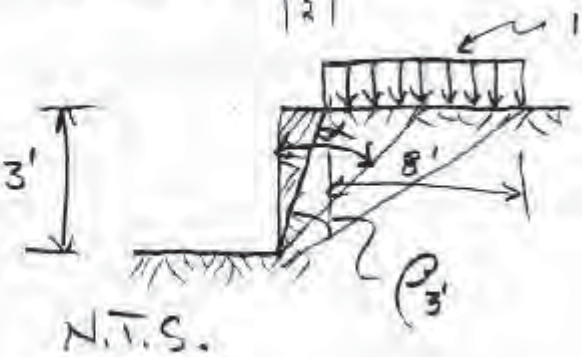
Unfactored $\begin{cases} (P_L)'_c \leq 0.333\,(1.875) = 0.625\,KSF \\ \& \leq P'_L \leq .625 + .320 = 0.945\,KSF \text{ Nominal} \end{cases}$ ← See Sheet #5

With Braced Excavation Reduction Taken @ 0.80

$$(P_L)_{Braced} \leq .80\,(.945) = \underline{.756\,KSF}$$

... And This Value Is Manageable & Conservative ...

Check Verses More Precise Elasticity Equations/Method:



$$\text{Tan}\,\alpha_3 = \frac{2 + \frac{8}{2}}{3} = 2.0$$

$$\alpha_3 = 1.107\,\text{Rad}$$

$\text{Tan } A_3 = \frac{10}{3}$ $A = 1.279$ Rad (X)

$\text{Tan } B_3 = \frac{2}{3}$ $B = 0.588$ Rad (Y)

$\rho_3 = A - B = \underline{0.691 \text{ Rad}}$ (X)

$$\sigma_h = \frac{2q}{\pi}\left\{\rho_h + \sin\rho_h \sin^2\alpha - \sin\rho_h \cos^2\alpha\right\}$$

{Foundation Analysis & Design
J. E. Bowles 1968 asp pp 279-300}

Where:

$q = 1.875$ KSF

$\rho = 0.691$ Rad (X)

$\alpha = 1.107$ Rad (Y)

@ $h = 3'$

$$\sigma_{3'_{max}} = \frac{2(1.875)}{\pi}\left\{.691 + \sin .691 \sin^2 1.107 - \sin .691 \cos^2 1.107\right\}$$

$\sigma_{3_{max}} = \underline{1.282 \text{ KSF}}$

@ $h = 2'$

$\text{Tan } \alpha_2 = \frac{6}{2} = 3 \Rightarrow \alpha_2 = 1.249$ Rad (Y)

$\text{Tan } A_2 = \frac{10}{2} \Rightarrow A = 1.373$ (X)
$\text{Tan } B_2 = 1 \Rightarrow B = .7854$ (X)
$\rho_2 = .588$ Rad (X)

$\sigma_{2'_{max}} = \underline{1.232 \text{ KSF}}$

@ h = 1

$\text{Tan}\,\alpha_1 = 6 \Rightarrow \alpha_1 = 1.4056$ (Y)

$\text{Tan}\,A_1 = 10 \Rightarrow A = 1.471$ (Z)

$\text{Tan}\,B_1 = 2 \Rightarrow B = 1.107$

$\rho_1 = .36397$ (K)

$\sigma_{1,max} = 0.836\ \text{KSF}$

Pressure Block:



.836
1.232
1.282

Take @ $p_{max} = 1.28\ \text{KSF}$

Take Design Pressure For Braced Excavation @ ...

$(p)_{Design} = 0.80(1.28 + .32) = 1.28\ \text{KSF}$ — Loose Sand - Conservative

{Could Take $\bar{p} \approx \frac{1.28}{\sqrt{3}} = .71$ ~ Unreduced Braced Calc.}

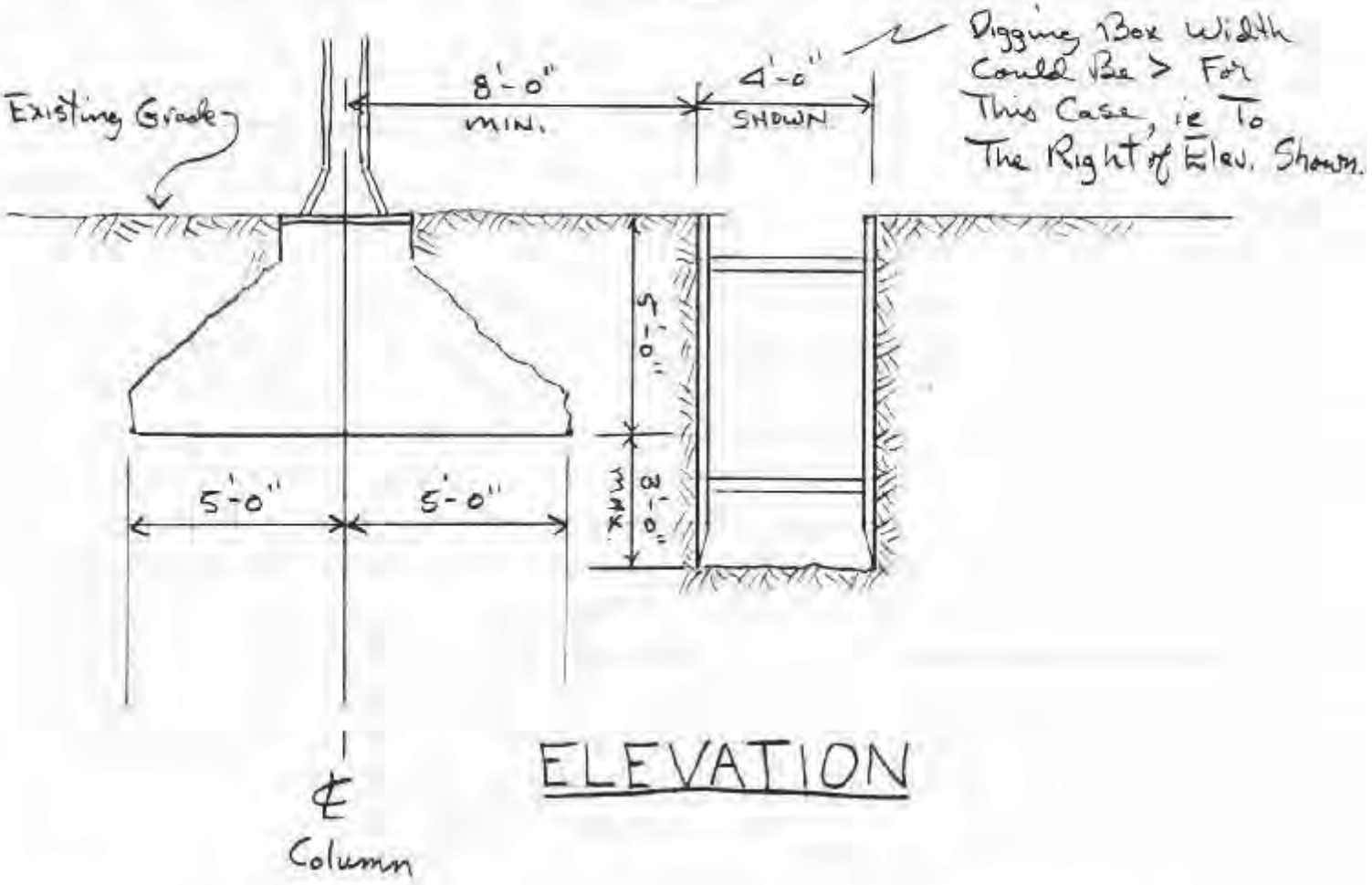
Between Interior Column Footings

... Note That The Simplified Method Using Active Pressure Is Non-Conservative. If p_{max} Is Reduced To $\bar{p}$ over 8' The Elastic Method Gives $\bar{p} \approx p_L$ As Calc'd On Sheet #6 But w/o Reduction. Nevertheless ...

USE Elasticity Method w/ $\bar{p} \leq p_{max} = p_{design}$

Second: Assess Interior Columns Between Bays @ 25'-0" Spacing.

The Pressures Calc'd Per Elevation Section Shown on Sheet #5 Could Be Used Here As Well, But These Are Considered Problematic. They Are High & Deformations Are Such That Removal of The Box (ie, Extraction) May Be Difficult. For This Case, Check Pressures @ 8' From Columns. Note That There Is Only A Column/Footing On One Side Of The Box (Not On Both Sides; cf Sheet #5).



ELEVATION

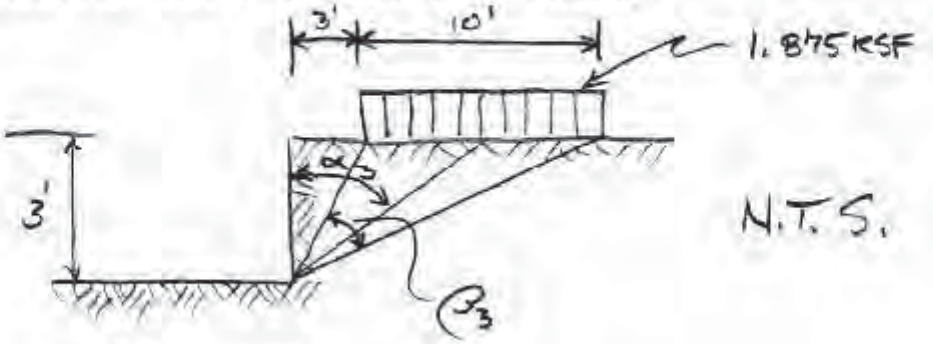
Active Soil Pressure Is As Before $\Rightarrow (p_a)_{soil} \leq$ 0.320 KSF

Pressure From Column Loads Taken, Again, @ ...

$$(P_{DL})_{Design} = 150^{k}$$

$$(\overline{P}_{DL})_{Design} = \frac{150}{80} = \underline{1.875 KSF}$$

... Addition Pressure Due To Column Loads:



$$\text{Tan}\,\alpha_3 = \frac{3 + 10/2}{3} = \frac{8}{3} = 2.66 \Rightarrow \alpha_3 = 1.212\ \text{Rad}\ (X)$$

$$\left.\begin{aligned} \text{Tan}\,A = \tfrac{3}{3} &\Rightarrow A = 0.785\ \text{Rad}\ (Z) \\ \text{Tan}\,B = \tfrac{13}{3} &\Rightarrow B = 1.3439\ \text{Rad} \end{aligned}\right\} \beta_3 = B - A = 0.5586\ (Y)$$

$$(\sigma_3)_{max} = \frac{2(1.875)}{\pi}\left\{.5586 + \sin .5586 \sin^2 1.212 - \sin .5586 \cos^2 1.212\right\}$$

$$(\sigma_3)_{max} = \underline{1.143 KSF}$$

$$\text{Tan}\,\alpha_2 = \frac{8}{2} = 4 \Rightarrow \alpha_2 = 1.325\ \text{Rad}\ (X)$$

$$\left.\begin{aligned} \text{Tan}\,A = \tfrac{3}{2} &\Rightarrow A = .9828\ \text{Rad}\ (Z) \\ \text{Tan}\,B = \tfrac{13}{2} &\Rightarrow B = 1.418\ \text{Rad} \end{aligned}\right\} \beta_2 = 0.4354\ \text{Rad}\ (Y)$$

$(\overline{\sigma_{2'}})_{max} = \underline{0.964\ KSF}$

$\tan \alpha_1 = 8 \Rightarrow \alpha_1 = 1.446\ Rad$ ①

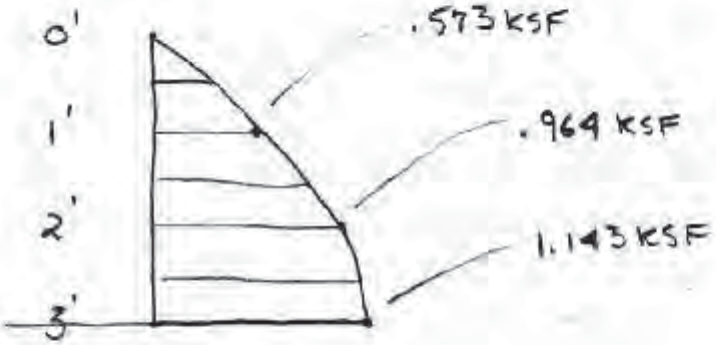
$\tan A = 3 \Rightarrow A = 1.249\ Rad$ ②

$\tan B = 13 \Rightarrow B = 1.494\ Rad$

$\Big\}\ \phi_1 = 0.2450\ Rad$ ④

$(\overline{\sigma_{1'}})_{max} = \underline{0.573\ KSF}$

Pressure Block:



Take Σ Pressure For Biased Excavation @ ...

$$(\Sigma p)_{design} = 0.8(1.14 + .32) = \underline{\underline{1.17\ KSF}}$$

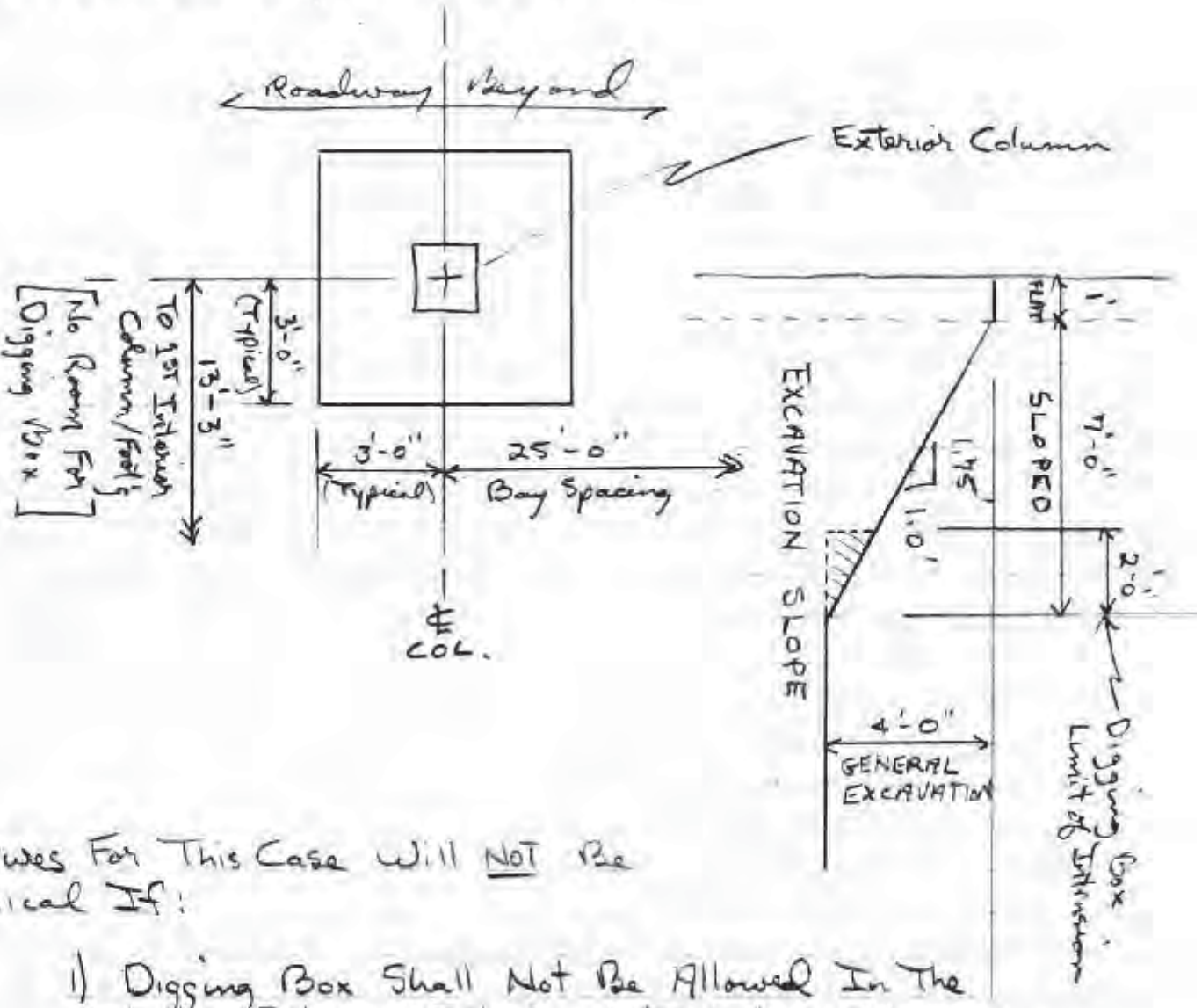
... Managable & Extraction OK ✓ w/ Column To One Side Only.

Extract No More Then 2' Prior To Backfill, Then 2' More w/ Backfill, Then 100% Extraction OK ✓

OK ✓

BY ℄ OZONE PARK/AECOM Sheet # 12
MODIFIED EXCAVATION

EXTERIOR COLUMNS/FOOTINGS:



Pressures For This Case Will NOT Be Critical If:

1) Digging Box Shall Not Be Allowed In The Areas Between Exterior & Interior Columns. (Only 13'-3" ± Is Available Here ∴ Box Would Be Too Close To Footing Plan Dimensions)
2) Digging Box Shall Not Be Placed Closer Than 0' From The Column (ie, To Right or Left As Shown Above).
3) Digging Box Shall Not Be Allowed Within 6'-0" Of Column ℄, ie 6'-0" Toward Interior of Structure. (This Is 2'-0" Into The Sloped Area Shown.)

= See Drawings.

BY E

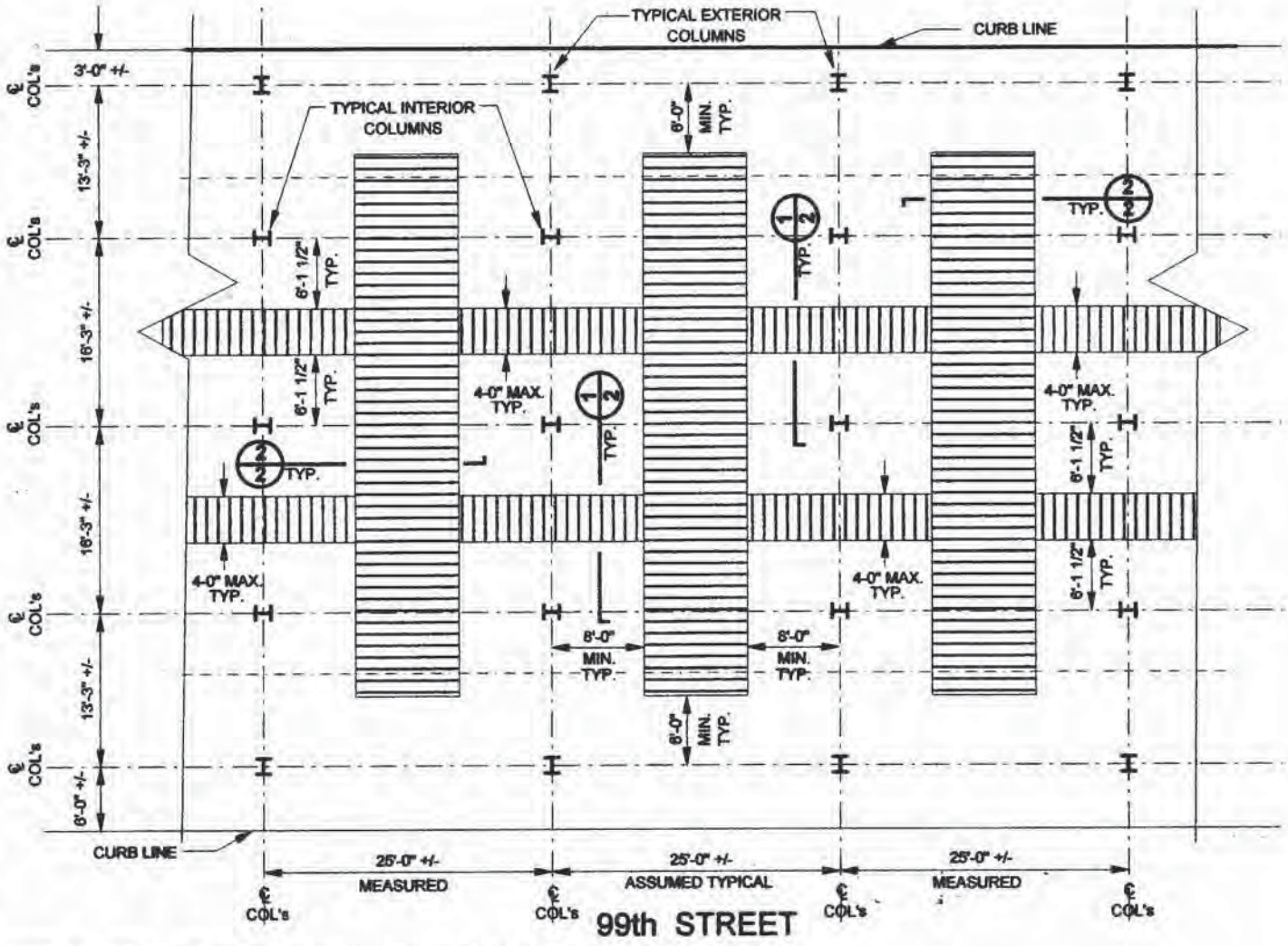
OZONE PARK / AECOM
MODIFIED EXCAVATION

Sheet # 13

CONCLUTIONS:

1) Looking At The Elevation Section Shown on Sheet # 5 And The Resulting Pressures, It Is Not Considered Prudent To Allow The Excavation To 8' Depth. Extraction of The Box May Also Be Difficult With The Possibility of "Jarked" Over-Extraction Being Real & Potentially Dangerous. With This In Mind, The Excavation Depth Between Interior Column Footings Shall Be Limited To 6'-0" Max [See Drawings]. Digging Box Shall Have 1200PSF Capacity & 4'-0" Max. Width.
2) For Excavations Between Column Lines (ie, Within 25-0 c/c Bays), 8' Deep Excavations Using A Digging Box With 1200 PSF Capacity Shall Be Allowed To Within 8'-0" (Plan) Of Column ℄'s.
3) For Excavations Per 2) Above, The Contractor Can Impose On The Perimeter Slopes To Within 6'-0" Inside The Exterior Column Line. Digging Box Width Can Be Up To 8'-0". Provided The 1200PSF Capacity Is Maintained In Full.
4) Extraction Of The Digging Box Shall Be Incremental With A 2'-0" (Height) Extraction (Maximum) Allowed Before Providing 2'-0" Height Of Backfill Within The Box. This First Increment Shall Be Followed By A 2ND 2'-0" Height Extraction & Backfill. With The Backfill To Within 4'-0" Of Original Grade, The Box May Be Fully Extracted.

See Drawings For Any Modification of Above Criteria.



NOTE: ALL EXCAVATION STRIPS ARE CENTERED BETWEEN COLUMN LINES (TYPICAL).

PERMITTED BRACED EXCAVATIONS

0' 5' 15' 25'

GRAPHIC SCALE

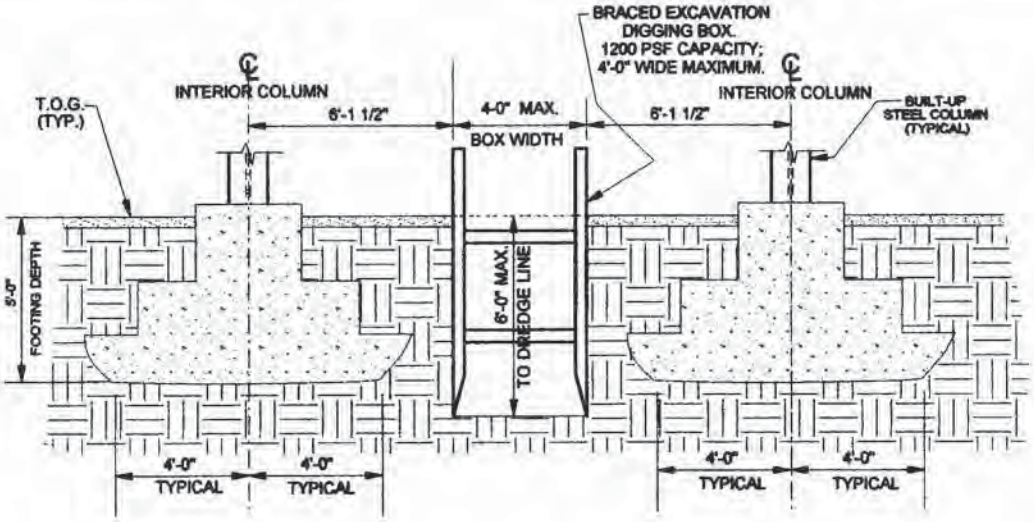
LEGEND

- UNEXCAVATED AREAS OR BACKFILLED TO GRADE
- 8-0" MAX. EXCAVATION
- 6-0" MAX. EXCAVATION

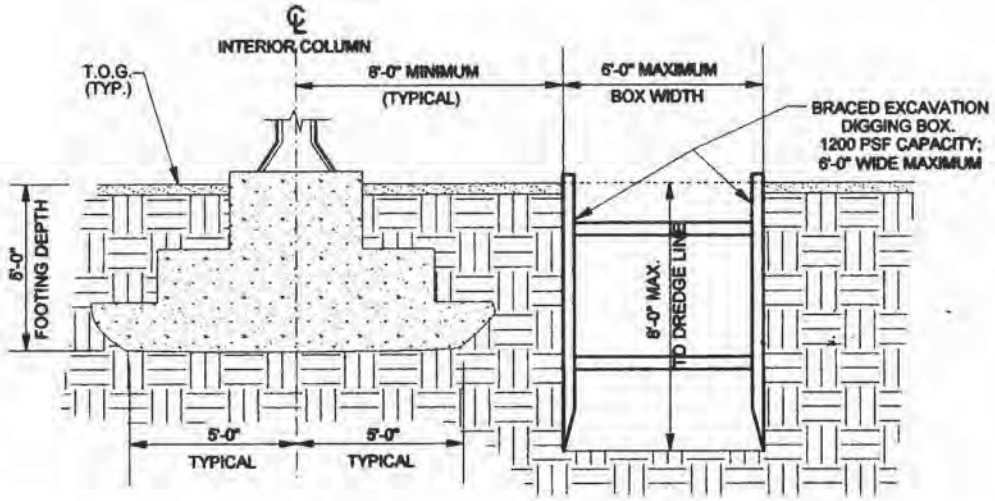
NOTES:

1. ALL EXCAVATIONS DEEPER THAN 4'-0" BELOW GRADE SHALL BE BRACED EXCAVATIONS USING A DIGGING BOX RATED AT OR ABOVE 1200 PSF (SWL).
2. THE CONTRACTOR SHALL ASSUME SOIL TYPE B WHEN EVALUATING THE DIGGING BOX MAXIMUM DEPTH CAPACITY.
3. THE DIGGING BOX WIDTH FOR 6-0" MAX. DEPTH AREAS (I.E., BETWEEN COLUMN LINES SPACED AT 16'-3" o/o) SHALL BE 4'-0" WIDE MAXIMUM. AT OTHER AREAS THE BOX WIDTH SHALL BE 6'-0" MAXIMUM.
4. COLUMNS AND FOOTINGS DIRECTLY EFFECTED BY DIGGING BOX EXCAVATIONS SHALL HAVE SOIL BACKFILLED TO ORIGINAL GRADE FOR ALL AREAS WITHIN 16'-0" OF THEIR CENTER.
6. IF MORE THAN ONE DIGGING BOX IS USED, THEY SHALL NOT BE PLACED SO AS TO EFFECT THE SAME COLUMNS OR FOOTINGS. BOX LENGTH SHALL NOT EXCEED 16'-0" IN ANY EVENT.
6. IF DIGGING OR DIGGING BOX IMPINGES ON ANY FOOTING CONCRETE, DIGGING SHALL STOP. THE EXCAVATION SHALL BE BACKFILLED ANDTHE BOX EXTRACTED PER THE PROCEDURE NOTES ON DRAWING AECOZN3-2.
7. FOR PROCEDURE NOTES, SEE DRAWING AECOZN3-2.

FORMER OZONE INDUSTRIES, INC. OZONE PARK, NEW YORK, NY AECOM PROJECT NO. 60138748.A.1		
ISSUE 02/14/12	ARTECNICS ENGINEERING	DRAWN BY D.L. CHK'D BY ℄
AECOM CORPORATION		
ALLOWED EXCAVATIONS 6'-0" & 8'-0" DEPTH		DWG. NO. AECOZN3-1



SECTION 1/2



SECTION 2/2

PROCEDURE NOTES:

1. THE SITE SHALL BE AT GRADE WITHIN A RADIUS OF 16'-0" (MINIMUM) OF EFFECTED COLUMNS.
2. ALL COLUMNS EFFECTED BY EXCAVATIONS SHOWN ON THESE DRAWINGS SHALL BE MONITORED FOR TILT AND SETTLEMENT [SEE DRAWING AECOZN3-x]. DIGGING SHALL STOP IMMEDIATELY IF TILT OR SETTLEMENT OF COLUMNS OR FOOTINGS IS DETECTED.
3. DEPTHS OF EXCACVATION SHOWN ARE ABSOLUTE MAXIMUMS AND SHALL NOT BE EXCEEDED.
4. AFTER DEPTH IS REACHED, THE DIGGING BOX SHALL BE EXTRACTED BY THE FOLLOWING METHOD:
   - A. PRIOR TO ANY EXTRACTION, BACKFILL THE EXCAVATION AT LEAST 1'-0" ABOVE THE DREDGE LINE.
   - B. EXTRACT THE BOX TO 2'-0 ABOVE THE DREDGE LINE, AND BACKFILL THE ADDITIONAL 2'-0".
   - C. FOR EXCAVATIONS THAT WERE DOWN TO 6'-0" MAX., THE BOX MAY NOW BE FULLY EXTRACTED. FOR EXCAVATIONS THAT WERE TO 8'-0", PARTIALLY EXTRACT THE BOX ANOTHER 2'-0" MAX. BACKFILL THE EXCAVATION AN ADDITIONAL 2'-0".
   - D. ONCE THE DEPTH OF EXCAVATION IS 4'-0" OR LESS, THE BOX MAY BE FULLY EXTRACTED.
5. ALL BACKFILLING (INCLUDING THAT NOTED ABOVE) SHALL BE COMPACTED GRANULAR FILL.

FORMER OZONE INDUSTRIES, INC. OZONE PARK, NEW YORK, NY AECOM PROJECT NO. 60138748.A.1		
ISSUE 02/14/12	ARTECNICS ENGINEERING	DRAWN BY D.L. CHK'D BY ℄
AECOM CORPORATION		
SECTIONS		DWG. NO. AECOZN3-2

Attachment 2
PW-1

NYC Buildings

EF1: eFiling Job Application Cover Sheet

Generated by the eFiling application.

Orient and affix BIS job number label here

You are almost done!

All documents generated by this eFiling must be signed and sealed appropriately and submitted with all other filing requirements to the borough office.

1 Key Application Information *This key information was generated based on information provided by the user during the eFiling process.*

Filing At: **QUEENS - 10161 99 STREET**

Validated On: **05/02/2013 11:30 PM** Forms Generated: **PW1**

Filing Type: **ALTERATION 2 (A2) - INITIAL**

2 Filing Fee Estimation *The following fee estimation is based on information provided by the applicant.*

ALTERATION 2 COSTS
OTHER 136000
TOTAL ALTERATION 2 COSTS
136000
COST FEE = ((136 - 5)* 10.3 + 225 + (2* 20)) = 1614.3
EQUIPMENT FEE = 160

Building Type: **OTHER**
Fee Status: **EXEMPT**
Directive 14: **YES**
Computed Total Filing Fee: **$1,774.30**
Minimum Required Payment: **$1,774.30**
Computed Civil Penalty: **$0.00**
Records Management Fee: **$165.00**
PROFESSIONAL CERTIFY JOB/PLANS

- Work Type(s) -

☐ PL ☐ MH ☐ BL ☐ FB ☐ FS
☐ FP ☐ SD ☐ SP ☐ FA ☒ EQ
☐ CC ☒ OT - **GENERAL CONSTRUCTION**

3 Asbestos Fee Estimation *Not included in above estimation, based on information provided by the applicant.*

Asbestos fee amount reported (due at filing): **$0**

Please note: All fee estimation information in sections 2 and 3 is subject to review and may be revised upon filing.

4 Other Important Information

- The applicant is responsible for reviewing all documentation generated by eFiling for completeness and accuracy. The submitted documents are the official filing record upon being accepted for filing at the Department.
- It is the applicant's responsibility to ensure that the forms generated by eFiling are accompanied by all other required plans and documentation and that all filing submissions are in compliance with applicable codes, laws, rules and regulations.
- Though eFiling checks all applications for errors, other issues may prevent the Department from accepting this filing.

5 Where to File *This application must be filed in-person in the borough where the proposed work is to occur, or electronically.*

Office Location: **120-55 QUEENS BLVD**
KEW GARDENS, NY 11424

Phone: **(718) 286-0600**

Hours: **8:30 AM - 4:30 PM**

T00000802318000003

DOB Reference Number: T00000802318-000003
User Ref ID: NJE081

08/12

NYC Buildings

PW1: Plan / Work Application

Must be typewritten.

Orient and affix BIS job number label here

1 Location Information *Required for all applications.*

House No(s) 10161 Street Name 99 STREET

Borough QUEENS Block 09106 Lot 00070 BIN 4458633 C.B. No. 409

Work on Floor(s) 001 Apt. / Condo No(s)

2 Applicant Information *Required for all applications. Fax, mobile telephone and e-mail address are optional information.*

Last Name CROWELL First Name SEAN Middle Initial A

Business Name AECOM Business Telephone (978)846-2299

Business Address 250 APOLLO DR Business Fax

City CHELMSFORD State MA Zip 01824 Mobile Telephone

E-Mail SEAN.CROWELL@AECOM.COM License Number 088379

Choose one: [X] P.E. [ ] R.A. [ ] Sign Hanger [ ] Other, please specify:

3 Filing Representative *Complete only if different from applicant specified in section 2. Fax, mobile phone, and e-mail are optional info.*

Last Name GANDHI First Name JIGNESH Middle Initial

Business Name NEXUS EXPEDITING INC. Business Telephone (212)242-4926

Business Address 82 WALL STREET, SUITE 511A Business Fax (212)242-4938

City NEW YORK State NY Zip 10005 Mobile Telephone

E-Mail JIMMY@NEXUSEXPEDITING.COM Registration Number X03745

4 Filing Status *Required for all applications. Choose **one** and provide specified associated information.*

[X] **Initial Filing** *5, 7, 11, 12A, 25-26*
Review is requested under which Building Code?
[ ] 2008 [ ] 1968 [X] Prior to 1968
Choose one: [ ] Standard Plan Examination or Review
[X] Professional Certification *PC1, POC1*
[ ] Professional Cert. of Objections *AI1*

[ ] **Prior to Approval Actions** *25-26*
[ ] Amend Existing Filing *4A*
[ ] Subsequent Filing *6-7, 8A (Alt-2 only), 11*
[ ] **Post Approval Amendment (PAA)** *4A, 6, 24-25*
Will PAA affect filing fees? [ ] Yes [ ] No
[ ] **New (Superseding) Applicant** *4A, 25-26*

[ ] **Reinstatement** *24-26*
[ ] **Withdrawal** *26*
[ ] Specified in 4A and 6
[ ] Entire Job

4A Indicate existing document number affected by filing:

5 Job/Project Types *Choose **one** and provide specified associated information.*

[ ] **Alteration Type 1** *6A-E, 8B-C, 9-10, 13C-F, 14 & 18-20, 22, PW1A, PD1, select all that apply:*
[ ] Change in Exits
[ ] Change in Number of Stories
[ ] Change in Number of Dwelling Units
[ ] Change in Occupancy / Use
[ ] Change inconsistent with current Cert. of Occup.

[ ] **Alteration Type 1, OT: "No Work"** *8C, 9-10 & 12, 13C-F, 14, 18-19, 22, PW1A, PD1*
[X] **Alteration Type 2** *5A, 6A-D, 8A-B, 9-10, & 13C-E, 14, 20, 22*
[ ] **Alteration Type 3** *5A, 6B-F, 8C, 9-10, 13C-E, 22*
[ ] **New Building** *6A-E, 8F-G, 9A-C,9L, 10, 12, 13A-E (13B: 2008 Code only), 14, 18-20, PW1A, PD1*

[ ] **Full Demolition** *6B, 8D, 9B-D, & 13D-E, 14, 21A, 22*
[ ] **Sign** *5A, 6B-D, 9B, 22-23*
[ ] **Subdivision** *9B, 12A-B*
[ ] Condominium [ ] Improved *17*
5A Directive 14 acceptance requested?
[X] Yes [ ] No

6 Work Types *Select all that apply but no more than allowed by job and filing type. "OT" required on all NB and Alteration 1 **initial** applications.*

6A [ ] BL - Boiler *PW1C*	[ ] FS - Fuel Storage *PW1C*	[ ] PL - Plumbing *PW1B*	6E [ ] CC - Curb Cut *16*
[ ] FA - Fire Alarm	[ ] FP - Fire Suppression	[ ] SD - Standpipe *PW1B*	6F [ ] OT/ANT - Antenna
[ ] FB - Fuel Burning *PW1C*	[ ] MH - Mechanical	[ ] SP - Sprinkler *PW1B*	[ ] OT/BPP - Builders Pavement Plan *8D*
6B [X] EQ - Construction Equipment *15*	6C [X] OT/GC - General Construction	6D [ ] OT - Other, *describe:*	[ ] OT/FPP - Fire Protection Plan
			[ ] OT/MAR - Marquee *8E, 26B*

DOB Reference Number: T00000802318-000003
User Ref ID: NJE081

7 Plans/Construction Documents Submitted *Plans are required for most applications.*

☒ AR - Architectural ☐ BP - BPP Checklist ☐ DM - Demolition (Full/Partial) ☐ EN - Energy Analysis ☐ FO - Foundation *or* ☐ NP - No Plans
☐ ME - Mechanical ☒ OT - Other ☐ PL - Plumbing ☐ ST - Structural ☐ ZO - Zoning

8 Additional Information

8A WT	Cost	WT	Cost	WT	Cost
OT	136000				

8G Total Construction Floor Area: sq. ft.

8B Is a building enlargement proposed?
☒ No enlargement is proposed
☐ Yes *12, PD1*
☐ Horizontal ☐ Vertical
Additional Construction Floor Area: sq. ft.

8C Estimated Job Cost $ 136000
8D Street Frontage: linear ft.
8E Height: ft. Width: ft.
8F Name of cluster or development below:
Project lead job no.

9 Additional Considerations, Limitations or Restrictions

	Yes	No		Yes	No	
9A	☐	☒	Structural peer review required per BC §1627 *If yes, 9F*			
9B	☐	☒	Filed to Comply with Local Law *If yes, 9G*	☐	☒	Landmark
	☐	☒	Other, specify:	☐	☒	"Little E" Hazmat Site
	☐	☒	Restrictive Declaration / Easement *If yes, 9M*	☐	☒	Unmapped Street
	☐	☒	Zoning Exhibit (I, II, III, etc.) *If yes, 9N*	☐	☒	Filing to Address Violation(s) *If yes, 9H*
	☐	☒	Requesting legalization of work where no work w/o a permit violations have been issued			
9C	☐	☒	Adult Establishment *If yes, plot diagram (except DM)*	☐	☒	Included in LMCCC
	☐	☒	Compensated Development (Inclusionary Housing)	☐	☒	Infill Zoning
	☐	☒	Low Income Housing (Inclusionary Housing)	☐	☒	Loft Board
	☐	☒	Single Room Occupancy (SRO) Multiple Dwelling	☐	☒	Quality Housing
	☐	☒	Filing includes Lot Merger / Reapportionment *If yes, 17*	☐	☒	Site Safety Job/Project
9D	☐	☒	Includes permanent removal of standpipe, sprinkler or fire suppression related systems			
9E	☐	☒	Work Includes partial demolition as defined in AC §28-101.5 *If yes, 21B*			
	☐	☒	Structural Stability affected by proposed work			
9L	☐	☒	Work Includes lighting fixture and/or controls, Installation or replacement. [§ECC 404 and 505]			

9M CRFN(s) *Restrictive Declaration / Easement (max. 4):*

9N CRFN(s) *Zoning Exhibit (I, II, III, etc. - max. 4):*

9F Structural Peer Reviewer License No. P.E.

9G Local Law No(s)	Year
9H Violation No(s)	
9I BSA Calendar No(s)	
9J CPC Calendar No(s)	

9K High-Rise Team Tracking Number:

10 NYCECC Compliance *New York City Energy Conservation Code*

☐ To the best of my knowledge, belief and professional judgment, all work under this application is in compliance with the NYCECC*

☐ Energy analysis is on another job number:

Yes	No	
☐	☐	This application is, or is part of, a project that utilizes trade-offs among different major systems
☐	☐	This application utilizes trade-offs within a single major system

☒ To the best of my knowledge, belief and professional judgment, all work under this application is exempt from the NYCECC* in accordance with one of the following: *Choose one*

☐ The work is an alteration of a State or National historic building.
☒ The scope of work is entirely in a "low-energy building" and is limited to the building envelope.
☐ The scope of work does not affect the energy use of the building.
☐ This is a post-approval amendment and exempt under a prior edition of the energy code. See statement of exemption on attached drawings.

** Note: Exceptions to Section ECC 101.4.3 are NOT exemptions. For exceptions, check compliance statement and use the Energy Analysis.*

11 Job Description

EXPLORATORY DEMOLITION, EXCAVATION WORK, AND TEMPORARY FENCE INSTALLATION PER PLANS FILED. RECONSTRUCTION PHASE OF WORK TO BE FILED IN SEPARATE APPLICATION. NO CHANGE IN USE, EGRESS, OR OCCUPANCY.

11A Related DOB Job Numbers

11B Primary application job no.

DOB Reference Number: T00000802318-000003
User Ref ID: NJE081

12 Zoning Characteristics

12A District(s) R5
Overlay(s)
Special Dist.(s)
Map Number 18A

12B Street legal width: ft.
Street Status: ☐ Public ☐ Private
If the zoning lot includes multiple tax lots, list all tax lots here ▶

12C *Proposed:* Use*	Zoning Floor Area	District	FAR
	sq. ft.		
	sq. ft.		
	sq. ft.		
	sq. ft.		
	sq. ft.		
	sq. ft.		
Proposed Totals	sq. ft.		
Existing Total	sq. ft.		

Proposed Lot Details:
Lot Type: ☐ Corner ☐ Interior ☐ Through
Lot Coverage %
Lot Area sq. ft.
Lot Width ft.

Proposed Other Details:
Enclosed Parking? ☐ Yes ☐ No
If yes, no. of parking spaces:
Perimeter Wall Height ft.

Proposed Yard Details:
Check here if no yards: ☐ *or*
Front Yard ft.
Rear Yard ft.
Rear Yard Equivalent ft.
Side Yard 1 ft.
Side Yard 2 ft.

**Use can be one of the following: residential, commercial, manufacturing, or community facility. List only one use per line.*

13 Building Characteristics **Main use/dominant occupancy per AC §28-101.5. **Use 2008 Code equivalents only. ‡Residential w/other use.*

13A Primary structural system, *choose one:* ☐ Masonry ☐ Concrete (CIP) ☐ Concrete (Precast) ☐ Wood ☐ Steel (Structural) ☐ Steel (Cold-Formed) ☐ Steel (Encased in Concrete)

13B	Existing	2008 Code Designations?	Proposed	2008 Code Designations?
Structural Occupancy Category				
Seismic Design Category				
13C Occupancy Classification*	COM	☐ Yes ☒ No		☒ Yes**
Construction Classification	3	☐ Yes ☒ No		☐ Yes ☐ No
Multiple Dwelling Classification				

13D Building Type: ☐ 1, 2, or 3 Family ☒ Other
Mixed use building?‡ ☐ Yes ☒ No

13E	Existing	Proposed
Building Height	16 ft.	ft.
Building Stories	1	
Dwelling Units		

13F Building was originally erected pursuant to which Building Code: ☐ 2008 ☐ 1968 ☐ Prior to 1968
The earliest Code with which this building or any part of it is required to comply: ☐ 2008 ☐ 1968 ☐ Prior to 1968

14 Fill *Choose one.*

☒ Not Applicable ☐ On-Site ☐ Off-Site ☐ Under 300 cubic yards

15 Construction Equipment

☐ Chute ☐ Sidewalk Shed
☒ Fence Size: linear ft.
☐ Supported Scaffold ☐ Other:

Construction Material: WOOD
BSA/MEA Approval No.

16 Curb Cut Description

Size of cut (with splays): ft.
Distance to nearest corner: ft.
to street:

17 Tax Lot Characteristics

Original tax lots being merged or reapportioned (if applicable):

Tentative tax lot numbers (new tax lots only):

18 Fire Protection Equipment

	Existing Yes	Existing No	Proposed Yes	Proposed No
Fire Alarm	☐	☐	☐	☐
Fire Suppression	☐	☐	☐	☐
Sprinkler	☐	☐	☐	☐
Standpipe	☐	☐	☐	☐

19 Open Spaces

	Existing	Proposed		Existing	Proposed
Plaza Area	sq. ft.	sq. ft.	Arcade Area	sq. ft.	sq. ft.
Parking Area	sq. ft.	sq. ft.	Parking Spaces		
Loading Berths	sq. ft.	sq. ft.	Loading Berths		

20 Site Characteristics

Yes	No	
☐	☒	Tidal / Fresh Water Wetlands
☐	☒	Urban Renewal
☐	☒	Fire District
☐	☒	Flood Hazard Area

21 Demolition Details *Mechanical equipment other than handheld devices to be used for demolition or removal of debris (BC §3306.4).*

	Yes	No	
21A	☐	☐	Demo. filing is for a secondary structure? *If yes, specify structure being demolished:*
	☐	☐	Mechanical means* from out of building? *If yes, mechanical means will demolish:* ☐ entire structure *or* ☐ part of structure
	☐	☐	Mechanical means* from within building? *If yes, describe equipment proposed:*
21B	☐	☐	Demolition work affects the exterior building envelope

22 Asbestos Abatement Compliance *Choose one.*

☐ The scope of work requires related asbestos abatement as defined in the regulations of the NYC Department of Environmental Protection (DEP).
☒ The scope of work does **not** require related asbestos abatement as defined in the regulations of the NYC DEP.
☐ The scope of work is exempt from the asbestos requirement as defined in the regulations promulgated by the NYC DEP (15 RCNY 1-23(b)).

23 Sign

Purpose: ☐ Advertising ☐ Non-Advertising

Type: ☐ Illuminated *23A* ☐ Non-Illuminated

Location: ☐ Ground ☐ Roof *23B* ☐ Wall

Estimated Cost: $

Total Square Feet:

Height above Curb: ft. in.

Height above Roof: ft. in.

	Yes	No	
	☐	☐	Is sign inside building line? *If no, sign projects by:* ft. in.
	☐	☐	Designed for changeable copy? *If no, 23C*
	☐	☐	Does an OAC have an interest in this sign or location? *If yes, 23G*
	☐	☐	Within 900' and within view of an arterial highway? *If yes, 23D*
	☐	☐	Within 200' and within view of a park 1/2 acre or more? *If yes, 23E*

→ *If answer is "yes" to either of the above two questions and this is an advertising sign, OAC sign number is required in section 23F*

23A Illuminated type: ☐ Direct ☐ Flashing ☐ Indirect

	Yes	No	
	☐	☐	If sign projects beyond building line, is owner billed for annual permit? *if no, specify in 26B*
23B	☐	☐	Is roof sign tight, closed or solid?

23C Sign wording. *If extensive, provide only key wording.*

23D Distance from Arterial Highway: ft.

23E Distance from Park 1/2 acre or more: ft.

23F OAC Sign Number:

23G OAC Registration Number:

24 Comments *Place additional comments on an AI-1 form. See Guide for proper incorporation of professional certification statements.*

I HEREBY STATE THAT I HAVE EXERCISED A PROFESSIONAL STANDARD OF CARE IN CERTIFYING THAT THE FILED APPLICATION IS COMPLETE AND IN ACCORDANCE WITH APPLICABLE LAWS, INCLUDING THE RULES OF THE DEPARTMENT OF BUILDINGS, AS OF THIS DATE. I AM AWARE THE COMMISSIONER WILL RELY UPON THE TRUTH AND ACCURACY OF THIS STATEMENT. I HAVE NOTIFIED THE OWNER THAT THIS APPLICATION HAS BEEN PROFESSIONALLY CERTIFIED. IF AN AUDIT OR OTHER EXAM DISCLOSES NON-COMPLIANCE, I AGREE TO NOTIFY THE OWNER OF THE REMEDIAL MEASURES THAT MUST BE TAKEN TO MEET LEGAL REQUIREMENTS. I FURTHER REALIZE THAT ANY MISREPRESENTATION OR FALSIFICATION OF FACTS MADE KNOWINGLY OR NEGLIGENTLY BY ME, MY AGENTS OR EMPLOYEES, OR BY OTHERS WITH MY KNOWLEDGE, WILL RENDER ME LIABLE FOR LEGAL AND DISCIPLINARY ACTION BY THE DEPARTMENT OF BUILDINGS AND OTHER APPROPRIATE AUTHORITIES, INCLUDING TERMINATION OF PARTICIPATION IN THE PROFESSIONAL CERTIFICATION PROCEDURES AT THE DEPARTMENT OF BUILDINGS.

25 Applicant's Statements and Signatures *Required for all applications.*

Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by imprisonment or fine or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department. I prepared or supervised the preparation of the construction documents and specifications herewith submitted and to the best of my knowledge and belief, the construction documents and work shown thereon comply with the provisions of the NYC Administrative Code and other applicable laws and rules, ☐ *(←check here if)* except as set forth in the accompanying documents. I acknowledge that I have read and compiled with all instructions pertaining to this application and supplemental schedules submitted. **Cluster Development Statement** (if applicable): I hereby state that all specifications relating to this job are identical to those previously filed under the group lead job number, except as specified herein.

	Yes	No	
	☐	☐	**For Initial New Building and Alteration 1 applications filed under the 2008 NYC Building Code only:** does this building qualify for high-rise designation?
	☒	☐	**Directive 14 initial applications only:** I certify that the construction documents submitted and all construction documents related to this application do not require a new or amended Certificate of Occupancy as there is no change in use, exits, or occupancy.

Name (please print) SEAN A. CONNELL

Signature

Date 1/2007

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

26 Property Owner's Statements and Signatures

Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by imprisonment or fine or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department. Furthermore, I understand that I am responsible for insuring that a final inspection be performed when the permitted work is complete, and that a satisfactory report of final inspection be submitted, along with all required submittal documents, so that the NYC Department of Buildings may issue a letter of completion or certificate of occupancy within the time prescribed by law.

I have authorized the applicant to file this application for the work specified herein and all future amendments. I will not knowingly authorize any work that is not in compliance with the New York City Energy Conservation Code (NYCECC).

Yes No

☐ ☒ **Fee Deferred Request Statement**
I hereby request a fee deferral for the work proposed on this application and understand that **all fees must be paid before issuance of any Certificate of Occupancy or job sign off**.

☒ ☐ **Fee Exemption Request Statement**
In accordance with §28-112.1 of the NYC Administrative Code I hereby state that the proposed work involves a building or property owned or used exclusively for the purposes indicated in such section.

☐ ☒ **Owner's Certifications Regarding Occupied Housing**
The site of the building to be altered or demolished, or the site of the new building to be constructed, contains one or more occupied dwelling units that will remain occupied during construction. These occupied dwelling units have been clearly indentified on the submitted construction documents.

☐ ☒ The site of the building to be altered or demolished, or the site of the new building to be constructed, contains occupied housing accommodations subject to rent control or rent stabilization under Chapters 3 and 4 of Title 26 of the New York City Administrative Code. ***If yes, select one of the following:***

☐ The owner is not required to notify the Division of Housing and Community Renewal (DHCR) of the owner's intention to file because the nature and scope of the work proposed, pursuant to DHCR regulations, does not require notification.

☐ The owner has notified the Division of Housing and Community Renewal (DHCR) of its intention to file such construction documents/apply for such permit and has complied with all requirements imposed by the regulations of such agency as preconditions for such [filing/application].

Provide date DHCR notified:

☐ ☒ **Owner's Certification for Adult Establishments**
I authorize and intend to create, enlarge, or extend an establishment with adult activity and/or adult material as defined in ZR §12-10 "adult establishment" or related sign at the subject premises.

☒ ☐ **Owner's Certification for Directive 14 Applications (If applicable)**
I have read and am fully aware of the applicant's statement that the construction documents submitted and all construction documents related to this application will not require a new or amended Certificate of Occupancy as there is no change in use, exits, or occupancy. Furthermore, I understand that I am responsible for retaining a qualified design professional to perform a final inspection when the permitted work is complete and this professional must submit a satisfactory final inspection report to the NYC Department of Buildings within the time following inspection prescribed by Department rule.

Owner type: ☐ Individual ☒ DCAS ☐ HHC ☐ NYCHA ☐ Partnership ☐ DOE ☐ HPD ☐ NYS ☐ Corporation *26A* ☐ Other Government ☐ Condo Unit Owner or Co-Op Tenant-shareholder *26A*

Is the owner a non-profit organization? ☒ Yes ☐ No

Name (please print): JOSEPH WAGNER

Relationship to Owner: CHIEF ENGINEER

Business Name/Agency: DCAS

Street Address: 1 CENTRE STREET, 20TH FLOOR SOUTH

City: NEW YORK State: NY Zip: 10007

Telephone Number: (212)386-0481 Fax:

E-Mail Address: JWAGNER@DCAS.NYC.GOV

Signature and Date ▶

26A Condo/Co-Op Board or Corporation Second Officer

Name (please print):

Title:

Street Address:

City: State: Zip:

Telephone Number: Fax:

E-Mail Address:

Signature and Date* ▶

**Signature required for authorized representative of Condo or Co-Op board. Second officer signature not required for corporations.*

26B Lessee Responsible for Annual Sign or Marquee Permit

Name (please print):

Relationship to Owner:

Business Name/Agency:

Street Address:

City: State: Zip:

Telephone Number: Fax:

E-Mail Address:

Internal Use Only

Pre-Filer Name:

Pre-Filer Signature: Date:

Cost Estimate: $

Amount Due: $ Verified by ▼ Date ▼

Initial Amount Paid: $

Balance Due: $

Stamps, Certifications and Notes:

Attachment 3
PW-3

NYC Buildings

PW3: Cost Affidavit

Must be typewritten.

Orient and affix BIS job number label here

1 Reason For Filing *Required for all applications.*

Reason for filing cost affidavit:	Cost information provided must be based on:
☒ Initial Filing *2-7*	Estimated cost of construction
☐ Prior to Approval Actions *1A, 2-7*	Estimated cost of construction
☐ Post Approval Amendment (PAA) *1A, 2-7*	Estimated cost of construction
☐ To obtain Sign-off *2-3, 5, 7*	Actual construction cost of completed work

1A Indicate existing document number affected by filing:

2 Location Information *Required for all applications.*

House No(s) 101-61 Street Name 99 Street

Borough Queens Block 9106 Lot 70 BIN 4458633 C.B. No. 409

3 Cost Details *Required for all applications.*

Cost estimates shall include total value of work per §28-112.3 of the NYC Administrative Code and shall be direct work costs based upon material and labor; work shall include all construction elements including, but not limited to, construction equipment, wall and floor finishes, built-in cabinets, and kitchen appliances. Indirect costs, including but not limited to general conditions and insurance, shall be added to direct work costs and shall be reflected in the unit costs shown. When filing an enlargement the estimated cost should be exclusive of any work performed within the additional square footage. ***"Yes" or "No" must be specified for each "Category of Work" listed below.***

Categories of Work *(Must match all applicable categories indicated on PW1.)*

Yes	No	
☐	☒	Boiler (BL)
☐	☒	Fire Alarm (FA)
☐	☒	Fuel Burning (FB)
☐	☒	Fuel Storage (FS)
☐	☒	Fire Suppression (FP)
☐	☒	Mechanical (MH)
☐	☒	Plumbing (PL)
☐	☒	Standpipe (SD)
☐	☒	Sprinkler (SP)
☐	☒	Signs (SG)
☐	☒	Other (OT)
	☐	Antenna (OT/ANT)
	☐	Marquee (OT/MAR)
	☐	(Describe)
☒	☐	General Construction (OT)
	☒	Partial Demolition
	☐	Non-Structural Demolition
	☐	Structural Work
	☐	Interior Renovation
	☐	Exterior Renovation
	☒	(Describe) Excavation

Category of Work*	Description of Work	Area/Units	Unit Cost ($)	Total Cost ($)	Work Category Total Cost ($)
Gen. Constr. (OT)					
Partial Demolition	- Demolition of exterior walls			36,000.00	
Excavation	- Excavation of soil			100,000.0	136,000.00
				TOTAL JOB COST: $	136,000.00

**List ALL Categories of Work specified "Yes" above. Use more than one line for Categories of Work that involve multiple unit costs. See PW3 Form Instructions for a sample of completed Section 3 Cost Details. For enlargements, only items associated with work performed in the existing area should be listed.*

4 Design Applicant Information

Choose One: ☒ P.E. ☐ R.A. ☐ Sign Hanger ☐ Other (specify) _____ License Number _____

Last Name Crowell First Name Sean Middle Initial

Business Name AECOM Business Phone (978)846-2299 Business Fax

Business Address 250 Apollo Dr Mobile Phone

City Chelmsford State MA Zip 01824 E-Mail sean.crowell@aecom.com

5 Owner/Lease Holder Information

Choose One: ☒ Owner ☐ Lease Holder

Last Name Wagner First Name Joseph Middle Initial

Business Name DCAS Business Phone (212)386-0481 Business Fax

Business Address 1 CENTRE STREET, 20TH FLOOR SOUTH Mobile Phone

City New York State NY Zip 10007 E-Mail jwagner@dcas.nyc.gov

6 Design Applicant's Statements and Signatures

I hereby state the information on this form is correct and complete to the best of my knowledge. I understand falsification of any statement is a misdemeanor and punishable by a fine, imprisonment, or both. I also understand it is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job of in exchange for special consideration. Violation is punishable by imprisonment or fine or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department.

Name (print) Signature Date

Sean A. Crowell 7/2013

STATE OF NEW YORK Sean Allen Crowell 088179 LICENSED PROFESSIONAL ENGINEER

P.E. / R.A. Seal *(apply seal then sign and date over seal)*

7 Owner's/Lease Holder's Statements and Signatures *Notary only required when submitting to obtain Sign-off.*

I hereby state the information on this form is correct and complete to the best of my knowledge. I understand falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. I also understand it is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by imprisonment or fine or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department.

Name (print) Joseph Wagner	Notarization State of New York, County of:	Notary Seal
Signature	Sworn to or affirmed under penalty of perjury	
	day of 20	
Date	Notary Public Signature	

Internal Use Only

Work Area	PW3 Cost Details Validation	Comments (May include cost guidance.)	Initials
Pre-Filing:	☐ Accept Original ☐ Revised Cost Needed		
Plan Examination:	☐ Accept Original ☐ Revised Cost Needed		
C of O:	☐ Accept Original ☐ Revised Cost Needed		
Pre-Filing/Plan Examination/C of O:	☐ Accept Revised Submission (Resolved)		

Attachment 4
TR-1

NYC Buildings

TR1: Technical Report
Statement of Responsibility

This form must be typewritten

Orient and affix BIS job number label here

1 Location Information *Required for all applications.*

House No(s) 10161 Street Name 99 Street

Work on Floor(s) 1

2 Applicant Information *Required for all applications.*

Choose all that apply: ☒ Design Applicant *3A, 4A, 5* ☒ Special Inspections Applicant *3B-D, 6-8* ☒ Progress Inspections Applicant *4B-D, 6-8*

Last Name Crowell First Name Sean Middle Initial A

Business Name AECOM Business Telephone (978) 846-2299

Business Address 25 Apollo Dr Business Fax

City Chelmsford State MA Zip 01824 Mobile Telephone

License Type *choose one:* ☒ P.E. ☐ R.A. ☐ Other: License Number 088379

Special Inspection Agency Number

3 Special Inspection Items *Required for all applications, continued on page 2;* ■ *indicates report required.*

3A ← Identification of Requirement				3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y N	Special Inspections		Code/Section	Initial & Date	Initial & Date	Initial & Date
☐ ☒	Flood Zone Compliance		BC G105			
☐ ☒	Fire Alarm Test		BC 907, BC 1704.13			
☐ ☒	Photoluminescent Exit Path Markings	■ TR7	BC 1026.11			
☐ ☒	Emergency Power Systems (Generators)		BC 1704.13, BC 2702			
☐ ☒	Structural Steel - Welding		BC 1704.3.1			
☐ ☒	Structural Steel - Erection & Bolting		BC 1704.3.2, BC 1704.3.3			
☐ ☒	Structural Cold-Formed Steel		BC 1704.3.4			
☐ ☒	Concrete - Cast-In-Place		BC 1704.4			
☐ ☒	Concrete - Precast		BC 1704.4			
☐ ☒	Concrete - Prestressed		BC 1704.4			
☐ ☒	Masonry		BC 1704.5			
☐ ☒	Wood - Off-Site fabrication of Structural Elements		BC 1704.6			
☐ ☒	Wood - Installation of High-Load Diaphragms		BC 1704.6.1			
☐ ☒	Wood - Installation of Metal-Plate-Connected Trusses		BC 1704.6.3			
☐ ☒	Wood - Installation of Prefabricated I-Joists		BC 1704.6.4			
☐ ☒	Soils - Site Preparation		BC 1704.7.1			
☐ ☒	Soils - Fill placement & In-Place Density		BC 1704 .7.2, BC 1704.7.3			
☐ ☒	Soils - Investigations (Borings/Test Pits)	■ TR4	BC 1704.7.4			
☐ ☒	Pile Foundations & Drilled Pier Installation	■ TR5	BC 1704.8			
☐ ☒	Pier Foundations		BC 1704.9			
☐ ☒	Underpinning		BC 1704.9.1			
☐ ☒	Wall Panels, Curtain Walls, and Veneers	■	BC 1704.10			
☐ ☒	Sprayed Fire-Resistant Materials		BC 1704.11			
☐ ☒	Exterior Insulation Finish Systems (EIFS)		BC 1704.12			
☐ ☒	Alternative Materials - OTCR Buildings Bulletin #_____		BC 1704.13			
☐ ☒	Smoke Control Systems		BC 1704.14			
☐ ☒	Mechanical Systems		BC 1704.15			
☐ ☒	Fuel-Oil Storage and Fuel-Oil Piping Systems		BC 1704.16			
☐ ☒	High-Pressure Steam Piping (Welding)		BC 1704.17			
☐ ☒	Fuel-Gas Piping (Welding)		BC 1704.18			
☒ ☐	Structural Safety - Structural Stability		BC 1704.19			
☐ ☒	Mechanical Demolition		BC 1704.19, BC 3306.6			

3 Special Inspection Items (continued) *Required for all applications; ■ indicates report required.*

3A ← Identification of Requirement				3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y N	Special Inspections		Code/Section	Initial & Date	Initial & Date	Initial & Date
☐ ☒	Excavation - Sheeting, Shoring, and Bracing		BC 1704.19, BC 3304.4.1			
☐ ☒	Soil Percolation Test - Dryweli ■		BC 1704.20.1			
☐ ☒	Soil Percolation Test - Septic ■		BC 1704.20.1			
☐ ☒	Site Storm Drainage Disposal and Detention System Installation		BC 1704.20			
☐ ☒	Septic System Installation		BC 1704.20			
☐ ☒	Sprinkler Systems		BC 1704.21			
☐ ☒	Standpipe Systems		BC 1704.22			
☐ ☒	Heating Systems		BC 1704.23			
☐ ☒	Chimneys		BC 1704.24			
☒ ☐	Firestop, Draftstop, and Fireblock systems		BC 1704.25			
☐ ☒	Aluminum Welding		BC 1704.26			
☐ ☒	Seismic Isolation Systems		BC 1707.8			
☐ ☒	Concrete Test Cylinders ■	TR2	BC 1905.6	Submit TR2 to complete these items		
☐ ☒	Concrete Design Mix ■	TR3	BC 1905.3	Submit TR3 to complete these items		

4 Progress Inspection Items *Required for all applications. ■ indicates report required.*

4A ← Identification of Requirement				4B Identification of Responsibilities	4C Certificate of Complete Inspections / Tests	4D Withdraw Responsibilities
Y N	Progress Inspections		Code/Section	Initial & Date	Initial & Date	Initial & Date
☐ ☒	Preliminary		28-116.2.1, BC 109.2			
☐ ☒	Footing and Foundation		BC 109.3.1			
☐ ☒	Lowest Floor Elevation (attach FEMA form)		BC 109.3.2			
☐ ☒	Frame Inspection		BC 109.3.3			
☐ ☒	Energy Code Compliance Inspections ■	TR8	BC 109.3.5	Submit TR8 to complete this item		
☐ ☒	Fire-Resistance Rated Construction		BC 109.3.4			
☐ ☒	Public Assembly Emergency Lighting		28-116.2.2			
☒ ☐	Final*		28-116.2.4.2, BC 109.5, Directive 14 of 1975, and 1 RCNY §101-10			

** For column 4C, indicate date when the actual final inspection was performed*

5 Design Applicant's Statements and Signatures *P.E./R.A. responsible for plans, choose both below and sign/seal.*

☒ I have identified all of the special inspections, progress inspections and tests required for compliance.

☒ I certify that the Special Inspection and Approved Agencies engaged by the owner to supervise the work specified above are acceptable. (BC 1704.1)

Name (please print) Sean Crowell

Signature

Date 1/2017

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

6 Owner's Statement and Signature for Progress/Special Inspector *Required when inspection applicant identifies responsibilities.*

I have reviewed the information provided herein and, to the best of my knowledge and belief, attest to its accuracy. I approve the identification of the responsible progress inspector. Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by a fine or imprisonment, or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department.

Name (print) Joseph Wagner Title Chief Engineer

Signature Date

7 Inspection Applicant's Identification of Responsibilities

Check all that apply below:

☒ For the **special inspections** indicated above in section 3, I certify that I am the principal/director of the special inspection agency accepting responsibility for conducting the inspections. I further certify that I have read the applicable sections of the New York City Construction Codes in connection with special inspections as well as 1 RCNY 101-06 Rule, which specifies the qualifications required for each inspection and that this agency meets those qualifications for each and every special inspection for which I/we take responsibility. I agree that both I and the agency will comply with all provisions of the New York City Construction Codes and the Rule. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ I certify that I am conducting **Small Building Inspections** and assume the responsibility for the special inspections specified in section 3 above. I personally, or where permitted by the New York City Construction Codes, qualified personnel under my direct supervision, will perform the required inspections and tests. All inspection and test reports shall be signed and made available to the Department. I understand that a qualified special inspection agency is required for Soils Investigation, Pier and Pile Installation, Underpinning of structures and Protection of the sides of excavations greater than 10 feet in depth. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☒ For the **progress inspections** indicated above in section 4, except energy code inspections on the TR1EN form, and/or **concrete test items** indicated in section 3, I assume the responsibility and I personally, or where permitted by the New York City Construction Codes, qualified personnel under my direct supervision, will perform the required inspections and tests on such forms and in such matter as the Department requires or requests. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Final Inspection:

☒ I will make final inspection of the construction work, including those inspections during its progress necessary to my certification upon final inspection that all work substantially conforms to approved construction documents and applicable laws and rules. I will confirm that the performance of progress inspections and other inspections has been documented before I report the work complete. As prescribed by 1 RCNY 101-10, I will perform the final inspection within 1 year from the expiration of the last valid permit of the work.

Upon completion of the work and within 30 days of my final inspection, I will file a certification attesting to the fact that all work was performed and completed in accordance with the approved construction documents, laws and rules, except as reported otherwise.

I understand that my failure to file a certification of completion or to notify the Department of my withdrawal of responsibilities within one year from expiration of the last valid permit may result in the loss of my privileges to file under Directives 2 and 14 of 1975 or issuance of a violation, or be aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ **Change of Applicant:** I am a newly designated individual responsible for the items specified herein and I hereby state that:

- ☐ None of the inspections/tests indicated herein have been performed to date by the previously designated individual.
- ☐ Some of the inspections/tests indicated herein have been performed by the previously designated individual, as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print)
Sean Crowell

Signature Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

8 Inspection Applicant's Certification of Completion

☐ I have completed the items specified herein and certify the following (check one only):

- ☐ All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations.
- ☐ All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations, except as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ **Withdrawal of Applicant:** I am withdrawing responsibility for the items of special/progress inspections and/or tests indicated herein and herewith submit the results or status of the work performed to date.

Name (please print)

Signature Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

Attachment 5
PC-1

NYC Buildings

PC1: Required Items Checklist for Professional Certification

Must be typewritten.

Orient and affix BIS job number label here

1 Location Information *Required for all applications.*

House No(s) 101-61 Street Name 99 Street

Borough Queens Block 9106 Lot 70 BIN 4458633 C.B. No. 409

2 Required Items *Required for all applications. Yes or no must be selected for every item. Continues on page 2.*

YES	NO	ITEMS REQUIRED PRIOR TO APPROVAL
☐	☒	LANDMARKS APPROVAL
☐	☒	LANDMARKS SIGNOFF
☐	☒	SEWER CONNECTION: DEP SD1 & SD2
☐	☒	HPD: SRO MD CERTIFICATE OF NO HARASSMENT
☐	☒	U.S. ARMY CORPS OF ENGINEERS APPROVAL
☐	☒	TRANSIT AUTHORITY APPROVAL
☐	☒	FIRE ALARM/SIGNAL SYSTEM (FA) SIGNOFF
☐	☒	URBAN RENEWAL AREA: HPD APPROVAL
☐	☒	SEPTIC INSTALLATION: DEP APPROVAL
☐	☒	ADDRESS: NEW HOUSE NUMBER APPROVED
☐	☒	TAX LOT: TENTATIVE LOT NUMBER ISSUED
☐	☒	STREET: NEW STREET NAME APPROVED
☐	☒	FIRE PROTECTION PLAN(FPP): FDNY APPROVAL
☐	☒	LOFT BOARD CERTIFICATE
☒	☐	ASBESTOS ACP 7 OR 5 OR ASB 4
☐	☒	BSA VARIANCE
☐	☒	TREE REMOVAL: OUTSIDE PROP./PARKS APPR
☐	☒	TREE REMOVAL: SPEC. ZON. DIST./CPC APPR
☐	☒	FOREIGN GOV'T PROPERTY: STATE DEPT. LTR
☐	☒	BPP-PARKS: REMOVE MATURE TREE
☐	☒	BPP-BSA REQUIREMENTS
☐	☒	BPP-CPC REQUIREMENTS
☐	☒	BPP-TA: RELOCATE BUS STOP
☐	☒	BPP-DEP: NON-STD DRAINAGE STRUCTURE
☐	☒	BPP-NYS DEC: DRAIN STREET TO WETLAND
☐	☒	BPP: DOT PERMISSION TO MOVE FRANCHISE
☐	☒	STREET: UNMAPPED-NOTIFY EMERG. AGENCIES
☐	☒	ART COMM. APPROVAL: DISTINCTIVE SIDEWALK
☐	☒	ART COMM. APPROVAL: CITY-OWNED PROPERTY
☐	☒	SITE CONNECTION: DEP
☐	☒	BPP-UTILITY APPROVAL TO RELOCATE POLE
☐	☒	ENVIRONMENTAL "E" DEP NOTICE TO PROCEED
☐	☒	BSA/CPC APPROVAL
☐	☒	CPC: HUDSON YARDS INITIAL CERTIFICATION
☐	☒	HPD: INCLUSIONARY HOUSING LETTER
☐	☒	NYCECC ANALYSIS
☐	☒	SITE SURVEY: INITIAL
☐	☒	RESTRICTION: EASEMENT AGREEMENT
☐	☒	RESTRICTION: DEED
☐	☒	ZONING EXHIBIT I: CERTIFICATION
☐	☒	ZONING EXHIBIT II: CERTIFICATION
☐	☒	ZONING EXHIBIT III:DESC. & OWNRSHP.STMNT
☐	☒	ZONING EXHIBIT IV: CERTIFICATION
☐	☒	ZONING EXHIBIT V: CERTIFICATION
☒	☐	COST AFFIDAVIT: ESTIMATED
☐	☒	FEE: CIVIL PENALTY FOR LEGALIZATION
☐	☒	FOUNDATION PLAN APPROVAL
☐	☒	WATERFRONT AREA ZONING COMPLIANCE
☐	☒	APPLICANT TO SELF CERTIFY OBJECTIONS
☐	☒	IDENTIFY THE PRIMARY JOB ON PW1
☐	☒	STEEL AFFIDAVIT: PRELIMINARY
☐	☒	ADULT ESTABLISHMENT APPROVAL
☐	☒	BPP: FILING REQUIRED
☐	☒	BPP: NOTES REQUIRED ON PLAN
☐	☒	BPP: TOPOGRAPHIC SURVEY
☐	☒	TR8: ENERGY CODE PROGRESS INSPECTIONS
☐	☒	BPP: PHOTOS-SIGNED/SEALED BY APPLICANT
☐	☒	BPP: INFRASTRUCTURE AND SITE SKETCH
☐	☒	BPP: SITE PLAN-NEW R.O.W. INSTALLATION
☐	☒	BPP: GRADE STUDY
☐	☒	BPP: STREET DRAINAGE APPLICATION
☐	☒	BPP: DISTINCT SIDEWALK-LEGAL AGREEMENT
☐	☒	BPP: DISTINCT SIDEWALK-STONE TEST REPORT
☐	☒	BPP: TRAFFIC ENG STDY-CC IN INTERSECTION
☐	☒	BPP: CONTRACTOR BOND-INSTALL ROADWAY
☐	☒	BPP: WAIVER OF GRADE FILING
☐	☒	BPP: CATCH BASIN/MANHOLE REQUIRED
☐	☒	BPP: FIELD VISITS RESULTS NEEDED
☐	☒	BPP: CHECKLIST IN LIEU OF PLANS-ALT3
☐	☒	SUBDIVISION SIGNOFF
☐	☒	OAC REGISTRATION
☐	☒	LOCAL LAW 58/1987 WAIVER
☐	☒	ADULT ACTIVITY APPROVAL
☐	☒	RESTRICTION: RESTRICTIVE DECLARATION
☐	☒	CURB CUT: PROVIDE EXISTING NUMBER
☐	☒	CLINTON DISTRICT: RESTRICTIVE DEC
☐	☒	HYDRO FLOW TEST LETTER
☐	☒	HYDRAULIC FLOW CALCULATIONS
☐	☒	TRASH COMPACTOR REQUIREMENTS
☐	☒	ANTI-HARASSMENT AREA CHECKLIST
☐	☒	CLINTON DISTRICT: ANTI-HARASSMENT CHECKLIST
☐	☒	BROOKLYN PARKING RESTRICTIONS
☐	☒	STREET TREE CHECKLIST
☒	☐	TENANT PROTECTION PLAN 2008 CODE
☐	☒	SOIL REPORT
☐	☒	DOB - ZONING DIAGRAM (ZD1)
☐	☒	DOB - ZONING RESOLUTION DETERMINATION(S) (ZRD1) x_____
☐	☒	DOB - CONSTRUCTION CODE DETERMINATION(S) (CCD1) x_____
☐	☒	FIRE APPARATUS ACCESS ROADS FOR DEV: FDNY APPROVAL
☐	☒	SRO MD ANTI-HARASSMENT CHECKLIST
☐	☒	NYS DEC TIDAL WETLANDS MAP
☐	☒	NYS DEC TIDAL WETLANDS APPROVAL
☐	☒	NYSDEC FRESHWATER WETLANDS MAP
☐	☒	NYS DEC FRESHWATER WETLANDS APPROVAL
☐	☒	NYS DEC COASTAL EROSION HAZARD MAP
☐	☒	NYS DEC COASTAL EROSION HAZARD APPROVAL
☐	☒	ASBESTOS: EXEMPTION (ASB4)
☒	☐	ASBESTOS: CERTIFICATION (DEP ACP5)
☐	☒	FIRE ALARM: FDNY RECEIVED & ACCEPTED PLANS
☐	☒	HUDSON YARDS PARKING AMENDMENT
☐	☒	BPP: STREET TREES SITE PLAN
☐	☒	RESOLVE ZONING DISCREPANCY
☐	☒	RESOLVE ZONING DESCRPANCY (DATA CHANGE)
☐	☒	CALENDARED PROPERTY– 40-DAY HOLD
☒	☐	2008 CODE TR1 REQUIRED
☐	☒	DOB- CONSTURCTION CODE DETERMINTATION (CCD1)
☒	☐	VERIFY DOB PLAN NAMING STANDARD IS MET
☐	☒	1ST ZONING REVIEW COMPLETE
☐	☒	2ND ZONING REVIEW COMPLETE
☐	☒	RECORDS MANAGEMENT FEE PAYMENT RECEIPT
☐	☒	OTHER:

2 Required Items (Continued) *Required for **all** applications. Yes or no must be selected for **every** item.*

YES	NO	ITEMS REQUIRED PRIOR TO PERMIT
☐	☒	CPC: HUDSON YARDS FINAL CERTIFICATION
☐	☒	JAMAICA: DEP SEWER CONNECTION APPROVAL
☐	☒	SITE SAFETY PLAN
☐	☒	EXCAVATION OR DEMOLITION: 5-DAY NOTICE
☐	☒	SIDEWALK SHED APPLICATION & PERMIT
☐	☒	TEMPORARY FENCE APPLICATION & PERMIT
☐	☒	SCAFFOLD APPLICATION & PERMIT
☐	☒	MICROFILM: INITIAL
☒	☐	INSURANCE: WORKERS' COMPENSATION
☐	☒	INSURANCE: WORKERS' COMP. WAIVER/AFFID
☐	☐	INSURANCE: LIABILITY
☒	☐	INSURANCE: DISABILITY
☒	☐	DIR-14 ID OF RESPONSIBILITY (TR1)
☐	☒	MASONRY MANUFACTURER'S STATEMENT-FORM 10H
☐	☒	EQUIPMENT (EQ) PERMITS
☐	☒	MICROFILM: ADDITIONAL REQUIRED
☐	☒	HIC LICENSE OR AFFIDAVIT
☐	☒	ELECTRICAL APPLICATION FOR SIDEWALK SHED LIGHTING
☐	☒	ASBESTOS; COMPLETION OR CLOSEOUT (ACP20 OR 21)
☐	☒	STREET TREES: RECEIPT OF STREET TREES SITE PLAN
☐	☒	ASBESTOS: VARIANCE (DEP FORM V5)
☐	☒	JAMAICA: DEP SEWER CONNECTION APPROVAL
☐	☒	2008 TR1 REQUIRED FOR NEW/WAIVED INSPECTIONS
☐	☒	TR3: CONCRETE DESIGN MIX TECHNICAL REPORT
☐	☒	PARTIAL DEMO: PLAN & DS1 (FOR AL/EW—OT PERMITS)
☐	☒	PARTIAL DEMO: 10-DAY NOTICE (FOR AL/EW—OT PERMITS)
☐	☒	STANDPIPE ALARM DRAWINGS 7 AI1 (OR AI1 PROOF)
☐	☒	STANDPIPE WORK PERMIT
☐	☒	OTHER:
☐	☒	OTHER:

YES	NO	ITEMS REQUIRED PRIOR TO C OF O OR SIGNOFF
☐	☒	LANDMARKS APPROVAL
☐	☒	LANDMARKS SIGNOFF
☐	☒	SEWER CONNECTION: DEP SD1 & SD2
☐	☒	HPD: SRO MD CERTIFICATE OF NO HARASSMENT
☐	☒	US ARMY CORPS OF ENGINEERS APPROVAL
☐	☒	TRANSIT AUTHORITY APPROVAL
☐	☒	FIRE ALARM/SIGNAL SYSTEM (FA) SIGNOFF
☐	☒	URBAN RENEWAL AREA: HPD APPROVAL
☐	☒	SEPTIC INSTALLATION: DEP APPROVAL
☐	☒	ADDRESS: NEW HOUSE NUMBER APPROVED
☐	☒	TAX LOT: FINAL LOT NUMBER ISSUED
☐	☒	STREET: NEW NAME APPROVED
☐	☒	FIRE PROTECTION PLAN (FPP); FDNY APPROVAL
☐	☒	ASBESTOS ACP 7 OR 5 OR ASB 4
☐	☒	BSA VARIANCE
☐	☒	WATER SUPPLY (PRIVATE): DOH APPROVAL
☐	☒	SWIMMING POOL: DOH APPROVAL
☐	☒	SWIMMING POOL: DEP APPROVAL
☐	☒	TREE REMOVAL: OUTSIDE PROP./PARKS APPR
☐	☒	TREE REMOVAL: SPEC. ZON. DIST./CPC APPR
☐	☒	FIRE RETARDANT TREATED WOOD: FDNY CERTIFICATE
☐	☒	BPP-DEP: INSTALL/MODIFY DRAINAGE STRUCTURE
☐	☒	BPP-DEP: INSTALL/RELOCATE FIRE HYDRANT
☐	☒	BPP-PARKS: PLANT NEW TREE
☐	☒	BPP-DOT: SIDEWALK ENCROACHMENT
☐	☒	BPP-DOT: RELOCATE STREET LIGHT
☐	☒	BPP-DOT: SIDEWALK/CURB/ROAD WORK PERMITS
☐	☒	BPP-TA: INSTALL SIDEWALK OVER STATION
☐	☒	BPP-ARTS COMM APPROVAL-DIST.SIDEWALK
☐	☒	STREET: UNMAPPED- NOTIFY EMERG. AGENCIES
☐	☒	ENVIRONMENTAL "E" DEP NOTICE OF SATIS
☐	☒	TAP LETTER - DOM SVC : DEP-DOM
☐	☒	TAP LETTER - FIRE SVC : DEP-FIRE
☐	☒	WATER METER PERMIT : DEP-METER

YES	NO	ITEMS REQUIRED PRIOR TO C OF O OR SIGNOFF (CONT.)
☐	☒	RPZ/DDCV TEST REPORT : GEN215B
☐	☒	SEWER/HOUSE CON SIGNOFF: DEP HC 021
☐	☒	FA - FDNY APPROVAL : FD-FAA
☐	☒	FA LETTER OF DEFECT : FD-FALD
☐	☒	FA SELF CERT DEFECT : FD-FASC
☐	☒	FIRE SUPP ANSUL APPROVL: FD-FSS
☐	☒	FEMA FORM (81-31): ELEVATION CERTIFICATE
☐	☒	CLINTON DIST: HPD CERT COMPLETION LOW-INCOME HOUSING
☐	☒	HPD: INCLUSIONARY HOUSING ELIG. CERT
☐	☒	FEMA FORM (81-65): DRY FLOOD-PROOFING CERTIFICATE
☐	☒	CERTIFICATE OF OCCUPANCY
☐	☒	PLACE OF ASSEMBLY (PA) SIGNOFF
☐	☒	SPRINKLER (SP) SIGNOFF
☐	☒	STANDPIPE (SD) SIGNOFF
☐	☒	ELEVATOR JOB SIGNOFF
☐	☒	GASOLINE TANK SIGNOFF
☐	☒	PILES: FINAL PILE PLAN/CREOSOTE LETTER
☐	☒	MARQUEE (OT) SIGNOFF
☐	☒	MECHANICAL (MH) SIGNOFF
☐	☒	CURB CUT (CC) SIGNOFF
☒	☐	COST AFFIDAVIT: ACTUAL
☐	☒	MICROFILM: ADDITIONAL REQUIRED
☐	☒	DETECTOR:SMOKE-CERT. OF INSTALLATION
☐	☒	EQUIPMENT USE PERMITS
☐	☒	SITE SURVEY: FINAL
☐	☒	RESTRICTION: EASEMENT AGREEMENT
☐	☒	RESTRICTION: DEED
☐	☒	FIRE SUPPRESSION SYSTEM (FP) SIGNOFF
☐	☒	FEES: PAY DEFERRED FEES
☐	☒	PLUMBING (PL) SIGNOFF
☐	☒	BOILER (BL) SIGNOFF
☐	☒	FUEL BURNING (FB) SIGNOFF
☐	☒	FUEL STORAGE (FS) SIGNOFF
☐	☒	CONSTRUCTION (OT) SIGNOFF
☐	☒	BPP: FINAL SIGNOFF
☐	☒	BPP: SIDEWALK & ROADWAY THICKNESS CORES
☐	☒	BPP: SIDEWALK CONCRETE STRENGTH REPORT
☐	☒	BPP: MAINTENANCE AGREEMENT - RETAINING WALL
☐	☒	DEMOLITION (DM) JOB SIGNOFF
☐	☒	BPP: ENGINEERS AFFIDAVIT
☐	☒	BPP: AS-BUILT SIDEWALK SURVEY
☐	☒	BPP: FIELD INSPECTION
☐	☒	BPP: FINAL AS-BUILT PHOTOGRAPHS
☐	☒	SP/SD DEVICE CERT : LTR-LIC ELECT
☐	☒	DRY PIPE VALVE TEST : FP-10
☐	☒	STANDPIPE INSP REPORT : FP-84
☐	☒	SPRINKLER INSP REPORT : FP-85
☐	☒	SD/SP FIRE PUMP TEST : FP-86
☐	☒	BOILER APPROVAL : 900A
☐	☒	GAS WELDER ANNUAL CERT : GAS-WELD
☐	☒	OIL TANK REMOVAL CERT : LETTER-FO
☐	☒	SEPTIC ABANDONMENT CERT: LETTER-SCAV
☐	☒	MEDICAL GAS INST CERT : LETTER-MED
☐	☒	DETECTOR:CARBON MONOXIDE-CERT.OF INSTALL
☐	☒	STEEL AFFIDAVIT- FINAL
☐	☒	MASONRY SUPPLIER'S STATEMENT-FORM 10J
☐	☒	RESTRICTION: RESTRICTIVE DECLARATION
☐	☒	SPRINKLER/STANDPIPE ELECTRICAL LETTER
☐	☒	SPRINKLER/STANDPIPE ELECTRICAL LETTER
☐	☒	HOUSE CONNECTION SIGNOFF
☐	☒	STREET TREE SIGNOFF
☐	☒	FEMA FORM (81-65): DRY FLOOD-PROOFING CERTIFICATE
☐	☒	ART COMM. SIGNOFF: CITY-OWNED PROPERTY (EXT. WORK)
☐	☒	PTA3: GREEN ROOF TAX ABATEMENT APPLICATION
☐	☐	PTA3: TAX ABATEMENT ELIGIBILITY APPROVAL

2 Required Items (Continued) *Required for all applications. Yes or no must be selected for every item.*

YES	NO	ITEMS REQUIRED PRIOR TO C OF O OR SIGNOFF (CONT.)
☐	☒	PTA4: SOLAR PANEL TAX ABATEMENT APPLICATION
☐	☒	PTA4: TAX ABATEMENT ELIGIBILITY APPROVAL
☐	☒	FIRE ALARM: AS-BUILT PLANS
☐	☒	STREET TREES SITE PLAN
☐	☒	DOB FINAL INSPECTION REQUIRED
☐	☒	DOB ZONING DIAGRAM (ZD1)
☐	☒	APPLICANT CONCRETE RETESTING REPORT
☐	☒	APPLICANT CONCRETE EVALUATION REPORT
☐	☒	EN2: AS BUILT ENERGY ANALYSIS
☐	☒	OTHER:

3 Statement and Signatures *Required for all applications.*

Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by imprisonment or fine or both.

Is a TR1 form required?
☒ Yes ☐ No

PAA only:
Is a ZD1 form required?
☐ Yes ☒ No

Name (please print) Sean Crowell (Type) P.E. / R.A.)

Signature

12/20/17
Date

STATE OF NEW YORK
Sean Allen Crowell
083570
LICENSED PROFESSIONAL ENGINEER

P.E. / R.A. Seal

Attachment 6
POC-1

NYC BUILDINGS

Job Number
(Affix Label)

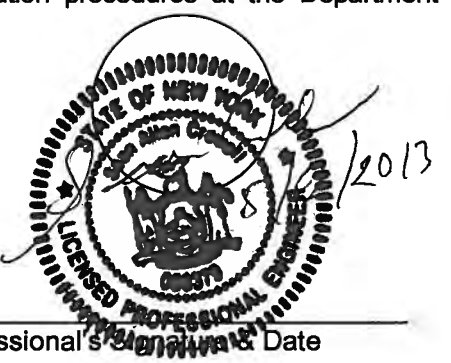
Professional and Owner Certification

Please file three (3) originals

1. Professional's Certification

"I hereby state that I have exercised a professional standard of care in certifying that the filed application is complete and in accordance with applicable laws, including the rules of the Department of Buildings, as of this date. I am aware the Commissioner will rely upon the truth and accuracy of this statement. I have notified the owner that this application has been professionally certified. If an audit or other exam discloses non-compliance, I agree to notify the owner of the remedial measures that must be taken to meet legal requirements. I further realize that any misrepresentation or falsification of facts made knowingly or negligently by me, my agents or employees, or by others with my knowledge, will render me liable for legal and disciplinary action by the Department of Buildings and other appropriate authorities, including termination of participation in the professional certification procedures at the Department of Buildings."

Professional's Seal



088379
Professional's License No.

Professional's Signature & Date

2. Owner's Statement

"I have read and am fully aware of the applicant's above statement that this job will be professionally certified, and agree to bring into compliance any construction which is found not to comply with all applicable laws and regulations."

Owner's Signature & Date

3. Applicant's Contact Information

	Fax Numbers	Email Addresses
Applicant		SEAN.CROWELL@AECOM.COM
Owner		JWAGNER@DCAS.NYC.GOV
Filing Representative		JIMMY@NEXUSEXPEDITING.COM

Attachment 7
ACP-5

NYC Environmental Protection

NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION

Asbestos Control Program
59-17 Junction Boulevard, 8th Floor, Flushing, NY 11373

ASBESTOS ASSESSMENT REPORT

RECEIVED
5/3/2013
DEP
ASBESTOS CONTROL
PROGRAM
FEE PAID

1. NYC DOB Job # (if applicable) _____ **Control Number: 4071998**

2. Premise No. 10161 Street Name 99th street Borough Queens Zip 11416

3. AKA _____ Type of Facility Commercial BIN 4458633 Block 09106 Lot 0070

4. Building Owner DCAS Address 1 Centre Street, 20th fl. South

5. City New York State NY Zip 10007 Contact Person Joseph Wagner

6. Tel. # (212) 386-0481 Fax # _____ Email jwagner@DCAS.NYC.GOV

7. Description of the Entire Scope of Work
EXPLORATORY DEMOLITION, EXCAVATION WORK, AND TEMPORARY FENCE INSTALLATION PER PLANS FILED. RECONSTRUCTION PHASE OF WORK TO BE FILED IN SEPARATE APPLICATION. NO CHANGE IN USE, EGRESS, OR OCCUPANCY.

8. I, ALAN YOUNG, have conducted an asbestos investigation on
Name of Certified Asbestos Investigator

05/23/2012
Date(s)

in accordance with Sections 1-16 and 1-28 of the NYC DEP Asbestos Control Program Rules and declare that at said facility address, the

- [X] a. portion(s) of the premises affected by the work is free of asbestos containing material (ACM).
- [ ] b. premise (or portions thereof) affected by the work contains 10 square feet or less or 25 linear feet or less of ACM. Specify locations in section 9: Note This material must be abated as a minor project in accordance with relevant provisions of the DEP Asbestos Rules
- [ ] c. asbestos is present and will not be disturbed during construction activity. Specify the quantity and area where asbestos is present. Specify amount: _____ sq. ft _____ linear ft.
  Specify locations (attach additional documents as necessary):
- [ ] d. entire building is free of asbestos containing material (ACM).

9. RESULTS OF ASBESTOS BUILDING SURVEY:

FLOOR	DESCRIBE SECTION OF FLOOR	ALL MATERIALS ASSUMED TO CONTAIN ACM AND/OR SAMPLED	NUMBER OF SAMPLES ANALYZED	ASBESTOS PRESENT	ASSUMED ACM
1	Bay #9, #11, #13, #14	Gypsum Wallboard, Wall Joint Compound	8	No	No
1	Outside Bay #6 and #9	Concrete Floor	2	No	No

I hereby declare the information provided herein is true and complete

ALAN YOUNG — *DEP Certified Asbestos Investigator's Signature*
5/3/2013 — *Date*
112999 — *Certificate Number*
2/12/2015 — *Expiration Date*

Tel. # (914) 262-4180 Fax # _____ Email ayoung@hillmanngroup.com

The investigator shall assume that some or all of the areas investigated contain ACM, and for each area that is not assumed to contain ACM, collect and submit for analysis bulk samples in accordance with §§ 1-36, 1-37, and 1-44 of the DEP Asbestos Rules and EPA publications 560/5-85-024 and 560/5-85-030a and 40 CFR 763.86.

SEAL OF THE NYC DEP CERTIFIED ASBESTOS INVESTIGATOR

CITY OF NEW YORK
ALAN G. YOUNG
CERTIFIED ASBESTOS INVESTIGATOR

2575735

5/3/2013 1 12 39 PM

NYC Environmental Protection

NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION

Asbestos Control Program
59-17 Junction Boulevard, 8th Floor, Flushing, NY 11373

ASBESTOS ASSESSMENT REPORT

RECEIVED
5/3/2013
DEP
ASBESTOS CONTROL
PROGRAM
FEE PAID

10. ANALYTICAL LABORATORY:

NAME	ELAP # (NYS DOH CERTIFICATION)	DATE(S) SAMPLES ANALYZED
Hillmann Consulting, LLC	10926	3/12/2013

11. NYS DOL Asbestos Handling license # 62252 Company Name Hillmann Consulting, LLC

I hereby declare the information provided herein is true and complete

ALAN YOUNG — *DEP Certified Asbestos Investigator's Signature*
5/3/2013 — *Date*
112999 — *Certificate Number*
2/12/2015 — *Expiration Date*

Tel. # (914) 262-4180 Fax # Email ayoung@hillmanngroup.com

The investigator shall assume that some or all of the areas investigated contain ACM, and for each area that is not assumed to contain ACM, collect and submit for analysis bulk samples in accordance with §§ 1-36, 1-37, and 1-44 of the DEP Asbestos Rules and EPA publications 560/5-85-024 and 560/5-85-030a and 40 CFR 763.86.

SEAL OF THE NYC DEP CERTIFIED ASBESTOS INVESTIGATOR

CITY OF NEW YORK CERTIFIED ASBESTOS INVESTIGATOR ALAN G. YOUNG

2575736

Attachment 8
Workers Comp/Insurance Information

Attachment 9
Project Plans

FORMER OZONE INDUSTRIES, INC.
OZONE PARK, 101-61 99 ST, QUEENS, NY
SOIL EXCAVATION, SOIL VAPOR EXTRACTION AND SUB-SLAB DEPRESSURIZATION REMEDIAL DESIGN



ENERGY ANALYSIS/2013 NYCECC		
ITEM DESCRIPTION:	PROPOSED	PRESCRIPTIVE
REMOVAL OF INTERIOR PARTITIONS	Various Types	Exempt low energy/ envelope only
REMOVAL OF INTERIOR FLOORS	soil/concrete/ asphault	Exempt low energy/ envelope only
REMOVAL OF UTILITIES	N/A	N/A

NOTE:

To the best of my knowledge, belief and professional judgement, all work under this application is exempt from the NYCECC. The scope of work is entirely in a low-energy building and is limited to the building envelope.

PREPARED BY:

AECOM
250 APOLLO DRIVE
CHELMSFORD, MA 01824
www.aecom.com

PROJ. NUMBER: 60221764

Block: 9106
Lot: 70
Zoning Map: 18A
Zoning District: R5
Construction Classification: NON-FIREPROOF STRUCTURES

ISSUED FOR DEMOLITION

SHEET	SHEET TITLE	REVISION	DATE
T-001.00	TITLE SHEET	REV 0	04/23/13
A-001.00	EXISTING CONDITIONS	REV 0	04/23/13
A-002.00	PROPOSED DEMOLITION PLAN	REV 0	04/23/13
A-003.00	PROPOSED EXCAVATION PLAN	REV 0	04/23/13
A-004.00	EXCAVATION DETAILS	REV 0	04/23/13
EQ-001.00	PROPOSED TEMPORARY FENCE	REV 0	04/23/13

SHEET	SHEET TITLE

NOTE:

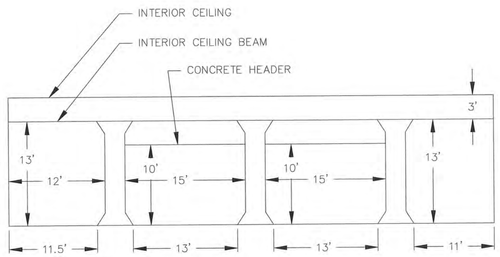
Exploratory demolition, excavation work, and termporary fence installation per plans filed. Reconstruction phase of the work to be filed in seperate application. No change in use, egress, or occupancy.

TR1 INSPECTIONS:

a) Structural Safety - Structural Stability; b) Firestop, Draftstop, and Fireblock Systems

CURRENT DATE	05/2/13	DRAWING NUMBER	T-001.00	SHEET NUMBER	1 of 6	REVISION	0

File: \\GMFTP001\Jobs\Ind_Service\Project Files\Archive_Inc\Ozone - Queens, NY\Remediation Implementation\Construction Expedite\Reforms Permit_5-2-13.mp.dwg Layout: Title Sheet User: kourtneyl Plotted: May 02, 2013 - 2:09pm Xref's:



NOTE:

BAY 8 AND 9 ELEVATIONS ARE REDUCED BY APPROXIMATELY 1.5 FEET TO ACCOUNT FOR A STEP UP IN FLOOR ELEVATION.

TYPICAL BAY ELEVATION
SCALE: NTS

RESIDENTIAL

101-20
AUTO REPAIR
LISENCA
LANDSCAPING

RESIDENCE

94609

SIDEWALK

101-11
100th STREET
TAVELLA PLUMBING AND HEATING

APPROXIMATE LOCATION OF SUBSURFACE PLUMBING LINE (1" COPPER LINE; UN-METERED; NOT CONNECTED TO SEWER OR CITY WATER LINE)

101-15
100th STREET
NEW YORK WATER SERVICE

366

APPROXIMATE LOCATION OF UN-DOCUMENTED SUBSURFACE ELECTRICAL SERVICE

SUBSURFACE ELECTRICAL BOXES (NYC ELECTRIC)

101-32
100th STREET
(FIVE STAR ELECTRICAL CORP.)

367

94608

101-28
RESIDENCE

OVERHEAD RAILROAD

PARKING LOT

SIDEWALK

100-21
101st STREET
(MOVING STORAGE COMPANY)

LEGEND

- EXISTING UTILITY POLE
- EXISTING SUMP
- OVERHEAD ELECTRICAL LINES

10 0 20
SCALE IN FEET

ISSUED FOR DEMOLITION

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0	RWM	04/23/13	ISSUED FOR DEMOLITION	RM	04/24/13	SAC	04/24/13

STATE OF NEW YORK — Steven Sloan, P.E. — 085316 — LICENSED PROFESSIONAL ENGINEER

AECOM
250 APOLLO DRIVE
CHELMSFORD, MA 01824
www.aecom.com

FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 05/2/13

EXISTING CONDITIONS

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: A-001.00

SHEET NUMBER: 2 of 6

REVISION 0

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NOTES:
1. PERSONAL DECONTAMINATION AND STOCKPILE AREAS SHALL BE MOVED ACCORDINGLY THROUGHOUT THE DEMOLITION ACTIVITIES IN ORDER TO PROPERLY SUPPORT THE OPERATION.
2. DOT PERMITS WILL BE OBTAINED, BY THE GENERAL CONTRACTOR, FOR PARTIAL STREET CLOSURES AND FENCES THAT EXTEND BEYOND 3 FEET INTO THE SIDEWALK.
3. EROSION CONTROLS WILL BE IMPLEMENTED ALONG THE FENCE LINE.

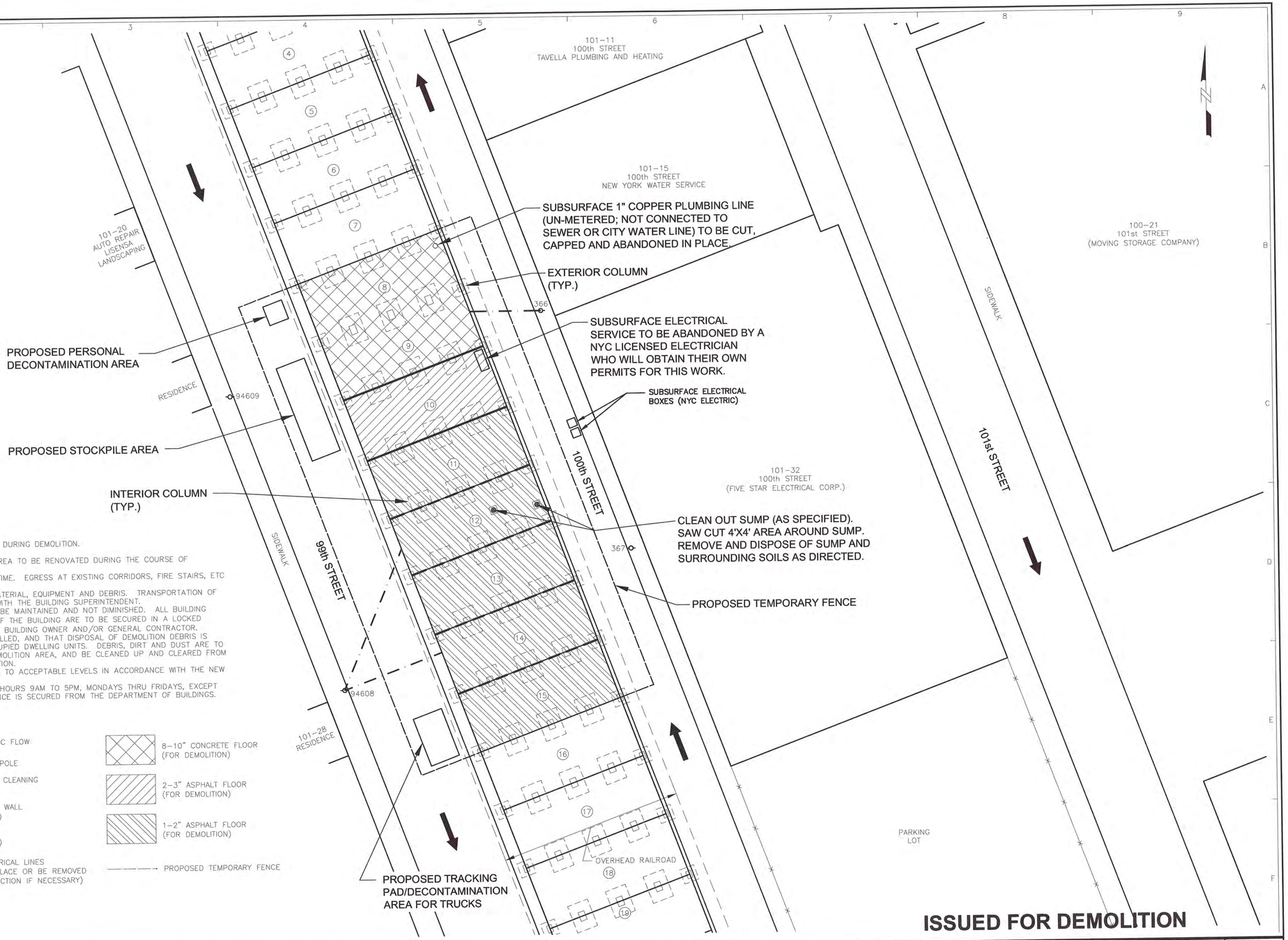
PLUMBING DEMOLITION NOTES:
1. GENERAL
A. PRIOR TO PROPOSAL SUBMISSION, CONTRACTOR SHALL VISIT THE SITE TO REVIEW THE EXISTING CONDITIONS ASSOCIATED WITH THE SCOPE OF WORK AND ADJACENT AREAS TO ASCERTAIN THE DIFFICULTIES WHICH WILL AFFECT THE EXECUTION OF THE WORK OF THIS CONTRACT.
B. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT THE ABOVE SITE EXAMINATION HAS BEEN MADE AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
C. DEMOLITION WORK SHALL INCLUDE ALL MATERIALS, LABOR, EXTENSIONS, CONNECTIONS, CUTTING, REPAIRING, ADAPTING AND OTHER PLUMBING WORK REQUIRED FOR THE COMPLETION OF THE PERMANENT WORK. COORDINATE THE EXTENT OF DEMOLITION WORK WITH THE ENGINEER.

2. SCOPE OF WORK
A. REMOVE BASE BUILDING PIPING AS INDICATED BELOW:
a. REMOVE ALL ABANDONED BASE BUILDING PIPING BACK TO THE EXISTING WET COLUMNS OR SHAFTS, OR AS NOTED ON THE DRAWINGS.
b. CONTRACTOR TO CONTACT BUILDING MANAGEMENT AND ADJACENT TENANTS REGARDING REMOVAL SCOPE OF WORK TO MAINTAIN CONTINUITY OF ALL SERVICES TO TENANTS WHO ARE TO REMAIN OPERATIONAL AND NOT BE AFFECTED BY DEMOLITION WORK. NOTE: IT IS ANTICIPATED THAT DEMOLITION OF THE SUBSURFACE 1" COPPER WATER LINE WILL NOT AFFECT SERVICE TO ADJACENT TENANTS.
B. PROVIDE ADDITIONAL SUPPORT FOR ALL EXISTING PIPING TO REMAIN WHICH ARE AFFECTED BY DEMOLITION.
C. ALL MATERIALS AND EQUIPMENT SHALL BE DISPOSED OF IN ACCORDANCE WITH APPLICABLE LAWS AND ENVIRONMENTAL REGULATIONS.

TENANT SAFETY PLAN – 2008 CODE:
28-104.8.4.
1. THIS BUILDING CONTAINS DWELLING UNITS THAT WILL BE OCCUPIED DURING DEMOLITION.
2. THE DEMOLITION WORK IS CONFINED TO GROUND FLOOR.
3. THERE WILL BE NOBODY OCCUPYING THE PROPOSED DEMOLITION AREA TO BE RENOVATED DURING THE COURSE OF DEMOLITION WORK.
4. EGRESS: REQUIRED EGRESS SHALL NOT BE OBSTRUCTED AT ANY TIME. EGRESS AT EXISTING CORRIDORS, FIRE STAIRS, ETC MUST BE MAINTAINED AT ALL TIMES.
5. ALL EXISTING MEANS OF EGRESS MAY NOT BE USED TO STORE MATERIAL, EQUIPMENT AND DEBRIS. TRANSPORTATION OF ALL MATERIALS, EQUIPMENT AND DEBRIS MUST BE COORDINATED WITH THE BUILDING SUPERINTENDENT.
6. EXISTING FIRE SAFETY FOR ALL OCCUPIED DWELLING UNITS SHALL BE MAINTAINED AND NOT DIMINISHED. ALL BUILDING MATERIALS STORED AT DEMOLITION AREA AND/OR IN ANY AREA OF THE BUILDING ARE TO BE SECURED IN A LOCKED AREA. ACCESS TO SUCH AREAS ARE TO BE CONTROLLED BY THE BUILDING OWNER AND/OR GENERAL CONTRACTOR.
7. THE GENERAL CONTRACTOR SHALL ENSURE THAT DUST IS CONTROLLED, AND THAT DISPOSAL OF DEMOLITION DEBRIS IS PERFORMED IN SUCH A MANNER AS TO NOT INTERFERE WITH OCCUPIED DWELLING UNITS. DEBRIS, DIRT AND DUST ARE TO BE KEPT TO A MINIMUM AND BE CONFINED TO THE IMMEDIATE DEMOLITION AREA, AND BE CLEANED UP AND CLEARED FROM THE BUILDING PERIODICALLY TO AVOID ANY EXCESSIVE ACCUMULATION.
8. THE GENERAL CONTRACTOR SHALL ENSURE THAT NOISE IS LIMITED TO ACCEPTABLE LEVELS IN ACCORDANCE WITH THE NEW YORK CITY NOISE CONTROL CODE.
9. DEMOLITION OPERATIONS WILL BE CONFINED TO NORMAL WORKING HOURS 9AM TO 5PM, MONDAYS THRU FRIDAYS, EXCEPT LEGAL HOLIDAYS, UNLESS AN AFTER-HOURS WORK PERMIT VARIANCE IS SECURED FROM THE DEPARTMENT OF BUILDINGS.

LEGEND
- PROPOSED TRAFFIC FLOW
- EXISTING UTILITY POLE
- PROPOSED SUMP CLEANING AND REMOVAL
- CONCRETE (CMU) WALL (FOR DEMOLITION)
- PLYWOOD WALL (FOR DEMOLITION)
- OVERHEAD ELECTRICAL LINES (TO REMAIN IN PLACE OR BE REMOVED DURING CONSTRUCTION IF NECESSARY)
- 8-10" CONCRETE FLOOR (FOR DEMOLITION)
- 2-3" ASPHALT FLOOR (FOR DEMOLITION)
- 1-2" ASPHALT FLOOR (FOR DEMOLITION)
- PROPOSED TEMPORARY FENCE

10 0 20
SCALE IN FEET



ISSUED FOR DEMOLITION

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
0	RWM	04/23/13	ISSUED FOR DEMOLITION	RM	04/24/13	SAC	04/24/13

STATE OF NEW YORK — Sean Xiang Chen — 086379 — LICENSED PROFESSIONAL ENGINEER

AECOM
250 APOLLO DRIVE
CHELMSFORD, MA 01824
www.aecom.com

FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

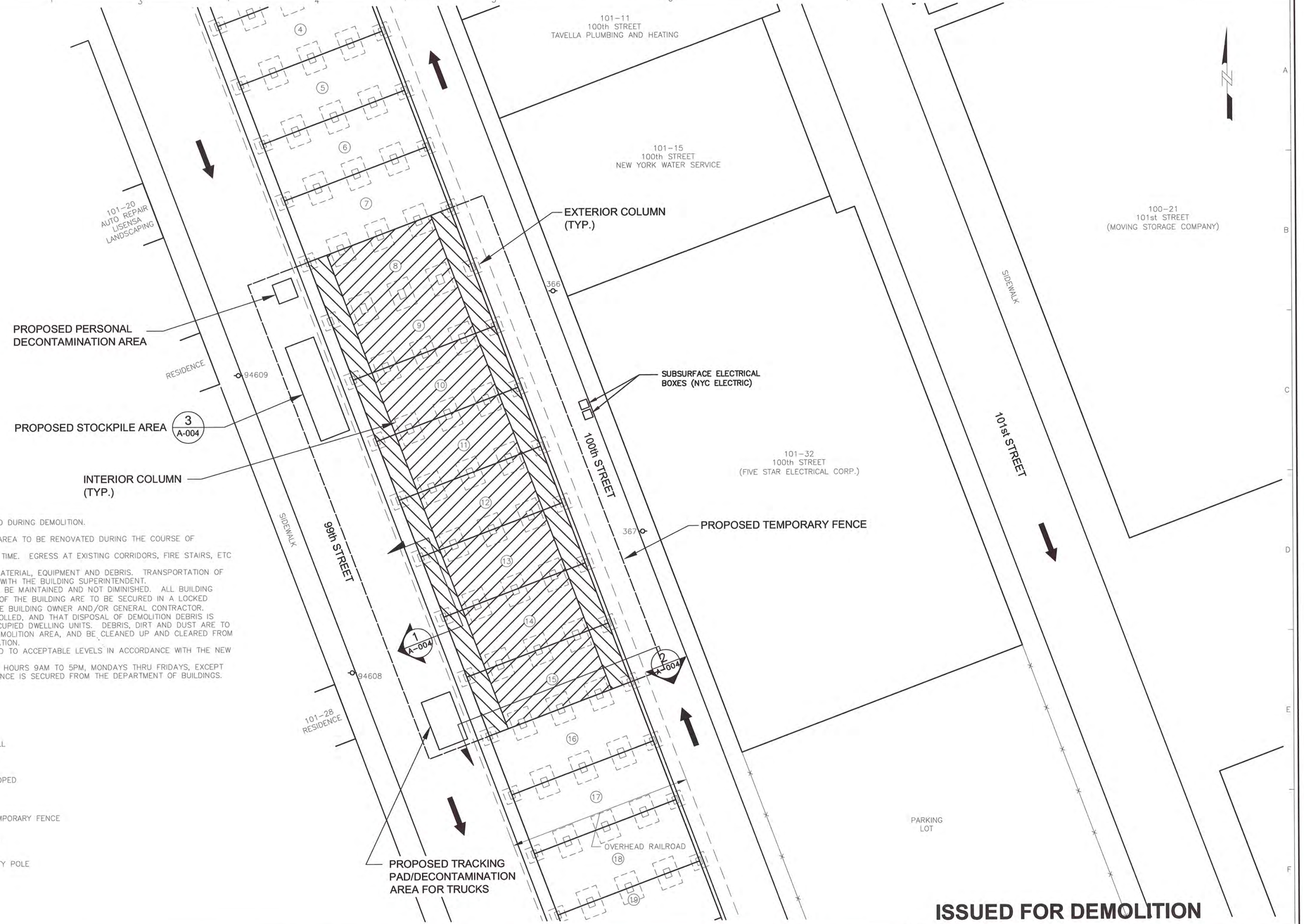
DATE: 05/2/13

PROPOSED DEMOLITION PLAN

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: A-002.00
SHEET NUMBER: 3 of 6
REVISION 0

File: \\US0977172001.local_Service Project Files\Environ_Inc\Ozone - Queens, NY\Remediation Implementation\Construction\Logistics Reports Permit_5-2-13.rvt dwg Layout: A-002 Proposed Demolition User: boardmanj Plotted: May 02, 2013 - 2:32pm Xref's:



NOTES:
1. EXCAVATION AND BACKFILL OPERATIONS ARE TO BE SEQUENCED AS DETAILED IN THE SPECIFICATIONS, AND DESIGN DOCUMENTS PROVIDED BY THE STRUCTURAL ENGINEER AS AN ATTACHMENT TO THE SPECIFICATIONS. THE STRUCTURAL ENGINEER'S DESIGN INCLUDES DETAILED REQUIREMENTS FOR VEHICULAR LOADING, SLOPING, BACKFILL/EXCAVATION SEQUENCING, MONITORING, ETC DURING DEMOLITION.
2. PERSONAL DECONTAMINATION AND STOCKPILE AREAS SHALL BE MOVED ACCORDINGLY THROUGHOUT THE DEMOLITION ACTIVITIES IN ORDER TO PROPERLY SUPPORT THE OPERATION.
3. DOT PERMITS WILL BE OBTAINED, BY THE GENERAL CONTRACTOR, FOR PARTIAL STREET CLOSURES AND FENCES THAT EXTEND BEYOND 3 FEET INTO THE SIDEWALK.
4. EROSION CONTROLS WILL BE IMPLEMENTED ALONG THE FENCE LINE.

TENANT SAFETY PLAN – 2008 CODE:
128-104.8.4.
1. THIS BUILDING CONTAINS DWELLING UNITS THAT WILL BE OCCUPIED DURING DEMOLITION.
2. THE DEMOLITION WORK IS CONFINED TO GROUND FLOOR.
3. THERE WILL BE NOBODY OCCUPYING THE PROPOSED DEMOLITION AREA TO BE RENOVATED DURING THE COURSE OF DEMOLITION WORK.
4. EGRESS: REQUIRED EGRESS SHALL NOT BE OBSTRUCTED AT ANY TIME. EGRESS AT EXISTING CORRIDORS, FIRE STAIRS, ETC MUST BE MAINTAINED AT ALL TIMES.
5. ALL EXISTING MEANS OF EGRESS MAY NOT BE USED TO STORE MATERIAL, EQUIPMENT AND DEBRIS. TRANSPORTATION OF ALL MATERIALS, EQUIPMENT AND DEBRIS MUST BE COORDINATED WITH THE BUILDING SUPERINTENDENT.
6. EXISTING FIRE SAFETY FOR ALL OCCUPIED DWELLING UNITS SHALL BE MAINTAINED AND NOT DIMINISHED. ALL BUILDING MATERIALS STORED AT DEMOLITION AREA AND/OR IN ANY AREA OF THE BUILDING ARE TO BE SECURED IN A LOCKED AREA. ACCESS TO SUCH AREAS ARE TO BE CONTROLLED BY THE BUILDING OWNER AND/OR GENERAL CONTRACTOR.
7. THE GENERAL CONTRACTOR SHALL ENSURE THAT DUST IS CONTROLLED, AND THAT DISPOSAL OF DEMOLITION DEBRIS IS PERFORMED IN SUCH A MANNER AS TO NOT INTERFERE WITH OCCUPIED DWELLING UNITS. DEBRIS, DIRT AND DUST ARE TO BE KEPT TO A MINIMUM AND BE CONFINED TO THE IMMEDIATE DEMOLITION AREA, AND BE CLEANED UP AND CLEARED FROM THE BUILDING PERIODICALLY TO AVOID ANY EXCESSIVE ACCUMULATION.
8. THE GENERAL CONTRACTOR SHALL ENSURE THAT NOISE IS LIMITED TO ACCEPTABLE LEVELS IN ACCORDANCE WITH THE NEW YORK CITY NOISE CONTROL CODE.
9. DEMOLITION OPERATIONS WILL BE CONFINED TO NORMAL WORKING HOURS 9AM TO 5PM, MONDAYS THRU FRIDAYS, EXCEPT LEGAL HOLIDAYS, UNLESS AN AFTER-HOURS WORK PERMIT VARIANCE IS SECURED FROM THE DEPARTMENT OF BUILDINGS.

ISSUED FOR DEMOLITION

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0	RWM	04/23/13	ISSUED FOR DEMOLITION	RM	04/24/13	SAC	04/24/13

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www.aecom.com

FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

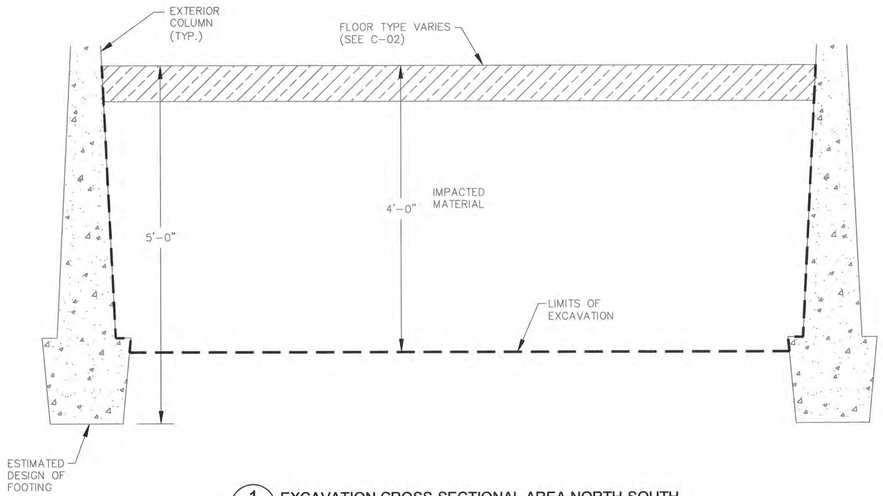
DATE: 05/2/13

PROPOSED EXCAVATION PLAN

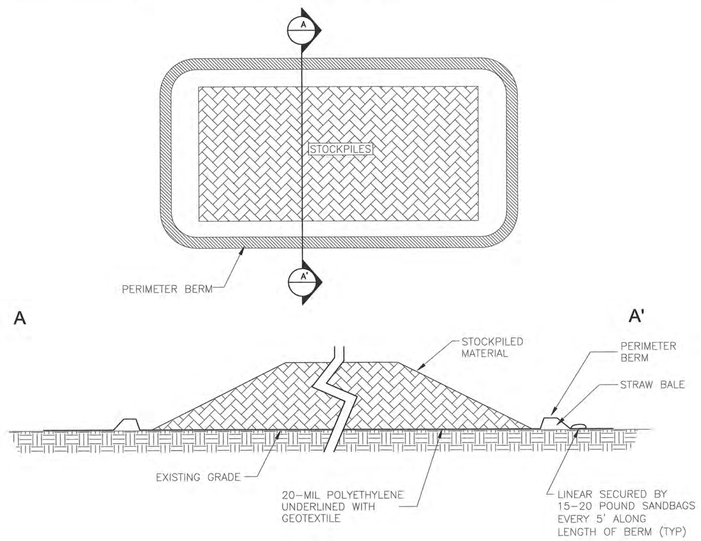
101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: A-003.00
SHEET NUMBER: 4 of 6
REVISION 0

File: \\GMT172001\Jobs\Hist_Service\Project Files\Ozone - Queens, NY\Remediation Implementation\Construction\Expedited Bid\Demo Permit_5-2-13_rev.dgn Layout: A-003 Proposed Excavation User: brandonj Plotted: May 02, 2013 - 2:33pm By:



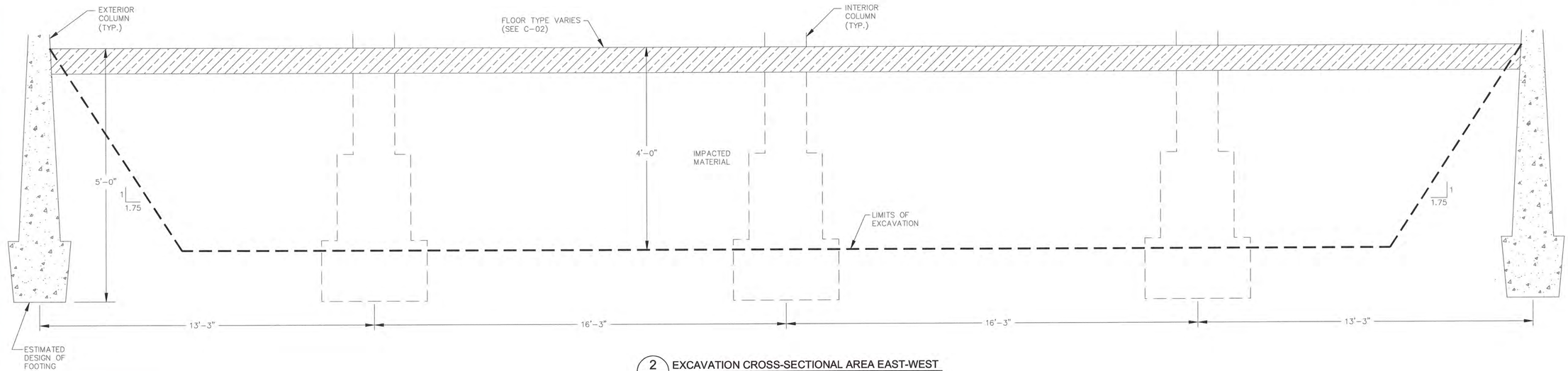
1 A-003 EXCAVATION CROSS-SECTIONAL AREA NORTH-SOUTH
SCALE: NTS



3 A-003 STOCKPILE AREA
SCALE: NTS

NOTES:
1. STOCKPILE AREA DIMENSIONS AND SHAPE MAY VARY. ACTUAL SIZE WILL BE DETERMINED BASED ON SITE CONDITIONS AND REQUIRED STORAGE AREA. GENERAL CONTRACTOR SHALL DETERMINE FINAL SIZE OF AREA WITH APPROVAL BY SITE ENGINEER.
2. CONTAINMENT BERMS SHALL BE CONSTRUCTED OF STRAW BALES.
3. PLACEMENT OF EXCAVATED SOIL WILL BE CAREFULLY PLACED SO THAT EQUIPMENT DOES NOT DAMAGE LINER.
4. UPON COMPLETION OF THE WORK, THE STOCKPILE AREA SHALL BE REMOVED, AND RESTORED TO EXISTING CONDITIONS.
5. ANY DAMAGE TO STOCKPILE AREA MUST BE REPORTED TO THE SITE ENGINEER IMMEDIATELY.
6. LINER SHALL BE ONE SOLID SHEET.
7. STOCKPILES TO BE COVERED WHEN NOT IN USE, IN THE EVENT OF INCLEMENT WEATHER AND/OR AT THE END OF EACH DAY WITH 10 MIL POLY OR ENGINEER APPROVED EQUIVALENT.
8. AT NO TIME SHALL THE QUANTITY OF SOIL STOCK PILED ON SITE EXCEED 200 CUBIC YARDS OF TOTAL MATERIAL.
9. THE STOCK PILES MAXIMUM HEIGHT SHALL NOT EXCEED 5'.
10. EXCAVATION AND BACKFILLING ACTIVITIES SHALL PROCEED AND BE SEQUENCED AS INDICATED IN THE SPECIFICATIONS AND AS SHOWN ON THE STRUCTURAL ENGINEERS REPORT AND DRAWINGS INCLUDED AS ATTACHMENTS TO THE SPECIFICATIONS.
11. SOME EXCAVATIONS DEEPER THAN 4' MAY BE NECESSARY AS DIRECTED BY THE ENGINEER PER THE STRUCTURAL ENGINEERS DESIGN (INCLUDED AS AN ATTACHMENT TO THE SPECIFICATIONS)

TENANT SAFETY PLAN – 2008 CODE:
128-104.8.4.
1. THIS BUILDING CONTAINS DWELLING UNITS THAT WILL BE OCCUPIED DURING DEMOLITION.
2. THE DEMOLITION WORK IS CONFINED TO GROUND FLOOR.
3. THERE WILL BE NOBODY OCCUPYING THE PROPOSED DEMOLITION AREA TO BE RENOVATED DURING THE COURSE OF DEMOLITION WORK.
4. EGRESS: REQUIRED EGRESS SHALL NOT BE OBSTRUCTED AT ANY TIME. EGRESS AT EXISTING CORRIDORS, FIRE STAIRS, ETC MUST BE MAINTAINED AT ALL TIMES.
5. ALL EXISTING MEANS OF EGRESS MAY NOT BE USED TO STORE MATERIAL, EQUIPMENT AND DEBRIS. TRANSPORTATION OF ALL MATERIALS, EQUIPMENT AND DEBRIS MUST BE COORDINATED WITH THE BUILDING SUPERINTENDENT.
6. EXISTING FIRE SAFETY FOR ALL OCCUPIED DWELLING UNITS SHALL BE MAINTAINED AND NOT DIMINISHED. ALL BUILDING MATERIALS STORED AT DEMOLITION AREA AND/OR IN ANY AREA OF THE BUILDING ARE TO BE SECURED IN A LOCKED AREA. ACCESS TO SUCH AREAS ARE TO BE CONTROLLED BY THE BUILDING OWNER AND/OR GENERAL CONTRACTOR.
7. THE GENERAL CONTRACTOR SHALL ENSURE THAT DUST IS CONTROLLED, AND THAT DISPOSAL OF DEMOLITION DEBRIS IS PERFORMED IN SUCH A MANNER AS TO NOT INTERFERE WITH OCCUPIED DWELLING UNITS. DEBRIS, DIRT AND DUST ARE TO BE KEPT TO A MINIMUM AND BE CONFINED TO THE IMMEDIATE DEMOLITION AREA, AND BE CLEANED UP AND CLEARED FROM THE BUILDING PERIODICALLY TO AVOID ANY EXCESSIVE ACCUMULATION.
8. THE GENERAL CONTRACTOR SHALL ENSURE THAT NOISE IS LIMITED TO ACCEPTABLE LEVELS IN ACCORDANCE WITH THE NEW YORK CITY NOISE CONTROL CODE.
9. DEMOLITION OPERATIONS WILL BE CONFINED TO NORMAL WORKING HOURS 9AM TO 5PM, MONDAYS THRU FRIDAYS, EXCEPT LEGAL HOLIDAYS, UNLESS AN AFTER-HOURS WORK PERMIT VARIANCE IS SECURED FROM THE DEPARTMENT OF BUILDINGS.



2 A-003 EXCAVATION CROSS-SECTIONAL AREA EAST-WEST
SCALE: NTS

ISSUED FOR DEMOLITION

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0	RWM	04/23/13	ISSUED FOR DEMOLITION	RM	04/24/13	SAC	04/24/13

STATE OF NEW YORK — Kiran Nihal Chhabra — 088379 — LICENSED PROFESSIONAL ENGINEER

AECOM
250 APOLLO DRIVE
CHELMSFORD, MA 01824
www.aecom.com

FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

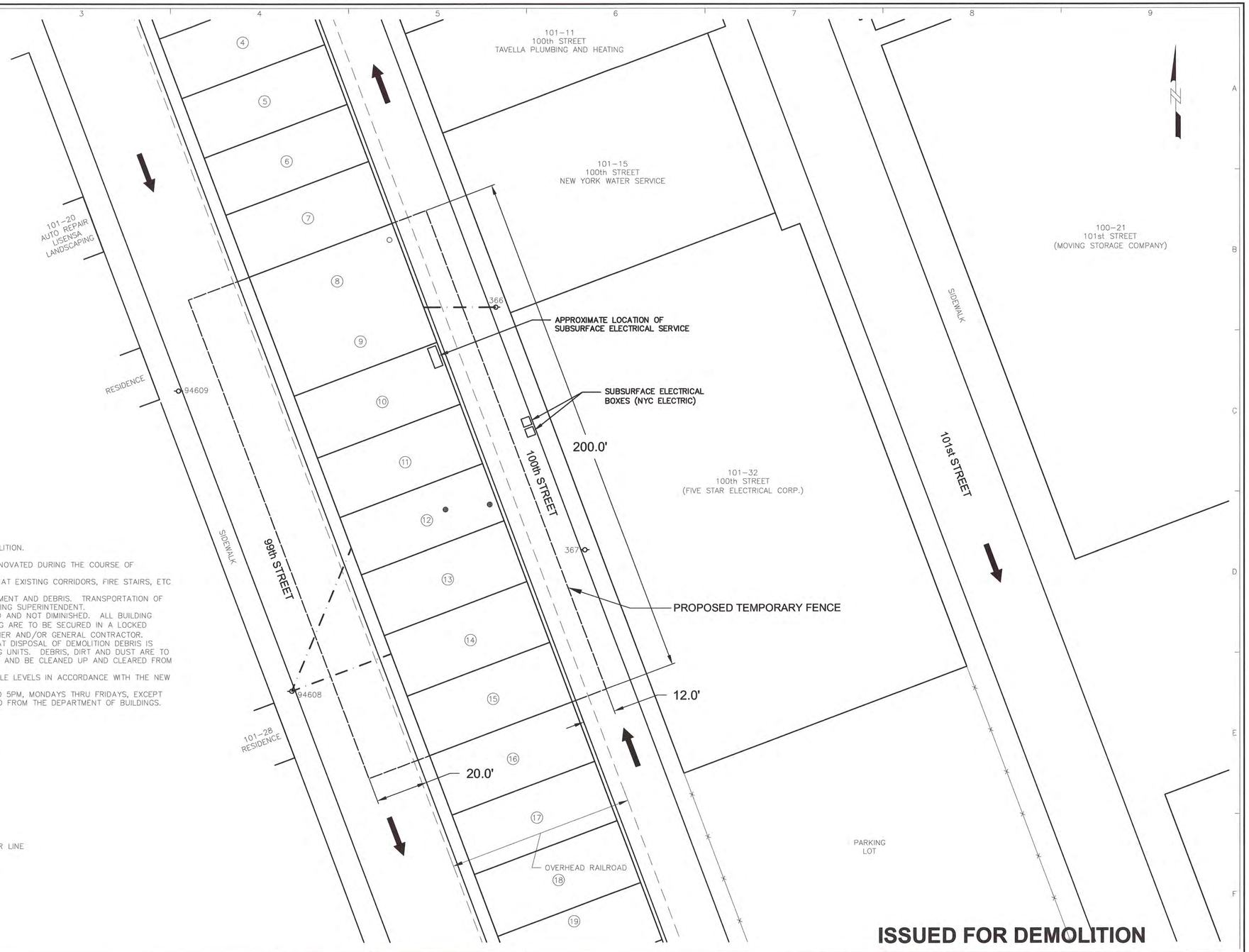
DATE: 05/2/13

PROPOSED EXCAVATION DETAILS

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: A-004.00
SHEET NUMBER: 5 of 6
REVISION 0

File: \\US0177129201\Jobs\Invt_Service\Project Files\Divisions, Inc\Ozone - Queens, NY\Remediation Implementation\Construction\Expedite Redlines Permit_5-2-13.rev.dwg Layout: A-004 Proposed Excavation Details User: boardboy Plotted: May 02, 2013 - 2:34pm Xref's:



NOTES:
1. DOT PERMITS WILL BE OBTAINED, BY THE GENERAL CONTRACTOR, FOR PARTIAL STREET CLOSURES AND FENCES THAT EXTEND BEYOND 3 FEET INTO THE SIDEWALK.
2. EROSION CONTROLS WILL BE IMPLEMENTED ALONG THE FENCE LINE.

TENANT SAFETY PLAN – 2008 CODE:
128-104.8.4.
1. THIS BUILDING CONTAINS DWELLING UNITS THAT WILL BE OCCUPIED DURING DEMOLITION.
2. THE DEMOLITION WORK IS CONFINED TO GROUND FLOOR.
3. THERE WILL BE NOBODY OCCUPYING THE PROPOSED DEMOLITION AREA TO BE RENOVATED DURING THE COURSE OF DEMOLITION WORK.
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LEGEND

- PROPOSED TEMPORARY FENCE
- PROPOSED TRAFFIC FLOW
- EXISTING UTILITY POLE
- EXISTING SUMP
- 1" SUBSURFACE COPPER WATER LINE
- OVERHEAD ELECTRICAL LINES

10 0 20
SCALE IN FEET

ISSUED FOR DEMOLITION

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							
0	RWM	04/23/13	ISSUED FOR DEMOLITION	RM	04/24/13	SAC	04/24/13

STATE OF NEW YORK
Alan Allen Cranmore
068378
LICENSED PROFESSIONAL ENGINEER

AECOM
250 APOLLO DRIVE
CHELMSFORD, MA 01824
www.aecom.com

FORMER OZONE INDUSTRIES, INC.
OZONE PARK
101-61 99 ST, QUEENS, NY

PROJ. NUMBER: 60221764

DATE: 05/2/13

PROPOSED TEMPORARY FENCE

101-61 99 ST, QUEENS, NY
GROUND FLOOR

DRAWING NUMBER: EQ-001.0(

SHEET NUMBER: 6 of 6

REVISION 0

File: \\GSWTYP001\Jobs Vol2_Service\Project Files\Environ Inc\Ozone - Queens, NY\Remediation Implementation\Construction\Operation Reports\Permit_5-2-13_rev.dwg Layout: EQ-001 Proposed Temporary Fence User: bourdeau Plotted: May 02, 2013 - 2:55pm

NYC Buildings

TR1: Technical Report
Statement of Responsibility

This form must be typewritten

Orient and affix BIS job number label here

1 Location Information *Required for all applications.*

House No(s) 101-61 Street Name 99 STREET

Work on Floor(s) 001

2 Applicant Information *Required for all applications.*

Choose all that apply: ☒ Design Applicant *3A, 4A, 5* ☐ Special Inspections Applicant *3B-D, 6-9* ☒ Progress Inspections Applicant *4B-D, 6-9*

Last Name SHELDEN First Name GEORGE Middle Initial

Business Name AECOM Business Telephone 212.377.8456

Business Address 125 BROAD STREET, SUITE 1500 Business Fax

City NEW YORK State NY Zip 10004 Mobile Telephone

License Type *choose one:* ☐ P.E. ☒ R.A. ☐ Other: License Number 027505

Special Inspection Agency Number

3 Special Inspection Categories *Required for all applications, continued on page 2;* ■ *indicates report required.*

3A ← Identification of Requirement			3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y N Special Inspections		Code/Section	Initial & Date	Initial & Date	Initial & Date
☐ ☒ Structural Steel – Welding		BC 1704.3.1			
☐ ☒ Structural Steel – Details		BC 1704.3.2			
☐ ☒ Structural Steel – High Strength Bolting		BC 1704.3.3			
☐ ☒ Structural Cold-Formed Steel		BC 1704.3.4			
☐ ☒ Concrete – Cast-In-Place		BC 1704.4			
☐ ☒ Concrete – Precast		BC 1704.4			
☐ ☒ Concrete – Prestressed		BC 1704.4			
☐ ☒ Masonry		BC 1704.5			
☐ ☒ Wood – Installation of High-Load Diaphragms		BC 1704.6.1			
☐ ☒ Wood – Installation of Metal-Plate-Connected Trusses		BC 1704.6.2			
☐ ☒ Wood – Installation of Prefabricated I-Joists		BC 1704.6.3			
☐ ☒ Subgrade Inspection		BC 1704.7.1			
☐ ☒ Subsurface Conditions – Fill Placement & In-Place Density		BC 1704.7.2 BC 1704.7.3			
☐ ☒ Subsurface Investigations (Borings/Test Pits)	■ TR4	BC 1704.7.4			
☐ ☒ Deep Foundation Elements	■ TR5	BC 1704.8			
☐ ☒ Helical Piles (BB # 2014-020)	■ TR5H	BC 1704.8.5			
☐ ☒ Vertical Masonry Foundation Elements		BC 1704.9			
☐ ☒ Wall Panels, Curtain Walls, and Veneers	■	BC 1704.10			
☐ ☒ Sprayed fire-resistant materials		BC 1704.11			
☐ ☒ Mastic and Intumescent Fire-resistant Coatings		BC 1704.12			
☐ ☒ Exterior Insulation and Finish Systems (EIFS)		BC 1704.13			
☐ ☒ Alternative Materials - OTCR Buildings Bulletin # _____		BC 1704.14			
☐ ☒ Smoke Control Systems		BC 1704.15			
☐ ☒ Mechanical Systems		BC 1704.16			
☐ ☒ Fuel-Oil Storage and Fuel-Oil Piping Systems		BC 1704.17			
☐ ☒ High-Pressure Steam Piping (Welding)		BC 1704.18			
☐ ☒ High Temperature Hot Water Piping (Welding)		BC 1704.18			
☐ ☒ High-Pressure Fuel-Gas Piping (Welding)		BC 1704.19			
☐ ☒ Structural Stability – Existing Buildings		BC 1704.20.1			
☐ ☒ Excavations—Sheeting, Shoring, and Bracing		BC 1704.20.2			
☐ ☒ Underpinning		BC 1704.20.3 BC 1814			
☐ ☒ Mechanical Demolition		BC 1704.20.4			

NYC Buildings

TR1: Technical Report
Statement of Responsibility

This form must be typewritten

Orient and affix BIS job number label here

3 Special Inspection Categories (continued) *Required for all applications, continued on page 2;* ■ *indicates report required.*

3A ← Identification of Requirement				3B Identification of Responsibilities	3C Certificate of Complete Inspections / Tests	3D Withdraw Responsibilities
Y	N	Special Inspections	Code/Section	Initial & Date	Initial & Date	Initial & Date
☐	☒	Raising and Moving of a Building	BC 1704.20.5			
☐	☒	Soil Percolation Test - Private On-Site Storm Water Drainage Disposal Systems, and Detention Facilities ■	BC 1704.21.1.2			
☐	☒	Private On-Site Storm Water Drainage Disposal Systems, and Detention Facilities Installation	BC 1704.21.2			
☐	☒	Individual On-Site Private Sewage Disposal Systems Installation	BC 1704.22			
☐	☒	Soil Percolation Test - Individual On-Site Private Sewage Disposal Systems ■	BC 1704.22			
☐	☒	Sprinkler Systems	BC 1704.23			
☐	☒	Standpipe Systems	BC 1704.24			
☐	☒	Heating Systems	BC 1704.25			
☐	☒	Chimneys	BC 1704.26			
☐	☒	Fire-resistant Penetrations and Joints	BC 1704.27			
☐	☒	Aluminum Welding	BC 1704.28			
☐	☒	Flood Zone Compliance (attach FEMA elevation/dry floodproofing certificate where applicable)	BC 1704.29 BC G105			
☐	☒	Luminous Egress Path Markings ■ TR7	BC 1704.30 BC 1024.8			
☐	☒	Emergency and Standby Power Systems (Generators)	BC 1704.31			
☐	☒	Post-installed Anchors (BB# 2014-018, 2014-019)	BC 1704.32			
☐	☒	Seismic Isolation Systems	BC 1707.8			
☐	☒	Concrete Design Mix ■ TR3	BC 1905.3 BC 1913.5	Submit TR3 to complete this item		
☐	☒	Concrete Sampling and Testing ■ TR2	BC 1905.6 BC 1913.10	Submit TR2 to complete this item		

4 Progress Inspection Categories *Required for all applications* ■ *indicates report required.*

4A ← Identification of Requirement				4B Identification of Responsibilities	4C Certificate of Complete Inspections / Tests	4D Withdraw Responsibilities
Y	N	Progress Inspections	Code/Section	Initial & Date	Initial & Date	Initial & Date
☐	☒	Preliminary	28-116.2.1, BC 110.2			
☐	☒	Footing and Foundation	BC 110.3.1			
☐	☒	Lowest Floor Elevation	BC 110.3.2			
☐	☒	Structural Wood Frame	BC 110.3.3			
☐	☒	Energy Code Compliance Inspections ■ TR8	BC 110.3.5	Submit TR8 to complete this item		
☐	☒	Fire-Resistance Rated Construction	BC 110.3.4			
☐	☒	Public Assembly Emergency Lighting	28-116.2.2			
☒	☐	Final*	28-116.2.4.2, BC 110.5, Directive 14 of 1975, and 1 RCNY §101-10		09/17/15	

** For column 4C, indicate date when the actual final inspection was performed*

5 Design Applicant's Statements and Signatures *P.E./R.A. responsible for plans, choose both below and sign/seal.*

☒ I have identified all of the special inspections, progress inspections and tests required for compliance.

☒ I certify that the Special Inspection and Approved Agencies engaged by the owner to supervise the work specified above are acceptable. (BC 1704.1)

Name (please print)

GEORGE SHELDEN

Signature

Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

6 Owner's Statement and Signature for Progress/Special Inspector *Required when inspection applicant identifies responsibilities.*

I have reviewed the information provided herein and, to the best of my knowledge and belief, attest to its accuracy. I approve the identification of the responsible inspector. Falsification of any statement is a misdemeanor and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by a fine or imprisonment, or both. I understand that if I am found after hearing to have knowingly or negligently made a false statement or to have knowingly or negligently falsified or allowed to be falsified any certificate, form, signed statement, application, report or certification of the correction of a violation required under the provisions of this code or of a rule of any agency, I may be barred from filing further applications or documents with the Department.

Name (print) JOSEPH WAGNER Title CHIEF ENGINEER

Signature Date

7 Inspection Applicant's Identification of Responsibilities

Check all that apply below:

☐ For the **special inspections** indicated above in section 3, I certify that I am the principal/director of the special inspection agency accepting responsibility for conducting the inspections. I further certify that I have read the applicable sections of the New York City Construction Codes in connection with special inspections as well as 1 RCNY 101-06 Rule, which specifies the qualifications required for each inspection and that this agency meets those qualifications for each and every special inspection for which I/we take responsibility. I agree that both I and the agency will comply with all provisions of the New York City Construction Codes and the Rule. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

☐ For the **progress inspections** indicated above in section 4, except energy code inspections on the TR1EN form, and/or **concrete test items** indicated in section 3, I assume the responsibility and I personally, or where permitted by the New York City Construction Codes, qualified personnel under my direct supervision, will perform the required inspections and tests on such forms and in such matter as the Department requires or requests. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Final Inspection:

☒ I will make final inspection of the construction work, including those inspections during its progress necessary to my certification upon final inspection that all work substantially conforms to approved construction documents and applicable laws and rules. I will confirm that the performance of progress inspections and other inspections has been documented before I report the work complete. As prescribed by 1 RCNY 101-10, I will perform the final inspection within 1 year from the expiration of the last valid permit of the work.

Upon completion of the work and within 30 days of my final inspection, I will file a certification attesting to the fact that all work was performed and completed in accordance with the approved construction documents, laws and rules, except as reported otherwise.

☐ **I understand that my failure to file a certification of completion or to notify the Department of my withdrawal of responsibilities within one year from expiration of the last valid permit may result in the loss of my privileges to file under Directives 2 and 14 of 1975 or issuance of a violation, or both. I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.**

☐ **Change of Applicant:** I am a newly designated individual responsible for the items specified herein and I hereby state that:

- ☐ None of the inspections/tests indicated herein have been performed to date by the previously designated individual.
- ☐ Some of the inspections/tests indicated herein have been performed by the previously designated individual, as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print) GEORGE SHELDEN

Signature Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

8 Inspection Applicant's Certification of Partial Completion

☐ I have completed the items specified herein and certify that the all work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations, except as indicated in the attached report.

☐ **Withdrawal of Applicant:** I am withdrawing responsibility for the items of special/progress inspections and/or tests indicated herein and herewith submit the results or status of the work performed to date.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print)

Signature Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

9 Inspection Applicant's Certification of Full Completion

All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Construction Codes and other designated rules and regulations.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Name (please print)

Signature 09/11/15 Date

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

APPENDIX F

Community Air Monitoring Plan Summary Reports

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 001
Date: 17-Jun-13

WEATHER:

(x) Clear () P. Cloudy () Cloudy Wind: N/A
Temperature (deg F): High: 84 Low: 68
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions:
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption:	0	gallons
Estimated Daily Electrical Usage:	0	kWh
Estimated Daily Fuel Consumption:	3	gallons
Daily Total Distance of Truck Travel:	N/A	miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		8.0	8.0
DAVID CURRAN		SITE SUPER		8.0	8.0
JAMESON MCDONALD		LABOR		8.0	8.0
LARRY VICKS		LABOR		8.0	
CHRIS ASTORINIO		EO		6.0	
ANTHONY SCALICI		EO		6.0	
Totals				44.0	24.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	1.7	2.0	2.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	1.3	2.0	2.0
Totals			3	4.0	4.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages
TAKHUECHI TB285	UNITED RENTALS	X		N/A
TAKHUECHI TL12	UNITED RENTALS	X		N/A

Summary of Daily Work Activities: Include estimated completion percentage of each major work activitiy.	**Percent Complete**
Mobilization / Site Preperation:	
MOB EQUIPMENT AND CONSOLIDATE DEBRIS TO ALLOW ITERIOR STORAGE FOR EQUIPMENT.	
MOB MATERIALS AND SUPPLIES FROM ALBANY OFFICE. OFFLOAD TRUCK AND PLACE CONTENTS INSIDE BAY 15	
DELIVERY OF TEMPORARY FACILITIIES VY JOHHNY ON THE SPOT. SET UP IN BAY 15	
OPERATING ENGINEERS NOT QUALIFIED TO WORK. SEND OFF SITE AT 13:00 HOURS. WORKNG WITH BA TO GET PROPER	
DOCUMENTATION TO BE ELIGIBLE TO WORK	
Bay Demolition:	
Soil Excavation / Hauling / Backfill:	
Well and Piping Installation:	
Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):	
Demobilization:	

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon Necessary? (Y or N)	Deconned and/or cleared by: (Initial)					

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)
H&S Incident Reported (Y or N) ? N (if yes, attach forms)
Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)
List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

TYPICAL DEMO--HEAVY EQUIPMENT OPERATION, DEBRIS HAZARDS, SLIPS TRIPS FALLS

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies identified, required retesting, etc., and the corresponding action to be taken.)

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to unforeseen site and weather conditions, etc.)

Remarks:

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY
Report prepared by:

6/18/2013
Date

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 001
Date: 18-Jun-13

WEATHER:

() Clear (X) P. Cloudy () Cloudy Wind: N/A
Temperature (deg F): High: 82 Low: 70
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions:
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption:	0	gallons
Estimated Daily Electrical Usage:	0	kWh
Estimated Daily Fuel Consumption:	7	gallons
Daily Total Distance of Truck Travel:	N/A	miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		8.0	16.0
DAVID CURRAN		SITE SUPER		8.0	16.0
JAMESON MCDONALD		LABOR		8.0	16.0
LARRY VICKS		LABOR		8.0	16.0
CHRIS ASTORINIO		EO		0.0	8.0
RUSSELL STEINER		EO		4.0	4.0
Totals				36.0	76.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	5	6.0	8.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	1	1.0	3.0
9.6K GENERATOR	UNITED RENTALS	TEMP POWER	1	4.0	4.0
Totals			7	11.0	15.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages
30 ft ATICULATING LIFT	UNITED RENTALS	X		N/A

Mobilization / Site Preperation:

Bay Demolition:

BEGIN WITH THE REMOVAL OF INTERIOR WALLS AND ASSOCIATED DEBRIS. UTILIZING THE SKID STEER AND GRAPPLE, STOCKPILE DEBRIS IN TWO SEPARATE AREAS. AREA ONE (BAY 12) IS THE ADDITIONAL DEBRIS PILES. AREA TWO (BAY 13) IS THE CONTRACT WALLS AND ASSOCIATED DEBRIS.

Soil Excavation / Hauling / Backfill:

Well and Piping Installation:

Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):

Demobilization:

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon	Deconned					

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)

H&S Incident Reported (Y or N) ? N (if yes, attach forms)

Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)

List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

TYPICAL DEMO--HEAVY EQUIPMENT OPERATION, DEBRIS HAZARDS, SLIPS TRIPS FALLS

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to

Remarks:

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY — **Report prepared by:**

6/18/2013 — **Date**

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 003
Date: 19-Jun-13

WEATHER:

() Clear () P. Cloudy (x) Cloudy Wind: N/A
Temperature (deg F): High: 86 Low: 65
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions:
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption:	0	gallons
Estimated Daily Electrical Usage:	0	kWh
Estimated Daily Fuel Consumption:	7	gallons
Daily Total Distance of Truck Travel:	N/A	miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		8.0	24.0
DAVID CURRAN		SITE SUPER		8.0	24.0
JAMESON MCDONALD		LABOR		8.0	24.0
LARRY VICKS		LABOR		8.0	24.0
RUSSELL STEINER		EO		8.0	12.0
Totals				40.0	108.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	5	6.0	8.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	1	1.0	3.0
9.6K GENERATOR	UNITED RENTALS	TEMP POWER	1	4.0	4.0
Totals			7	11.0	15.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages

Mobilization / Site Preperation:

Bay Demolition:

CONTINUE WITH THE REMOVAL OF INTERIOR WALLS AND ASSOCIATED DEBRIS. UTILIZING THE SKID STEER AND GRAPE
STOCKPILE DEBRIS IN TWO SEPARATE AREAS. AREA ONE (BAY 12) IS THE ADDITIONAL DEBRIS PILES. AREA TWO (BAY 13) IS THE CONTRACT WALLS AND ASSOCIATED DEBRIS.
REMOVE APPROXIMATELY 50 SQUARE FT OF CONCRETE FLLOR IN BAY #9. STOCKPILE IN BAY #10 FOR SAMPLING.

Soil Excavation / Hauling / Backfill:

Well and Piping Installation:

Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):

Demobilization:

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon	Deconned					

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)

H&S Incident Reported (Y or N) ? N (if yes, attach forms)

Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)

List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

TYPICAL DEMO--HEAVY EQUIPMENT OPERATION, DEBRIS HAZARDS, SLIPS TRIPS FALLS

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to

Remarks:

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY — **Report prepared by:**

6/19/2013 — **Date**

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 004
Date: 20-Jun-13

WEATHER:

() Clear () P. Cloudy (x) Cloudy Wind: N/A
Temperature (deg F): High: 86 Low: 65
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions:
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption:	0	gallons
Estimated Daily Electrical Usage:	0	kWh
Estimated Daily Fuel Consumption:	7	gallons
Daily Total Distance of Truck Travel:	N/A	miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		8.0	32.0
DAVID CURRAN		SITE SUPER		8.0	32.0
JAMESON MCDONALD		LABOR		8.0	32.0
LARRY VICKS		LABOR		8.0	32.0
RUSSELL STEINER		EO		8.0	20.0
Totals				40.0	148.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	7	7.0	15.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	5	3.0	6.0
9.6K GENERATOR	UNITED RENTALS	TEMP POWER	1	2.0	6.0
Totals			13	12.0	27.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages

Mobilization / Site Preperation:

Bay Demolition:

CONTINUE WITH THE REMOVAL OF INTERIOR WALLS AND ASSOCIATED DEBRIS. UTILIZING THE SKID STEER AND GRAPE
STOCKPILE DEBRIS IN TWO SEPARATE AREAS. AREA ONE (BAY 12) IS THE ADDITIONAL DEBRIS PILES. AREA TWO (BAY 13) IS THE CONTRACT WALLS AND ASSOCIATED DEBRIS.
REMOVE APPROXIMATELY 50 SQUARE FT OF CONCRETE FLLOR IN BAY #9. STOCKPILE IN BAY #10 FOR SAMPLING.

Soil Excavation / Hauling / Backfill:

Well and Piping Installation:

Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):

Demobilization:

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon	Deconned					

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)

H&S Incident Reported (Y or N) ? N (if yes, attach forms)

Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)

List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

TYPICAL DEMO--HEAVY EQUIPMENT OPERATION, DEBRIS HAZARDS, SLIPS TRIPS FALLS

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to

Remarks:

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY — **Report prepared by:**

6/20/2013 — **Date**

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 005
Date: 21-Jun-13

WEATHER:

(x) Clear () P. Cloudy () Cloudy Wind: N/A
Temperature (deg F): High: 88 Low: 72
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions: clean
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption:	0	gallons
Estimated Daily Electrical Usage:	0	kWh
Estimated Daily Fuel Consumption:	7	gallons
Daily Total Distance of Truck Travel:	N/A	miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		0.0	32.0
DAVID CURRAN		SITE SUPER		8.0	40.0
JAMESON MCDONALD		LABOR		8.0	40.0
LARRY VICKS		LABOR		8.0	40.0
RUSSELL STEINER		EO		8.0	28.0
Totals				32.0	180.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	4	4.0	19.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	3	2.0	8.0
9.6K GENERATOR	UNITED RENTALS	TEMP POWER	1	2.0	8.0
Totals			8	8.0	35.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages

Mobilization / Site Preperation:

Bay Demolition:

CONTINUE WITH THE REMOVAL OF INTERIOR WALLS AND ASSOCIATED DEBRIS. UTILIZING THE SKID STEER AND GRAPE
STOCKPILE DEBRIS IN TWO SEPARATE AREAS. AREA ONE (BAY 12) IS THE ADDITIONAL DEBRIS PILES. AREA TWO (BAY 13) IS THE CONTRACT WALLS AND ASSOCIATED DEBRIS.
REMOVE APPROXIMATELY 50 SQUARE FT OF CONCRETE FLLOR IN BAY #9. STOCKPILE IN BAY #10 FOR SAMPLING.

Soil Excavation / Hauling / Backfill:

Well and Piping Installation:

Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):

Demobilization:

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon	Deconned					

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)

H&S Incident Reported (Y or N) ? N (if yes, attach forms)

Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)

List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

TYPICAL DEMO--HEAVY EQUIPMENT OPERATION, DEBRIS HAZARDS, SLIPS TRIPS FALLS

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to

Remarks:

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY — **Report prepared by:**

6/21/2013 — **Date**

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 006
Date: 24-Jun-13

WEATHER:

(x) Clear () P. Cloudy () Cloudy Wind: N/A
Temperature (deg F): High: 94 Low: 77
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions: clean
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption: 60 gallons
Estimated Daily Electrical Usage: 0 kWh
Estimated Daily Fuel Consumption: 25 gallons
Daily Total Distance of Truck Travel: 100 miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		8.0	40.0
DAVID CURRAN		SITE SUPER		8.0	48.0
JAMESON MCDONALD		LABOR		8.0	48.0
LARRY VICKS		LABOR		8.0	48.0
RUSSELL STEINER		EO		8.0	36.0
CHRIS ASTERINO		EO		8.0	8.0
Totals				48.0	228.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	5	7.0	26.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	5	7.0	15.0
9.6K GENERATOR	UNITED RENTALS	TEMP POWER	2	5.0	13.0
Totals			12	19.0	54.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages
20 YARD ROLL OFF	KRYSTAL	X		

Mobilization / Site Preperation:	
Bay Demolition:	
LOAD 20 YARD ROLL OFF WITH DEBRIS FROM BAY 12 (EXCLUDED TRASH)	
PROCESS DEBRIS IN BAY 13 TO ALLOW FOR MANAGABLE LOAD OUT.	
CONTINUE TO REMOVE OBSTRUCTIONS FROM CEILING AREA.	
Soil Excavation / Hauling / Backfill:	
Well and Piping Installation:	
Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):	
Demobilization:	

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon Necessary?	Deconned and/or					
RIZZO	14	N/A	N		C&D	5 ton	50m		N/A

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)

H&S Incident Reported (Y or N) ? N (if yes, attach forms)

Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)

List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

TYPICAL DEMO--HEAVY EQUIPMENT OPERATION, DEBRIS HAZARDS, SLIPS TRIPS FALLS

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to

Remarks:

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY
Report prepared by:

6/24/2013
Date

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 007
Date: 25-Jun-13

WEATHER:

(x) Clear () P. Cloudy () Cloudy Wind: N/A
Temperature (deg F): High: 97 Low: 75
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions: clean
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption: 75 gallons
Estimated Daily Electrical Usage: 0 kWh
Estimated Daily Fuel Consumption: 30 gallons
Daily Total Distance of Truck Travel: 110 miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		8.0	48.0
DAVID CURRAN		SITE SUPER		8.0	56.0
JAMESON MCDONALD		LABOR		8.0	56.0
LARRY VICKS		LABOR		8.0	56.0
RUSSELL STEINER		EO		8.0	44.0
CHRIS ASTERINO		EO		8.0	16.0
Totals				48.0	276.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	5	7.0	32.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	5	7.0	22.0
9.6K GENERATOR	UNITED RENTALS	TEMP POWER	2	6.0	21.0
Totals			12	20.0	75.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages
20 YARD ROLL OFF	KRYSTAL	swaps		

Mobilization / Site Preperation:	
Bay Demolition:	
LOAD (5) 20 YARD ROLL OFFS WITH DEBRIS FROM BAY 12 (EXCLUDED TRASH)	
PROCESS DEBRIS IN BAY 13 TO ALLOW FOR MANAGABLE LOAD OUT.	
CONTINUE TO REMOVE OBSTRUCTIONS FROM CEILING AREA.	
Soil Excavation / Hauling / Backfill:	
Well and Piping Installation:	
Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):	
Demobilization:	

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon Necessary?	Deconned and/or					
RIZZO	14	N/A	N		C&D	5 ton	18	NEW STYLE	N/A
RIZZO	14	N/A	N		C&D	5 ton	18	NEW STYLE	N/A
RIZZO	4	N/A	N		C&D	5 ton	18	NEW STYLE	N/A
RIZZO	4	N/A	N		C&D	5 ton	18	NEW STYLE	N/A
RIZZO	8	N/A	N		C&D	5 ton	18	NEW STYLE	N/A

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)

H&S Incident Reported (Y or N) ? N (if yes, attach forms)

Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)

List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

TYPICAL DEMO--HEAVY EQUIPMENT OPERATION, DEBRIS HAZARDS, SLIPS TRIPS FALLS

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to

Remarks:

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY
Report prepared by:

6/25/2013
Date

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 008
Date: 26-Jun-13

WEATHER:

(x) Clear () P. Cloudy () Cloudy Wind: N/A
Temperature (deg F): High: 95 Low: 77
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions: clean
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption: 60 gallons
Estimated Daily Electrical Usage: 0 kWh
Estimated Daily Fuel Consumption: 15 gallons
Daily Total Distance of Truck Travel: 100 miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		0.0	48.0
DAVID CURRAN		SITE SUPER		8.0	64.0
JAMESON MCDONALD		LABOR		8.0	64.0
LARRY VICKS		LABOR		8.0	64.0
RUSSELL STEINER		EO		8.0	52.0
CHRIS ASTERINO		EO		0.0	16.0
Totals				32.0	308.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	5	7.0	39.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	5	0.0	22.0
9.6K GENERATOR	UNITED RENTALS	TEMP POWER	4	6.0	27.0
Totals			14	13.0	88.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages
20 YARD ROLL OFF	KRYSTAL	swaps		

Mobilization / Site Preperation:	
FENCE INSTALLED PER DRAWINGS	
Bay Demolition:	
LOAD (5) 20 YARD ROLL OFFS WITH DEBRIS FROM BAY 13 (CONTRACT DEBRIS)	
PROCESS STEEL DEBRIS IN BAY 15 TO ALLOW FOR MANAGABLE LOAD OUT.	
CONTINUE TO REMOVE OBSTRUCTIONS FROM CEILING AREA.	
Soil Excavation / Hauling / Backfill:	
Well and Piping Installation:	
Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):	
Demobilization:	

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon Necessary?	Deconned and/or					
RIZZO	14	N/A	N		C&D	5 ton	18	NEW STYLE	N/A
RIZZO	4	N/A	N		C&D	5 ton	18	NEW STYLE	N/A
RIZZO	14	N/A	N		C&D	5 ton	18	NEW STYLE	N/A
RIZZO	4	N/A	N		C&D	5 ton	18	NEW STYLE	N/A
RIZZO	14	N/A	N		C&D	5 ton	18	NEW STYLE	N/A

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)

H&S Incident Reported (Y or N) ? N (if yes, attach forms)

Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)

List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

TYPICAL DEMO--HEAVY EQUIPMENT OPERATION, DEBRIS HAZARDS, SLIPS TRIPS FALLS

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to

Remarks:

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY
Report prepared by:

6/26/2013
Date

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 009
Date: 27-Jun-13

WEATHER:

(x) Clear () P. Cloudy () Cloudy Wind: N/A
Temperature (deg F): High: 95 Low: 77
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions: clean
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption: 60 gallons
Estimated Daily Electrical Usage: 0 kWh
Estimated Daily Fuel Consumption: 15 gallons
Daily Total Distance of Truck Travel: 100 miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		0.0	48.0
DAVID CURRAN		SITE SUPER		8.0	64.0
JAMESON MCDONALD		LABOR		8.0	64.0
LARRY VICKS		LABOR		8.0	64.0
RUSSELL STEINER		EO		8.0	52.0
CHRIS ASTERINO		EO		0.0	16.0
Totals				32.0	308.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	4	5.0	44.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	0	0.0	22.0
9.6K GENERATOR	UNITED RENTALS	TEMP POWER	4	7.0	34.0
Totals			8	12.0	100.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages

Mobilization / Site Preperation:	
FENCE INSTALLED PER DRAWINGS	
Bay Demolition:	
LOAD (1) 20 YARD ROLL OFF WITH DEBRIS FROM BAY 13 (CONTRACT DEBRIS)	
PROCESS STEEL DEBRIS IN BAY 15 TO ALLOW FOR MANAGABLE LOAD OUT.	
CONTINUE TO REMOVE OBSTRUCTIONS FROM CEILING AREA.	
CLEAN UP AROUND COLUMNS, REMOVE OBSTRUCTIONS FROM WALLS AND CELINGS	
Soil Excavation / Hauling / Backfill:	
Well and Piping Installation:	
Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):	
Demobilization:	

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon Necessary?	Deconned and/or					

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)

H&S Incident Reported (Y or N) ? N (if yes, attach forms)

Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)

List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

TYPICAL DEMO--HEAVY EQUIPMENT OPERATION, DEBRIS HAZARDS, SLIPS TRIPS FALLS

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to

Remarks:

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY
Report prepared by:

6/27/2013
Date

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 010
Date: 28-Jun-13

WEATHER:

() Clear (x) P. Cloudy () Cloudy Wind: N/A
Temperature (deg F): High: 91 Low: 68
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions: clean
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption: 10 gallons
Estimated Daily Electrical Usage: 0 kWh
Estimated Daily Fuel Consumption: 8 gallons
Daily Total Distance of Truck Travel: 0 miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		0.0	48.0
DAVID CURRAN		SITE SUPER		8.0	72.0
JAMESON MCDONALD		LABOR		8.0	72.0
LARRY VICKS		LABOR		8.0	72.0
RUSSELL STEINER		EO		8.0	60.0
CHRIS ASTERINO		EO		0.0	16.0
Totals				32.0	340.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	4	5.0	49.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	0	0.0	22.0
9.6K GENERATOR	UNITED RENTALS	TEMP POWER	4	7.0	41.0
Totals			8	12.0	112.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages

Mobilization / Site Preperation:	
Bay Demolition:	
PROCESS STEEL DEBRIS IN BAY 15 TO ALLOW FOR MANAGABLE LOAD OUT.	
UTILIZING THE MANLIFT, CONTINUE TO REMOVE OBSTRUCTIONS FROM CEILING AREA.	
CLEAN UP AROUND COLUMNS, REMOVE OBSTRUCTIONS FROM WALLS AND CELINGS	
Soil Excavation / Hauling / Backfill:	
Well and Piping Installation:	
Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):	
Demobilization:	

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon Necessary?	Deconned and/or					

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)

H&S Incident Reported (Y or N) ? N (if yes, attach forms)

Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)

List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

TYPICAL DEMO--HEAVY EQUIPMENT OPERATION, DEBRIS HAZARDS, SLIPS TRIPS FALLS
BIRD CARCAS'

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to

Remarks:

WITH NO INTRUSIVE HEAVY EQUIPMENT WORK AND THE DEMOLITION COMPLETE, THE UNION OPERATING ENGINEERS HAVE BEEN RELIEVED UNTIL SUCH TIME WHEN THEY WILL BE AGAIN NEEDED

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY — **Report prepared by:**

6/28/2013 — **Date**

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 011
Date: 01-Jul-13

WEATHER:

() Clear (x) P. Cloudy () Cloudy Wind: N/A
Temperature (deg F): High: 87 Low: 74
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions: clean
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption: 15 gallons
Estimated Daily Electrical Usage: 0 kWh
Estimated Daily Fuel Consumption: 12 gallons
Daily Total Distance of Truck Travel: 0 miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		8.0	56.0
DAVID CURRAN		SITE SUPER		8.0	80.0
JAMESON MCDONALD		LABOR		6.0	78.0
LARRY VICKS		LABOR		8.0	80.0
RUSSELL STEINER		EO		0.0	60.0
CHRIS ASTERINO		EO		0.0	16.0
Totals				30.0	370.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	0	0.0	49.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	0	0.0	22.0
9.6K GENERATOR	UNITED RENTALS	TEMP POWER	4	8.0	49.0
6k GENERATOR	OP-TECH	TEMP POWER	4	8.0	8.0
Totals			8	16.0	128.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages

Mobilization / Site Preperation:	
Bay Demolition:	
PREP FOR SUMP CLEANOUT	
UTILIZING THE MANLIFT, CONTINUE TO REMOVE OBSTRUCTIONS FROM CEILING AREA.	
CLEAN UP AROUND COLUMNS, REMOVE OBSTRUCTIONS FROM WALLS AND CELINGS	
Soil Excavation / Hauling / Backfill:	
Well and Piping Installation:	
Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):	
Demobilization:	

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon Necessary?	Deconned and/or					
RIZZO	14	N/A	N	N	C&D	5 TON	10	TRANS	

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)

H&S Incident Reported (Y or N) ? N (if yes, attach forms)

Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)

List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

TYPICAL DEMO--HEAVY EQUIPMENT OPERATION, DEBRIS HAZARDS, SLIPS TRIPS FALLS
BIRD CARCAS'

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to

Remarks:

WITH NO INTRUSIVE HEAVY EQUIPMENT WORK AND THE DEMOLITION COMPLETE, THE UNION OPERATING ENGINEERS HAVE BEEN RELIEVED UNTIL SUCH TIME WHEN THEY WILL BE AGAIN NEEDED

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY — **Report prepared by:**

7/2/2013 — **Date**

OP-TECH
3851 Western Turnpike
Duanesburg, NY

Project Name: Former Ozone Industries - Ozone Park, NY
Project No.: AAEH0012

DAILY CONTRACTOR QUALITY CONTROL REPORT

Report No.: 012
Date: 02-Jul-13

WEATHER:

() Clear (x) P. Cloudy () Cloudy Wind: N/A
Temperature (deg F): High: 92 Low: 74
Precipitation: Today: 0 Previous Period (i.e.weekend):
Site Conditions: clean
Lost Time Due to Inclement Weather: 0% Lost Time Due to Unforeseen Site Conditions: 0%

Green Report:

Estimated Daily Water Consumption: 10 gallons
Estimated Daily Electrical Usage: 0 kWh
Estimated Daily Fuel Consumption: 12 gallons
Daily Total Distance of Truck Travel: 0 miles

Labor Resources:

Name of Employee	Subcontractor Name	Task		Hrs. Today	Hrs. Total
MICHAEL T PIERCEY		PROJECT SUPERVIOR		8.0	64.0
DAVID CURRAN		SITE SUPER		8.0	88.0
JAMESON MCDONALD		LABOR		0.0	78.0
LARRY VICKS		LABOR		8.0	88.0
RUSSELL STEINER		EO		0.0	60.0
CHRIS ASTERINO		EO		0.0	16.0
Totals				24.0	394.0

Equipment Utilization:

Name of Equipment	Equipment Owner	Task	Estimated Fuel Consumption (gallons)	Hrs. Today	Hrs. Total
TRACK SKID STEER	UNITED RENTALS	DEBRIS CONSOLIDATION	0	0.0	49.0
EXCAVATOR/ 19K	UNITED RENTALS	DEBRIS CONSOLIDATION	0	0.0	22.0
9.6K GENERATOR	UNITED RENTALS	TEMP POWER	6	8.0	57.0
6k GENERATOR	OP-TECH	TEMP POWER	6	8.0	16.0
Totals			12	16.0	144.0

Equipment Mobilization / Demobilization: (Include a description of equipment, quantity, and supplier.

Equipment Name and Model	Vendor	Mob.	Demob.	Damages

Mobilization / Site Preperation:	
Bay Demolition:	
SUMP CLEANOUT	
REMOVE STANDNG WATER AND SLUDGE FROM SUMPS (3) TOTAL. DRUM WASTE. PHOTO DOCUMENT THE SUMP BOTTOM	
PLACE 3-4 INCH BASE OF CONCRETE IN SUMP BOTTOMS.	
Soil Excavation / Hauling / Backfill:	
Well and Piping Installation:	
Final Restoration (HDPE liner, Conctrete Construction, Door and Wall Construction):	
Demobilization:	

Summary of Testing and/or Inspections Performed

Name of Test / Inspection Performed	Name of Tester / Inspector	Work Activity	Results

Trucking Log

Name of Transporter	Truck / Trailer ID#	Waste Profile #	Vehicle Inspection		Material	Estimated Quantity	Estimated Travel Distance	Destination	Manifest Tracking No.
			Decon Necessary?	Deconned and/or					

Health and Safety / Site Security

Daily H&S Meeting Conducted (Y or N) ? Y (attach form with meeting minutes)

H&S Incident Reported (Y or N) ? N (if yes, attach forms)

Security Issues (Y or N)? N (if yes, summarize below)

Near Hit Reported (Y or N) ? N (if yes, attach forms)

List and attach any work permits issued (i.e., hot work, confined space etc.)

General H&S or Security comments or concerns:

PROPER PPE RESP. PROTECTION ETC. WORK WITH AECOM ON THE AIR MONITORING . FOLLOW H&S PROTOCAL DURING SUMP CLEANOUT ACTIVITY. SOME FLASH ELEVATED VOC LEVELS. CLEAR TO CONTINUE WITH TASK.

Verbal Instructions Received or Given: (List any instructions received from client or given by OP-TECH on construction deficiencies

Changed Conditions/Delays/Conflicts Encountered: (List any conflicts with the scope of work, any delays to the project attributed to

Remarks:

WITH NO INTRUSIVE HEAVY EQUIPMENT WORK AND THE DEMOLITION COMPLETE, THE UNION OPERATING ENGINEERS HAVE BEEN RELIEVED UNTIL SUCH TIME WHEN THEY WILL BE AGAIN NEEDED

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

MICHAEL T PIERCEY — **Report prepared by:**

7/3/2013 — **Date**

Weekly Summary No. 01
Ozone Park / Reconstruction

Period covered: Week of July 20, 2015

Community Relations:

- A couple of pedestrians asked AECOM and NRC (AECOM subcontractor) personnel about the activities. Mostly, what we were doing and when are the bays available again for rent. The tenant from Bay 7 also spoke with AECOM - about the work and when the bays will be available for rent.
- No on-site questions or complaints to report.

Schedule:

- No delays to report.

Health and Safety:

- There have been no any recordable incidents. AECOM will continue to conduct daily Health and Safety briefing with its employees, including AECOM's subcontractors.
- A security/privacy fence was installed along the Bays on the 99th street side of the Bays.
- The door to Bay 10 was apparently opened and the locked was changed by unknown people. We need to cut the locks and put a new one.

Construction area Air Monitoring

- Localized monitoring with PID and LELs (no ambient air PID/LEL levels measured).

Accomplishments during the week of July 20th, 2015:

- Subcontractor mobilized to site.
- Setup of security fence, debris roll-off, safety equipment, and sanitary installation.
- Cleanup of all the bays, including debris from previous electrical installation and remediation activities, plus unexpected/unknown debris disposed inside the bays by unknown people. The unexpected debris included:
    - One 55-gallon with soil sludge and trash;
    - Trash bags;
    - Dead animals (mostly raccoons / pigeons);
    - A series of trash bags with plaster like material and with PPE (suits, gloves, masks) near Bays 10 and 11.
- Sampling of unknown debris for asbestos. The sampling was conducted from the series of trash bags with plaster like material, bags with PPE (suits, gloves, masks), and from other debris bags left at the site (near Bays 10 and 11) by unknown people.

    - The asbestos results came back negative.
- Offsite transportation of the first roll-off with debris.
- Surveying of site monitoring wells.

Anticipated Activities for the week of July 27th, 2015:

- Cleanup and offsite disposal of the suspected asbestos pile (tested negative for asbestos);
- Preparation of the bays for the concrete work (laying rebar and other activities);
- Potential pouring of concrete (late in the week if possible); and
- Off-site disposal of the above 55-gallon with soil sludge and trash.

Outstanding Issues: None

Other: None

Weekly Summary No. 02
Ozone Park / Reconstruction

Period covered: Week of July 27, 2015

Community Relations:

- A couple of pedestrians asked AECOM and NRC personnel about the activities. Mostly, what we were doing and when are the Bays available again for rent. .
- No on-site questions or complaints to report.

Schedule:

- No delays to report.

Health and Safety:

- There have not been any recordable incidents. AECOM will continue to conduct daily Health and Safety briefing with its employees, including AECOM's subcontractors.
- Bay doors that were open during construction had cones placed in front of them to prevent workers from wandering out into the busy street traffic.
- When the generator was used, the exhaust was pointed outside.
- PPE including High-Visibility vests, steel toed boots, hard hats, and safety glasses were worn at all times when working in the Bays.
    - Additional PPE was worn, including ear protection and work gloves, when cutting rebar and concrete forms.
- The door to Bay 10 was apparently opened and the locked was changed by unknown people. We need to cut the lock and put a new one.

<u>Construction area Air Monitoring</u>

- Localized monitoring with PID (ambient air PID levels ND for duration of project).

Accomplishments during the week of July 27th, 2015:

- Subcontractor Sclafmore Construction mobilized to site.
- Rebar laid in all of the bays (8A through 15), tied with wire, and lifted with concrete bricks.
- A 10 CY roll-off container was mobilized to site on Tuesday and the miscellaneous garbage in Bay 10 was thrown in it.
- The final elevation of the concrete floor was marked out in each of the bays.
    - In bay 8B, the floor had to be raised 3 inches from the original elevation to have enough concrete over the rebar.
    - The floor can be sloped down to the existing sidewalk level of 99th street when the wall is removed and the new overhead door is installed.
- Perimeter walls prepped for concrete pour

- Excess liner was cut so it would be below top elevation of the concrete
- Monitoring wells set at approximate final elevation
  - Confirmed with survey to be below top of concrete elevation and will be adjusted when floor is poured.
  - All monitoring wells covered with tape to protect them from concrete
  - Align road boxes so wells are in the center
- Begin installing forms for concrete work expected on Tuesday and Wednesday of next week.
- Exterior asphalt/concrete cleaned and prepared to hand pour around next week.

Anticipated Activities for the week of August 3rd, 2015:

- Finish laying forms around each bay for concrete pouring
- Install expansion joints in the bays with stone perimeter walls.
- 2 days of pouring concrete
  - Day one: Tuesday, August 4, 2015 starting with Bay 8A, 10, 12, 14, 8B
  - Day two: Wednesday, August 5, 2015 starting with Bay 9, 11, 13, 15
  - Hand patch exterior locations where new concrete meets existing asphalt/concrete
- Demobilize concrete construction off site
- Potentially: begin prep work for installing overhead doors and louvre.
- Disposal of any remaining trash/debris

Outstanding Issues: None

Other: None

Pictures



Bay 13-Rebar laid and tied



Bay 11-Rebar laid, tied and lifted



Site-Rebar laid, tied, and lifted. Beginning forms in Bay 8A in background

Weekly Summary No. 03
Ozone Park / Reconstruction

Period covered: Week of August 3, 2015

Community Relations:

- Pedestrians asked AECOM and NRC personnel about the activities. Mostly, when would the bays be available again to rent.
- No on-site questions or complaints to report.

Schedule:

- The week of August 10th will have no site activity by Sclafmore. Walls will most likely begin the following week.
- Possibility that City Gates will be able to install the overhead doors in Bay 8A and Bay 8B.
    - OpTech will know by Monday or Tuesday if the doors will be installed at the end of the week.
    - Otherwise they will be installed within the next two weeks

Health and Safety:

- Near Miss Incident: Friday, August 7, 2015 Sclafmore was mixing concrete and used water from a hydrant on the sidewalk. The valve was opened too much and a jet of water streamed across the street and hit a parked car. No one was injured and no property damaged was incurred (the owner of the car came out and inspected it). The hydrant was only open for a minute and the workers were told not to use the hydrant water anymore but instead the water that had been provided.
- AECOM will continue to conduct daily Health and Safety briefing with its employees, including AECOM's subcontractors.
- Bay doors that were open during construction had cones placed in front of them to prevent workers from wandering out into the busy street traffic.
- When the generator was used, the exhaust was pointed outside to dispel the carbon monoxide
- PPE including High-Visibility vests, steel toed boots, hard hats, and safety glasses were worn at all times when working in the bays
- During the pouring of the concrete, traffic was directed around active trucks and security fencing was placed around them to control traffic.
- The lock on Bay 10 door has been replaced with one of AECOM's own locks

<u>Construction area Air Monitoring</u>

- Localized monitoring with five gas meter (ambient air PID levels ND for duration of project).

Accomplishments during the week of August 3, 2015:

- Sclafmore Construction installed concrete forms in the remaining bays and around the perimeter doorways.
- Sclafmore Construction poured concrete in all bays
    - Bays 8A, 8B, 10, 12, and 14 were poured on Tuesday August 4, 2015
    - Bays 9, 11, 13, and 15 were poured on Wednesday August 5, 2015
    - All bays were poured to a level grade and slightly pitched down at the entrances to the street to tie into the existing curbs.
    - Bays were brushed with a broom to a medium roughness.
    - Construction joints were cut into each bay approximately 12 ft off center (essentially the middle of each bay and at the center of each column)
    - Expansion joints were placed around the perimeter stone walls and in between bays where the step down was wide enough to accommodate them.
- The 10 CY roll-off container was removed from site on Tuesday morning.
- Monitoring wells were uncovered once concrete was poured and dried.
- Openings for the overhead doors in Bays 8A and 8B were knocked out and had the lentils installed
    - Openings covered with plywood and braced from the inside to secure building before leaving for the weekend.
- General site cleaned and debris consolidated.

Anticipated Activities for the week of August 10, 2015:

- Sclafmore not onsite.
- City Gates possibly comes and installs overhead doors at the end of the week.

Outstanding Issues: None

Other: None

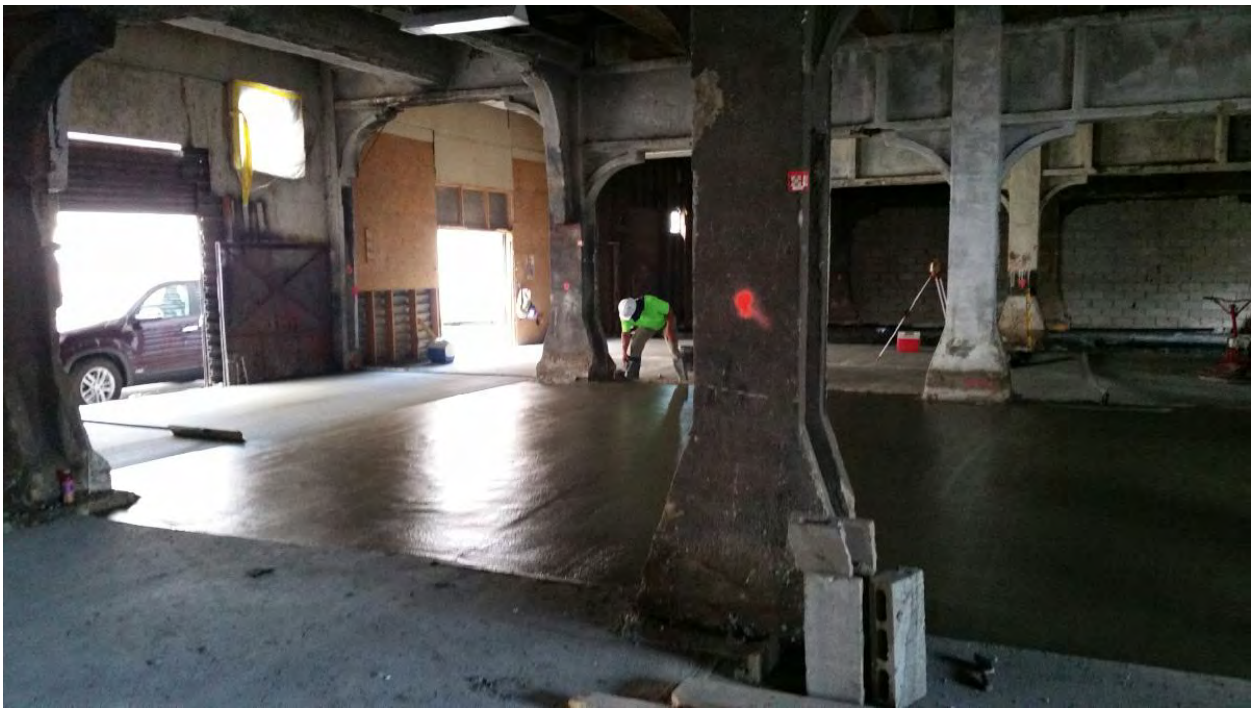
Pictures



Opening for overhead door in Bay 8B



Concrete floor looking from Bay 14



Pouring concrete in Bay 13



Finished concrete floor in Bay 12

Weekly Summary No. 04
Ozone Park / Reconstruction

Period covered: Week of August 17, 2015

Community Relations:

- Pedestrians asked AECOM and NRC personnel about the activities. Mostly, when would the bays be available again to rent.
- No on-site questions or complaints to report.

Schedule:

- Walls framing will be completed on Monday.
- Interior wall construction to begin next week either Monday or Tuesday.
    - Potentially walls will be complete by the end of the week.
- Louvre to be installed during the week.

Health and Safety:

- There have been no incidents to report.
- AECOM will continue to conduct daily Health and Safety briefing with its employees, including AECOM's subcontractors.
- Bay doors that were open during construction had cones placed in front of them to prevent workers from wandering out into the busy street traffic.
- When the generator was used, the exhaust was pointed outside to dispel the carbon monoxide
- PPE including High-Visibility vests, steel toed boots, hard hats, and safety glasses were worn at all times when working in the bays
- When taking down the obstruction from the ceiling between Bay 8A and Bay 9, scaffolding was and sufficient additional bracing support was used.

Accomplishments during the week of August 17, 2015:

- Sclafmore Construction began to install the framing in the openings in between each bay.
    - Metal frames 12 inches apart are in each section of each bay.
    - Bays 15, 14, 13, 12, and 11 have framing completed.
        - This does not include the uppermost section in the middle of the bays. This will be framed and have the wall installed at the same time to minimize scaffolding movement.
    - Bays 10 and 9 have 90% of framing complete and will be finished Monday.
    - Bay 8A and 8B has 50% of framing complete and will be finished Monday.
        - The wall separating Bay 8A and 8B will be installed Monday.
    - Sheetrock and cement board was delivered Thursday, August 20, 2015
    - Metal hanging obstruction was removed from the ceiling in between Bay 8A and Bay 9

        - 2 portions still in place to be removed on Monday
- Overhead doors were delivered and installed on Tuesday, August 18, 2015
- Louvre was delivered on Thursday, August 20, 2015 and will be installed next week.
- Heavy rains from Thursday night to Friday morning caused leaking from the ceiling between Bay 11 and Bay 12.
    - Water running down columns and could be seen dripping from where the ceiling of the two bays met.
    - Leaking will be addressed as the interior walls go up with the possible solution of a spray-rubber coating prior to the frames are installed.
        - To be discussed further next week.
- General site cleaned and debris consolidated.

Anticipated Activities for the week of August 24, 2015:

- Finish interior wall framing
- Begin and potentially finish interior wall installation
- General site clean up
- Debris disposal/potential partial or full demobilization from site until mechanical work is to begin.

Outstanding Issues: None

Other: None

Pictures

Overhead obstruction removed from ceiling



Interior Wall Framing







New Overhead Doors



Water leaking between Bay 11/12

Weekly Summaries No. 05 & 06
Ozone Park / Reconstruction

Period covered: Weeks of August 30 and September 07, 2015

Community Relations:

- Pedestrians asked AECOM and NRC personnel about the activities. Mostly, when would the bays be available again to rent.
- No on-site questions or complaints to report.

Schedule:

- Continue hanging sheetrock and concrete board.
- Begin taping and adding fire-stopping sealant to walls.
- Begin placing concrete in areas between concrete column and sheetrock where the gap is too wide for fire sealant alone.
- Install louvre into Bay 8A.
- Begin taping and adding fire-stopping sealant to walls.
- Demob majority from site.
- Special Fire inspection and schedule Final Inspection.

Health and Safety:

- There have been no incidents to report.
- AECOM will continue to conduct daily Health and Safety briefing with its employees, including AECOM's subcontractors.
- Bay doors that were open during construction had cones placed in front of them to prevent workers from wandering out into the busy street traffic.
    - Bays that have had the sheetrock completed will have doors shut and locked for the duration of the work day. They will only be opened if personnel need to enter during the work day.
- When the generator was used, the exhaust was pointed outside to dispel the carbon monoxide
- PPE including High-Visibility vests, steel toed boots, hard hats, and safety glasses were worn at all times when working in the bays

Accomplishments during the week of August 24, 2015:

- Sclafmore Construction completed the installation of the framing in the lower walls of all bays.
    - Metal frames 12 inches apart are in each section of each bay.
- Louvre installation was tentatively moved to the week of September 7th so focus could be directed to getting all the interior wall partitions installed. The louvre was moved to Bay 8A.
- Both crews from Sclafmore Construction were present to continue installing sheetrock between the bays.

- Sheetrock installation was completed in the lower walls of every bay. Note that a small opening in bays 9 and 12 remain as to provide easier and quicker access between the bays.
- Sheetrock was installed and completed on the top part of bays 8, 12, 13, 14, and 15.
  - They are partially installed in bays 9 and 11.
  - Note that a 2 hour rated fire proof sealant was installed in any areas where the sheetrock touched the concrete.
  - If the sheet rock was cut into more than one piece, than a piece of a 2 hr. rated fireproof tape was installed at the seam.

- Two hour rated fire proof tape was installed in between the sheetrock in the lower walls of bays 8, 10, 11, 12, 13, 14, and 15.
- Begin installing two hour rated fire proof caulking in the lower walls of bay 9 where the sheetrock touched the concrete.
- Insulation installed in Bay 8B on wall adjacent to 8A. Cement board was then placed over the insulation.
- Insulation was installed in Bay 9 on the wall adjacent to 8A. Cement board was installed over the insulation.
- In Bay 15, concrete was placed in between the column and sheetrock where the gap was too wide to install fireproof caulking.
- Mr. Naeem Janjua from NYCDCAS arrived on site on September 2, 2015. He requested a completion date and took photos.
- General site cleaned and debris consolidated.

Accomplishments during the week of September 07, 2015:

- Louvre installation was completed on Thursday, September 10th.
- Sclafmore Construction finished sealing the perimeters of the walls in each bay with approved fire sealant.
- Sclafmore Construction finished taping joints between adjacent walls with approved taping.
- All keys and locks inventoried and relocated around the perimeter doors to make opening each of the individual bays easier.
- Finished labeling the SVE and MWs located in each bay.
- General site cleaned and debris consolidated and removed from site
- NRC removes temporary fencing and equipment off site.
- Special Fire Inspector came on Wednesday, September 9th
  - Work was not complete in each bay so he commented that remaining perimeters had to be sealed.

Anticipated Activities for the week of September 14, 2015:

- Final inspection to be conducted this week to go over all bays.
- Final special fire inspection to be conducted this week.

Outstanding Issues: None

Other: None

Pictures

Completed Bay 14



Fireproof tape Bay 14:



Sheetrock/fireproofing on top of Bay 14:

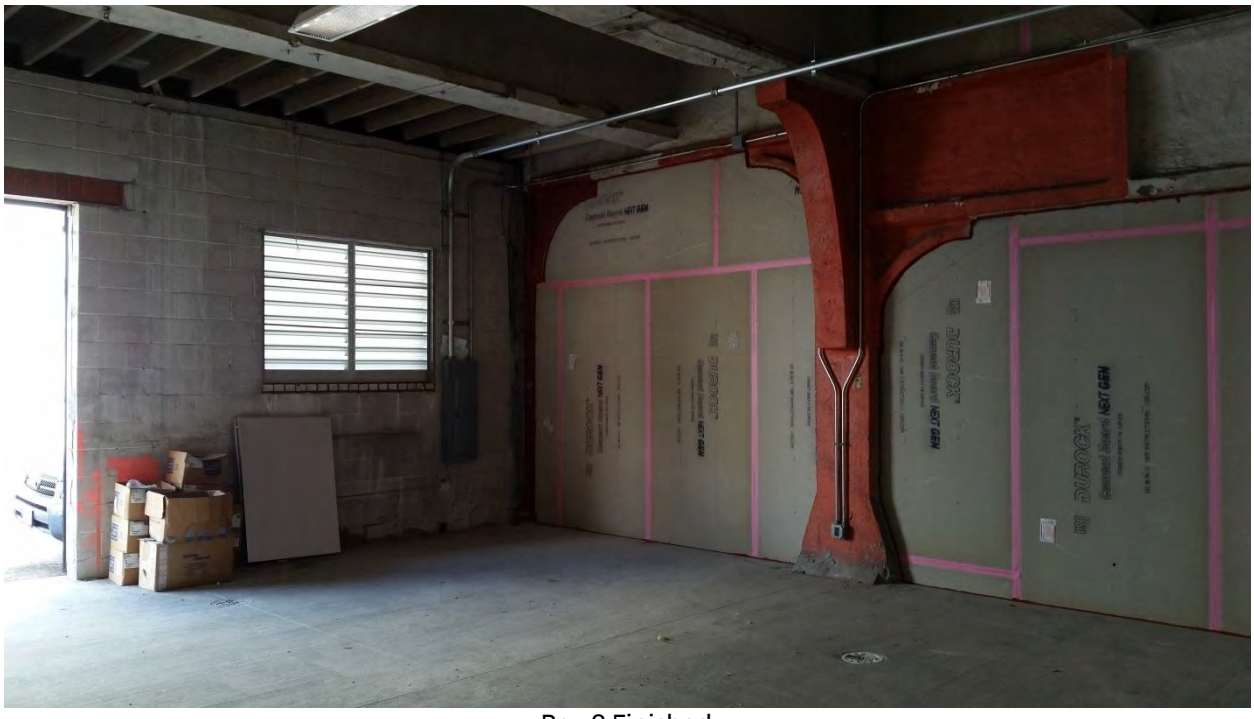


Fireproof caulking in Bay 11:





Bay 8 Louvre



Bay 8 Finished



Bay 8 Finished



Bay 13 Finished



Bay 8B Finished



Bay 8B Finished

AECOM
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Baseline Community Air Monitoring Summary

Project:	**Former Ozone Industries, Inc. Site**
Location:	**Ozone Park, Queens, NY**
Period:	**Baseline / Pre-Construction May 29 through May 30, 2013**
Date	**June 17, 2013**

This baseline data summary report includes both tabular information and written discussions summarizing the ambient air-quality data collected during the report period noted above in accordance with DER-10 Technical Guidance for Site Investigation and Remediation Appendix 1A New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (DER-10) at the Former Ozone Industries, Inc. Site in Queens, NY. Monitoring and sampling were conducted in accordance with the Site-specific Community Air Monitoring Plan (CAMP), Attachment B of the Remedial Design/Remedial Action Work Plan dated October 2011.

Introduction

Consistent with the CAMP for the project, AECOM completed background / pre-construction air monitoring and sampling. During the upcoming project, community air monitoring data will be continuously reviewed and compared to NYSDEC/NYSDOH Action Levels. In order to manage the Site more effectively, AECOM has employed a more conservative level (Alert Level) to help mitigate possible fugitive emissions before the Action Levels are reached. The purpose of the Alert Level is to help manage the Site and prevent concentrations from reaching the Action Levels. Engineering controls, dust suppression, and / or odor suppression will be used as necessary throughout the daily work activities.

- **Table 1**: Site specific Alert and Action Levels.

Real-Time Air Monitoring Summary – PM_{10} and TVOC

Continuous real-time air monitoring for PM_{10} (Particulate Matter 10 micro meters or less) and Total Volatile Organic Compounds (TVOC) was conducted at two (2) portable air monitoring (PAM) stations along the Bay entrances on 99th Street. PAM stations were located in the vicinity of Bays 8 and 15 (at opposite ends of the work zone). The reason for this is because the main entrance to the Bays during the inside work will be through Bay 12 on 99th Street, and the Bays will not be accessed from 100th Street. Additionally, periodic hand-held and observational monitoring for PM_{10}, TVOC, visible dust, and odor were performed routinely throughout the monitoring days along the Site perimeter and in the vicinity. The intent of the real-time air monitoring program during upcoming Site activities is to provide early detection of short-term emissions and potential off-Site migration of PM_{10} and TVOCs related to Site activities. The real-time perimeter air monitoring system will consist of PAM stations; hand-held PM_{10} and TVOC instruments; a meteorological tower; and possibly a central computer system with an automatic alarm notification system.

During the report period discussed herein there were no TVOC concentrations greater than the Action Levels. There were, however, PM_{10} concentrations greater than the Alert and Action Levels (no Site activities were occurring). These PM_{10} concentrations were evaluated further in accordance with the CAMP and determined to be below the Alert and Action Levels after accounting for background concentrations. Background concentrations are defined as the lowest current onsite concentration during the same 15-minute period as an elevated concentration. The results of the real-time air monitoring are presented in the following tables:

- **Table 2**: Weekly real-time maximum PM_{10} and TVOC concentrations summary; and

- **Table 3**: Concentrations above the Alert and Action Levels.

Integrated VOC Sampling Summary

Integrated 8-hour Volatile Organic Compounds (VOC) samples were collected at each PAM station during the baseline period on May 29 and May 30, 2013. Additionally, one co-located sample was collected during the baseline period. These samples were submitted to an analytical laboratory for analysis via United States Environmental Protection Agency (USEPA) Method TO-15. Results of the analysis showed some low level detected concentrations for various VOCs. The results are included in **Attachment A**.

Meteorological Observations and Site Maps

Additional information related to the air monitoring activities during the report period is included in the following figures:

- **Figure 1**: Weekly wind rose summary;
- **Figure 2**: Weekly meteorological summaries; and
- **Figure 3**: Daily/weekly Site map(s).

Table 1: Site Specific Alert and Action Levels

Target Compounds	Alert Level	Action Level
PM_{10}	> 100 µg/m^3 above background[1]	> 150 µg/m^3 above background[1]
TVOC	> 3.7 ppm above background[1]	> 5.0 ppm above background[1]

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million

[1] Background is defined as the lowest current onsite concentration during the same 15-minute period of an elevated concentration.

Table 2: Weekly Real-Time Maximum PM_{10} and TVOC Concentrations Summary

	PAM-1		PAM-2		Hand-Held	
	PM_{10} µg/m³	**TVOC ppm**	**PM_{10} µg/m³**	**TVOC ppm**	**PM_{10} µg/m³**	**TVOC ppm**
	Maximum 15-Minute Average Concentrations (Action Level: PM_{10} = 150 µg/m³ / TVOC = 5.0 ppm)				***Instantaneous Concentrations***	
Wed 5/29/13	95.6	0.1	88.3	0.1	159	0.0
Thu 5/30/13	81.1	0.1	69.8	0.1	130	0.0

Definitions:

PAM = Portable Air Monitoring Station

PM_{10} = Particulate Matter 10 micro meters or less

TVOC = Total Volatile Organic Compounds

µg/m³ = Micrograms per cubic meter

ppm = Parts per million

NA = Not Applicable

ND = No Data

- Highlighted concentrations require further analysis (see **Table 3**).
- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.
- Hand-held PM_{10} and TVOC data represent the maximum instantaneous concentrations of the readings taken periodically during work activities; however, in the event of an elevated concentration a 15-minute average concentration is measured and compared to the Site-Specific Action Levels.

Table 3: Concentrations above the Alert and Action Levels

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Background Concentration	Resultant Concentration	Comments/Explanation
Alert Level Concentrations								
PM_{10}	Wed 5/29/13	11:45AM	Bay 1 99th	SSW 11.5 mph*	110	63	47	Elevated hand-held concentrations were caused by high regional background concentrations related to hazy and humid conditions. Background concentrations were great enough to reduce each of the elevated concentrations below the Alert Level.
		12:30PM 12:35PM	Bay 8 99th Bay 15 99th	SSW 6.9 mph*	115 126	72	43 54	
		1:30PM 1:35PM	Bay 8 99th Bay 1 99th	S 6.9 mph*	105 105	67	38 38	
		2:32PM 2:34PM 2:39PM	Bay 1 99th Bay 8 100th Bay 15 99th	SSE 8.1 mph*	138 123 117	87	51 36 30	
		3:30PM	Bay 8 99th	S 4.6 mph*	110	64	46	
		4:29PM	Bay 1 99th	S 6.9 mph*	114	54	60	
PM_{10}	Thu 5/30/13	10:33AM	Bay 1 100th	NNE 2.3 mph	124	52	72	Elevated hand-held concentrations were caused by high regional background concentrations related to hazy and humid conditions. Background concentrations were great enough to reduce each of the elevated concentrations below the Alert Level.
		3:57PM	Bay 1 99th	SSW 4.2 mph	130	48	82	
Action Level Concentrations								
PM_{10}	Wed 5/29/13	2:30PM 2:33PM	Bay 8 99th Bay 1 100th	SSE 8.1 mph*	159 153	87	72 66	Elevated hand-held concentrations were caused by high regional background concentrations related to hazy and humid conditions. Background concentrations were great enough to reduce each of the elevated concentrations below the Alert Level.

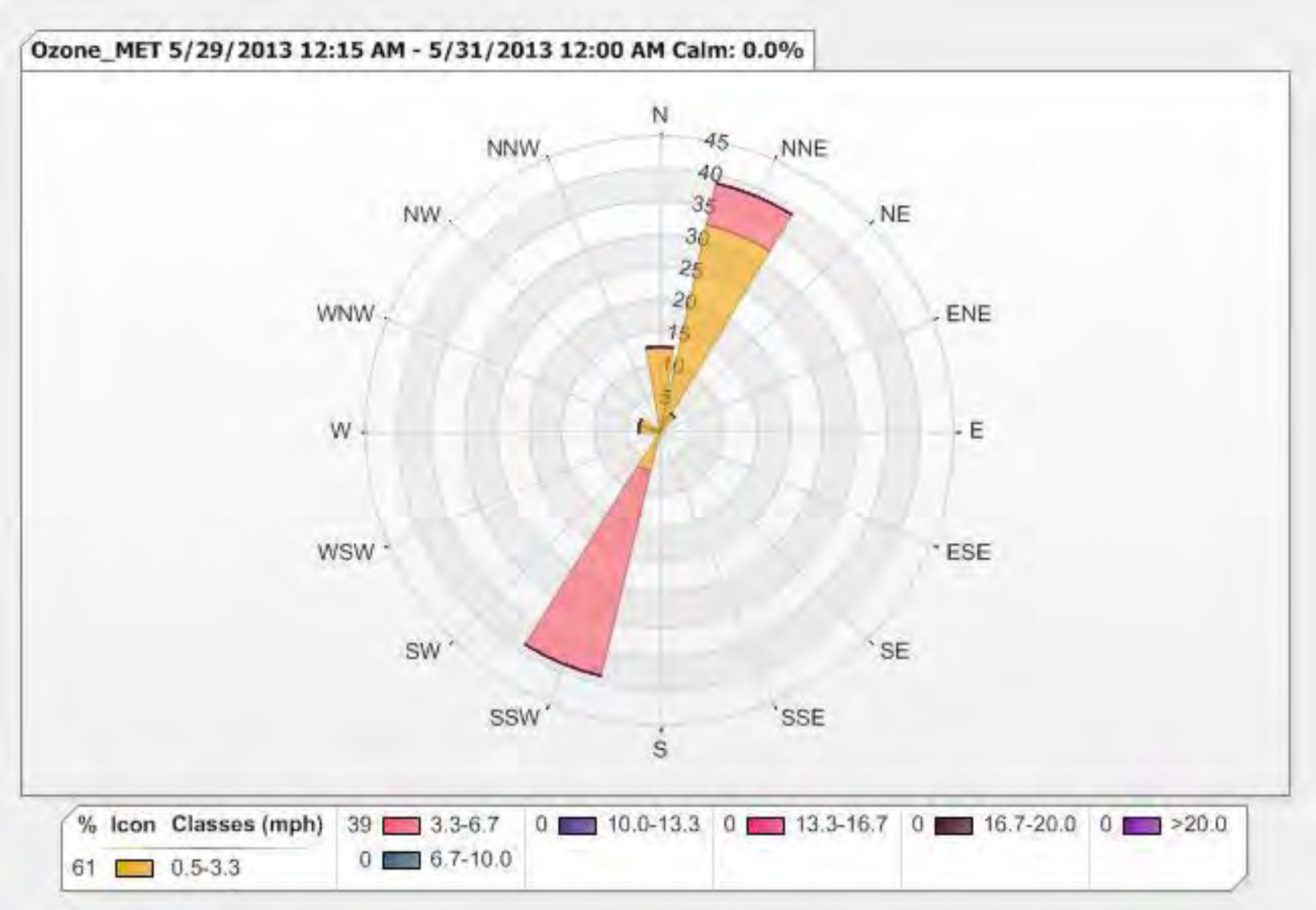
Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.
- Hand-held PM_{10} and TVOC data represent instantaneous concentrations unless a longer duration average is specified above.
- Background is defined as the lowest current onsite concentration during the same 15-minute period of an elevated concentration.

*Meteorological data obtained from local weather station (KJFK) because onsite meteorological system not functioning properly.

Figure 1: Wind Rose 5/29/13 – 5/30/13 (work hours only)



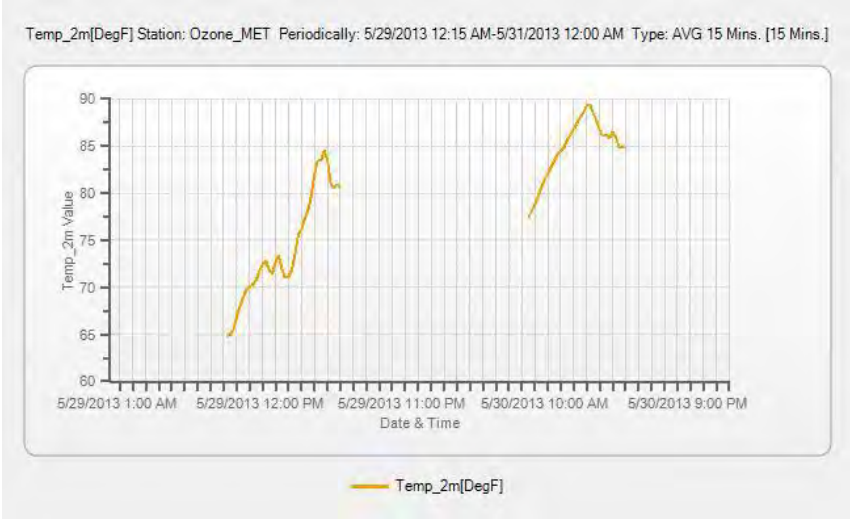
*****Meteorological data missing on 5/29/13 because of a system connection issue. Problem was resolved during setup on 5/30/13.

Figure 2: Meteorological Plots 5/29/13 – 5/30/13 (work hours only)

Wind Speed:



Temperature:

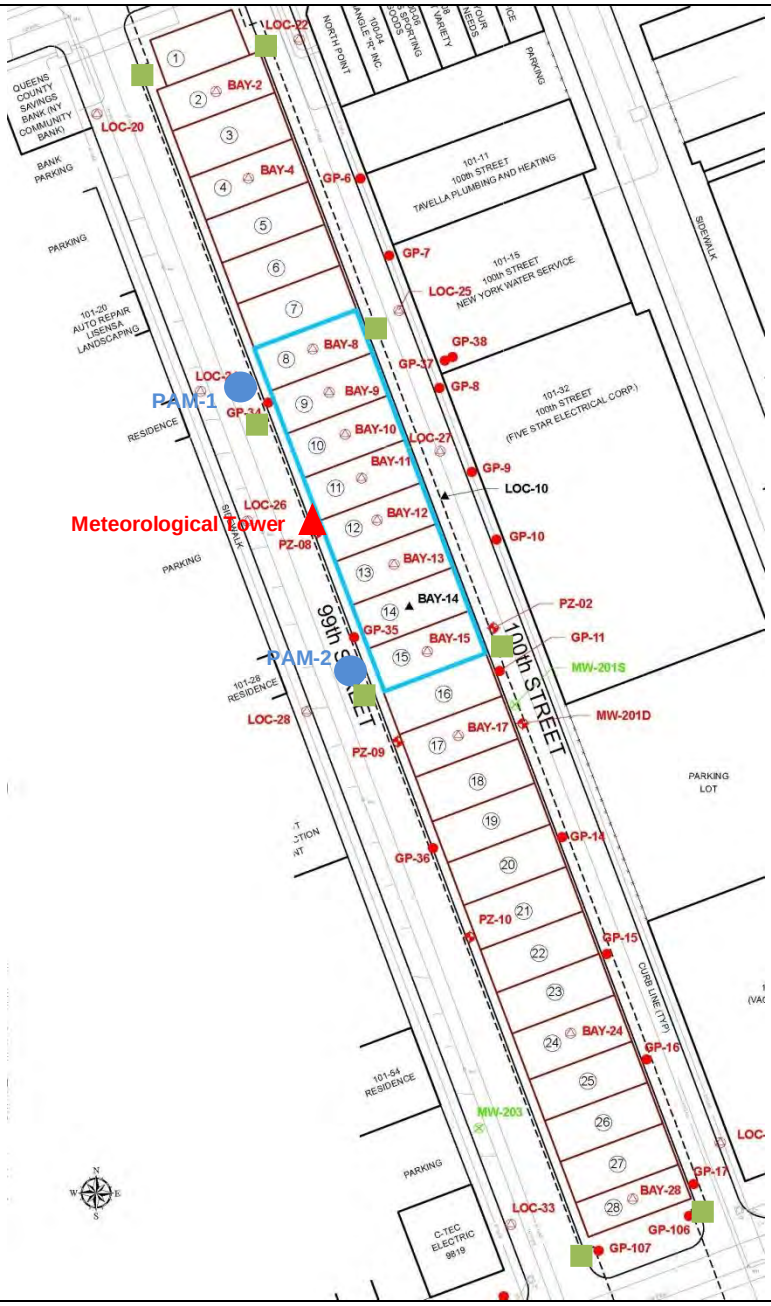


Relative Humidity:



*****Meteorological data missing on 5/29/13 because of a system connection issue. Problem was resolved during setup on 5/30/13.

Figure 3: Site Map (5/29 – 5/30/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

Attachment A

Integrated 8-Hour VOC Results

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Community Air Monitoring Summary

Project:	**Former Ozone Industries, Inc. Site**
Location:	**Ozone Park, Queens, NY**
Report Period:	**Site Clean Up June 19 – June 21, 2013**
Date	**June 26, 2013**

During the report period there were no respirable particulate matter (PM_{10}) and total volatile organic compounds (TVOC) greater than the Site-specific Action Levels.

The Report Period includes three days of air monitoring (6/19/13 – 6/21/13) during inside Site activities that included demolition of inside walls and accumulation of trash (no intrusive work or soil removal).

This weekly air monitoring data summary includes both tabular information and written discussions summarizing the ambient air-quality data collected during the report period noted above in accordance with DER-10 Technical Guidance for Site Investigation and Remediation Appendix 1A New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) (DER-10) at the Former Ozone Industries, Inc. Site in Queens, NY. Monitoring and sampling were conducted in accordance with the Site-specific Community Air Monitoring Plan (CAMP), Attachment B of the Remedial Design/Remedial Action Work Plan dated October 2011.

Introduction

In accordance with the CAMP, community air monitoring data was collected continuously and the results were reviewed and compared to NYSDEC/NYSDOH Action Levels. In order to manage the Site more effectively, AECOM has employed a more conservative level (Alert Level) to help mitigate possible fugitive emissions before the Action Levels are reached. The purpose of the Alert Level is to help manage the Site and prevent concentrations from reaching the Action Levels. No Site-specific Action Levels were exceeded during this reporting period. Engineering controls, dust suppression, and / or odor suppression are used as necessary throughout the daily work activities.

- **Table 1**: Site specific Alert and Action Levels.

Real-Time Air Monitoring Summary – PM_{10} and TVOC

Continuous real-time air monitoring for PM_{10} and TVOC was conducted at two (2) portable air monitoring (PAM) stations along the Bay entrances on 99th Street. PAM stations were located in the vicinity of Bays 8 (PAM-1) and 15 (PAM-2) (at opposite ends of the work zone). The reason for this is because the main entrance to the Bays during the inside work is primarily through Bay 12 on 99th Street, and the Bays will not be accessed from 100th Street. These locations were approved by the NYSDEC. The intent of the real-time air monitoring program during Site activities is to provide early detection of short-term emissions and potential off-Site migration of PM_{10} and TVOCs related to Site activities. The real-time perimeter air monitoring system consists of PAM stations; hand-held PM_{10}

and TVOC instruments; a meteorological tower; and a central computer system with an automatic alarm notification system.

During the report period discussed herein there were no PM_{10} and TVOC concentrations greater than the Action Levels. There were, however, PM_{10} concentrations greater than the Alert Level (no ground intrusive Site activities were occurring) during two 15-minute intervals on June 19, 2013. Site controls to control dust were utilized in response (although the readings may not be completely site-related). These PM_{10} concentrations are evaluated further in accordance with the CAMP as noted below. Background concentrations are conservatively estimated continuously using the lowest onsite concentration during each 15-minute period. The results of the real-time air monitoring are presented in the following tables:

- **Table 2**: Weekly real-time maximum15-minute average PM_{10} and TVOC concentrations summary;
- **Table 3**: Real-time 15-minute average concentrations above the Action Levels; and
- **Table 4**: Real-time 15-minute average concentrations above the Alert Levels.

Integrated VOC Sampling Summary

Integrated 8-hour Volatile Organic Compounds (VOC) samples were not collected during the report period because there were no ground intrusive ongoing during the Site cleanup phase. Samples will be collected once a week at each PAM station during the upcoming intrusive phase (soil removal). These samples will be submitted to an analytical laboratory for analysis via United States Environmental Protection Agency (USEPA) Method TO-15. Results of the analysis will be reported as they are available from the laboratory.

Periodic Hand-held Air Monitoring Summary – PM_{10} and TVOC

Additionally, periodic hand-held and observational monitoring for PM_{10}, TVOC, visible dust, and odor were performed routinely throughout the monitoring days along the Site perimeter and in the vicinity. Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations. The results of the periodic hand-held monitoring are presented in the following tables:

- **Table 5**: Weekly maximum hand-held and observational monitoring summary; and
- **Table 6**: Hand-held concentrations above the Alert and Action Levels.

Meteorological Observations and Site Maps

Additional information related to the air monitoring activities during the report period is included in the following figures:

- **Figure 1**: Weekly wind rose summary;
- **Figure 2**: Weekly meteorological summaries; and
- **Figure 3**: Daily/weekly Site map(s).

Table 1: Site Specific Alert and Action Levels

Target Compounds	Alert Level	Action Level
PM_{10}	> 100 µg/m^3 above background[1]	> 150 µg/m^3 above background[1]
TVOC	> 3.7 ppm above background[1]	> 5.0 ppm above background[1]

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million

[1] Background concentrations are conservatively estimated continuously using the lowest onsite concentration during each 15-minute period.

Table 2: Weekly Real-Time Maximum 15-Minute Average PM_{10} and TVOC Concentrations Summary

	PAM-1 (Bay 8)		PAM-2 (Bay 15)	
	PM_{10} µg/m^3	**TVOC ppm**	**PM_{10} µg/m^3**	**TVOC ppm**
	Maximum 15-Minute Average Concentrations (Action Level: PM_{10} = 150 µg/m^3 / TVOC = 5.0 ppm)			
Wed 6/19/13	34.4	0.1	146.4	0.7
Thu 6/20/13	66.4	1.2	95.1	0.7
Fri 6/21/13	69.9	0.1	58.7	0.6

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

- Highlighted concentrations require further analysis (see **Table 3** and **Table 4** for the Action and Alert Concentrations, respectively).
- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 3: Real-Time 15-Minute Average Concentrations above the Action Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Action Limit	Background Concentration	Resultant Concentration	Comments/Explanation
Action Level Concentrations (PM_{10} = 150 µg/m^3 and TVOC = 5.0 ppm)								
NA	NA	NA	NA	NA	NA	NA	NA	Real-time 15-minute concentrations remained below the Action Levels.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.
- Background concentrations are conservatively estimated continuously using the lowest onsite concentration during each 15-minute period.

Table 4: Real-Time 15-Minute Average Concentrations above the Alert Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Alert Level	Background Concentration	Resultant Concentration	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 µg/m^3 and TVOC = 3.7 ppm)								
PM_{10}	Wed 6/19/13	11:00AM 11:15AM	PAM-2 (Bay 15)	NNE 11.5 mph*	119.9 115.5	23.9 21.2	96.0 94.3	PM_{10} concentrations were potentially caused by cleanup activities and fan exhaust from the Garage Bay 15. Work was stopped and water was applied.
PM_{10}	Wed 6/19/13	1:30PM 1:45PM	PAM-2 (Bay 15)	NNE 8.1 mph*	129.8 146.4	20.9 28.0	108.9 118.4	PM_{10} concentrations were potentially caused by cleanup activities and fan exhaust from the Garage Bay 15. Work was stopped and water was applied.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.
- Background concentrations are conservatively estimated continuously using the lowest onsite concentration during each 15-minute period.

*Meteorological data obtained from local weather station (KJFK) because onsite meteorological system not functioning properly.

Table 5: Weekly Maximum Hand-Held and Observational Monitoring Summary

(Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations.)

	Hand-Held Monitoring	
	PM_{10} $\mu g/m^3$	**TVOC ppm**
	Instantaneous Concentrations	
Wed 6/19/13	200	1.0
Thu 6/20/13	101	1.1
Fri 6/21/13	54	0.0

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Highlighted concentrations or observations require further analysis (see **Table 6**).
- Hand-held PM_{10} and TVOC data represent the maximum instantaneous concentrations of the readings taken periodically during work activities; however, in the event of an elevated concentration a 15-minute average concentration is measured and compared to the Site-Specific Action Levels.

Table 6: Hand-Held Concentrations above the Alert and Action Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Alert and/or Action Levels	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm) & Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	Wed 6/19/13	10:39AM 10:40AM	Bay 28 99th Bay 15 99th	NNE 11.5 mph*	181 200	Hand-held PM_{10} concentrations were potentially caused by dust escaping through holes in the bays. Any large holes were sealed with plastic wrap from the inside to further prevent dust from escaping the structure.
PM_{10}	Wed 6/19/13	2:40PM	Bay 15 100th	N 8.1 mph*	101	Hand-held PM_{10} concentrations were potentially caused by cleanup activities in the bay. Water was implemented to control dust.
PM_{10}	Thu 6/20/13	11:20AM	Bay 8 99th	SSW 10.4*	101	Hand-held PM_{10} concentrations were potentially caused by exhaust from metal work. A door was open during this operation and was closed following the elevated concentration.
TVOC	NA	NA	NA	NA	NA	Hand-held TVOC concentrations remained below the Alert and Action Levels.

Definitions:

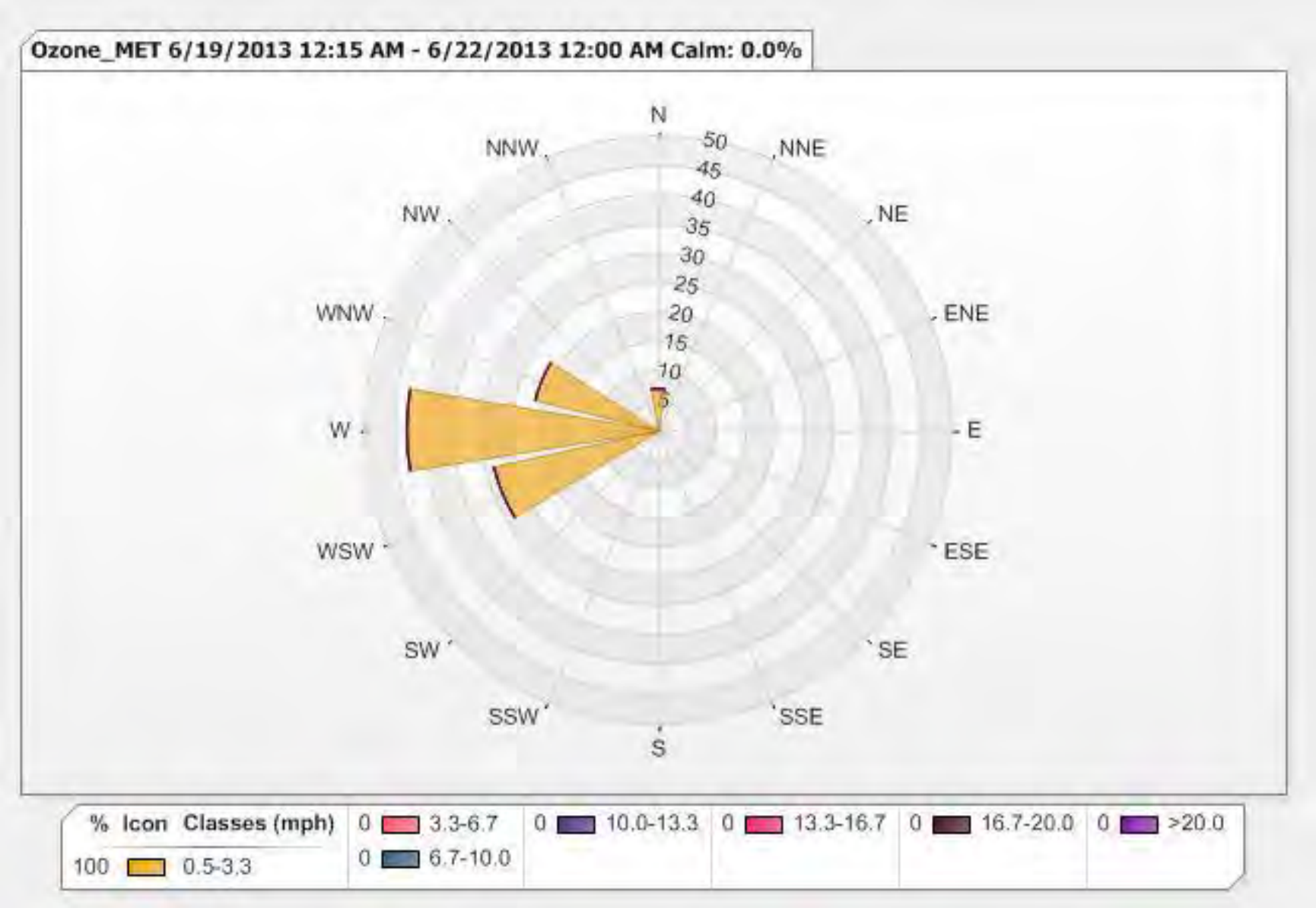
PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Hand-held concentrations represent instantaneous concentrations unless otherwise state. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite dust controls operations.

*Meteorological data obtained from local weather station (KJFK) because onsite meteorological system not functioning properly.

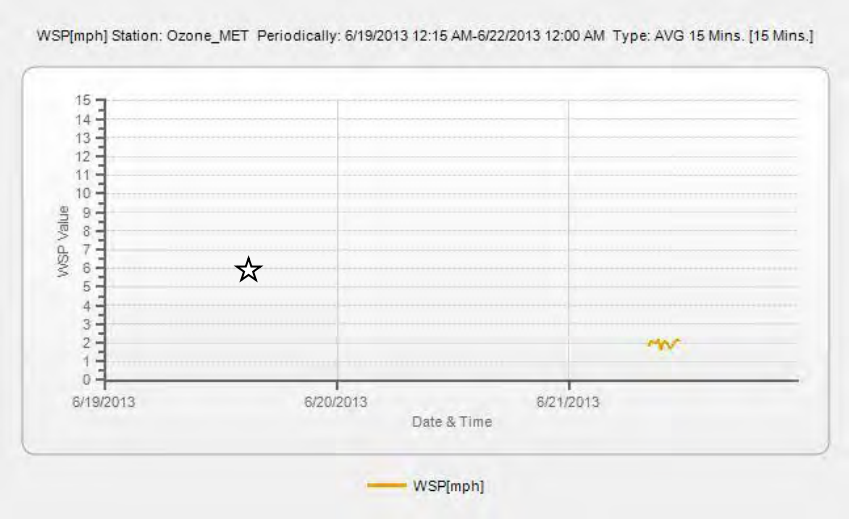
Figure 1: Wind Rose 6/19/13 – 6/21/13 (work hours only)



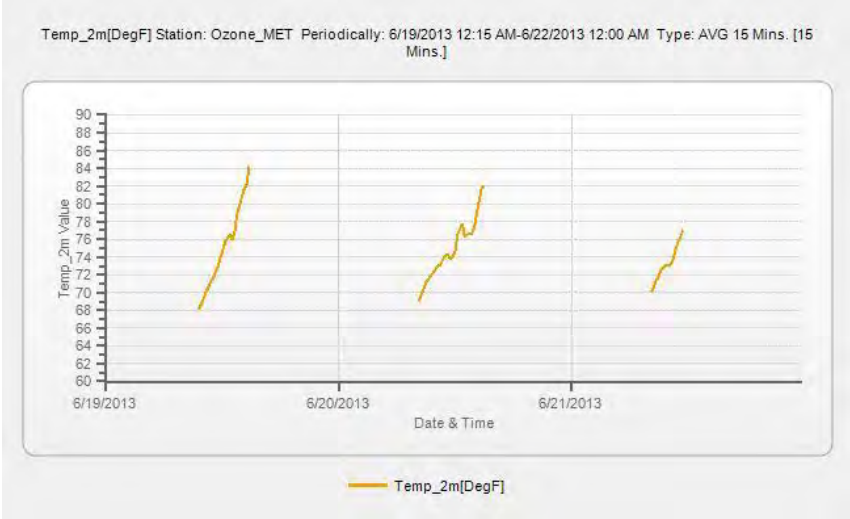
*****Meteorological wind data missing on 6/19 and 6/20/13 because of a system connection issue. Problem was resolved during setup on 6/21/13.

Figure 2: Meteorological Plots 6/19/13 – 6/21/13 (work hours only)

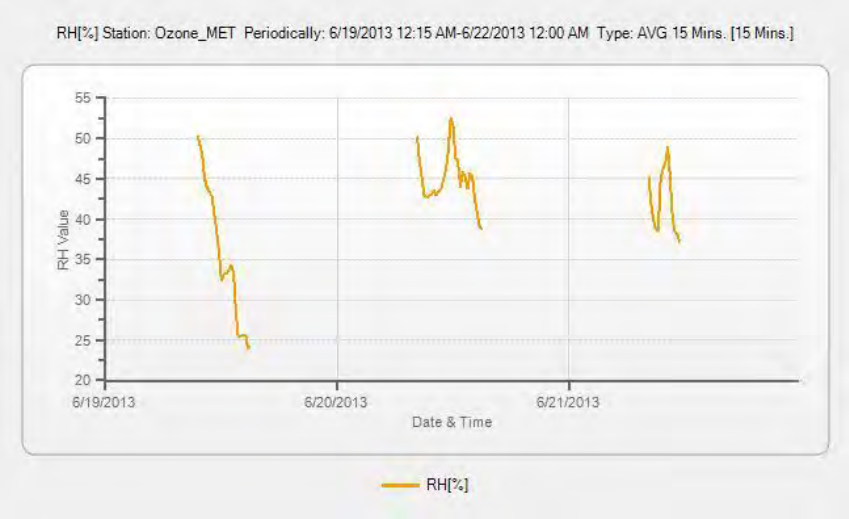
Wind Speed:



Temperature:

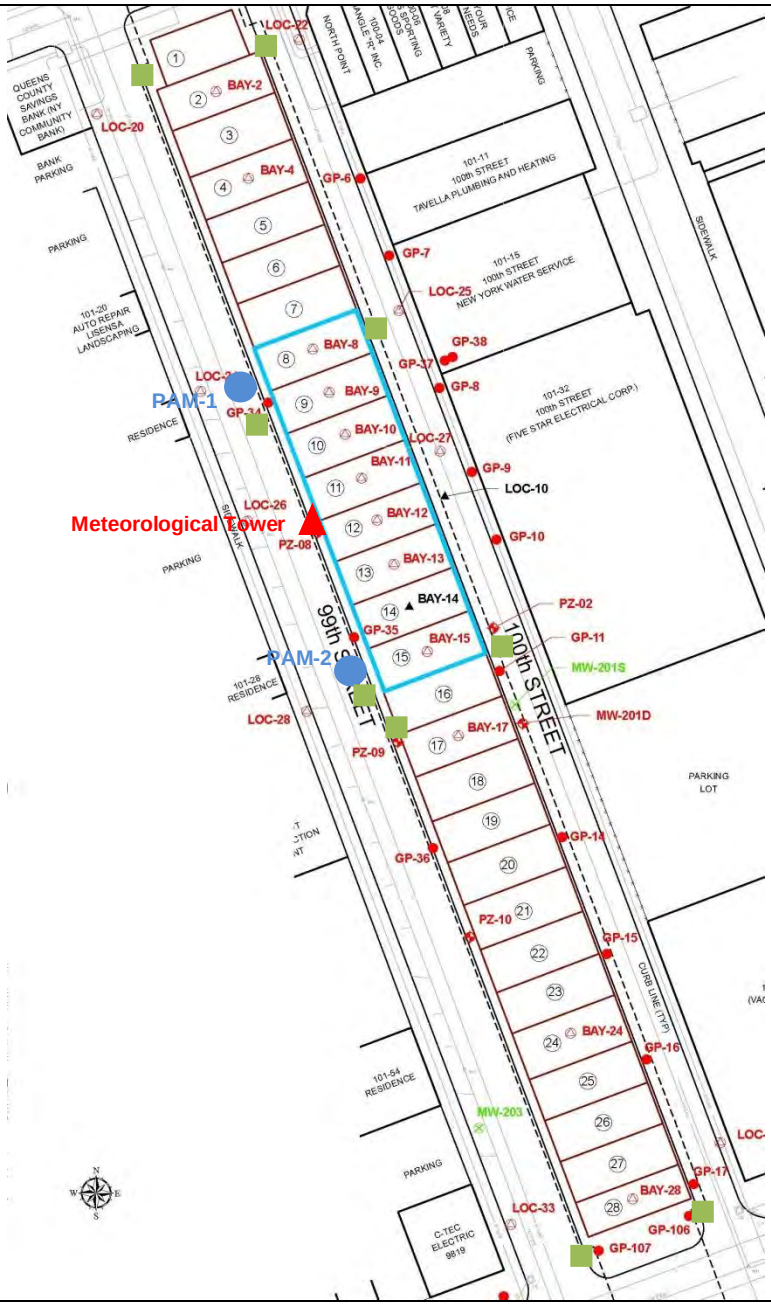


Relative Humidity:



*****Meteorological wind data missing on 6/19 and 6/20/13 because of a system connection issue. Problem was resolved during setup on 6/21/13.

Figure 3: Site Map (6/19– 6/21/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

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Community Air Monitoring Summary

Project:	**Former Ozone Industries, Inc. Site**
Location:	**Ozone Park, Queens, NY**
Report Period:	**Site Clean Up June 24 – June 28, 2013**
Date	**July 3, 2013**

During the report period there were no respirable particulate matter (PM_{10}) and total volatile organic compounds (TVOC) greater than the Site-specific Action Levels after accounting for background concentrations.

The Report Period includes five days of air monitoring (6/24/13 – 6/28/13) during inside Site activities that included demolition of inside walls and removal of trash (no intrusive work or soil removal).

This weekly air monitoring data summary includes both tabular information and written discussions summarizing the ambient air-quality data collected during the report period noted above in accordance with DER-10 Technical Guidance for Site Investigation and Remediation Appendix 1A New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) (DER-10) at the Former Ozone Industries, Inc. Site in Queens, NY. Monitoring and sampling were conducted in accordance with the Site-specific Community Air Monitoring Plan (CAMP), Attachment B of the Remedial Design/Remedial Action Work Plan dated October 2011.

Introduction

In accordance with the CAMP, community air monitoring data was collected continuously and the results were reviewed and compared to NYSDEC/NYSDOH Action Levels. In order to manage the Site more effectively, AECOM has employed a more conservative level (Alert Level) to help mitigate possible fugitive emissions before the Action Levels are reached. The purpose of the Alert Level is to help manage the Site and prevent concentrations from reaching the Action Levels. No Site-specific Action Levels were exceeded during this reporting period. Engineering controls, dust suppression, and / or odor suppression are used as necessary throughout the daily work activities.

- **Table 1**: Site specific Alert and Action Levels.

Real-Time Air Monitoring Summary – PM_{10} and TVOC

Continuous real-time air monitoring for PM_{10} and TVOC was conducted at two (2) portable air monitoring (PAM) stations along the Bay entrances on 99th Street. PAM stations were located in the vicinity of Bays 8 (PAM-1) and 15 (PAM-2) (at opposite ends of the work zone). The reason for this is because the main entrance to the Bays during the inside work is primarily through Bay 12 on 99th Street, and the Bays will not be accessed from 100th Street. These locations were approved by the NYSDEC. The intent of the real-time air monitoring program during Site activities is to provide early detection of short-term emissions and potential off-Site migration of PM_{10} and TVOCs related to Site activities. The real-time perimeter air monitoring system consists of PAM stations; hand-held PM_{10}

and TVOC instruments; a meteorological tower; and a central computer system with an automatic alarm notification system.

During the report period discussed herein there were no TVOC concentrations greater than the Action Levels. There were, however, PM_{10} concentrations greater than the Alert and Action Levels before accounting for background concentrations. These PM_{10} concentrations were evaluated further in accordance with the NYSDOH Guidelines (DER-10). After performing background subtraction per NYSDOH guidelines, each concentration fell below the Alert and Action Levels with the exception of one concentration which remained above the Alert Level but below the Action Level. Site controls to control dust were utilized in response (although the readings may not be completely site-related). These PM_{10} concentrations are evaluated further in accordance with the CAMP as noted below. Background concentrations are conservatively estimated continuously using the lowest onsite concentration during each 15-minute period. The results of the real-time air monitoring are presented in the following tables:

- **Table 2**: Weekly real-time maximum15-minute average PM_{10} and TVOC concentrations summary;
- **Table 3**: Real-time 15-minute average concentrations above the Action Levels; and
- **Table 4**: Real-time 15-minute average concentrations above the Alert Levels.

Integrated VOC Sampling Summary

Integrated 8-hour Volatile Organic Compounds (VOC) samples were not collected during the report period because there were no ground intrusive ongoing during the Site cleanup phase. Samples will be collected once a week at each PAM station during the upcoming intrusive phase (soil removal). These samples will be submitted to an analytical laboratory for analysis via United States Environmental Protection Agency (USEPA) Method TO-15. Results of the analysis will be reported as they are available from the laboratory.

Periodic Hand-held Air Monitoring Summary – PM_{10} and TVOC

Additionally, periodic hand-held and observational monitoring for PM_{10}, TVOC, visible dust, and odor were performed routinely throughout the monitoring days along the Site perimeter and in the vicinity. Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations. The results of the periodic hand-held monitoring are presented in the following tables:

- **Table 5**: Weekly maximum hand-held and observational monitoring summary; and
- **Table 6**: Hand-held concentrations above the Alert and Action Levels.

Meteorological Observations and Site Maps

Additional information related to the air monitoring activities during the report period is included in the following figures:

- **Figure 1**: Weekly wind rose summary;
- **Figure 2**: Weekly meteorological summaries; and
- **Figure 3 and 4**: Daily/weekly Site map(s).

Table 1: Site Specific Alert and Action Levels

Target Compounds	Alert Level	Action Level
PM_{10}	> 100 µg/m^3 above background[1]	> 150 µg/m^3 above background[1]
TVOC	> 3.7 ppm above background[1]	> 5.0 ppm above background[1]

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million

[1] Background concentrations are conservatively estimated continuously using the lowest onsite concentration during each 15-minute period.

Table 2: Weekly Real-Time Maximum 15-Minute Average PM_{10} and TVOC Concentrations Summary

	PAM-1 (Bay 8)		PAM-2 (Bay 15)	
	PM_{10} µg/m^3	**TVOC ppm**	**PM_{10} µg/m^3**	**TVOC ppm**
	Maximum 15-Minute Average Concentrations (Action Level: PM_{10} = 150 µg/m^3 / TVOC = 5.0 ppm)			
Mon 6/24/13	113.4	1.4	151.3	0.9
Tue 6/25/13	219.2	0.3	113.1	0.3
Wed 6/26/13	31.8	0.3	43.6	0.3
Thu 6/27/13	60.6	0.1	92.1	0.2
Fri 6/28/13	30.9	0.6	35.8	0.1

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

- Highlighted concentrations require further analysis (see **Table 3** and **Table 4** for the Action and Alert Concentrations, respectively).
- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 3: Real-Time 15-Minute Average Concentrations above the Action Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Action Limit	Background Concentration	Resultant Concentration	Comments/Explanation
Action Level Concentrations (PM_{10} = 150 µg/m³ and TVOC = 5.0 ppm)								
PM_{10}	Mon 6/24/13	2:30PM	PAM-2	SW 1.6 mph	151.3	57.1	94.2	PM_{10} concentrations were potentially caused by a combination of high regional background concentrations (hazy and humid conditions) and Site activities (loading roll offs with construction debris). Water spray continued inside the Bays to mitigate the potential for fugitive dust.
PM_{10}	Tue 6/25/13	1:45PM	PAM-1	SW 3.5 mph	219.2	74.4	144.8	PM_{10} concentrations were potentially caused by a combination of high regional background concentrations (hazy and humid conditions) and Site activities (loading roll offs with construction debris). The Bay doors were closed. Water spray continued inside the Bays to mitigate the potential for fugitive dust.
TVOC	NA	NA	NA	NA	NA	NA	NA	TVOC concentrations remained below the Action Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m³ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.
- Background concentrations are conservatively estimated continuously using the lowest onsite concentration during each 15-minute period.

Table 4: Real-Time 15-Minute Average Concentrations above the Alert Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Alert Level	Background Concentration	Resultant Concentration	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm)								
PM_{10}	Mon 6/24/13	10:00AM 11:00AM 11:45AM	PAM-2	WSW 1.4 mph N 1.9 mph SW 1.6 mph	147.5 101.8 117.5	57.2 68.0 83.5	90.3 33.8 34.0	PM_{10} concentrations were potentially caused by a combination of high regional background concentrations (hazy and humid conditions) and Site activities (loading roll offs with construction debris). Water spray continued inside the Bays to mitigate the potential for fugitive dust.
		12:00PM 1:45PM	PAM-1	SSW 1.6 mph SSW 2.4 mph	105.5 113.4	77.0 54.0	28.5 59.4	
		3:15PM	PAM-2	SSW 1.7 mph	148.4	63.5	84.9	
PM_{10}	Tue 6/25/13	11:45AM 1:00PM 1:15PM 1:30PM	PAM-1	WSW 2.1 mph WSW 3.0 mph SSW 2.9 mph NNE 2.6 mph	112.4 107.3 124.6 111.7	74.2 70.7 78.0 74.1	38.2 36.6 46.6 37.6	PM_{10} concentrations were potentially caused by a combination of high regional background concentrations (hazy and humid conditions) and Site activities (loading roll offs with construction debris). The Bay doors were closed. Water spray continued inside the Bays to mitigate the potential for fugitive dust.
		2:00PM 2:15PM	PAM-2	ENE 3.5 mph WSW 3.1 mph	113.1 107.6	101.5 93.3	11.6 14.3	
		3:15PM 3:30PM	PAM-1	SW 2.8 mph NE 2.6 mph	107.4 100.9	107.4 100.9	0 0	
		3:15PM 3:30PM	PAM-2	SW 2.8 mph NE 2.6 mph	110.6 109.4	107.4 100.9	3.2 8.5	
TVOC	NA	NA	NA	NA	NA	NA	NA	TVOC concentrations remained below the Alert Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.
- Background concentrations are conservatively estimated continuously using the lowest onsite concentration during each 15-minute period.

Table 5: Weekly Maximum Hand-Held and Observational Monitoring Summary

(Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations.)

	Hand-Held Monitoring	
	PM_{10} $\mu g/m^3$	**TVOC ppm**
	Instantaneous Concentrations	
Mon 6/24/13	197	0.0
Tue 6/25/13	162	0.0
Wed 6/26/13	71	0.6
Thu 6/27/13	118	0.0
Fri 6/28/13	57	0.0

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Highlighted concentrations or observations require further analysis (see **Table 6**).
- Hand-held PM_{10} and TVOC data represent the maximum instantaneous concentrations of the readings taken periodically during work activities; however, in the event of an elevated concentration a 15-minute average concentration is measured and compared to the Site-Specific Action Levels.

Table 6: Hand-Held Concentrations above the Alert and Action Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Alert and/or Action Levels	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm) & Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	Mon 6/24/13	9:57AM	Bay 15 99th	WSW 1.4 mph	197	Hand-held PM_{10} concentrations were most likely caused by high regional background concentrations (hazy and humid conditions).
PM_{10}	Tue 6/25/13	9:05AM 10:36AM 10:39AM 11:50AM 11:58AM 11:59AM 12:03PM 1:19PM 2:24PM 2:32PM 2:33PM 2:35PM	Bay 8 100th Bay 8 100th Bay 28 100th Bay 8 99th Bay 8 100th Bay 15 100th Bay 28 100th Bay 1 99th Bay 8 99th Bay 28 100th Bay 28 99th Bay 15 99th	SSW – NNE 1.6 – 3.7 mph	117 162 142 112 107 121 113 119 122 131 123 132	Hand-held PM_{10} concentrations were most likely caused by high regional background concentrations (hazy and humid conditions).
PM_{10}	Thu 6/27/13	9:35AM 9:37AM 9:38AM 10:36AM 10:37AM 10:39AM 10:43AM 11:33AM 11:45AM 2:10PM	Bay 8 100th Bay 15 100th Bay 28 100th Bay 8 100th Bay 15 100th Bay 28 100th Bay 15 99th Bay 8 99th Bay 15 99th Bay 1 100th	Light & Variable	102 112 113 115 106 116 107 104 114 118	Hand-held PM_{10} concentrations were most likely caused by high regional background concentrations (hazy and humid conditions).
TVOC	NA	NA	NA	NA	NA	Hand-held TVOC concentrations remained below the Alert and Action Levels.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Hand-held concentrations represent instantaneous concentrations unless otherwise state. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite dust controls operations.

Figure 1: Wind Rose 6/24/13 – 6/28/13 (work hours only)

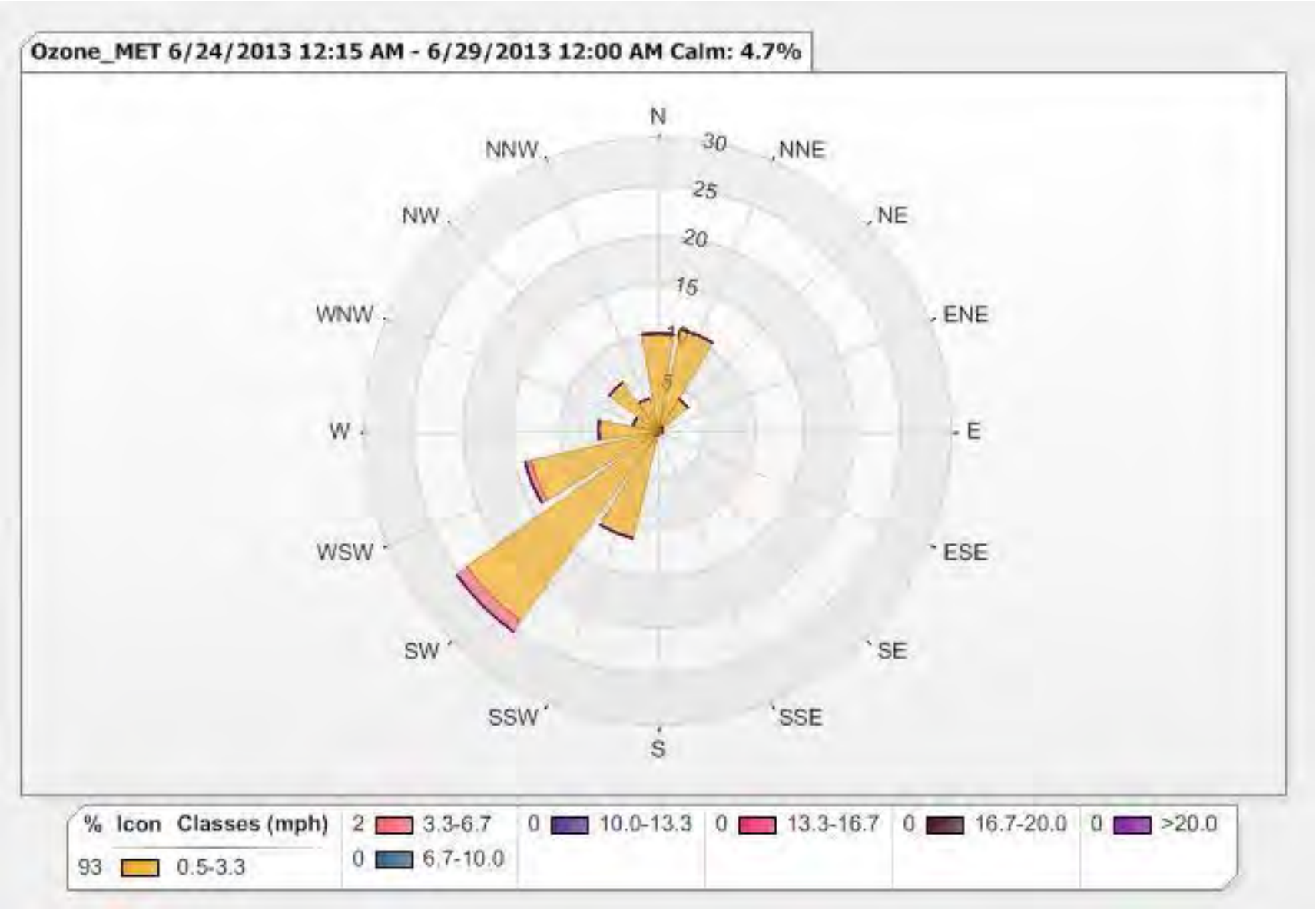
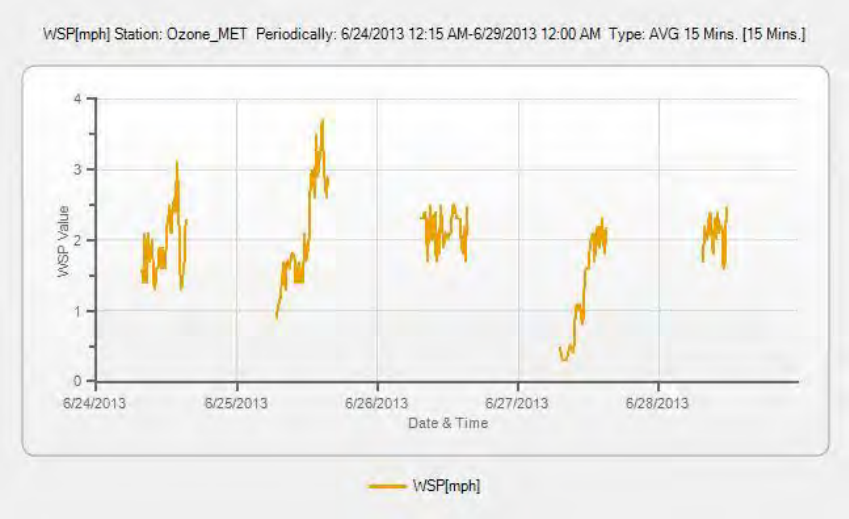
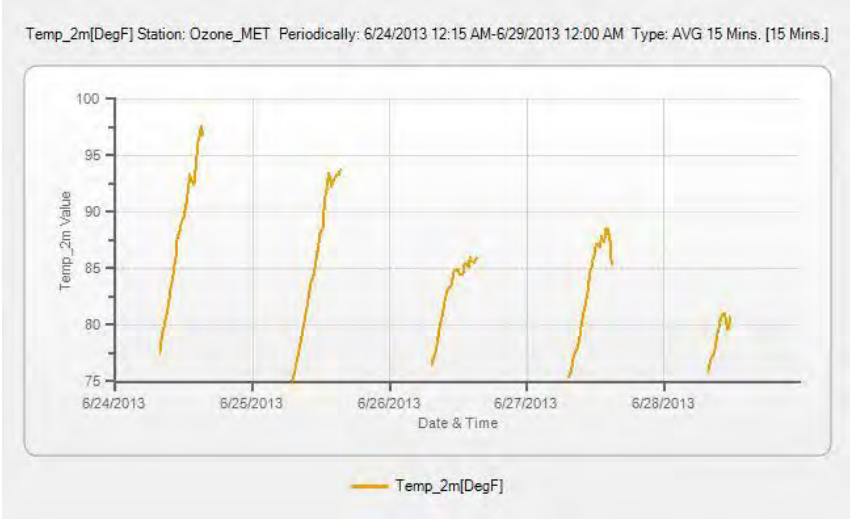


Figure 2: Meteorological Plots 6/24/13 – 6/28/13 (work hours only)

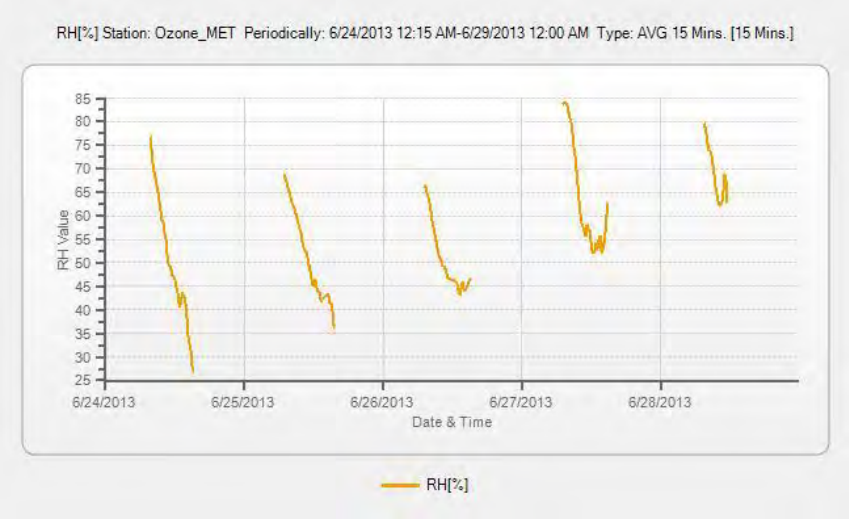
Wind Speed:



Temperature:

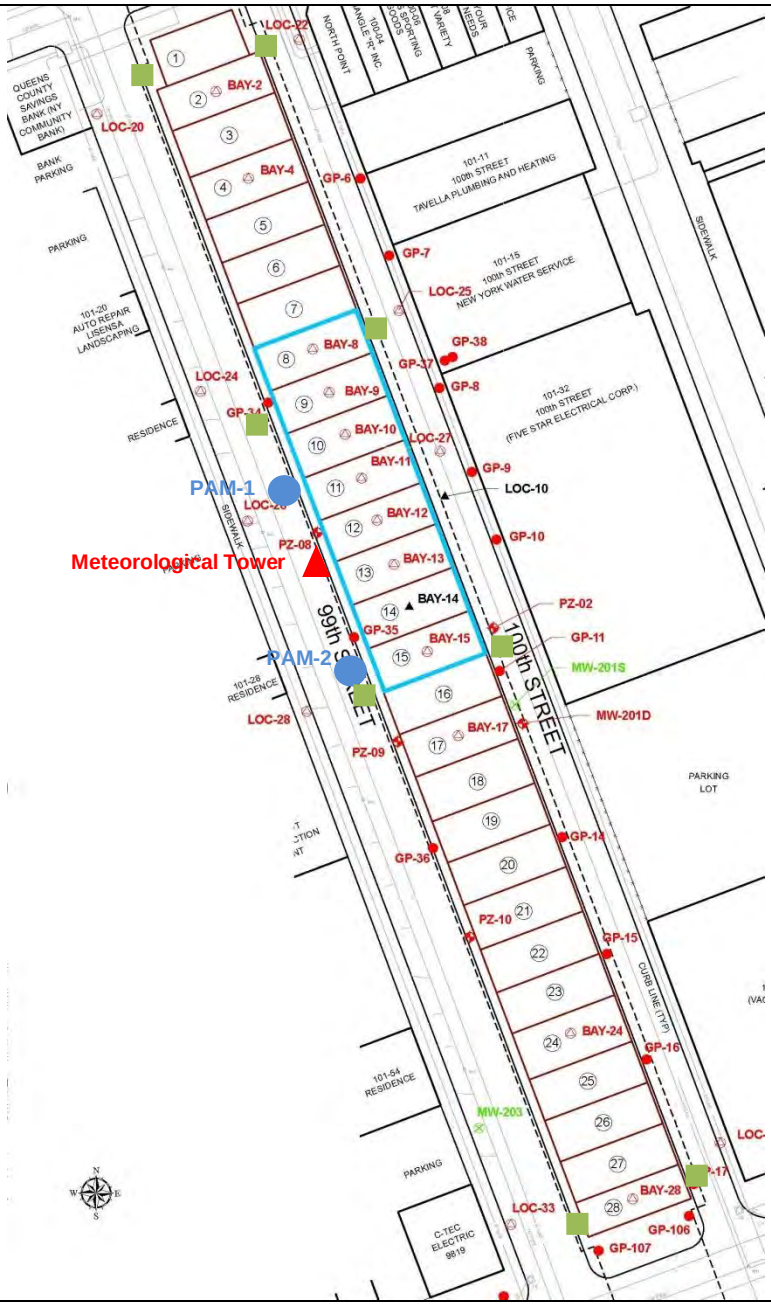


Relative Humidity:



*

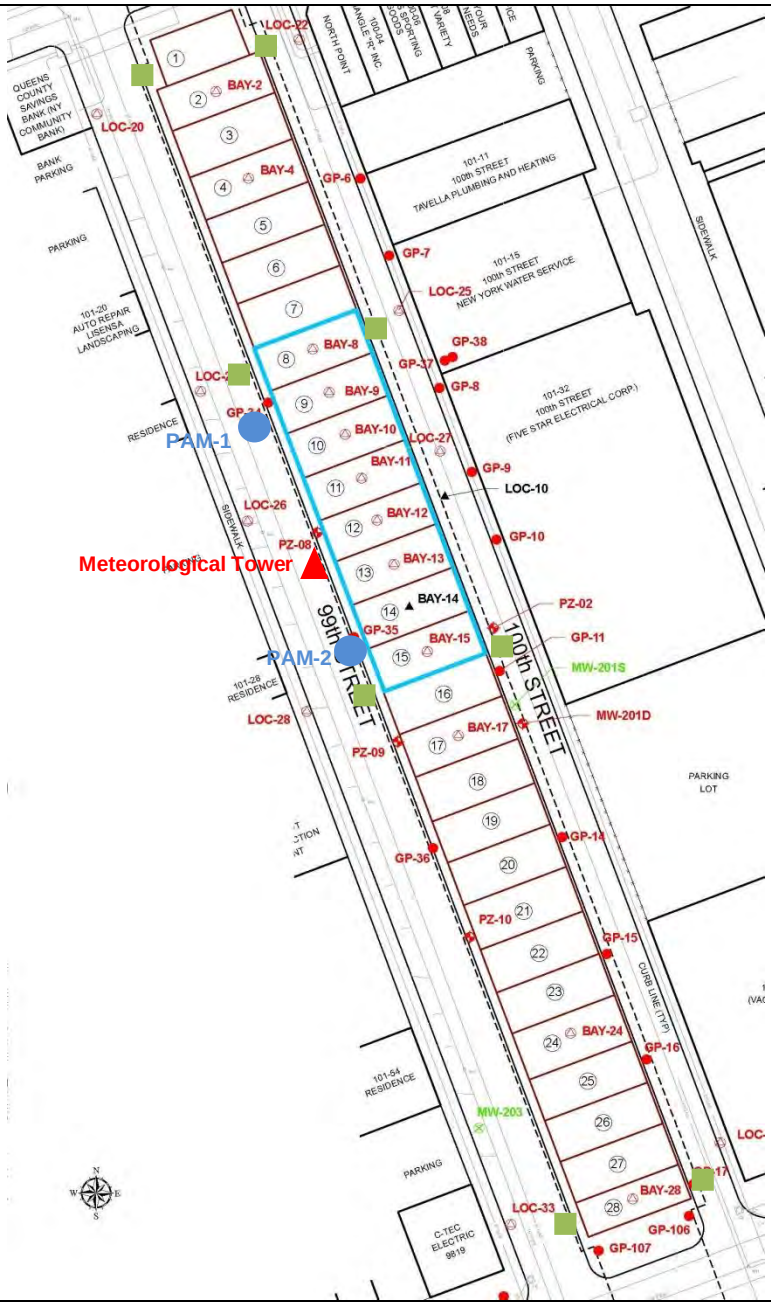
Figure 3: Site Map (6/24 – 6/25/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

Figure 4: Site Map (6/26 – 6/28/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

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Community Air Monitoring Summary

Project:	**Former Ozone Industries, Inc. Site**
Location:	**Ozone Park, Queens, NY**
Report Period:	**Site Clean Up and Bay 12 Sump Cleanouts July 1 and 2, 2013**
Date	**July 23, 2013**

During the report period (two days of site activities during the week) there were no respirable particulate matter (PM_{10}) and total volatile organic compounds (TVOC) greater than the Site-specific Action Levels.

This weekly air monitoring data summary includes both tabular information and written discussions summarizing the ambient air-quality data collected during the report period noted above in accordance with DER-10 Technical Guidance for Site Investigation and Remediation Appendix 1A New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) (DER-10) at the Former Ozone Industries, Inc. Site in Queens, NY. Monitoring and sampling were conducted in accordance with the Site-specific Community Air Monitoring Plan (CAMP), Attachment B of the Remedial Design/Remedial Action Work Plan dated October 2011.

Introduction

In accordance with the CAMP, community air monitoring data was collected continuously and the results were reviewed and compared to NYSDEC/NYSDOH Action Levels. In order to manage the Site more effectively, AECOM has employed a more conservative level (Alert Level) to help mitigate possible fugitive emissions before the Action Levels are reached. The purpose of the Alert Level is to help manage the Site and prevent concentrations from reaching the Action Levels. Engineering controls, dust suppression, and / or odor suppression are used as necessary throughout the daily work activities. AECOM, NYSDEC and NYSDOH had a conference call on July 16, 2013 to discuss previous CAMP monitoring reports for this project, and it was decided to not report background levels and calculate resultant concentrations, due to the configuration of the site and locations of the portable air monitoring (PAM) stations, access to the Site or indoor work (through a limited number of doors on 99th Street), and establishing up and down wind conditions. To date, the real-time monitoring (discussed below) has only indicated PM_{10} levels over Alert Levels during a relatively small percentage of the total Site time. The monitoring has achieved its main goal – Site personnel were alerted real-time to adjust Site operations to address levels over Alert Levels (which may not have been caused solely by Site operations). As stated in the CAMP "The purpose of the air-monitoring program is to provide early detection in the field of potential short-term emissions. The early detection of potential emissions and associated contingency measures is intended to expedite any necessary mitigation measures, and to reduce the potential for the community and public to be exposed to site constituents at levels above accepted regulatory limits and guidelines provided in the NYSDOH Generic CAMP." Currently, the CAMP monitoring is providing a good early warning system.

The Alert and Action Levels used at the Site are shown in the following table:

- **Table 1**: Site specific Alert and Action Levels.

Real-Time Air Monitoring Summary – PM_{10} and TVOC

Continuous real-time air monitoring for PM_{10} and TVOC was conducted at two (2) PAM stations along the Bay entrances on 99th Street. PAM stations were located in the vicinity of Bays 8 (PAM-1) and 15 (PAM-2) (at opposite ends of the work zone). The reason for this is because the main entrance to the Bays during the inside work is primarily through Bay 12 on 99th Street, and the Bays will not be accessed from 100th Street. These locations were approved by the NYSDEC. The intent of the real-time air monitoring program during Site activities is to provide early detection of short-term emissions and potential off-Site migration of PM_{10} and TVOCs related to Site activities. The real-time perimeter air monitoring system consists of PAM stations; hand-held PM_{10} and TVOC instruments; a meteorological tower; and a central computer system with an automatic alarm notification system.

During the report period discussed herein there were no PM_{10} and TVOC concentrations greater than the Action Levels. The results of the real-time air monitoring are presented in the following tables:

- **Table 2**: Weekly real-time maximum15-minute average PM_{10} and TVOC concentrations summary;
- **Table 3**: Real-time 15-minute average concentrations above the Action Levels; and
- **Table 4**: Real-time 15-minute average concentrations above the Alert Levels.

Integrated VOC Sampling Summary

Integrated 8-hour Volatile Organic Compounds (VOC) samples were collected on July 2, 13 during the sump clean out. Samples will be collected once a week at each PAM station during the ground intrusive phase (soil removal). These samples will be submitted to an analytical laboratory for analysis via United States Environmental Protection Agency (USEPA) Method TO-15. Results of the analysis will be reported as they are available from the laboratory.

Results of the integrated VOC sampling on July 2, 2013 are included in **Attachment A**. Canisters were collected at each of the PAM stations; however, due to an error of the flow controller the canister collected at PAM-1 was not representative of the 8-hour period. Therefore, was not submitted to the laboratory for analysis.

Periodic Hand-held Air Monitoring Summary – PM_{10} and TVOC

Additionally, periodic hand-held and observational monitoring for PM_{10}, TVOC, visible dust, and odor were performed routinely throughout the monitoring days along the Site perimeter and in the vicinity. Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations. The results of the periodic hand-held monitoring are presented in the following tables:

- **Table 5**: Weekly maximum hand-held and observational monitoring summary; and
- **Table 6**: Hand-held concentrations above the Alert and Action Levels.

Meteorological Observations and Site Maps

Additional information related to the air monitoring activities during the report period is included in the following figures:

- **Figure 1**: Weekly wind rose summary;

- **Figure 2**: Weekly meteorological summaries; and
- **Figure 3**: Daily/weekly Site map(s).

Table 1: Site Specific Alert and Action Levels

Target Compounds	Alert Level	Action Level
PM_{10}	> 100 µg/m^3	> 150 µg/m^3
TVOC	> 3.7 ppm	> 5.0 ppm

Definitions:
PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million

Table 2: Weekly Real-Time Maximum 15-Minute Average PM_{10} and TVOC Concentrations Summary

	PAM-1 (Bay 8)		PAM-2 (Bay 15)	
	PM_{10} µg/m^3	**TVOC ppm**	**PM_{10} µg/m^3**	**TVOC ppm**
	Maximum 15-Minute Average Concentrations (Action Level: PM_{10} = 150 µg/m^3 / TVOC = 5.0 ppm Alert Level: PM_{10} = 100 µg/m^3 / TVOC = 3.7 ppm)			
Mon 7/1/13	57.6	ND[1]	ND[2]	ND[1]
Tue 7/2/13	62.2	0.5	53.1	0.8
Wed 7/3/13	NA[3]	NA[3]	NA[3]	NA[3]
Thu 7/4/13	NA[3]	NA[3]	NA[3]	NA[3]
Fri 7/5/13	NA[3]	NA[3]	NA[3]	NA[3]

Definitions:
PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

[1] TVOC data invalid because of moisture buildup in the instrument sensors. Sensors were replaced 7/2/13. There was no intrusive work during this day (7/1/13).
[2] PM_{10} data missing because of a data logger malfunction. Data acquisition system installed on 7/3/13.
[3] Site closed for the Independence Holiday weekend (no Site activities).

- Highlighted concentrations require further analysis (see **Table 3** and **Table 4** for the Action and Alert Concentrations, respectively). None for this reporting period.
- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 3: Real-Time 15-Minute Average Concentrations above the Action Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Action Limit	Comments/Explanation
Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10} and TVOC	NA	NA	NA	NA	NA	PM_{10} and TVOC concentrations remained below the Action Levels.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 4: Real-Time 15-Minute Average Concentrations above the Alert Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Alert Level	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm)						
PM_{10} and TVOC	NA	NA	NA	NA	NA	PM_{10} and TVOC concentrations remained below the Alert Levels.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 5: Weekly Maximum Hand-Held and Observational Monitoring Summary

(Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations.)

	Hand-Held Monitoring	
	PM_{10} µg/m³	**TVOC ppm**
	Instantaneous Concentrations	
Mon 7/1/13	ND[1]	ND[1]
Tue 7/2/13	99	0.0
Wed 7/3/13	NA[2]	NA[2]
Thu 7/4/13	NA[2]	NA[2]
Fri 7/5/13	NA[2]	NA[2]

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m³ = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

[1] Hand-held monitoring not performed because of poor weather conditions (periodic thunderstorms) and limited work on-site (no intrusive work occurring). Periodic walks around site and vicinity indicated no observations of visible dust along 99th and 100th street.

[2] Site closed for Independence Holiday weekend (no Site activities).

- Highlighted concentrations or observations require further analysis (see **Table 6**). None for this reporting period.
- Hand-held PM_{10} and TVOC data represent the maximum instantaneous concentrations of the readings taken periodically during work activities.

Table 6: Hand-Held Concentrations above the Alert and Action Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Alert and/or Action Levels	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm) & Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10} and TVOC	NA	NA	NA	NA	NA	Hand-held PM_{10} and TVOC concentrations remained below the Alert and Action Levels.

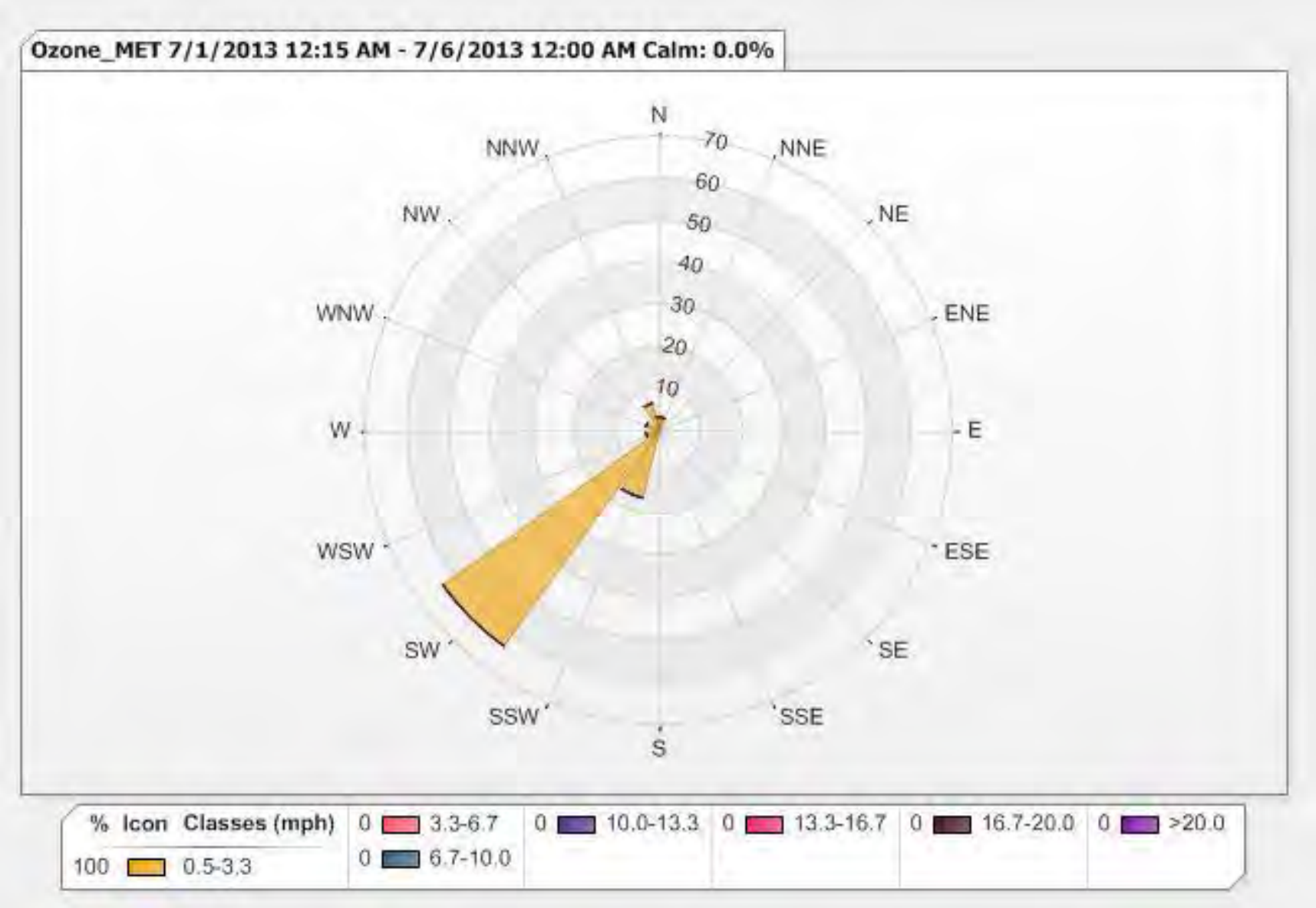
Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Hand-held concentrations represent instantaneous concentrations unless otherwise state. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite dust controls operations.

Figure 1: Wind Rose 7/1/13 – 7/6/13 (work hours only)



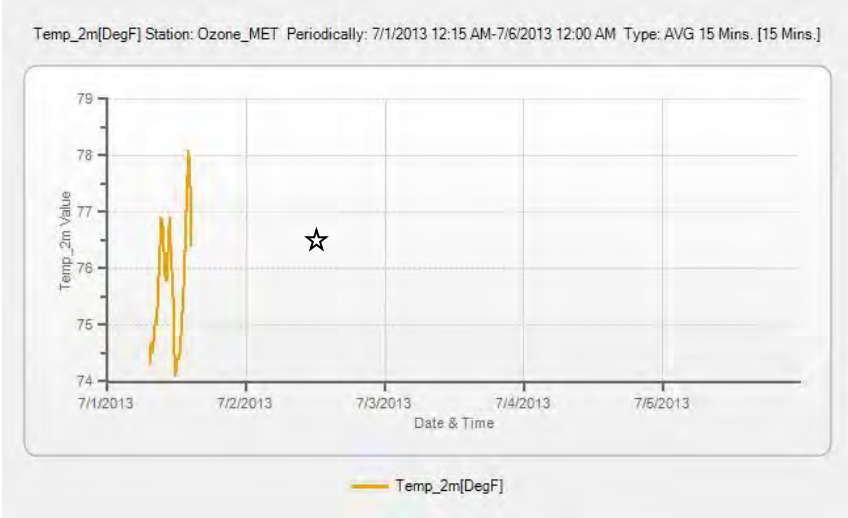
*****Meteorological data missing on 7/2/13 because of a failure of the data backup system. The data acquisition system was installed on 7/3/13.

Figure 2: Meteorological Plots 7/1/13 – 7/5/13 (work hours only)

Wind Speed:



Temperature:

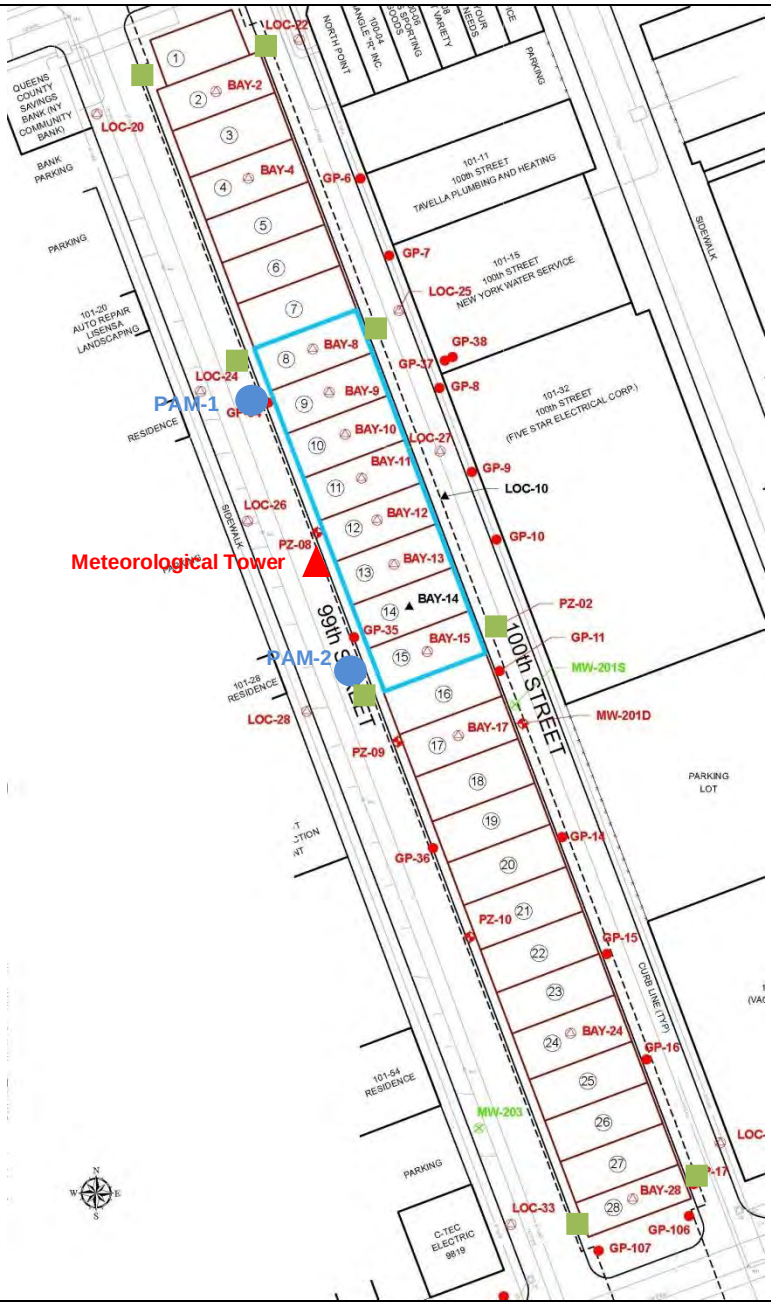


Relative Humidity:



*****Meteorological data missing on 7/2/13 because of a failure of the data backup system. The data acquisition system was installed on 7/3/13.

Figure 3: Site Map (7/1 – 7/2/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

Attachment A

Integrated 8-Hour VOC Results

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Community Air Monitoring Summary

Project:	**Former Ozone Industries, Inc. Site**
Location:	**Ozone Park, Queens, NY**
Report Period:	**July 18, 2013 (soil excavation)**
Date	**July 24, 2013**

During the report period (one day of Site activities during the week) there were no respirable particulate matter (PM_{10}) and total volatile organic compounds (TVOC) greater than the Site-specific Action Levels.

This weekly air monitoring data summary includes both tabular information and written discussions summarizing the ambient air-quality data collected during the report period noted above in accordance with DER-10 Technical Guidance for Site Investigation and Remediation Appendix 1A New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) (DER-10) at the Former Ozone Industries, Inc. Site in Queens, NY. Monitoring and sampling were conducted in accordance with the Site-specific Community Air Monitoring Plan (CAMP), Attachment B of the Remedial Design/Remedial Action Work Plan dated October 2011.

Introduction

In accordance with the CAMP, community air monitoring data was collected continuously and the results were reviewed and compared to NYSDEC/NYSDOH Action Levels. In order to manage the Site more effectively, AECOM has employed a more conservative level (Alert Level) to help mitigate possible fugitive emissions before the Action Levels are reached. The purpose of the Alert Level is to help manage the Site and prevent concentrations from reaching the Action Levels. Engineering controls, dust suppression, and / or odor suppression are used as necessary throughout the daily work activities. The July 23, 2013 CAMP Summary Report provides a discussion on the elimination of reporting background levels and resultant concentrations,

The Alert and Action Levels used at the Site are shown in the following table:

- **Table 1**: Site specific Alert and Action Levels.

Real-Time Air Monitoring Summary – PM_{10} and TVOC

Continuous real-time air monitoring for PM_{10} and TVOC was conducted at two (2) PAM stations along the Bay entrances on 99th Street. PAM stations were located in the vicinity of Bays 8 (PAM-1) and 15 (PAM-2) (at opposite ends of the work zone). The reason for this is because the main entrance to the Bays during the inside work is primarily through Bay 12 on 99th Street, and the Bays will not be accessed from 100th Street. These locations were approved by the NYSDEC. The intent of the real-time air monitoring program during Site activities is to provide early detection of short-term emissions and potential off-Site migration of PM_{10} and TVOCs related to Site activities. The real-time perimeter air monitoring system consists of PAM stations; hand-held PM_{10} and TVOC instruments; a meteorological tower; and a central computer system with an automatic alarm notification system.

During the report period discussed herein there were no PM_{10} and TVOC concentrations greater than the Action Levels. The results of the real-time air monitoring are presented in the following tables:

- **Table 2**: Weekly real-time maximum15-minute average PM_{10} and TVOC concentrations summary;
- **Table 3**: Real-time 15-minute average concentrations above the Action Levels; and
- **Table 4**: Real-time 15-minute average concentrations above the Alert Levels.

Integrated VOC Sampling Summary

Integrated 8-hour Volatile Organic Compounds (VOC) samples are collected once a week at each PAM station during the ground intrusive phase (soil removal). These samples are submitted to an analytical laboratory for analysis via United States Environmental Protection Agency (USEPA) Method TO-15. Results of the analysis are reported as they are available from the laboratory. Integrated VOC samples were collected on July 18, 2013. The results of the analysis will be included in the weekly summaries as they become available from the laboratory.

Periodic Hand-held Air Monitoring Summary – PM_{10} and TVOC

Additionally, periodic hand-held and observational monitoring for PM_{10}, TVOC, visible dust, and odor were performed routinely throughout the monitoring days along the Site perimeter and in the vicinity. Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations. The results of the periodic hand-held monitoring are presented in the following tables:

- **Table 5**: Weekly maximum hand-held and observational monitoring summary; and
- **Table 6**: Hand-held concentrations above the Alert and Action Levels.

Meteorological Observations and Site Maps

Additional information related to the air monitoring activities during the report period is included in the following figures:

- **Figure 1**: Weekly wind rose summary;
- **Figure 2**: Weekly meteorological summaries; and
- **Figure 3**: Daily/weekly Site map(s).

Table 1: Site Specific Alert and Action Levels

Target Compounds	Alert Level	Action Level
PM_{10}	> 100 µg/m^3	> 150 µg/m^3
TVOC	> 3.7 ppm	> 5.0 ppm

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million

Table 2: Weekly Real-Time Maximum 15-Minute Average PM_{10} and TVOC Concentrations Summary

	PAM-1 (Bay 8)		PAM-2 (Bay 15)	
	PM_{10} µg/m^3	**TVOC ppm**	**PM_{10} µg/m^3**	**TVOC ppm**
	Maximum 15-Minute Average Concentrations (Action Level: PM_{10} = 150 µg/m^3 / TVOC = 5.0 ppm Alert Level: PM_{10} = 100 µg/m^3 / TVOC = 3.7 ppm)			
Mon 7/15/13	NA[1]	NA[1]	NA[1]	NA[1]
Tue 7/16/13	NA[1]	NA[1]	NA[1]	NA[1]
Wed 7/17/13	NA[1]	NA[1]	NA[1]	NA[1]
Thu 7/18/13	54.1	0.2	137.5	0.2
Fri 7/19/13	NA[1]	NA[1]	NA[1]	NA[1]

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

[1] Site closed (no Site activities).

- Highlighted concentrations require further analysis (see **Table 3** and **Table 4** for the Action and Alert Concentrations, respectively).
- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 3: Real-Time 15-Minute Average Concentrations above the Action Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Action Limit	Comments/Explanation
Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10} and TVOC	NA	NA	NA	NA	NA	PM_{10} and TVOC concentrations remained below the Action Levels.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 4: Real-Time 15-Minute Average Concentrations above the Alert Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Alert Level	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm)						
PM_{10}	Thu 7/18/13	9:45AM	PAM-2	Light and Variable	129.2	PM_{10} concentrations caused by a combination of high regional background concentrations and jack hammering activities in the vicinity of PAM-2. The area where the jack hammer was in use was wet down with water spray and concentrations returned below the Alert Level.
PM_{10}	Thu 7/18/13	10:30AM	PAM-2	Light and Variable	137.5	PM_{10} concentrations caused by a combination of high regional background concentrations and jack hammering activities in the vicinity of PAM-2. The area where the jack hammer was in use was wet down with water spray and concentrations returned below the Alert Level.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Alert Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 5: Weekly Maximum Hand-Held and Observational Monitoring Summary

(Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations.)

	Hand-Held Monitoring	
	PM_{10} µg/m³	**TVOC ppm**
	Instantaneous Concentrations	
Mon 7/15/13	NA[1]	NA[1]
Tue 7/16/13	NA[1]	NA[1]
Wed 7/17/13	NA[1]	NA[1]
Thu 7/18/13	136	0.0
Fri 7/19/13	NA[1]	NA[1]

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m³ = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

[1] Site closed (no Site activities).

- Highlighted concentrations or observations require further analysis (see **Table 6**).
- Hand-held PM_{10} and TVOC data represent the maximum instantaneous concentrations of the readings taken periodically during work activities.

Table 6: Hand-Held Concentrations above the Alert and Action Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Alert and/or Action Levels	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm) & Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	Thu 7/18/13	9:07AM 10:06AM 10:09AM	Bay 28 100th Bay 8 100th Bay 28 100th	Light and Variable	122 136 106	Hand-held PM_{10} concentrations caused by high regional background concentrations (hazy, hot and humid conditions).
TVOC	NA	NA	NA	NA	NA	Hand-held TVOC concentrations remained below the Alert and Action Levels.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Hand-held concentrations represent instantaneous concentrations unless otherwise state. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite dust controls operations.

Figure 1: Wind Rose 7/15/13 – 7/19/13 (work hours only)

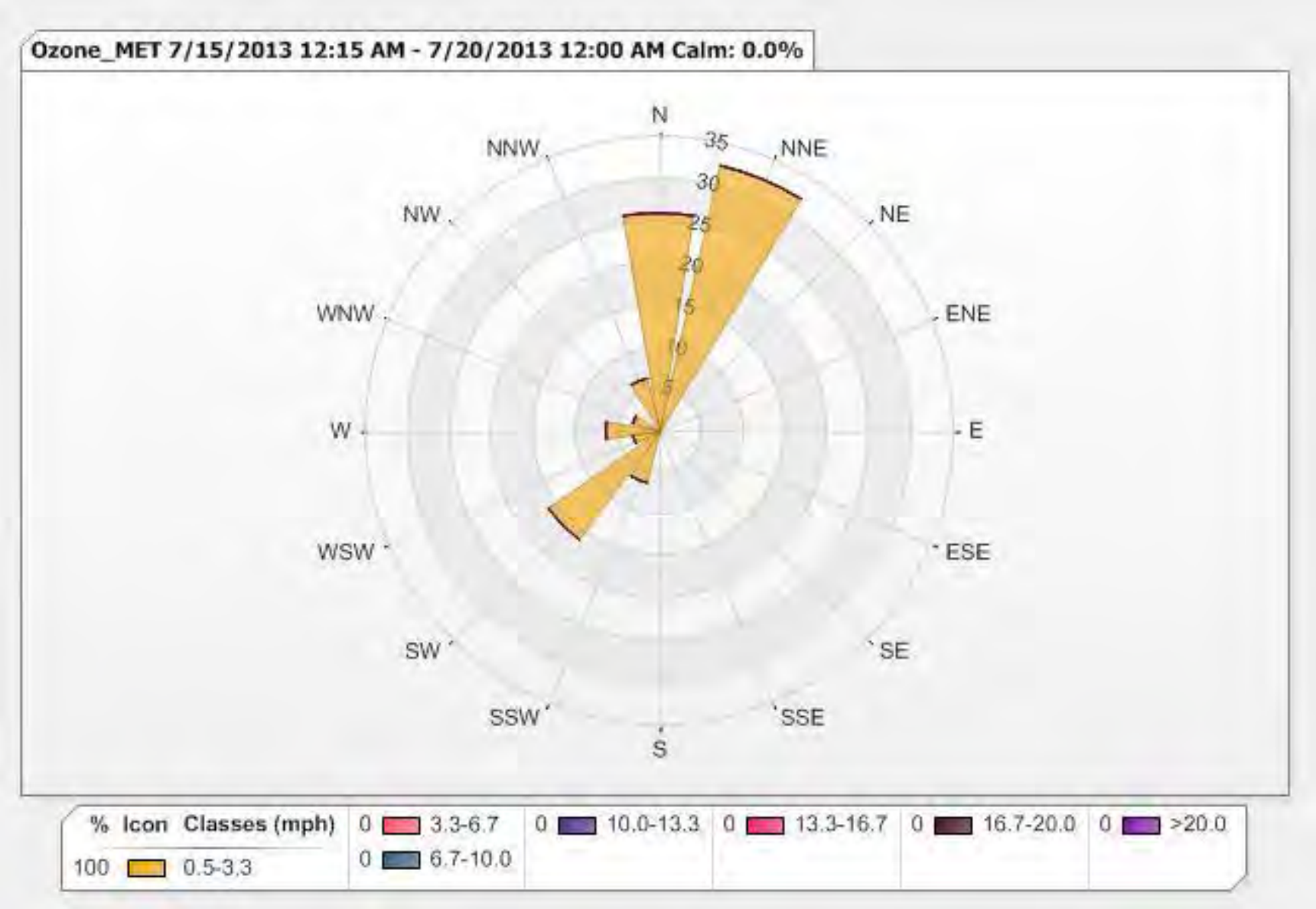
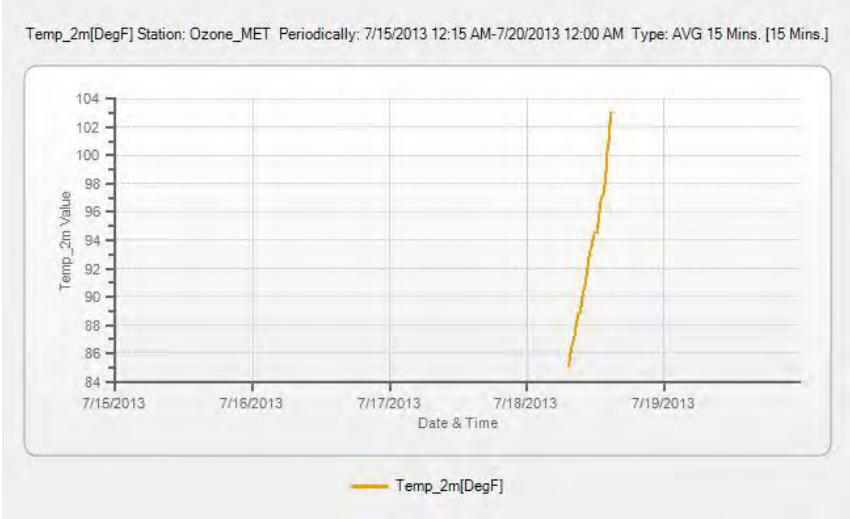


Figure 2: Meteorological Plots 7/15/13 – 7/19/13 (work hours only)

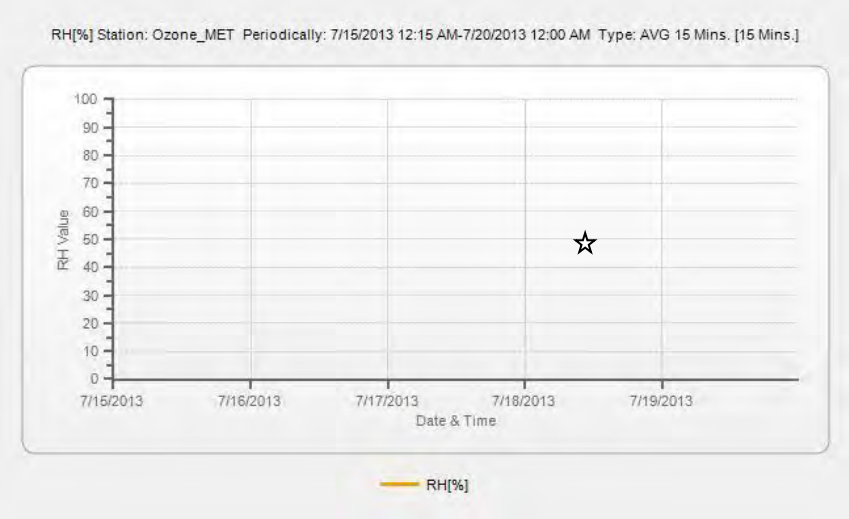
Wind Speed:



Temperature:

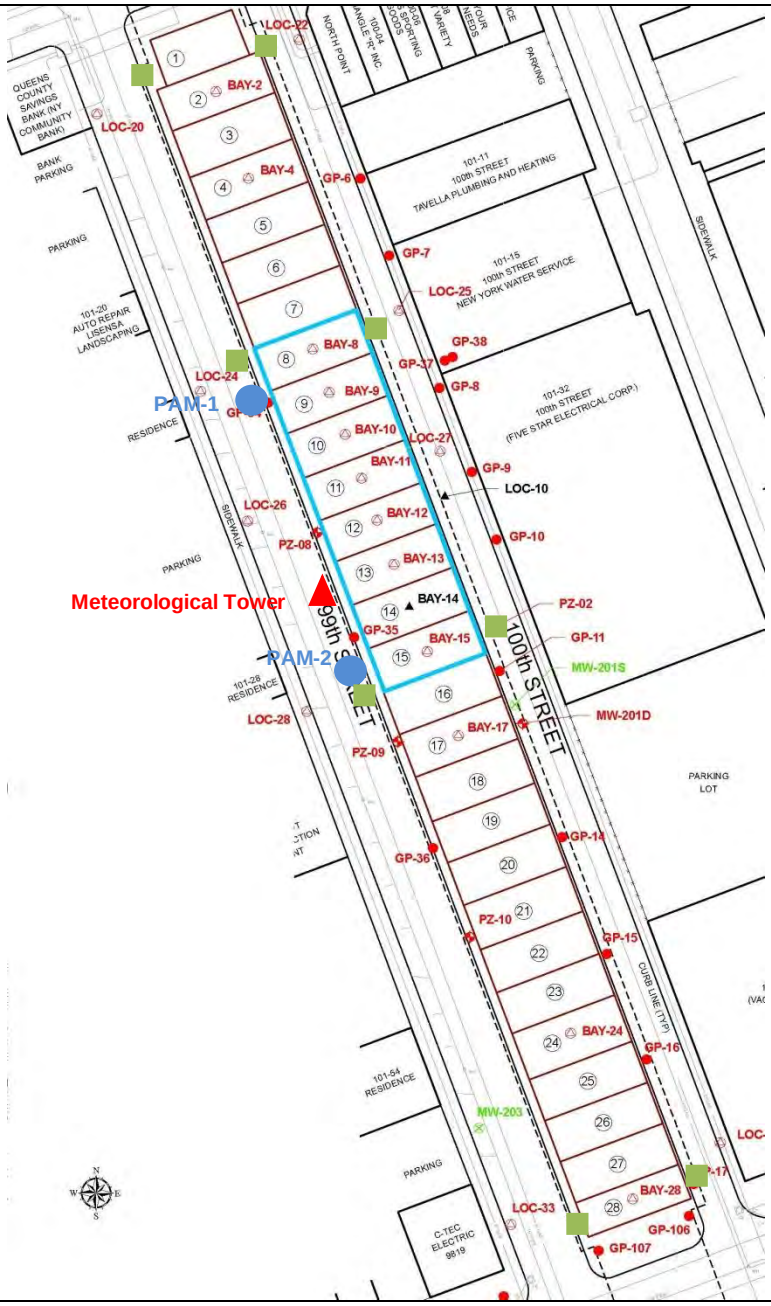


Relative Humidity:



*****Relative humidity sensor failed. Troubleshooting performed July 23, 2013.

Figure 3: Site Map (7/18/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

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Community Air Monitoring Summary

Project:	**Former Ozone Industries, Inc. Site**
Location:	**Ozone Park, Queens, NY**
Report Period:	**July 22 and July 26, 2013 (soil excavation)**
Date	**July 31, 2013**

During the report period (Monday, July 22 through Friday, July 26, 2013) there were no total volatile organic compounds (TVOC) concentrations greater than the Site-specific Action Levels. There was, however, one 15-minute respirable particulate matter (PM_{10}) concentration slightly greater than the Action Level and details are provided herein.

This weekly air monitoring data summary includes both tabular information and written discussions summarizing the ambient air-quality data collected during the report period noted above in accordance with DER-10 Technical Guidance for Site Investigation and Remediation Appendix 1A New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) (DER-10) at the Former Ozone Industries, Inc. Site in Queens, NY. Monitoring and sampling were conducted in accordance with the Site-specific Community Air Monitoring Plan (CAMP), Attachment B of the Remedial Design/Remedial Action Work Plan dated October 2011.

Introduction

In accordance with the CAMP, community air monitoring data was collected continuously and the results were reviewed and compared to NYSDEC/NYSDOH Action Levels. In order to manage the Site more effectively, AECOM has employed a more conservative level (Alert Level) to help mitigate possible fugitive emissions before the Action Levels are reached. The purpose of the Alert Level is to help manage the Site and prevent concentrations from reaching the Action Levels. Engineering controls, dust suppression, and / or odor suppression are used as necessary throughout the daily work activities.

The Alert and Action Levels used at the Site are shown in the following table:

- **Table 1**: Site specific Alert and Action Levels.

Real-Time Air Monitoring Summary – PM_{10} and TVOC

Continuous real-time air monitoring for PM_{10} and TVOC was conducted at two (2) PAM stations along the Bay entrances on 99th Street. PAM stations were located in the vicinity of Bays 8 (PAM-1) and 15 (PAM-2) (at opposite ends of the work zone). The reason for this is because the main entrance to the Bays during the inside work is primarily through Bay 12 on 99th Street, and the Bays will not be accessed from 100th Street. These locations were approved by the NYSDEC. The intent of the real-time air monitoring program during Site activities is to provide early detection of short-term emissions and potential off-Site migration of PM_{10} and TVOCs related to Site activities. The real-time perimeter air monitoring system consists of PAM stations; hand-held PM_{10} and TVOC instruments; a meteorological tower; and a central computer system with an automatic alarm notification system.

During the report period discussed herein there were no TVOC concentrations greater than the Action Levels. There was, however, one 15-minute PM_{10} concentration greater than the Action Level. The results of the real-time air monitoring are presented in the following tables:

- **Table 2**: Weekly real-time maximum15-minute average PM_{10} and TVOC concentrations summary;
- **Table 3**: Real-time 15-minute average concentrations above the Action Levels; and
- **Table 4**: Real-time 15-minute average concentrations above the Alert Levels.

Integrated VOC Sampling Summary

Integrated 8-hour Volatile Organic Compounds (VOC) samples are collected once a week at each PAM station during the ground intrusive phase (soil removal). These samples are submitted to an analytical laboratory for analysis via United States Environmental Protection Agency (USEPA) Method TO-15. Results of the analysis are reported as they are available from the laboratory. Integrated VOC samples were collected on July 23, 2013. The results of the analysis will be included in the weekly summaries as they become available from the laboratory.

Periodic Hand-Held Air Monitoring Summary – PM_{10} and TVOC

Additionally, periodic hand-held and observational monitoring for PM_{10}, TVOC, visible dust, and odor were performed routinely throughout the monitoring days along the Site perimeter and in the vicinity. Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations. The results of the periodic hand-held monitoring are presented in the following tables:

- **Table 5**: Weekly maximum hand-held and observational monitoring summary; and
- **Table 6**: Hand-held concentrations above the Alert and Action Levels.

Meteorological Observations and Site Maps

Additional information related to the air monitoring activities during the report period is included in the following figures:

- **Figure 1**: Weekly wind rose summary;
- **Figure 2**: Weekly meteorological summaries; and
- **Figure 3**: Daily/weekly Site map(s).

Table 1: Site Specific Alert and Action Levels

Target Compounds	Alert Level	Action Level
PM_{10}	> 100 µg/m^3	> 150 µg/m^3
TVOC	> 3.7 ppm	> 5.0 ppm

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million

Table 2: Weekly Real-Time Maximum 15-Minute Average PM_{10} and TVOC Concentrations Summary

	PAM-1 (Bay 8)		PAM-2 (Bay 15)	
	PM_{10} µg/m^3	**TVOC ppm**	**PM_{10} µg/m^3**	**TVOC ppm**
	Maximum 15-Minute Average Concentrations (Action Level: PM_{10} = 150 µg/m^3 / TVOC = 5.0 ppm Alert Level: PM_{10} = 100 µg/m^3 / TVOC = 3.7 ppm)			
Mon 7/22/13	56.6	0.1	92.4	0.1
Tue 7/23/13	67.9	0.2	75.4	0.1
Wed 7/24/13	26.7	0.1	86.4	0.1
Thu 7/25/13	47.1	0.1	153.0	0.1
Fri 7/26/13	42.9	0.1	112.2	0.1

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

- Highlighted concentrations require further analysis (see **Table 3** and **Table 4** for the Action and Alert Concentrations, respectively).
- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 3: Real-Time 15-Minute Average Concentrations above the Action Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Action Limit	Comments/Explanation
Action Level Concentrations (PM_{10} = 150 µg/m³ and TVOC = 5.0 ppm)						
PM_{10}	Thu 7/25/13	9:15AM	PAM-2	NE 1.5 mph	153.0	PM_{10} concentration caused by sweeping activities in the vicinity of PAM-2. The area where clean backfill had been unloaded was being swept generating some visible dust. Sweeping activities were stopped and concentrations quickly dropped below the Alert and Action Levels.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Action Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m³ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 4: Real-Time 15-Minute Average Concentrations above the Alert Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Alert Level	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 µg/m³ and TVOC = 3.7 ppm)						
PM_{10}	Fri 7/26/13	10:45AM	PAM-2	NNE 2.0 mph	100.8	PM_{10} concentration was caused by rock moving activities by the open Bay door. The area was sprayed down with water and concentrations quickly dropped below the Alert Level.
PM_{10}	Fri 7/26/13	4:15PM	PAM-2	WSW 1.5 mph	112.2	PM_{10} concentration was caused by clean dirt moving activities by the open Bay door. The Bay door was closed and concentrations quickly dropped below the Alert Level.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Alert Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m³ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 5: Weekly Maximum Hand-Held and Observational Monitoring Summary

(Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations.)

	Hand-Held Monitoring	
	PM_{10} $\mu g/m^3$	**TVOC ppm**
	Instantaneous Concentrations	
Mon 7/22/13	114	0.0
Tue 7/23/13	115	0.0
Wed 7/24/13	95	0.0
Thu 7/25/13	102	0.0
Fri 7/26/13	108	0.0

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Highlighted concentrations or observations require further analysis (see **Table 6**).
- Hand-held PM_{10} and TVOC data represent the maximum instantaneous concentrations of the readings taken periodically during work activities.

Table 6: Hand-Held Concentrations above the Alert and Action Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Alert and/or Action Levels	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm) & Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	Mon 7/22/13	12:43PM	Bay 15 99th	NW 1.4 mph	114	Hand-held PM_{10} concentration was caused by high regional background concentrations.
PM_{10}	Tue 7/23/13	1:41PM	Bay 8 100th	NW 1.8 mph	115	Hand-held PM_{10} concentration was caused by Bay 10 door being open and active work activities inside the bay. The area was sprayed with water and the bay door was closed.
PM_{10}	Thu 7/25/13	9:00AM	Bay 15 99th	ENE 1.5 mph	102	Hand-held PM_{10} concentration was caused by rock moving activities by Bay 8. The area was sprayed with water.
PM_{10}	Fri 7/26/13	11:15AM	Bay 15 99th	NNE 1.8 mph	108	Hand-held PM_{10} concentration was caused by Bay 15 door being open and active work activities inside the bay. No visible dust was observed.
TVOC	NA	NA	NA	NA	NA	Hand-held TVOC concentrations remained below the Alert and Action Levels.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Hand-held concentrations represent instantaneous concentrations unless otherwise state. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite dust controls operations.

Figure 1: Wind Rose 7/22/13 – 7/26/13 (work hours only)

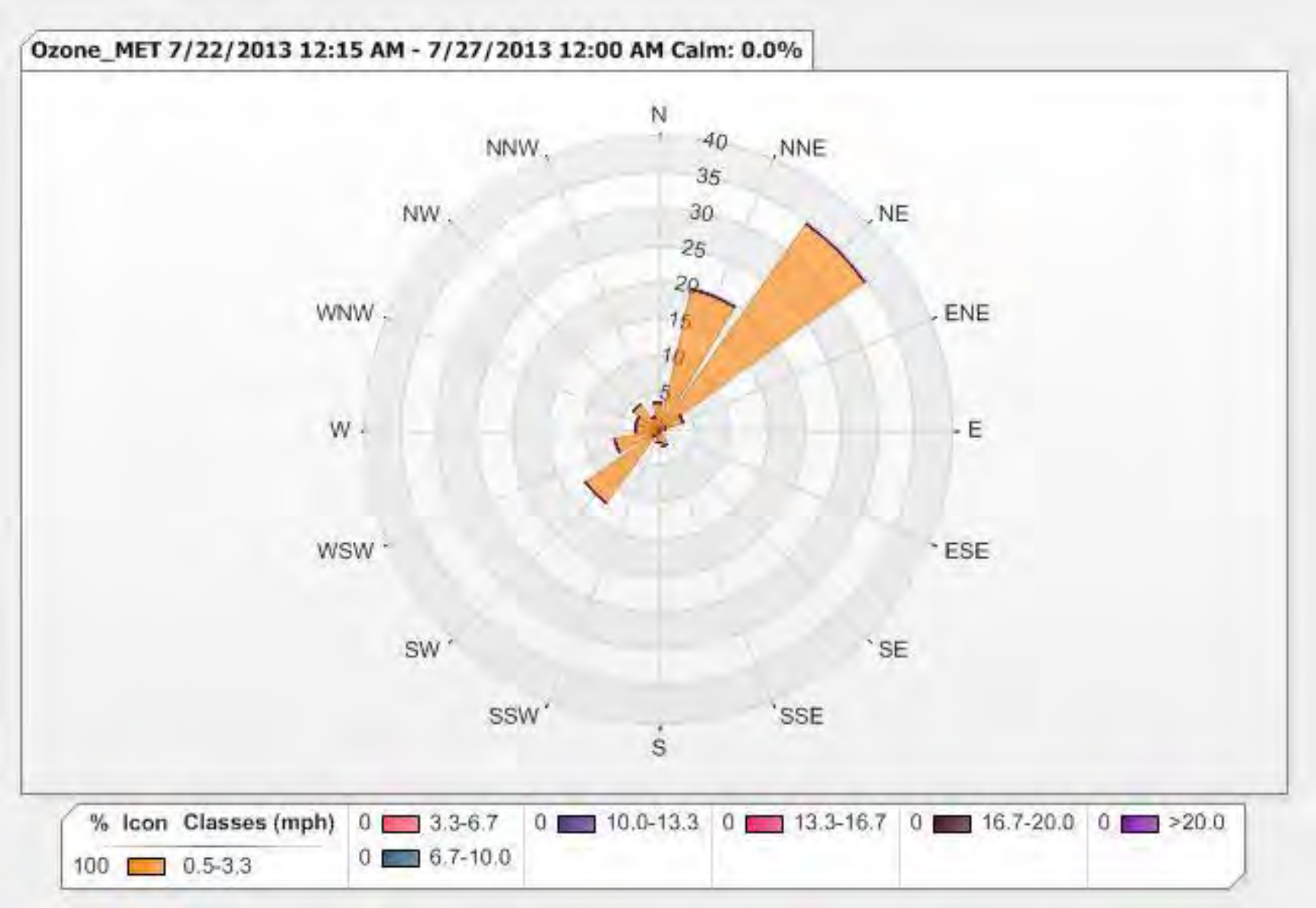
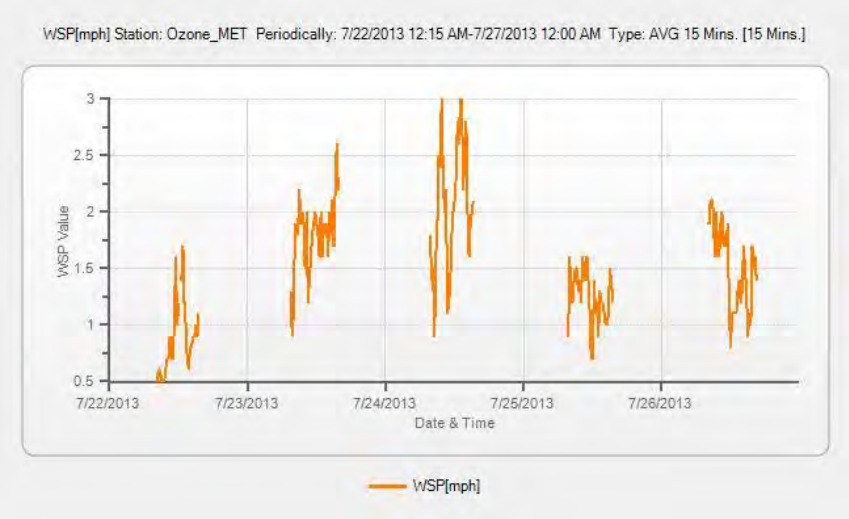
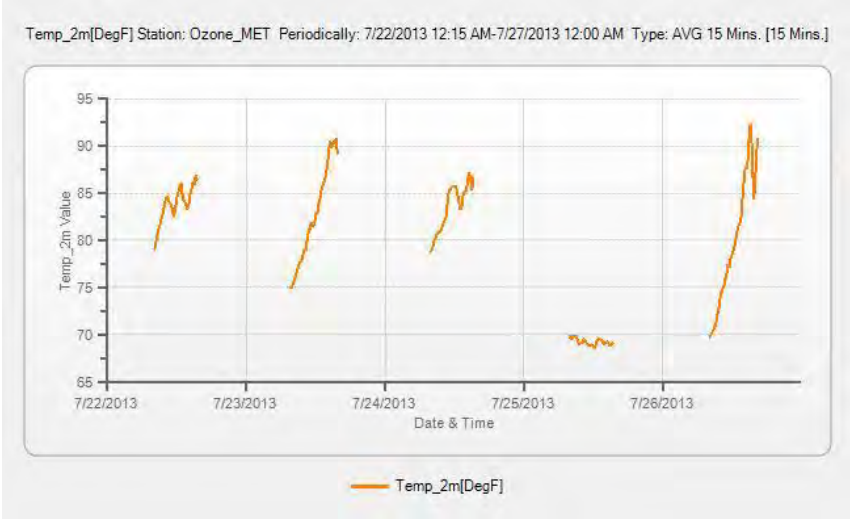


Figure 2: Meteorological Plots 7/22/13 – 7/26/13 (work hours only)

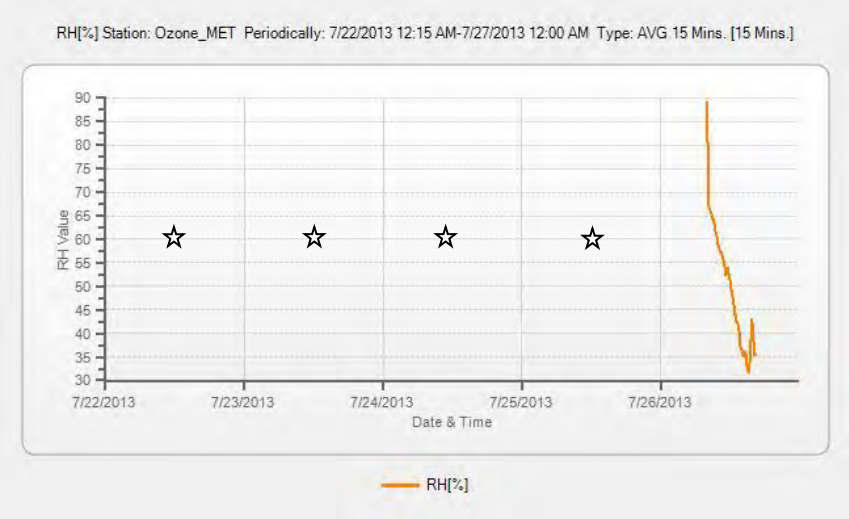
Wind Speed:



Temperature:

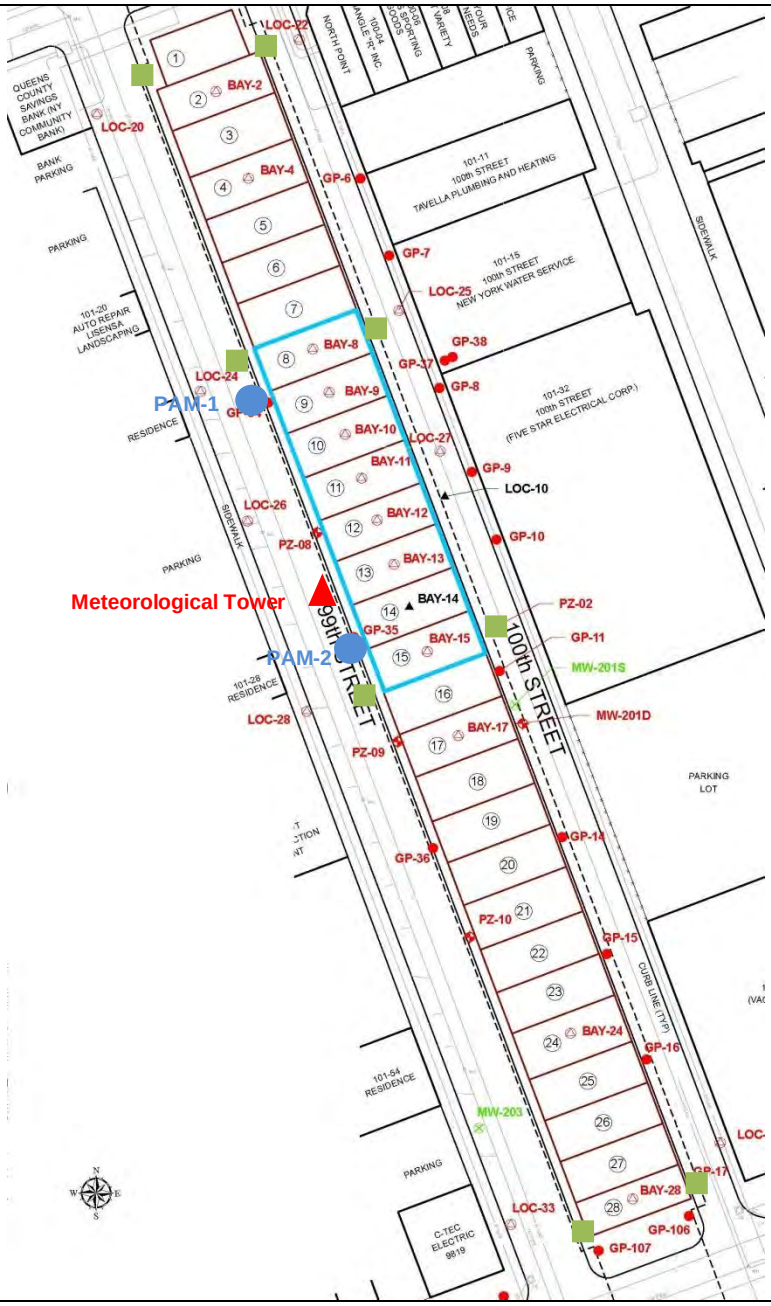


Relative Humidity:



***Relative humidity sensor failed. Troubleshooting performed July 23, 2013.

Figure 3: Site Map (7/22 – 7/26/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

AECOM
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Community Air Monitoring Summary

Project:	**Former Ozone Industries, Inc. Site**
Location:	**Ozone Park, Queens, NY**
Report Period:	**July 29 through August 2, 2013 (soil excavation)**
Date	**August 8, 2013**

During the report period there were no total volatile organic compounds (TVOC) greater than the Site-specific Action Levels. There were, however, short periods of respirable particulate matter (PM_{10}) greater than the Action Levels.

This weekly air monitoring data summary includes both tabular information and written discussions summarizing the ambient air-quality data collected during the report period noted above in accordance with DER-10 Technical Guidance for Site Investigation and Remediation Appendix 1A New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) (DER-10) at the Former Ozone Industries, Inc. Site in Queens, NY. Monitoring and sampling were conducted in accordance with the Site-specific Community Air Monitoring Plan (CAMP), Attachment B of the Remedial Design/Remedial Action Work Plan dated October 2011.

Introduction

In accordance with the CAMP, community air monitoring data was collected continuously and the results were reviewed and compared to NYSDEC/NYSDOH Action Levels. In order to manage the Site more effectively, AECOM has employed a more conservative level (Alert Level) to help mitigate possible fugitive emissions before the Action Levels are reached. The purpose of the Alert Level is to help manage the Site and prevent concentrations from reaching the Action Levels. Engineering controls, dust suppression, and / or odor suppression are used as necessary throughout the daily work activities.

The Alert and Action Levels used at the Site are shown in the following table:

- **Table 1**: Site specific Alert and Action Levels.

Real-Time Air Monitoring Summary – PM_{10} and TVOC

Continuous real-time air monitoring for PM_{10} and TVOC was conducted at two (2) PAM stations along the Bay entrances on 99th Street. PAM stations were located in the vicinity of Bays 8 (PAM-1) and 15 (PAM-2) (at opposite ends of the work zone). The reason for this is because the main entrance to the Bays during the inside work is primarily through Bay 12 on 99th Street, and the Bays will not be accessed from 100th Street. These locations were approved by the NYSDEC. The intent of the real-time air monitoring program during Site activities is to provide early detection of short-term emissions and potential off-Site migration of PM_{10} and TVOCs related to Site activities. The real-time perimeter air monitoring system consists of PAM stations; hand-held PM_{10} and TVOC instruments; a meteorological tower; and a central computer system with an automatic alarm notification system.

During the report period discussed herein there were no TVOC concentrations greater than the Alert and Action Levels. There were, however, short periods of PM_{10} concentrations greater than the Alert and Action Levels. The results of the real-time air monitoring are presented in the following tables:

- **Table 2**: Weekly real-time maximum15-minute average PM_{10} and TVOC concentrations summary;
- **Table 3**: Real-time 15-minute average concentrations above the Action Levels; and
- **Table 4**: Real-time 15-minute average concentrations above the Alert Levels.

Integrated VOC Sampling Summary

Integrated 8-hour Volatile Organic Compounds (VOC) samples were collected on July 31, 2013 during routine excavation. Samples will be collected once a week at each PAM station during the ground intrusive phase (soil removal). These samples will be submitted to an analytical laboratory for analysis via United States Environmental Protection Agency (USEPA) Method TO-15. Results of the analysis will be reported as they are available from the laboratory.

Results of the integrated VOC sampling on July 18, 2013 are included in **Attachment A**. Canisters were collected at each of the PAM stations.

Periodic Hand-held Air Monitoring Summary – PM_{10} and TVOC

Additionally, periodic hand-held and observational monitoring for PM_{10}, TVOC, visible dust, and odor were performed routinely throughout the monitoring days along the Site perimeter and in the vicinity. Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations. The results of the periodic hand-held monitoring are presented in the following tables:

- **Table 5**: Weekly maximum hand-held and observational monitoring summary; and
- **Table 6**: Hand-held concentrations above the Alert and Action Levels.

Meteorological Observations and Site Maps

Additional information related to the air monitoring activities during the report period is included in the following figures:

- **Figure 1**: Weekly wind rose summary;
- **Figure 2**: Weekly meteorological summaries; and
- **Figure 3**: Daily/weekly Site map(s).

Table 1: Site Specific Alert and Action Levels

Target Compounds	Alert Level	Action Level
PM_{10}	> 100 µg/m^3	> 150 µg/m^3
TVOC	> 3.7 ppm	> 5.0 ppm

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million

Table 2: Weekly Real-Time Maximum 15-Minute Average PM_{10} and TVOC Concentrations Summary

	PAM-1 (Bay 8)		PAM-2 (Bay 15)	
	PM_{10} µg/m^3	**TVOC ppm**	**PM_{10} µg/m^3**	**TVOC ppm**
	Maximum 15-Minute Average Concentrations (Action Level: PM_{10} = 150 µg/m^3 / TVOC = 5.0 ppm Alert Level: PM_{10} = 100 µg/m^3 / TVOC = 3.7 ppm)			
Mon 7/29/13	54.6	0.1	96.7	0.2
Tue 7/30/13	19.1	0.1	176.6	0.1
Wed 7/31/13	106.2	0.2	218.3	0.2
Thu 8/1/13	78.8	0.3	173.7	0.3
Fri 8/2/13	20.6	0.1	95.7	0.1

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

- Highlighted concentrations require further analysis (see **Table 3** and **Table 4** for the Action and Alert Concentrations, respectively).
- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 3: Real-Time 15-Minute Average Concentrations above the Action Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Action Limit	Comments/Explanation
Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	Tue 7/30/13	8:30AM 8:45AM	PAM-2	ENE 1.7 mph ENE 2.0 mph	176.6 170.7	PM_{10} concentrations most likely caused by rock moving activities inside Bay 15. The area was sprayed down and the garage bay door was closed to reduce the potential for fugitive dust.
PM_{10}	Wed 7/31/13	1:15PM 1:30PM 2:15PM	PAM-2	WNW 1.4 mph W 1.7 mph W 2.4 mph	154.2 218.3 200.8	PM_{10} concentrations most likely caused by rock moving activities inside Bay 14. The area was sprayed down to reduce the potential for fugitive dust.
PM_{10}	Thu 8/1/13	11:30AM	PAM-2	W 1.8 mph	173.7	PM_{10} concentration most likely caused by a combination of rock moving activities inside Bay 15 and dust from Bay 14 and 15 blowing around. The areas were sprayed down to reduce the potential for fugitive dust.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Action Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 4: Real-Time 15-Minute Average Concentrations above the Alert Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Alert Level	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm)						
PM_{10}	Wed 7/31/13	3:00PM	PAM-1	W 1.7 mph	106.2	PM_{10} concentration caused by sidewalk sweeping. Activity stopped to reduce potential for fugitive dust.
PM_{10}	Thu 8/1/13	11:15AM 11:45AM	PAM-2	W 1.9 mph NW 1.6 mph	104.6 148.4	PM_{10} concentrations most likely caused by a combination of rock moving activities inside Bay 15 and dust from Bay 14 and 15 blowing around. The areas were sprayed down to reduce the potential for fugitive dust.
PM_{10}	Thu 8/1/13	1:00PM	PAM-2	W 2.4 mph	109.0	PM_{10} concentration most likely caused by excavation inside Bay 15. The area of excavation was sprayed down and concentrations quickly dropped below the Alert Level.
PM_{10}	Thu 8/1/13	4:00PM	PAM-2	WNW 0.8 mph	103.0	PM_{10} concentration most likely caused by backfilling moving activities. No actions required because concentrations dropped below the Alert Level.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Alert Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 5: Weekly Maximum Hand-Held and Observational Monitoring Summary

(Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations.)

	Hand-Held Monitoring	
	PM_{10} $\mu g/m^3$	**TVOC ppm**
	Instantaneous Concentrations	
Mon 7/29/13	79	0.0
Tue 7/30/13	121	0.0
Wed 7/31/13	115	0.0
Thu 8/1/13	94	0.9
Fri 8/2/13	88	0.1

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Highlighted concentrations or observations require further analysis (see **Table 6**). None for this reporting period.
- Hand-held PM_{10} and TVOC data represent the maximum instantaneous concentrations of the readings taken periodically during work activities.

Table 6: Hand-Held Concentrations above the Alert and Action Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Alert and/or Action Levels	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm) & Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	Tue 7/30/13	1:29PM	Bay 15 99th	W 2.6 mph	121	Hand-held PM_{10} concentration most likely caused by activities inside Bay 15 (moving bags of cement).
PM_{10}	Wed 7/31/13	10:26AM	Bay 15 99th	ESE 1.0 mph	115	Hand-held PM_{10} concentration most likely caused by activities across the street (moving cinder blocks across the street).
TVOC	NA	NA	NA	NA	NA	Hand-held TVOC concentrations remained below the Alert and Action Levels.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Hand-held concentrations represent instantaneous concentrations unless otherwise state. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite dust controls operations.

Figure 1: Wind Rose 7/29/13 – 8/2/13 (work hours only)

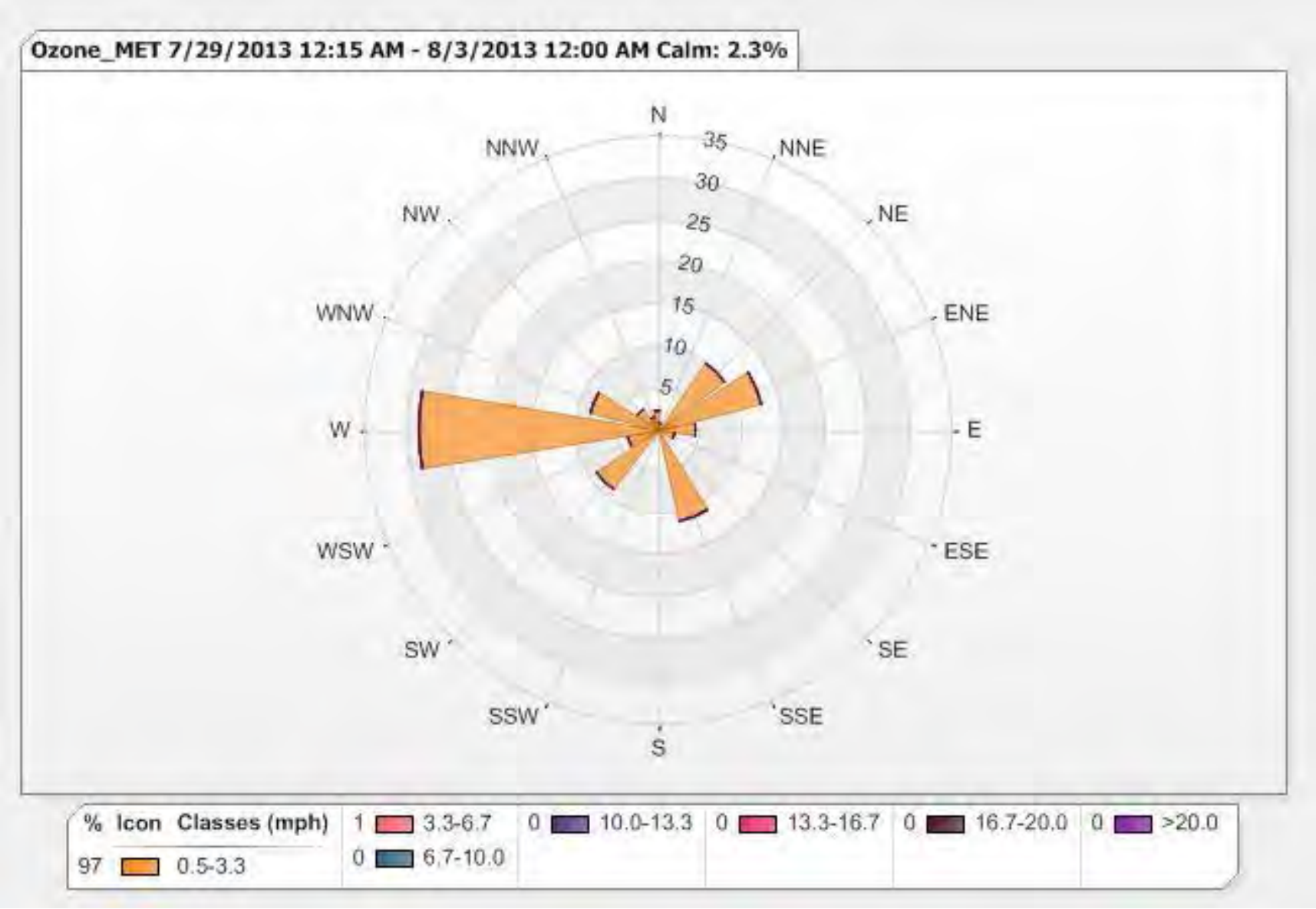
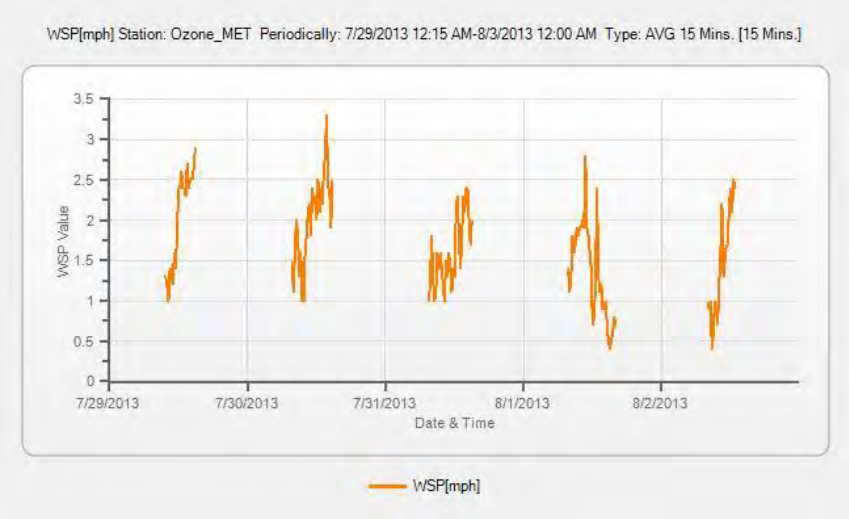
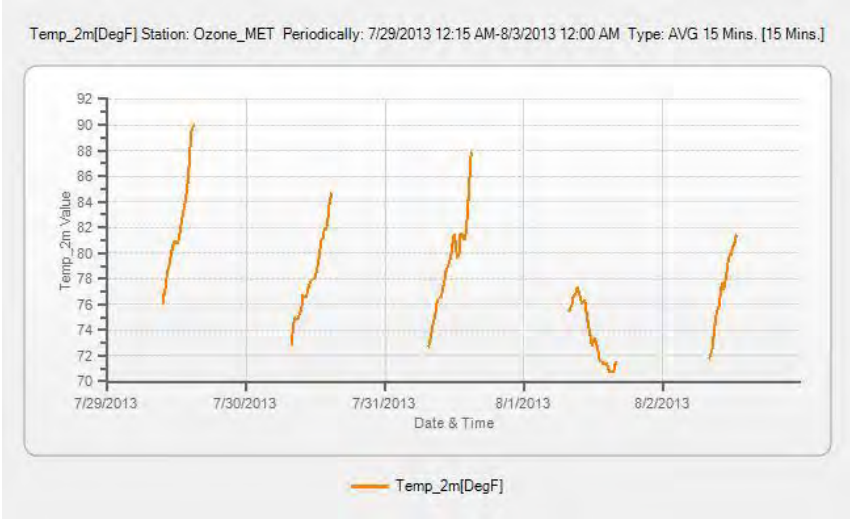


Figure 2: Meteorological Plots 7/29/13 – 8/2/13 (work hours only)

Wind Speed:



Temperature:



Relative Humidity:

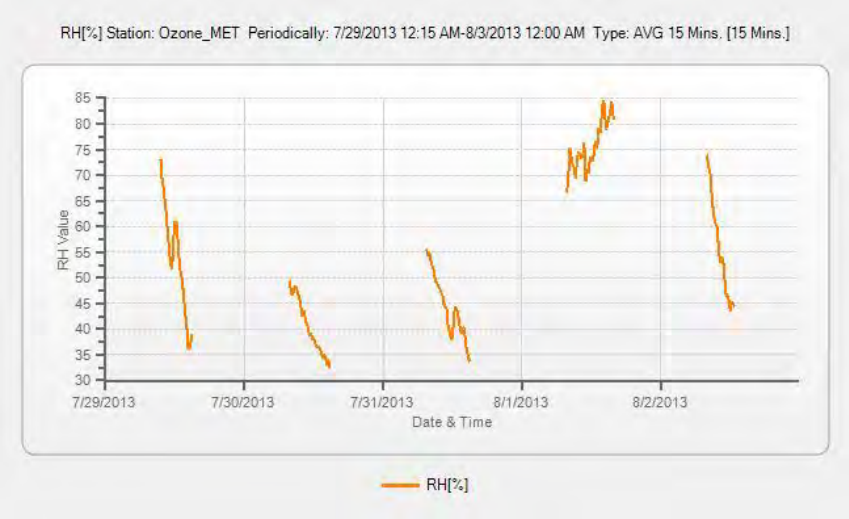
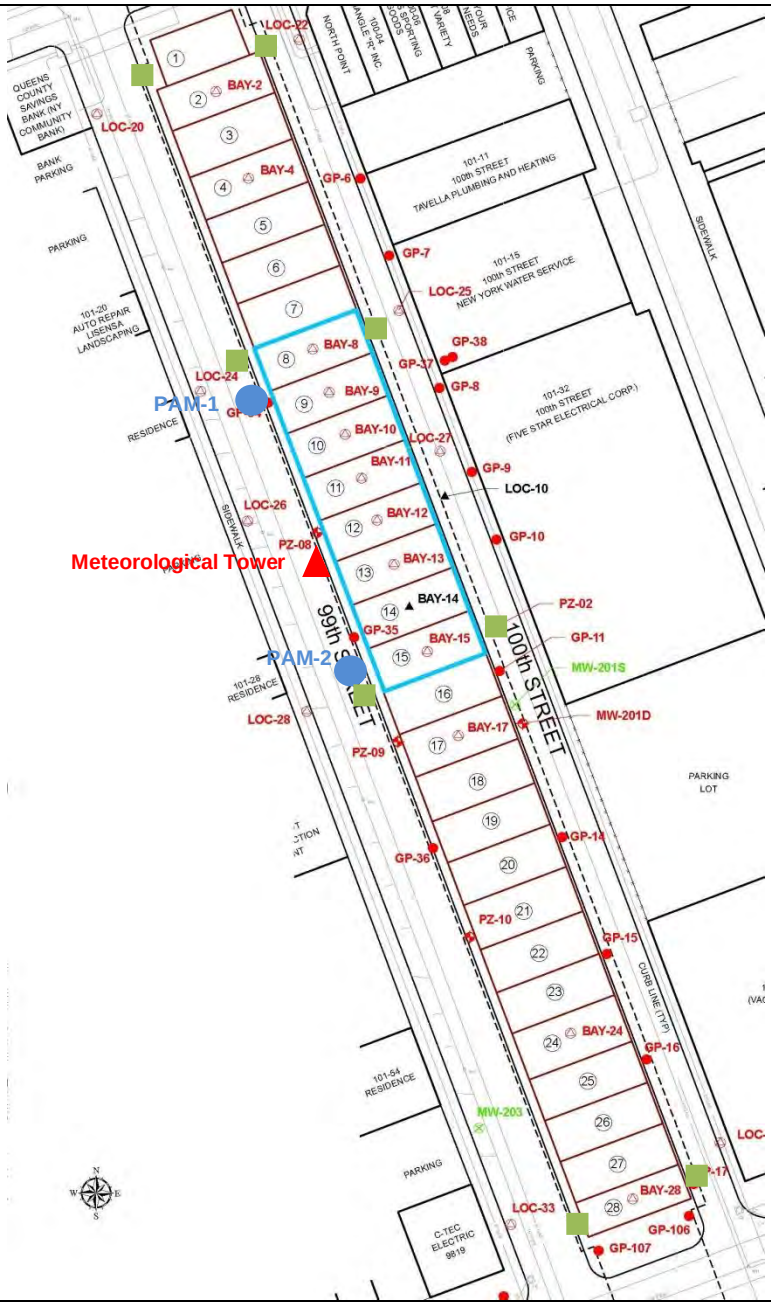


Figure 3: Site Map (7/29 – 8/2/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

Attachment A

Integrated 8-Hour VOC Results

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Community Air Monitoring Summary

Project:	**Former Ozone Industries, Inc. Site**
Location:	**Ozone Park, Queens, NY**
Report Period:	**August 5 through August 9, 2013 (soil excavation)**
Date	**August 16, 2013**

During the report period there were no total volatile organic compounds (TVOC) greater than the Site-specific Action Levels. There were, however, short periods of respirable particulate matter (PM_{10}) greater than the Action Levels.

This weekly air monitoring data summary includes both tabular information and written discussions summarizing the ambient air-quality data collected during the report period noted above in accordance with DER-10 Technical Guidance for Site Investigation and Remediation Appendix 1A New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) (DER-10) at the Former Ozone Industries, Inc. Site in Queens, NY. Monitoring and sampling were conducted in accordance with the Site-specific Community Air Monitoring Plan (CAMP), Attachment B of the Remedial Design/Remedial Action Work Plan dated October 2011.

Introduction

In accordance with the CAMP, community air monitoring data was collected continuously and the results were reviewed and compared to NYSDEC/NYSDOH Action Levels. In order to manage the Site more effectively, AECOM has employed a more conservative level (Alert Level) to help mitigate possible fugitive emissions before the Action Levels are reached. The purpose of the Alert Level is to help manage the Site and prevent concentrations from reaching the Action Levels. Engineering controls, dust suppression, and / or odor suppression are used as necessary throughout the daily work activities.

The Alert and Action Levels used at the Site are shown in the following table:

- **Table 1**: Site specific Alert and Action Levels.

Real-Time Air Monitoring Summary – PM_{10} and TVOC

Continuous real-time air monitoring for PM_{10} and TVOC was conducted at two (2) PAM stations along the Bay entrances on 99th Street. PAM stations were located in the vicinity of Bays 8 (PAM-1) and 15 (PAM-2) (at opposite ends of the work zone). The reason for this is because the main entrance to the Bays during the inside work is primarily through Bay 12 on 99th Street, and the Bays will not be accessed from 100th Street. These locations were approved by the NYSDEC. The intent of the real-time air monitoring program during Site activities is to provide early detection of short-term emissions and potential off-Site migration of PM_{10} and TVOCs related to Site activities. The real-time perimeter air monitoring system consists of PAM stations; hand-held PM_{10} and TVOC instruments; a meteorological tower; and a central computer system with an automatic alarm notification system.

During the report period discussed herein there were no TVOC concentrations greater than the Alert and Action Levels. There were, however, short periods of PM_{10} concentrations greater than the Alert and Action Levels. The results of the real-time air monitoring are presented in the following tables:

- **Table 2**: Weekly real-time maximum15-minute average PM_{10} and TVOC concentrations summary;
- **Table 3**: Real-time 15-minute average concentrations above the Action Levels; and
- **Table 4**: Real-time 15-minute average concentrations above the Alert Levels.

Integrated VOC Sampling Summary

Integrated 8-hour Volatile Organic Compounds (VOC) samples were collected on August 8, 2013 during routine excavation. Samples will be collected once a week at each PAM station during the ground intrusive phase (soil removal). These samples will be submitted to an analytical laboratory for analysis via United States Environmental Protection Agency (USEPA) Method TO-15. Results of the analysis will be reported as they are available from the laboratory.

Results of the integrated VOC sampling on July 23, 2013 and July 31, 2013 are included in **Attachment A**. Canisters were collected at each of the PAM stations with a collocated sample collected on July 23, 2013 at the PAM-1 (Bay 8) sampling location.

Periodic Hand-held Air Monitoring Summary – PM_{10} and TVOC

Additionally, periodic hand-held and observational monitoring for PM_{10}, TVOC, visible dust, and odor were performed routinely throughout the monitoring days along the Site perimeter and in the vicinity. Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations. The results of the periodic hand-held monitoring are presented in the following tables:

- **Table 5**: Weekly maximum hand-held and observational monitoring summary; and
- **Table 6**: Hand-held concentrations above the Alert and Action Levels.

Meteorological Observations and Site Maps

Additional information related to the air monitoring activities during the report period is included in the following figures:

- **Figure 1**: Weekly wind rose summary;
- **Figure 2**: Weekly meteorological summaries; and
- **Figure 3**: Daily/weekly Site map(s).

Table 1: Site Specific Alert and Action Levels

Target Compounds	Alert Level	Action Level
PM_{10}	> 100 µg/m^3	> 150 µg/m^3
TVOC	> 3.7 ppm	> 5.0 ppm

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million

Table 2: Weekly Real-Time Maximum 15-Minute Average PM_{10} and TVOC Concentrations Summary

	PAM-1 (Bay 8)		PAM-2 (Bay 15)	
	PM_{10} µg/m^3	**TVOC ppm**	**PM_{10} µg/m^3**	**TVOC ppm**
	Maximum 15-Minute Average Concentrations (Action Level: PM_{10} = 150 µg/m^3 / TVOC = 5.0 ppm Alert Level: PM_{10} = 100 µg/m^3 / TVOC = 3.7 ppm)			
Mon 8/5/13	18.0	0.1	107.0	0.1
Tue 8/6/13	105.9	0.1	217.2	0.1
Wed 8/7/13	71.7	0.1	129.1	0.1
Thu 8/8/13	102.7	0.1	162.1	0.1
Fri 8/9/13	61.5	0.1	179.4	0.1

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

- Highlighted concentrations require further analysis (see **Table 3** and **Table 4** for the Action and Alert Concentrations, respectively).
- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 3: Real-Time 15-Minute Average Concentrations above the Action Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Action Limit	Comments/Explanation
Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	Tue 8/6/13	11:30AM 11:45AM 12:00PM	PAM-2	W 2.0 mph W 1.8 mph WSW 1.9 mph	186.7 168.2 217.2	PM_{10} concentrations were caused by a combination of compaction activities in Bay 15 and excavation activities in Bay 14. The area was sprayed with water and concentrations fell below the Alert and Action Levels.
PM_{10}	Thu 8/8/13	11:00AM 11:30AM	PAM-2	W 0.7 mph WSW 0.5 mph	153.7 162.1	PM_{10} concentrations were caused by a combination of compaction activities in Bay 14 and excavation activities in Bay 13. Work stopped and the area was sprayed with water. Concentrations fell below the Alert and Action Levels.
PM_{10}	Fri 8/9/13	1:45PM	PAM-2	W 2.2 mph	179.4	PM_{10} concentration was caused by a combination of excavation activities in Bay 13 and offsite sand moving activities. Onsite work was stopped and concentrations fell below the Alert and Action Levels.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Action Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 4: Real-Time 15-Minute Average Concentrations above the Alert Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Alert Level	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm)						
PM_{10}	Mon 8/5/13	2:00PM	PAM-2	ESE 2.2 mph	107.0	PM_{10} concentration caused by digging activities adjacent to Bay 15 door. The area was sprayed with water and concentrations quickly dropped below the Alert Level.
PM_{10}	Tue 8/6/13	4:00PM	PAM-1	WSW 2.3 mph	105.9	PM_{10} concentration caused by dusty conditions surrounding the backfill pile near Bay 8. The area was sprayed with water and concentrations quickly dropped below the Alert Level.
PM_{10}	Wed 8/7/13	12:30PM 12:45PM	PAM-2	WSW 1.5 mph W 1.5 mph	123.1 121.2	PM_{10} concentrations caused by excavation activities in Bay 14. The area was sprayed with water and concentrations quickly dropped below the Alert Level.
PM_{10}	Wed 8/7/13	3:30PM 3:45PM 4:30PM 4:45PM	PAM-2	WSW 1.6 mph W 1.8 mph WSW 1.6 mph W 1.8 mph	128.0 125.7 125.5 129.1	PM_{10} concentrations caused by excavation activities in Bay 14. The area was sprayed with water.
PM_{10}	Thu 8/8/13	8:45AM 9:15AM 10:30AM	PAM-2	W 1.3 mph W 0.8 mph WNW 1.0 mph	128.8 104.0 108.1	PM_{10} concentrations caused by loading backfill into Bay 14. The area was sprayed with water and concentrations quickly dropped below the Alert Level.
PM_{10}	Thu 8/8/13	11:15AM	PAM-1 PAM-2	WSW 0.7 mph	102.7 149.9	PM_{10} concentrations were caused by a combination of compaction activities in Bay 14 and excavation activities in Bay 13. Work stopped and the area was sprayed with water. Concentrations fell below the Alert Level.
PM_{10}	Fri 8/9/13	11:45AM	PAM-2	W 2.6 mph	103.4	PM_{10} concentration was caused by loading soil into truck. The bay doors were closed during this period with little air flow. Concentrations quickly fell below the Alert Level.
PM_{10}	Fri 8/9/13	1:15PM 1:30PM	PAM-2	W 2.8 mph W 2.1 mph	101.3 117.1	PM10 concentrations were caused by a combination of excavation activities in Bay 13 and high background concentrations (caused by regional weather conditions). The area was sprayed with water and concentrations fell below the Alert Level.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Alert Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 5: Weekly Maximum Hand-Held and Observational Monitoring Summary

(Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations.)

	Hand-Held Monitoring	
	PM_{10} $\mu g/m^3$	**TVOC ppm**
	Instantaneous Concentrations	
Mon 8/5/13	44	0.0
Tue 8/6/13	104	0.1
Wed 8/7/13	88	0.0
Thu 8/8/13	140	3.2
Fri 8/9/13	79	0.0

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Highlighted concentrations or observations require further analysis (see **Table 6**). None for this reporting period.
- Hand-held PM_{10} and TVOC data represent the maximum instantaneous concentrations of the readings taken periodically during work activities.

Table 6: Hand-Held Concentrations above the Alert and Action Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Alert and/or Action Levels	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 µg/m³ and TVOC = 3.7 ppm) & Action Level Concentrations (PM_{10} = 150 µg/m³ and TVOC = 5.0 ppm)						
PM_{10}	Tue 8/6/13	3:30PM	Bay 8 99th	WSW 2.1 mph	104	Hand-held PM_{10} concentration was caused by moving clean backfill near Bay 8. The area was sprayed with water and concentrations dropped below the Alert Level.
PM_{10}	Thu 8/8/13	1:34PM 1:36PM	Bay 8 100th Bay 15 100th	W 1.0 mph	140 122	Hand-held PM_{10} concentrations were caused by work activities in Bay 14. The area was sprayed with water and the door was closed. Concentrations dropped below the Alert Level.
TVOC	NA	NA	NA	NA	NA	Hand-held TVOC concentrations remained below the Alert and Action Levels.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m³ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Hand-held concentrations represent instantaneous concentrations unless otherwise state. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite dust controls operations.

Figure 1: Wind Rose 8/5/13 – 8/9/13 (work hours only)

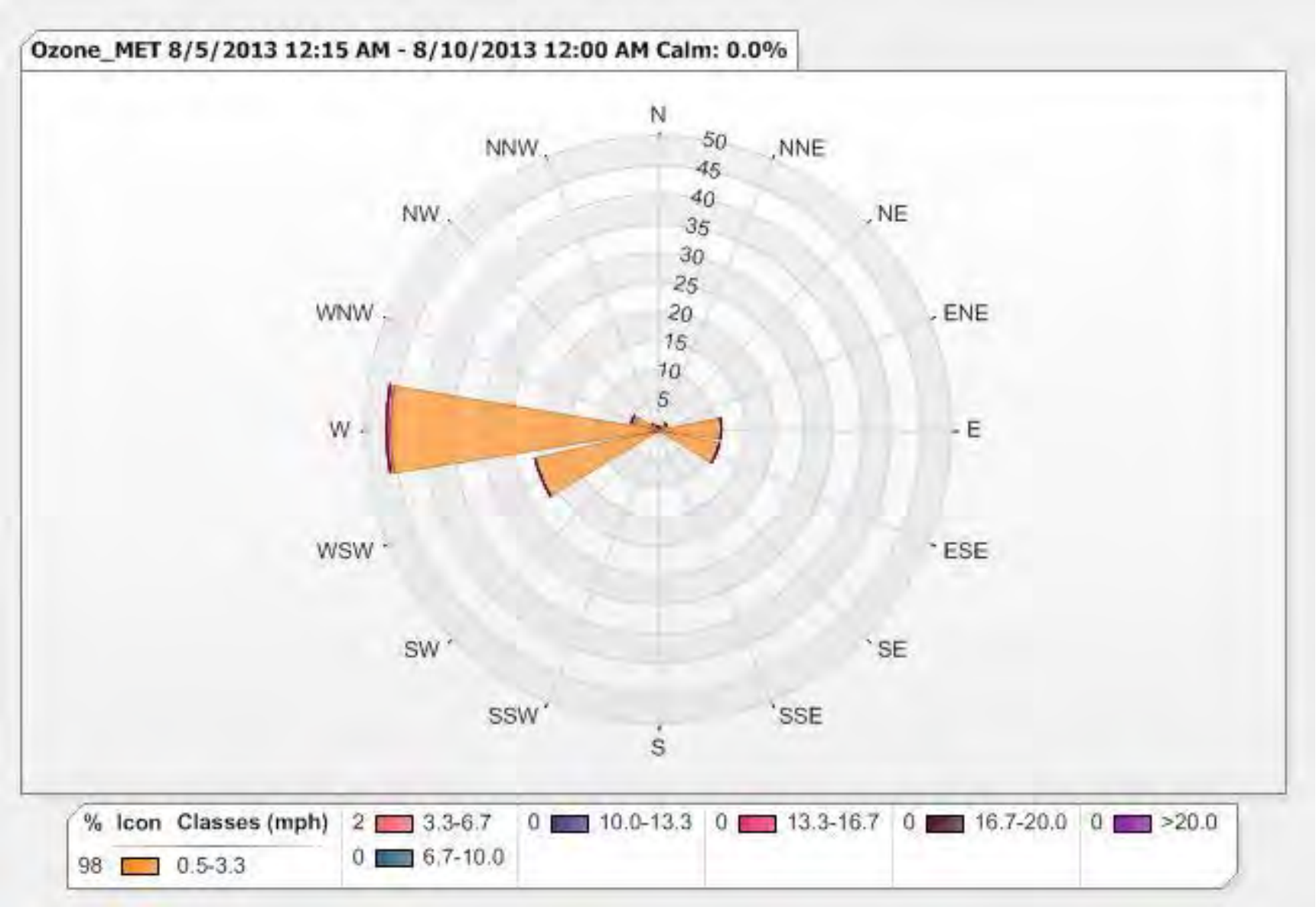
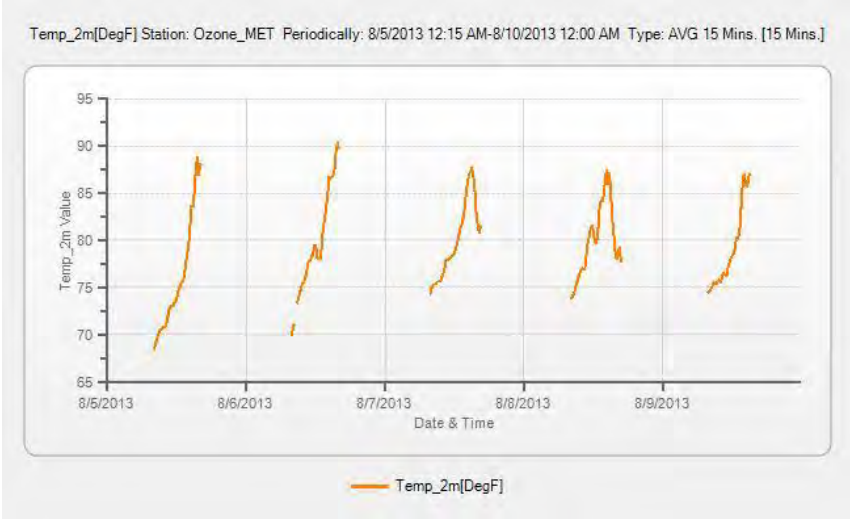


Figure 2: Meteorological Plots 8/5/13 – 8/9/13 (work hours only)

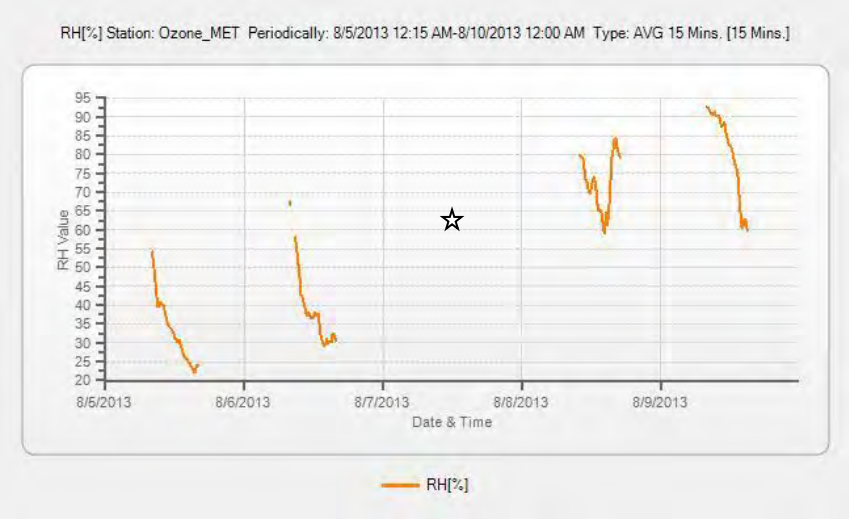
Wind Speed:



Temperature:

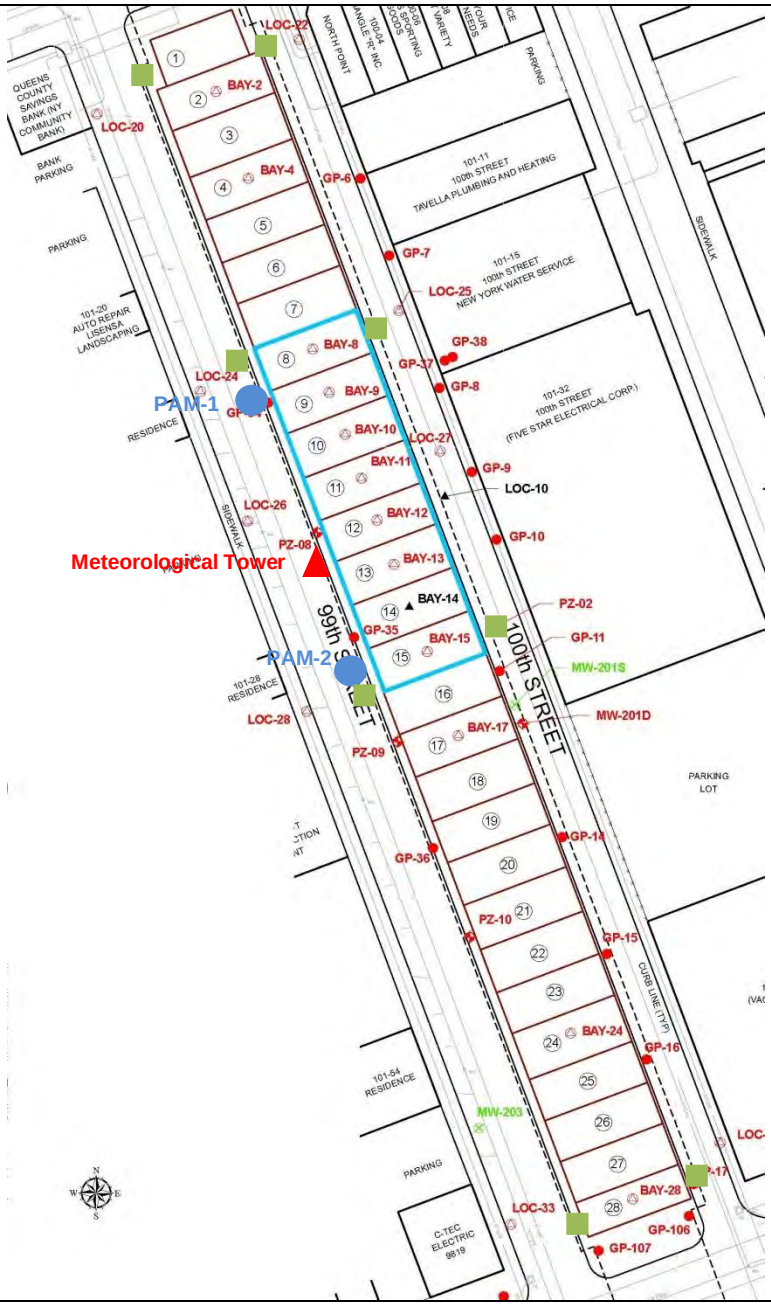


Relative Humidity:



*Relative Humidity invalid because of a sensor connection issue.

Figure 3: Site Map (8/5/13 – 8/9/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

Attachment A

Integrated 8-Hour VOC Results

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Community Air Monitoring Summary

Project:	**Former Ozone Industries, Inc. Site**
Location:	**Ozone Park, Queens, NY**
Report Period:	**August 12 through August 16, 2013 (soil excavation)**
Date	**August 26, 2013**

During the report period there were no total volatile organic compounds (TVOC) greater than the Site-specific Action Levels. There were, however, short periods of respirable particulate matter (PM_{10}) greater than the Action Levels.

This weekly air monitoring data summary includes both tabular information and written discussions summarizing the ambient air-quality data collected during the report period noted above in accordance with DER-10 Technical Guidance for Site Investigation and Remediation Appendix 1A New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) (DER-10) at the Former Ozone Industries, Inc. Site in Queens, NY. Monitoring and sampling were conducted in accordance with the Site-specific Community Air Monitoring Plan (CAMP), Attachment B of the Remedial Design/Remedial Action Work Plan dated October 2011.

Introduction

In accordance with the CAMP, community air monitoring data was collected continuously and the results were reviewed and compared to NYSDEC/NYSDOH Action Levels. In order to manage the Site more effectively, AECOM has employed a more conservative level (Alert Level) to help mitigate possible fugitive emissions before the Action Levels are reached. The purpose of the Alert Level is to help manage the Site and prevent concentrations from reaching the Action Levels. Engineering controls, dust suppression, and / or odor suppression are used as necessary throughout the daily work activities.

The Alert and Action Levels used at the Site are shown in the following table:

- **Table 1**: Site specific Alert and Action Levels.

Real-Time Air Monitoring Summary – PM_{10} and TVOC

Continuous real-time air monitoring for PM_{10} and TVOC was conducted at two (2) PAM stations along the Bay entrances on 99th Street. PAM stations were located in the vicinity of Bays 8 (PAM-1) and 15 (PAM-2) (at opposite ends of the work zone). The reason for this is because the main entrance to the Bays during the inside work is primarily through Bay 12 on 99th Street, and the Bays will not be accessed from 100th Street. These locations were approved by the NYSDEC. The intent of the real-time air monitoring program during Site activities is to provide early detection of short-term emissions and potential off-Site migration of PM_{10} and TVOCs related to Site activities. The real-time perimeter air monitoring system consists of PAM stations; hand-held PM_{10} and TVOC instruments; a meteorological tower; and a central computer system with an automatic alarm notification system.

During the report period discussed herein there were no TVOC concentrations greater than the Alert and Action Levels. There were, however, short periods of PM_{10} concentrations greater than the Alert and Action Levels. The results of the real-time air monitoring are presented in the following tables:

- **Table 2**: Weekly real-time maximum15-minute average PM_{10} and TVOC concentrations summary;
- **Table 3**: Real-time 15-minute average concentrations above the Action Levels; and
- **Table 4**: Real-time 15-minute average concentrations above the Alert Levels.

Integrated VOC Sampling Summary

Integrated 8-hour Volatile Organic Compounds (VOC) samples were collected on August 15, 2013 during routine excavation. Samples will be collected once a week at each PAM station during the ground intrusive phase (soil removal and drilling). These samples will be submitted to an analytical laboratory for analysis via United States Environmental Protection Agency (USEPA) Method TO-15. Results of the analysis will be reported as they are available from the laboratory.

Periodic Hand-held Air Monitoring Summary – PM_{10} and TVOC

Additionally, periodic hand-held and observational monitoring for PM_{10}, TVOC, visible dust, and odor were performed routinely throughout the monitoring days along the Site perimeter and in the vicinity. Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations. The results of the periodic hand-held monitoring are presented in the following tables:

- **Table 5**: Weekly maximum hand-held and observational monitoring summary; and
- **Table 6**: Hand-held concentrations above the Alert and Action Levels.

Meteorological Observations and Site Maps

Additional information related to the air monitoring activities during the report period is included in the following figures:

- **Figure 1**: Weekly wind rose summary;
- **Figure 2**: Weekly meteorological summaries; and
- **Figure 3**: Daily/weekly Site map(s).

Table 1: Site Specific Alert and Action Levels

Target Compounds	Alert Level	Action Level
PM_{10}	> 100 µg/m^3	> 150 µg/m^3
TVOC	> 3.7 ppm	> 5.0 ppm

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million

Table 2: Weekly Real-Time Maximum 15-Minute Average PM_{10} and TVOC Concentrations Summary

	PAM-1 (Bay 8)		PAM-2 (Bay 15)	
	PM_{10} µg/m^3	**TVOC ppm**	**PM_{10} µg/m^3**	**TVOC ppm**
	Maximum 15-Minute Average Concentrations (Action Level: PM_{10} = 150 µg/m^3 / TVOC = 5.0 ppm Alert Level: PM_{10} = 100 µg/m^3 / TVOC = 3.7 ppm)			
Mon 8/12/13	155.1	0.1	83.3	0.1
Tue 8/13/13	87.8	0.1	123.9	0.1
Wed 8/14/13	17.7	0.1	61.8	0.1
Thu 8/15/13	50.9	0.2	90.1	0.5
Fri 8/16/13	54.7	0.1	68.2	0.1

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

- Highlighted concentrations require further analysis (see **Table 3** and **Table 4** for the Action and Alert Concentrations, respectively).
- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 3: Real-Time 15-Minute Average Concentrations above the Action Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Action Limit	Comments/Explanation
Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	Mon 8/12/13	2:00PM	PAM-1	SSW 0.7 mph	155.1	The PM_{10} concentration was most likely caused by shoveling backfill material in the vicinity of PAM-1. Once shoveling was complete, concentrations fell below the Alert and Action Level.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Action Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 4: Real-Time 15-Minute Average Concentrations above the Alert Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Alert Level	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm)						
PM_{10}	Tue 8/13/13	8:30AM 8:45AM	PAM-2	WSW 0.5 mph W 0.6 mph	107.3 123.9	PM_{10} concentrations were most likely caused by a combination of onsite truck traffic, excavation activities and load out activities in close proximity to PAM-2. The area was sprayed with water and concentrations quickly dropped below the Alert Level.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Alert Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 5: Weekly Maximum Hand-Held and Observational Monitoring Summary

(Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations.)

	Hand-Held Monitoring	
	PM_{10} µg/m³	**TVOC ppm**
	Instantaneous Concentrations	
Mon 8/12/13	80	0.0
Tue 8/13/13	115	0.0
Wed 8/14/13	93	0.0
Thu 8/15/13	65	0.0
Fri 8/16/13	76	0.0

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m³ = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Highlighted concentrations or observations require further analysis (see **Table 6**).
- Hand-held PM_{10} and TVOC data represent the maximum instantaneous concentrations of the readings taken periodically during work activities.

Table 6: Hand-Held Concentrations above the Alert and Action Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Alert and/or Action Levels	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm) & Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	Tue 8/13/13	10:30AM	Bay 15 99th	ESE 0.5 mph	115	Hand-held PM_{10} concentration most likely caused by moving and load out of soils. Concentrations quickly dropped below the Alert Level.
TVOC	NA	NA	NA	NA	NA	Hand-held TVOC concentrations remained below the Alert and Action Levels.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Hand-held concentrations represent instantaneous concentrations unless otherwise state. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite dust controls operations.

Figure 1: Wind Rose 8/12/13 – 8/16/13 (work hours only)

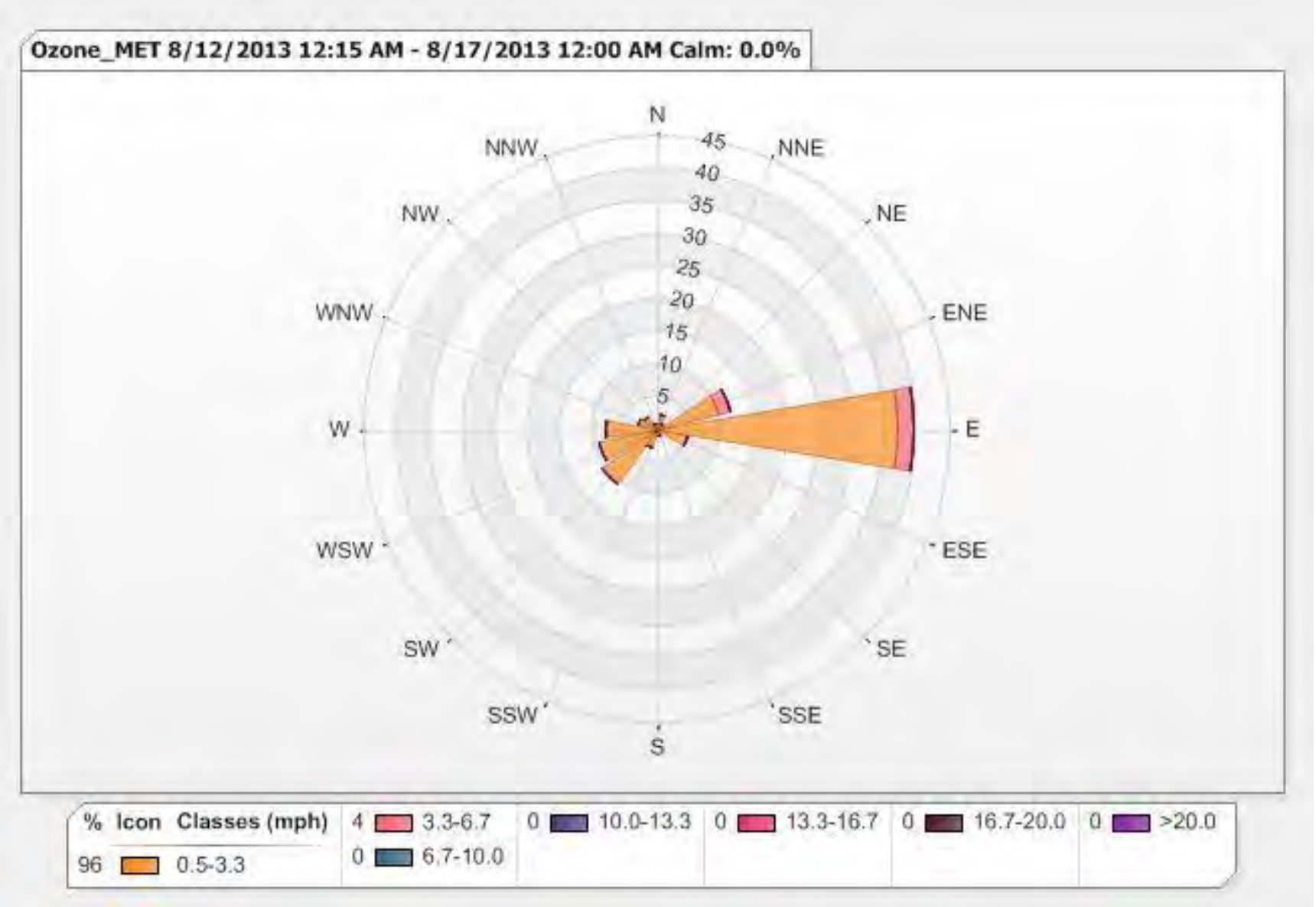
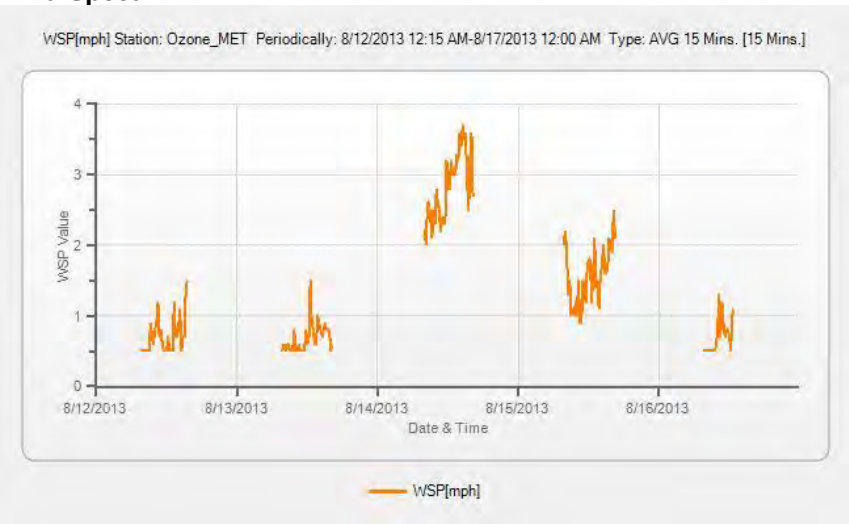
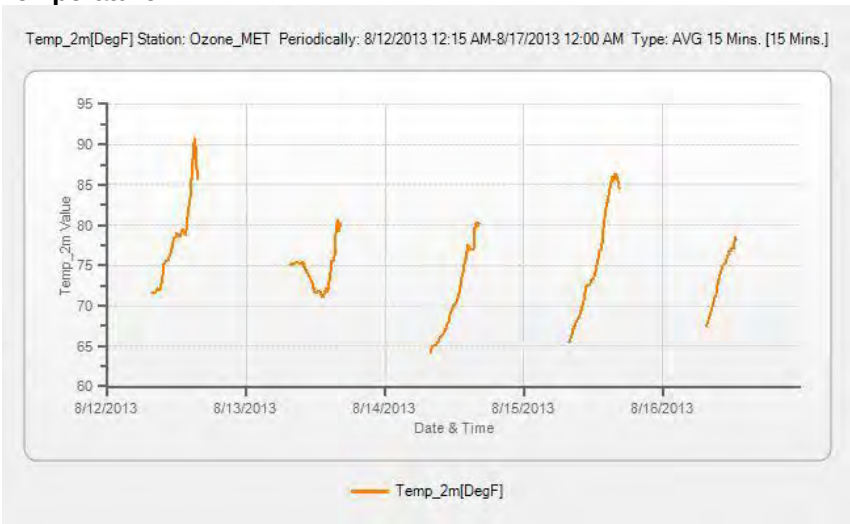


Figure 2: Meteorological Plots 8/12/13 – 8/16/13 (work hours only)

Wind Speed:



Temperature:



Relative Humidity:

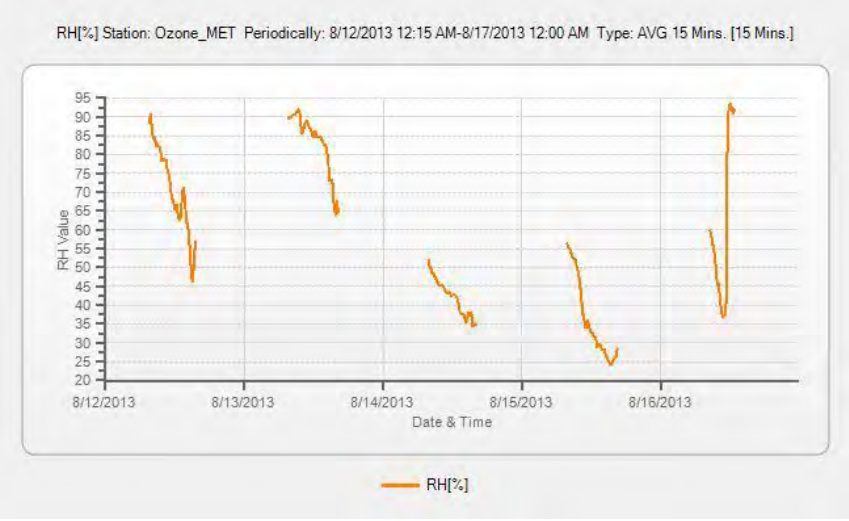
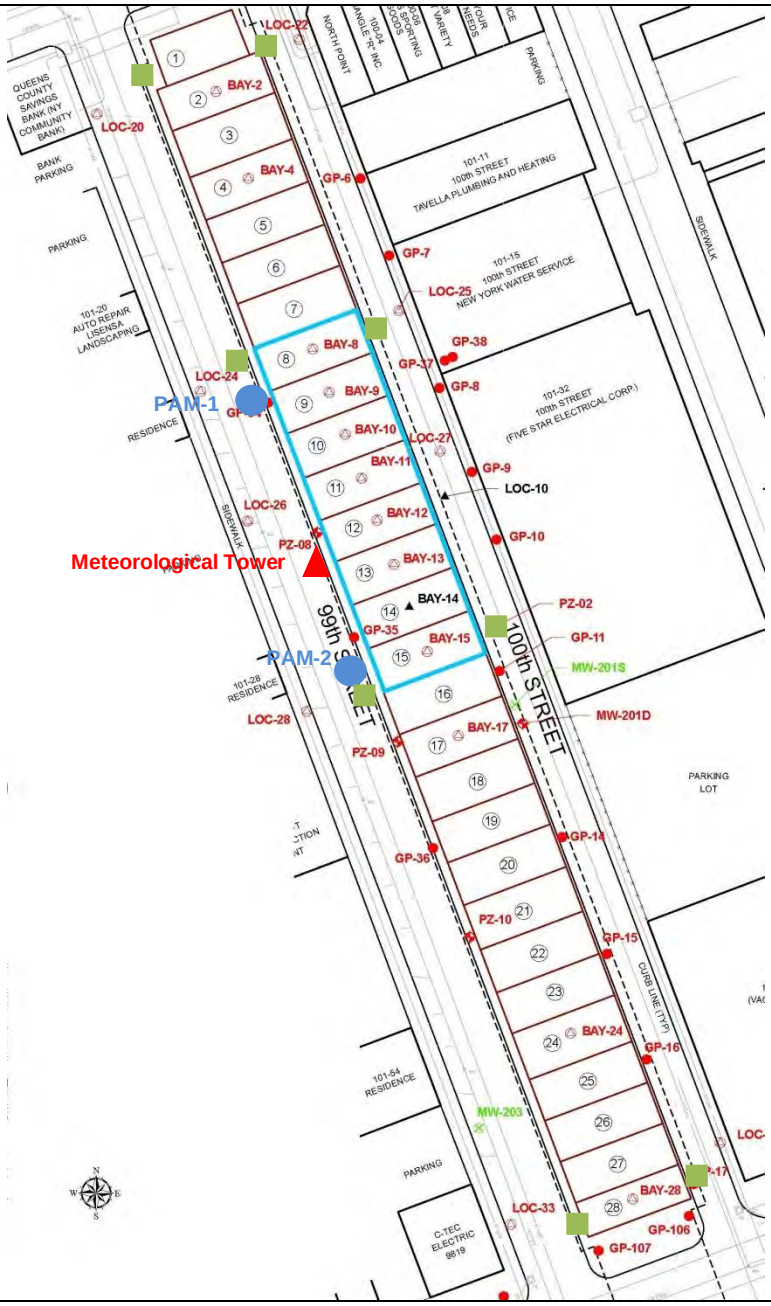


Figure 3: Site Map (8/12/13 – 8/16/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

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Community Air Monitoring Summary

Project:	**Former Ozone Industries, Inc. Site**
Location:	**Ozone Park, Queens, NY**
Report Period:	**August 19 through August 23, 2013 (soil excavation and drilling)**
Date	**August 28, 2013**

During the report period there were no 15-minute average total volatile organic compounds (TVOC) and respirable particulate matter (PM_{10}) concentrations greater than the Site-specific Action Levels.

This weekly air monitoring data summary includes both tabular information and written discussions summarizing the ambient air-quality data collected during the report period noted above in accordance with DER-10 Technical Guidance for Site Investigation and Remediation Appendix 1A New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) (DER-10) at the Former Ozone Industries, Inc. Site in Queens, NY. Monitoring and sampling were conducted in accordance with the Site-specific Community Air Monitoring Plan (CAMP), Attachment B of the Remedial Design/Remedial Action Work Plan dated October 2011.

Introduction

In accordance with the CAMP, community air monitoring data was collected continuously and the results were reviewed and compared to NYSDEC/NYSDOH Action Levels. In order to manage the Site more effectively, AECOM has employed a more conservative level (Alert Level) to help mitigate possible fugitive emissions before the Action Levels are reached. The purpose of the Alert Level is to help manage the Site and prevent concentrations from reaching the Action Levels. Engineering controls, dust suppression, and / or odor suppression are used as necessary throughout the daily work activities.

The Alert and Action Levels used at the Site are shown in the following table:

- **Table 1**: Site specific Alert and Action Levels.

Real-Time Air Monitoring Summary – PM_{10} and TVOC

Continuous real-time air monitoring for PM_{10} and TVOC was conducted at two (2) PAM stations along the Bay entrances on 99th Street. PAM stations were located in the vicinity of Bays 8 (PAM-1) and 15 (PAM-2) (at opposite ends of the work zone). The reason for this is because the main entrance to the Bays during the inside work is primarily through Bay 12 on 99th Street, and the Bays will not be accessed from 100th Street. These locations were approved by the NYSDEC. The intent of the real-time air monitoring program during Site activities is to provide early detection of short-term emissions and potential off-Site migration of PM_{10} and TVOCs related to Site activities. The real-time perimeter air monitoring system consists of PAM stations; hand-held PM_{10} and TVOC instruments; a meteorological tower; and a central computer system with an automatic alarm notification system.

During the report period discussed herein there were no 15-minute average TVOC concentrations greater than the Alert and Action Levels. Additionally, there were no 15-minute average PM_{10} concentrations greater than the Action Level. There were, however, short periods of PM_{10} concentrations greater than the Alert Level. The results of the real-time air monitoring are presented in the following tables:

- **Table 2**: Weekly real-time maximum15-minute average PM_{10} and TVOC concentrations summary;
- **Table 3**: Real-time 15-minute average concentrations above the Action Levels (none for this reporting period); and
- **Table 4**: Real-time 15-minute average concentrations above the Alert Levels.

Integrated VOC Sampling Summary

Integrated 8-hour Volatile Organic Compounds (VOC) samples were collected on August 21, 2013 during routine excavation. Samples will be collected once a week at each PAM station during the ground intrusive phase (soil removal). These samples will be submitted to an analytical laboratory for analysis via United States Environmental Protection Agency (USEPA) Method TO-15. Results of the analysis will be reported as they are available from the laboratory.

Results of the integrated VOC sampling on August 8, 2013 are included in **Attachment A**. Canisters were collected at each of the PAM stations.

Periodic Hand-held Air Monitoring Summary – PM_{10} and TVOC

Additionally, periodic hand-held and observational monitoring for PM_{10}, TVOC, visible dust, and odor were performed routinely throughout the monitoring days along the Site perimeter and in the vicinity. Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations. The results of the periodic hand-held monitoring are presented in the following tables:

- **Table 5**: Weekly maximum hand-held and observational monitoring summary; and
- **Table 6**: Hand-held concentrations above the Alert and Action Levels.

Meteorological Observations and Site Maps

Additional information related to the air monitoring activities during the report period is included in the following figures:

- **Figure 1**: Weekly wind rose summary;
- **Figure 2**: Weekly meteorological summaries; and
- **Figure 3**: Daily/weekly Site map(s).

Table 1: Site Specific Alert and Action Levels

Target Compounds	Alert Level	Action Level
PM_{10}	> 100 µg/m^3	> 150 µg/m^3
TVOC	> 3.7 ppm	> 5.0 ppm

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million

Table 2: Weekly Real-Time Maximum 15-Minute Average PM_{10} and TVOC Concentrations Summary

	PAM-1 (Bay 8)		PAM-2 (Bay 15)	
	PM_{10} µg/m^3	**TVOC ppm**	**PM_{10} µg/m^3**	**TVOC ppm**
	Maximum 15-Minute Average Concentrations (Action Level: PM_{10} = 150 µg/m^3 / TVOC = 5.0 ppm Alert Level: PM_{10} = 100 µg/m^3 / TVOC = 3.7 ppm)			
Mon 8/19/13	38.8	0.1	84.1	0.1
Tue 8/20/13	70.9	0.1	117.7	0.1
Wed 8/21/13	45.3	0.2	150.9	0.1
Thu 8/22/13	40.6	0.1	64.9	0.1
Fri 8/23/13	21.8	0.1	38.5	0.1

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

- Highlighted concentrations require further analysis (see **Table 3** and **Table 4** for the Action and Alert Concentrations, respectively).
- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 3: Real-Time 15-Minute Average Concentrations above the Action Levels (none this reporting period)

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Action Limit	Comments/Explanation
Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	NA	NA	NA	NA	NA	PM_{10} concentrations remained below the Action Level.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Action Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 4: Real-Time 15-Minute Average Concentrations above the Alert Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Alert Level	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm)						
PM_{10}	Tue 8/20/13	10:45AM 12:00PM	PAM-2	E 1.4 mph E 1.2 mph	100.7 117.7	PM_{10} concentrations were likely caused by drilling activities in Bay 15. Drilling was temporarily stopped until concentrations dropped below the Alert Level.
PM_{10}	Wed 8/21/13	9:00AM	PAM-2	WNW 0.9 mph	105.9	PM_{10} concentrations were likely caused by drilling activities in Bay 15. Drilling was temporarily stopped until concentrations dropped below the Alert Level.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Alert Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 5: Weekly Maximum Hand-Held and Observational Monitoring Summary

(Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite vapor and dust controls operations.)

	Hand-Held Monitoring	
	PM_{10} µg/m³	**TVOC ppm**
	Instantaneous Concentrations	
Mon 8/19/13	122	0.0
Tue 8/20/13	143	0.0
Wed 8/21/13	232	17.4
Thu 8/22/13	95	0.0
Fri 8/23/13	51	0.0

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m³ = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Highlighted concentrations or observations require further analysis (see **Table 6**).
- Hand-held PM_{10} and TVOC data represent the maximum instantaneous concentrations of the readings taken periodically during work activities.

Table 6: Hand-Held Concentrations above the Alert and Action Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Alert and/or Action Levels	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm) & Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	Mon 8/19/13	4:06PM	Bay 15 100th	NE 2.0 mph	122	Hand-held PM_{10} concentration likely caused by compacting backfill in Bay 11. Water was applied and concentrations dropped below the Alert Level.
PM_{10}	Tue 8/20/13	2:46PM	Bay 1 99th	W 2.0 mph	143	Hand-held PM_{10} concentration likely caused by offsite activities in Bay 5/6 (activities included cutting and shaving metal poles).
PM_{10}	Wed 8/21/13	12:07PM 12:09PM	Bay 28 100th Bay 28 99th	ESE 0.8 mph	232 105	Hand-held PM_{10} and TVOC concentrations likely caused by offsite activities in Bay 24 (activities included auto detailing and painting). Strong paint/cleaner odor observed on 100th Street side.
TVOC		12:07PM	Bay 28 100th		17.4	

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Hand-held concentrations represent instantaneous concentrations unless otherwise state. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data is used to enhance the management of onsite dust controls operations.

Figure 1: Wind Rose 8/19/13 – 8/23/13 (work hours only)

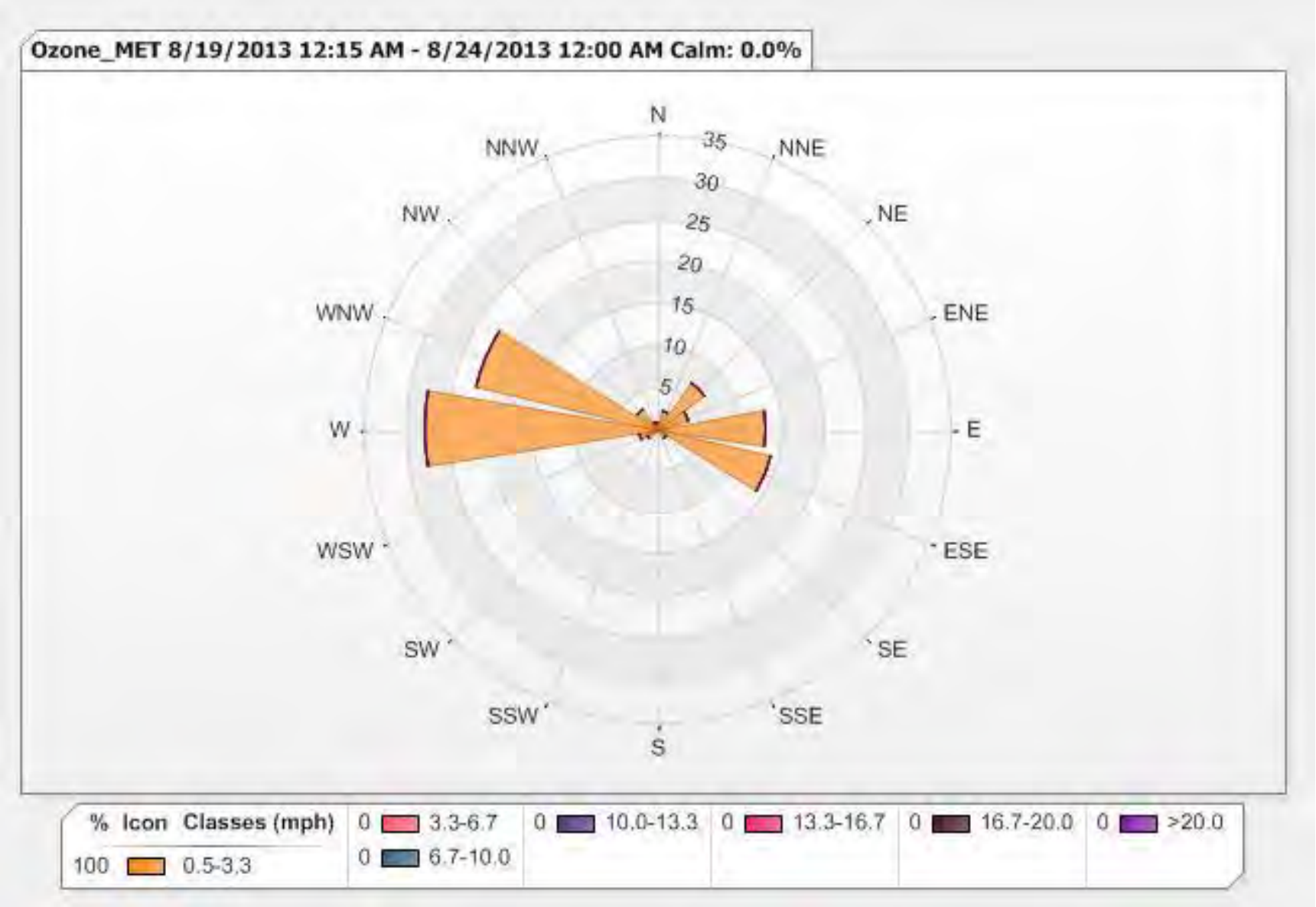
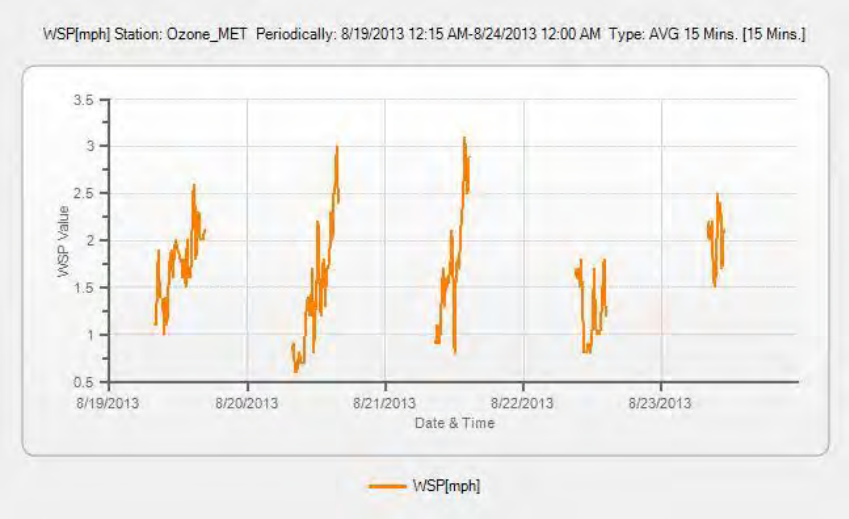
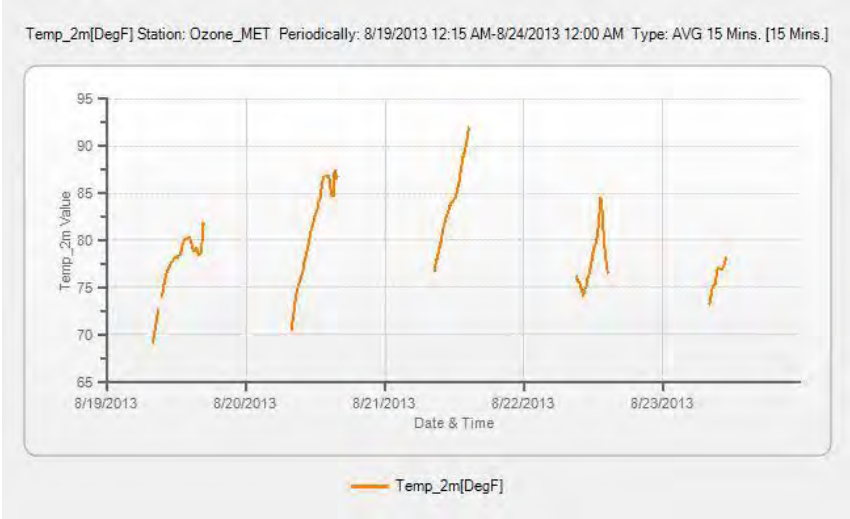


Figure 2: Meteorological Plots 8/19/13 – 8/23/13 (work hours only)

Wind Speed:



Temperature:



Relative Humidity:

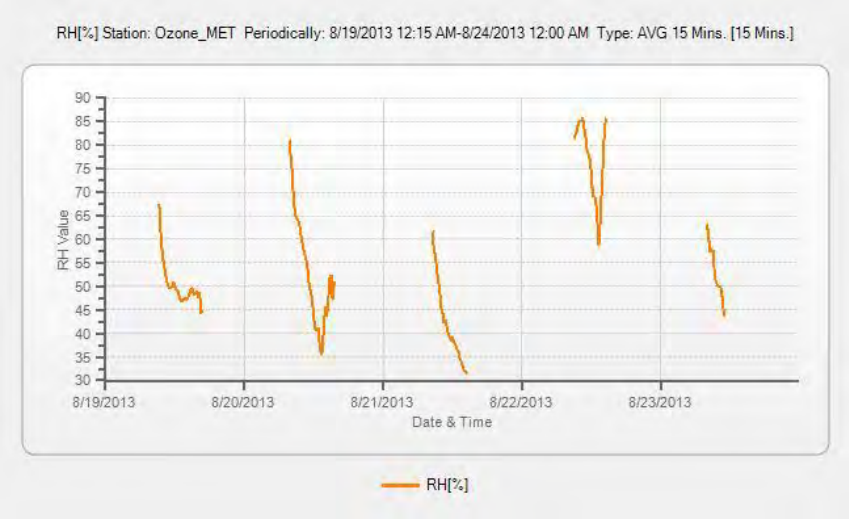
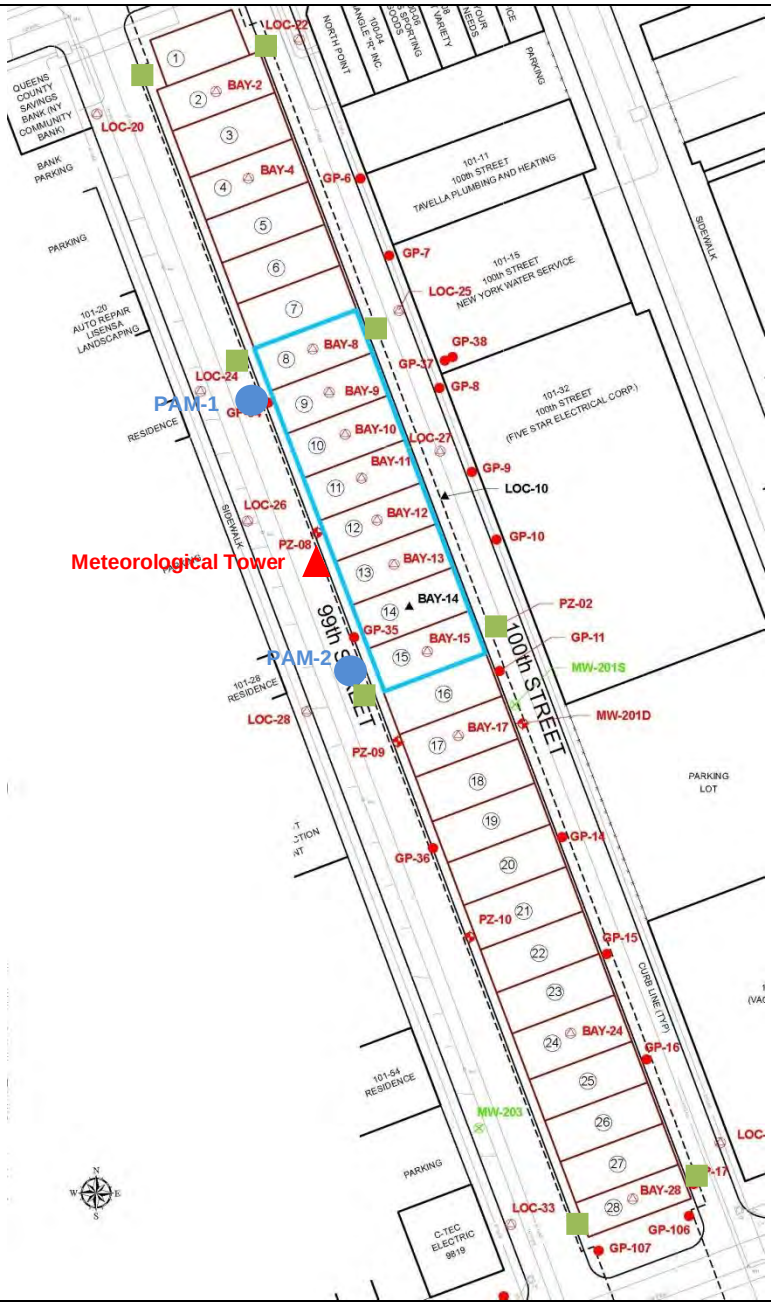


Figure 3: Site Map (8/19/13 – 8/23/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

ATTACHMENT A

Integrated 8-Hour VOC Results

AECOM
250 Apollo Drive
Chelmsford, MA 01824

978.905.2100 tel
978.905.2101 fax

Community Air Monitoring Summary

Project:	**Former Ozone Industries, Inc. Site**
Location:	**Ozone Park, Queens, NY**
Report Period:	**August 26 through August 29, 2013 (drilling)**
Date	**September 26, 2013**

During the report period there were no 15-minute average total volatile organic compounds (TVOC) and respirable particulate matter (PM_{10}) concentrations greater than the Site-specific Action Levels. These preliminary results were communicated to NYSDEC and NYSDOH in an e-mail on September 3, 2013. Intrusive work requiring CAMP monitoring ended on August 29, 2013.

This weekly air monitoring data summary includes both tabular information and written discussions summarizing the ambient air-quality data collected during the report period noted above in accordance with DER-10 Technical Guidance for Site Investigation and Remediation Appendix 1A New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) (DER-10) at the Former Ozone Industries, Inc. Site in Queens, NY. Monitoring and sampling were conducted in accordance with the Site-specific Community Air Monitoring Plan (CAMP), Attachment B of the Remedial Design/Remedial Action Work Plan dated October 2011.

Introduction

In accordance with the CAMP, community air monitoring data were collected continuously and the results were reviewed and compared to NYSDEC/NYSDOH Action Levels. In order to manage the Site more effectively, AECOM employed a more conservative level (Alert Level) to help mitigate possible fugitive emissions before the Action Levels were possibly reached. The purpose of the Alert Level was to help manage the Site and prevent concentrations from reaching the Action Levels. Engineering controls, dust suppression, and / or odor suppression were used as necessary throughout the daily work activities.

The Alert and Action Levels used at the Site are shown in the following table:

- **Table 1**: Site specific Alert and Action Levels.

Real-Time Air Monitoring Summary – PM_{10} and TVOC

Continuous real-time air monitoring for PM_{10} and TVOC was conducted at two (2) PAM stations along the Bay entrances on 99th Street. PAM stations were located in the vicinity of Bays 8 (PAM-1) and 15 (PAM-2) (at opposite ends of the work zone). The reason for this is because the main entrance to the Bays during the inside work was primarily through Bay 12 on 99th Street, and the Bays were not accessed from 100th Street. These locations were approved by the NYSDEC. The intent of the real-time air monitoring program during Site activities was to provide early detection of short-term emissions and potential off-Site migration of PM_{10} and TVOCs related to Site activities. The real-time perimeter air monitoring system consisted of PAM stations; hand-held PM_{10} and TVOC instruments; a meteorological tower; and a central computer system with an automatic alarm notification system.

During the report period discussed herein there were no 15-minute average PM_{10} and TVOC concentrations greater than the Alert and Action Levels. The results of the real-time air monitoring are presented in the following tables:

- **Table 2**: Weekly real-time maximum15-minute average PM_{10} and TVOC concentrations summary;
- **Table 3**: Real-time 15-minute average concentrations above the Action Levels (none); and
- **Table 4**: Real-time 15-minute average concentrations above the Alert Levels (none).

Integrated VOC Sampling Summary

Integrated 8-hour Volatile Organic Compounds (VOC) samples were collected on August 29, 2013 during routine drilling activities. Samples were collected once a week at each PAM station during the ground intrusive phase. These samples were submitted to an analytical laboratory for analysis via United States Environmental Protection Agency (USEPA) Method TO-15. Results of the analysis have been reported as they were available from the laboratory.

Results of the integrated VOC sampling on August 15, August 21 and August 29, 2013 are included in **Attachment A**. Canisters were collected at each of the PAM stations with a collocated sample collected at PAM-2 on August 21, 2013.

Periodic Hand-held Air Monitoring Summary – PM_{10} and TVOC

Additionally, periodic hand-held and observational monitoring for PM_{10}, TVOC, visible dust, and odor were performed routinely throughout the monitoring days along the Site perimeter and in the vicinity. Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data were used to enhance the management of onsite vapor and dust controls operations. The results of the periodic hand-held monitoring are presented in the following tables:

- **Table 5**: Weekly maximum hand-held and observational monitoring summary; and
- **Table 6**: Hand-held concentrations above the Alert and Action Levels (none).

Meteorological Observations and Site Maps

Additional information related to the air monitoring activities during the report period is included in the following figures:

- **Figure 1**: Weekly wind rose summary;
- **Figure 2**: Weekly meteorological summaries; and
- **Figure 3**: Daily/weekly Site map(s).

Table 1: Site Specific Alert and Action Levels

Target Compounds	Alert Level	Action Level
PM_{10}	> 100 µg/m^3	> 150 µg/m^3
TVOC	> 3.7 ppm	> 5.0 ppm

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million

Table 2: Weekly Real-Time Maximum 15-Minute Average PM_{10} and TVOC Concentrations Summary

	PAM-1 (Bay 8)		PAM-2 (Bay 15)	
	PM_{10} µg/m^3	**TVOC ppm**	**PM_{10} µg/m^3**	**TVOC ppm**
	Maximum 15-Minute Average Concentrations (Action Level: PM_{10} = 150 µg/m^3 / TVOC = 5.0 ppm Alert Level: PM_{10} = 100 µg/m^3 / TVOC = 3.7 ppm)			
Mon 8/26/13	18.8	0.1	41.6	0.1
Tue 8/27/13	21.7	0.1	41.1	0.4
Wed 8/28/13	88.4	0.1	72.6	0.1
Thu 8/29/13	25.5	0.1	61.8	0.1

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
µg/m^3 = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 3: Real-Time 15-Minute Average Concentrations above the Action Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Action Limit	Comments/Explanation
Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	NA	NA	NA	NA	NA	PM_{10} concentrations remained below the Action Level.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Action Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 4: Real-Time 15-Minute Average Concentrations above the Alert Levels

Parameter	Date	Time	Location	Wind Conditions	Concentration Greater than Alert Level	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm)						
PM_{10}	NA	NA	NA	NA	NA	PM_{10} concentrations remained below the Alert Level.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Alert Level.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- PAM reported PM_{10} and TVOC data represent 15-minute average concentrations.

Table 5: Weekly Maximum Hand-Held and Observational Monitoring Summary

(Hand-held concentrations represent instantaneous concentrations unless otherwise stated. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data was used to enhance the management of onsite vapor and dust controls operations.)

	Hand-Held Monitoring	
	PM_{10} $\mu g/m^3$	**TVOC ppm**
	Instantaneous Concentrations	
Mon 8/26/13	84	0.0
Tue 8/27/130	67	0.0
Wed 8/28/13	52	0.0
Thu 8/29/13	39	0.0

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrograms per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Hand-held PM_{10} and TVOC data represent the maximum instantaneous concentrations of the readings taken periodically during work activities.

Table 6: Hand-Held Concentrations above the Alert and Action Levels

Parameter	Date	Time	Location	Wind Conditions	Greater than Alert and/or Action Levels	Comments/Explanation
Alert Level Concentrations (PM_{10} = 100 $\mu g/m^3$ and TVOC = 3.7 ppm) & Action Level Concentrations (PM_{10} = 150 $\mu g/m^3$ and TVOC = 5.0 ppm)						
PM_{10}	NA	NA	NA	NA	NA	PM_{10} concentrations remained below the Alert and Action Levels.
TVOC	NA	NA	NA	NA	NA	TVOC concentrations remained below the Alert and Action Levels.

Definitions:

PAM = Portable Air Monitoring Station
PM_{10} = Particulate Matter 10 micro meters or less
TVOC = Total Volatile Organic Compounds
$\mu g/m^3$ = Micrometers per cubic meter
ppm = Parts per million
NA = Not Applicable
ND = No Data

Notes:

- Hand-held concentrations represent instantaneous concentrations unless otherwise state. Therefore, they cannot be directly compared to the 15-minute Alert and Action Levels to demonstrate compliance. The hand-held data was used to enhance the management of onsite dust controls operations.

Figure 1: Wind Rose 8/26/13 – 8/29/13 (work hours only)

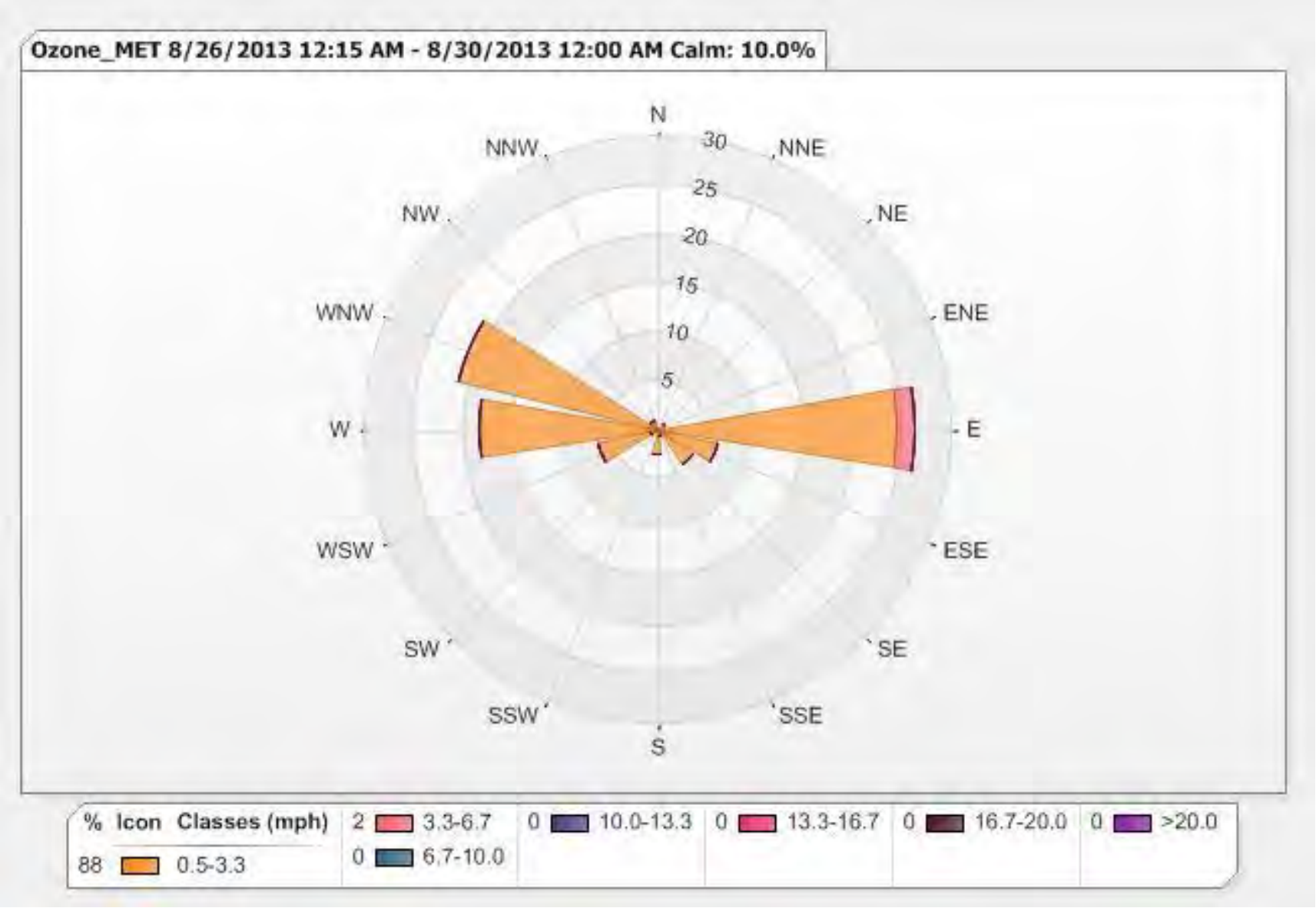
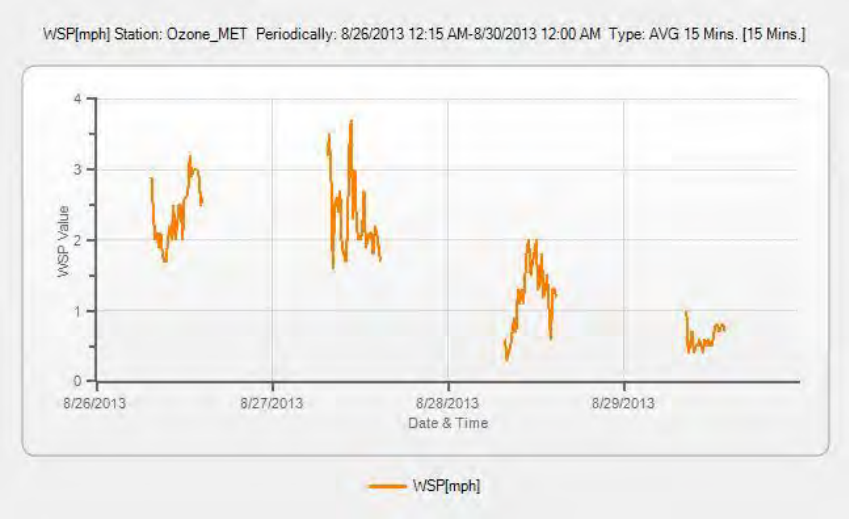
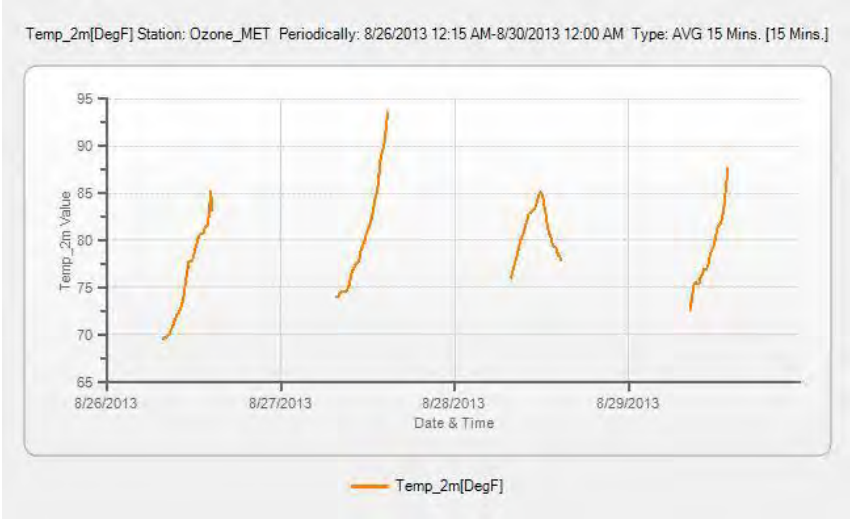


Figure 2: Meteorological Plots 8/26/13 – 8/29/13 (work hours only)

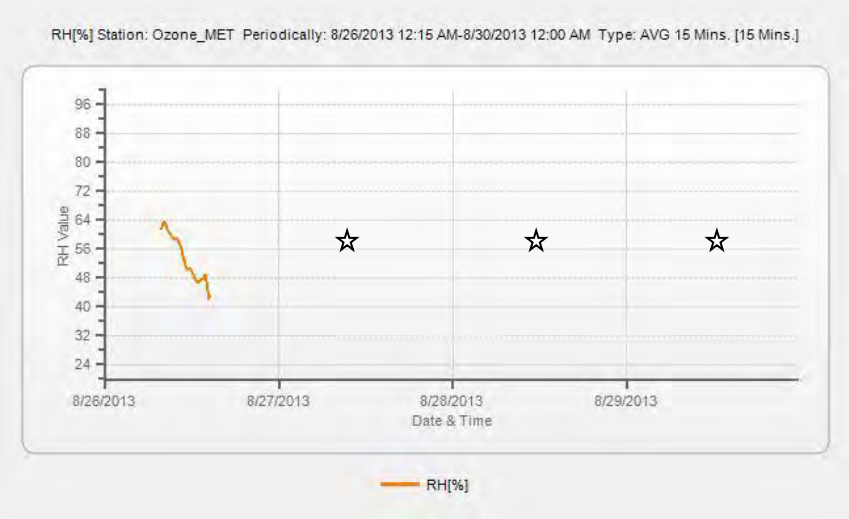
Wind Speed:



Temperature:

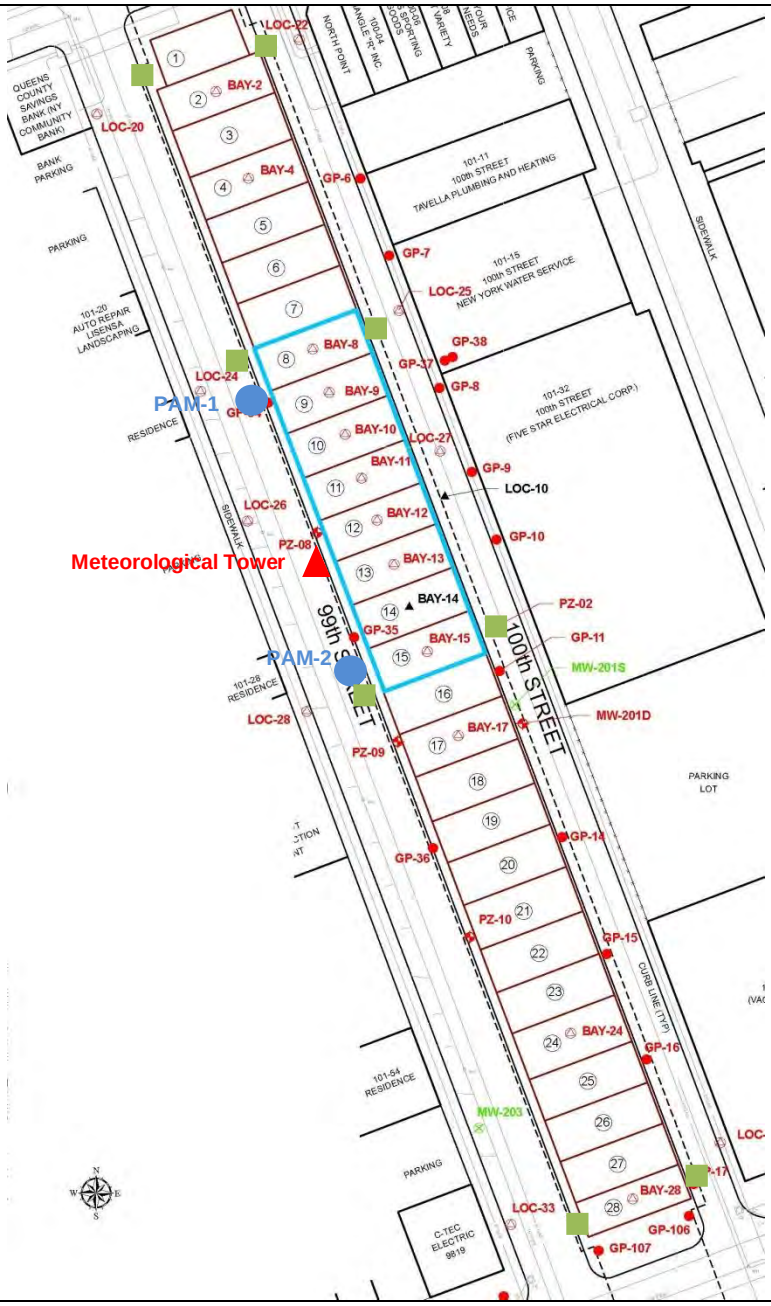


Relative Humidity:



*Relative humidity invalid because of a sensor connection issue.

Figure 3: Site Map (8/26/13 – 8/29/13)



Legend:

- PAM – Portable Air Monitoring Station
- HH – Hand-Held Monitoring Location
- Meteorological Tower

ATTACHMENT A

Integrated 8-Hour VOC Results

APPENDIX G

Contractor's Daily Reports

APPENDIX H

Photo Log

Customer: 15RIC
Profile: 2013-083-15RIC
Waste: All
Truck: All

Seneca Meadows, Inc.

Customer Activity Report (Site)

Transactions from 07/24/2013 through 07/30/2013
Inbound and Outbound Tickets
Third Party and Intercompany Customers
Recycle and Disposal Waste
Full Details

Ticket	Date	Time	Truck	Profile	Cust Ref# (Manifest)		
15RIC							
BCS01							
2371410	07/24/13	08:19:04	RIC836	2013-083-15RIC	004	36.43	0.00
2371412	07/24/13	08:20:18	RIC835	2013-083-15RIC	002	29.22	0.00
2371413	07/24/13	08:20:49	RIC830	2013-083-15RIC	001	35.66	0.00
2371506	07/24/13	09:36:13	RIC840	2013-083-15RIC		28.65	0.00
2372037	07/25/13	07:26:07	DOUBLEA1	2013-083-15RIC	72413002	41.92	0.00
2372087	07/25/13	08:03:59	CH106	2013-083-15RIC	072413003	33.91	0.00
2372137	07/25/13	08:41:53	CH96	2013-083-15RIC	072413001	31.53	0.00
2372846	07/26/13	08:18:03	RIC835	2013-083-15RIC	72513001	38.31	0.00
2372851	07/26/13	08:21:31	RIC830	2013-083-15RIC	72513002	35.98	0.00
2372931	07/26/13	09:16:53	RIC836	2013-083-15RIC	72512004	40.31	0.00
2372939	07/26/13	09:25:03	RIC840	2013-083-15RIC	72513003	43.40	0.00
BCS01						395.32	0.00
11 tickets and 11 transactions							
15RIC						**395.32**	**0.00**
11 tickets and 11 transactions							

Report Grand Totals

	395.32	**0.00**

11 tickets and 11 transactions

Seneca Meadows, Inc.

Customer Activity Report (Site)

Customer: 15RIC
Profile: 2013-083-15RIC
Waste: All
Truck: All

Transactions from 07/31/2013 through 07/31/2013
Inbound and Outbound Tickets
Third Party and Intercompany Customers
Recycle and Disposal Waste
Full Details

Ticket	Date	Time	Truck	Profile	Cust Ref# (Manifest)		
15RIC							
BCS01							
2375290	07/31/13	07:15:53	CH106	2013-083-15RIC	72013002	30.65	0.00
2375347	07/31/13	08:00:16	RIC836	2013-083-15RIC	73013001	42.71	0.00
2375434	07/31/13	09:06:33	RIC840	2013-083-15RIC	73013-003	34.12	0.00
2375922	07/31/13	15:47:13	DOUBLEA3	2013-083-15RIC	73113001	37.23	0.00
BCS01						144.71	0.00
4 tickets and 4 transactions							
15RIC						**144.71**	**0.00**
4 tickets and 4 transactions							
Report Grand Totals						**144.71**	**0.00**
4 tickets and 4 transactions							

Customer: 15RIC
Profile: 2013-083-15RIC
Waste: All
Truck: All

Seneca Meadows, Inc.

Customer Activity Report (Site)

Transactions from 08/01/2013 through 08/01/2013
Inbound and Outbound Tickets
Third Party and Intercompany Customers
Recycle and Disposal Waste
Full Details

Ticket	Date	Time	Truck	Profile	Cust Ref# (Manifest)		
15RIC							
BCS01							
2376113	08/01/13	07:44:22	RIC839	2013-083-15RIC	73113002	36.88	0.00
BCS01						36.88	0.00
1 ticket and 1 transaction							
15RIC						**36.88**	**0.00**
1 ticket and 1 transaction							

Report Grand Totals

	36.88	**0.00**

1 ticket and 1 transaction

Customer: 15RIC
Profile: 2013-083-15RIC
Waste: All
Truck: All

Seneca Meadows, Inc.

Customer Activity Report (Site)

Transactions from 08/02/2013 through 08/02/2013
Inbound and Outbound Tickets
Third Party and Intercompany Customers
Recycle and Disposal Waste
Full Details

Ticket	Date	Time	Truck	Profile	Cust Ref# (Manifest)		
15RIC							
BCS01							
2376769	08/02/13	07:29:33	RIC837	2013-083-15RIC	080113002	36.63	0.00
2376782	08/02/13	07:38:56	RIC830	2013-083-15RIC	080113001	36.40	0.00
2376891	08/02/13	08:53:41	RIC840	2013-083-15RIC	080113003	42.42	0.00
BCS01						115.45	0.00
3 tickets and 3 transactions							
15RIC						**115.45**	**0.00**
3 tickets and 3 transactions							

Report Grand Totals

	115.45	**0.00**

3 tickets and 3 transactions

Customer: 15RIC
Profile: 2013-083-15RIC
Waste: All
Truck: All

Seneca Meadows, Inc.

Customer Activity Report (Site)

Transactions from 08/03/2013 through 08/03/2013
Inbound and Outbound Tickets
Third Party and Intercompany Customers
Recycle and Disposal Waste
Full Details

Ticket	Date	Time	Truck	Profile	Cust Ref# (Manifest)		
15RIC							
BCS01							
2377446	08/03/13	06:25:28	DOUBLEA7	2013-083-15RIC	080213003	36.04	0.00
2377492	08/03/13	07:15:34	RIC825	2013-083-15RIC	080213001	41.18	0.00
2377519	08/03/13	07:41:10	RIC846	2013-083-15RIC	08213002	36.71	0.00
BCS01						113.93	0.00
3 tickets and 3 transactions							
15RIC						**113.93**	**0.00**
3 tickets and 3 transactions							

Report Grand Totals

	113.93	**0.00**

3 tickets and 3 transactions

Customer: 15RIC
Profile: 2013-083-15RIC
Waste: All
Truck: All

Seneca Meadows, Inc.

Customer Activity Report (Site)

Transactions from 08/05/2013 through 08/05/2013
Inbound and Outbound Tickets
Third Party and Intercompany Customers
Recycle and Disposal Waste
Full Details

Ticket	Date	Time	Truck	Profile	Cust Ref# (Manifest)		
15RIC							
BCS01							
2378278	08/05/13	14:30:29	DOUBLEA7	2013-083-15RIC	080513001	41.21	0.00
BCS01						41.21	0.00
1 ticket and 1 transaction							
15RIC						**41.21**	**0.00**
1 ticket and 1 transaction							

Report Grand Totals

	41.21	**0.00**

1 ticket and 1 transaction

RIZZO ENVIRONMENTAL SERVICES

51737

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 6-24-13 PURCHASE ORDER # _____

CUSTOMER Krystal Env Svcs

JOBSITE 101 Ave & 99 St Qns

PARKING REGULATIONS _____

★ DRIVER NAME JR TRUCK # 14

ROLL-OFF CONTAINER SIZES:

☐ 10	☐ 15	☒ 20	☐ 30	☐ 40	OTHER
WEIGHT LIMIT (TONS): 3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

☒ DROP ☐ SWITCH ☐ PICK UP ☐ BULK MATERIAL ☐ HEAVY DEMO

DROP OFF BOX # 232 WORK ORDER C+D for change order

PICK UP BOX # _____ WORK ORDER _____

TOLLS: $ _____ TIRE DISPOSAL: _____

CHECK # _____ AMOUNT: $ _____ BALANCE DUE: $ _____

WOOD UNDER WHEELS: ☐ YES ☐ NO

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

CUSTOMER COPY

RIZZO
ENVIRONMENTAL SERVICES

51745

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 6-25-13 **PURCHASE ORDER #** _____

CUSTOMER Kriegel Environmental

JOBSITE 99th & 101 Ave Qns

PARKING REGULATIONS _____

★ DRIVER NAME JR **TRUCK #** 4

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☒ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 202 **WORK ORDER** C.O.D for Change order

PICK UP BOX # 232 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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RIZZO ENVIRONMENTAL SERVICES

51764

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 6-25-13 **PURCHASE ORDER #** _____

CUSTOMER Rystal Env.

JOBSITE 101-35 99st

PARKING REGULATIONS _____

★ DRIVER NAME KRIS **TRUCK #** 14

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	❑ 20	❑ 30	❑ 40	OTHER 10/20
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ~~❑ SWITCH~~ ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 112 **WORK ORDER** C+D for Change Order

PICK UP BOX # 232 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

CUSTOMER COPY

RIZZO
ENVIRONMENTAL SERVICES

51767

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 6-25-13 **PURCHASE ORDER #** _____

CUSTOMER Krystal Env

JOBSITE 101-35 99 st Qs

PARKING REGULATIONS _____

★ DRIVER NAME KRIS **TRUCK #** 14

	❑	❑	☑	❑	❑	
ROLL-OFF CONTAINER SIZES:	10	15	20	30	40	**OTHER**
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☑ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 232 **WORK ORDER** Call for change order

PICK UP BOX # 219 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

CUSTOMER COPY

RIZZO
ENVIRONMENTAL SERVICES

51877

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 6/05/13 **PURCHASE ORDER #** CC

CUSTOMER CRISTAL ENV. BOROUGH TAL. CC

JOBSITE 99 ST X 101 AVE QN

PARKING REGULATIONS _____

★ **DRIVER NAME** MAURICIO **TRUCK #** 8

ROLL-OFF CONTAINER SIZES:	☐ 10	☐ 15	☒ 20	☐ 30	☐ 40	**OTHER**
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

☐ **DROP** ☒ **SWITCH** ☐ **PICK UP** ☐ **BULK MATERIAL** ☐ **HEAVY DEMO**

DROP OFF BOX # 219 **WORK ORDER** C+D for Change order

PICK UP BOX # 20.101 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ☒ **YES** ☐ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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ENVIRONMENTAL SERVICES

52103

ROLL OFF CONTAINER SERVICE

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NYC BIC #2778

DATE OF SERVICE 6.26.13 **PURCHASE ORDER #** _____

CUSTOMER KRATAL SUN

JOBSITE 99ST 101-103 AV QNS

PARKING REGULATIONS _____

★ **DRIVER NAME** DISH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☑ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☒ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 203 **WORK ORDER** _____

PICK UP BOX # 202 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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NYC BIC #2778

DATE OF SERVICE 6 26 13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL GNN

JOBSITE 995 101 - 103 Av QNS

PARKING REGULATIONS _____

★ **DRIVER NAME** DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☒ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 202 **WORK ORDER** _____

PICK UP BOX # 233 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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NYC BIC #2778

DATE OF SERVICE 6.26.13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL ENN

JOBSITE 995 F 101-102 AV QNS

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	**OTHER**
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☒ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 233 **WORK ORDER** _____

PICK UP BOX # 202 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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NYC BIC #2778

DATE OF SERVICE 6-26-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL ENN

JOBSITE 995 101 103 Av QUC

PARKING REGULATIONS _____

★ **DRIVER NAME** DASP **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☑ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☑ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 202 **WORK ORDER** _____

PICK UP BOX # 233 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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NYC BIC #2778

DATE OF SERVICE 7-1-13 PURCHASE ORDER # _____

CUSTOMER Krystal Group

JOBSITE 101-35 99 st Qs

PARKING REGULATIONS _____

★ DRIVER NAME KRIS TRUCK # 14

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ DROP ☒ SWITCH ❑ PICK UP ❑ BULK MATERIAL ❑ HEAVY DEMO

DROP OFF BOX # 268 WORK ORDER _____

PICK UP BOX # 202 WORK ORDER _____

TOLLS: $ _____ TIRE DISPOSAL: _____

CHECK # _____ AMOUNT: $ _____ BALANCE DUE: $ _____

WOOD UNDER WHEELS: ❑ YES ❑ NO

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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NYC BIC #2778

DATE OF SERVICE 7-10-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL ENV.

JOBSITE 101-35 99st QS

PARKING REGULATIONS _____

★ **DRIVER NAME** KRIS **TRUCK #** 14

ROLL-OFF CONTAINER SIZES:	☐ 10	☐ 15	☒ 20	☐ 30	☐ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

☐ **DROP** ☐ **SWITCH** ☐ **PICK UP** ☐ **BULK MATERIAL** ☐ **HEAVY DEMO**

DROP OFF BOX # 236 **WORK ORDER** _____

PICK UP BOX # 268 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ☐ **YES** ☐ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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ROLL OFF CONTAINER SERVICE

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NYC BIC #2778

DATE OF SERVICE 7-15-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL EN

JOBSITE 101 35 99 St 9

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☒ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 289 **WORK ORDER** _____

PICK UP BOX # 236 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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53013

ROLL OFF CONTAINER SERVICE

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NYC BIC #2778

DATE OF SERVICE 7-15-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL EN

JOBSITE 101-35 99 ST QN

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ❑ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 225 **WORK ORDER** _____

PICK UP BOX # 259 **WORK ORDER** Concrete

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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NYC BIC #2778

DATE OF SERVICE 7.15.12 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL EN

JOBSITE 101-35 99th QNS

PARKING REGULATIONS _____

★ DRIVER NAME DILSH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	☐ 10	☐ 15	☒ 20	☐ 30	☐ 40	**OTHER**
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

☐ **DROP** ☐ **SWITCH** ☐ **PICK UP** ☐ **BULK MATERIAL** ☐ **HEAVY DEMO**

DROP OFF BOX # 289 **WORK ORDER** _____

PICK UP BOX # 225 **WORK ORDER** CONCRETE

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ☐ **YES** ☐ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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53015

ROLL OFF CONTAINER SERVICE

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NYC BIC #2778

DATE OF SERVICE 7-15-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL GN

JOBSITE 101-35 99 ST &-S

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ DROP ❑ SWITCH ❑ PICK UP ❑ BULK MATERIAL ❑ HEAVY DEMO

DROP OFF BOX # 225 **WORK ORDER** _____

PICK UP BOX # 289 **WORK ORDER** Concrete

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ YES ❑ NO

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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ROLL OFF CONTAINER SERVICE

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NYC BIC #2778

DATE OF SERVICE 7-16-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL

JOBSITE 101 35 99 ST QNS

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ❑ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 289 **WORK ORDER** _____

PICK UP BOX # 225 **WORK ORDER** Concrete

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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53017

ROLL OFF CONTAINER SERVICE

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NYC BIC #2778

DATE OF SERVICE 2-16-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL

JOBSITE 101-35 99 ST QNS

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ❑ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 112 **WORK ORDER** _____

PICK UP BOX # 289 **WORK ORDER** [redacted]

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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NYC BIC #2778

DATE OF SERVICE 6-24-13 PURCHASE ORDER # _____

CUSTOMER Krystal Env Svcs

JOBSITE 101 Ave & 99 St Qns

PARKING REGULATIONS _____

★ DRIVER NAME JR TRUCK # 14

ROLL-OFF CONTAINER SIZES:

☐ 10	☐ 15	☒ 20	☐ 30	☐ 40	OTHER
WEIGHT LIMIT (TONS): 3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

☒ DROP ☐ SWITCH ☐ PICK UP ☐ BULK MATERIAL ☐ HEAVY DEMO

DROP OFF BOX # 232 WORK ORDER C+D for change order

PICK UP BOX # _____ WORK ORDER _____

TOLLS: $ _____ TIRE DISPOSAL: _____

CHECK # _____ AMOUNT: $ _____ BALANCE DUE: $ _____

WOOD UNDER WHEELS: ☐ YES ☐ NO

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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ROLL OFF CONTAINER SERVICE

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NYC BIC #2778

DATE OF SERVICE 6-25-13 **PURCHASE ORDER #** _____

CUSTOMER Kriegel Environmental

JOBSITE 99th & 101 Ave Qns

PARKING REGULATIONS _____

★ DRIVER NAME JR **TRUCK #** 4

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☒ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 202 **WORK ORDER** C.O.D for Change order

PICK UP BOX # 232 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 6-25-13 **PURCHASE ORDER #** _____

CUSTOMER Rystal Env.

JOBSITE 101-35 99st

PARKING REGULATIONS _____

★ DRIVER NAME KRIS **TRUCK #** 14

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	❑ 20	❑ 30	❑ 40	OTHER 10/20
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ~~❑ SWITCH~~ ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 112 **WORK ORDER** C+D for Change Order

PICK UP BOX # 232 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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ROLL OFF CONTAINER SERVICE

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NYC BIC #2778

DATE OF SERVICE 6-25-13 **PURCHASE ORDER #** _____

CUSTOMER Krystal Env

JOBSITE 101-35 99 st Qs

PARKING REGULATIONS _____

★ DRIVER NAME KRIS **TRUCK #** 14

	❑	❑	☑	❑	❑	
ROLL-OFF CONTAINER SIZES:	10	15	20	30	40	**OTHER**
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☑ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 232 **WORK ORDER** Call for change order

PICK UP BOX # 219 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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ROLL OFF CONTAINER SERVICE

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800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 6/05/13 **PURCHASE ORDER #** CC

CUSTOMER CRISTAL ENV. BOROUGH TAL. CC

JOBSITE 99 ST X 101 AVE QN

PARKING REGULATIONS _____

★ **DRIVER NAME** MAURICIO **TRUCK #** 8

ROLL-OFF CONTAINER SIZES:	☐ 10	☐ 15	☒ 20	☐ 30	☐ 40	**OTHER**
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

☐ **DROP** ☒ **SWITCH** ☐ **PICK UP** ☐ **BULK MATERIAL** ☐ **HEAVY DEMO**

DROP OFF BOX # 219 **WORK ORDER** C+D for Change order

PICK UP BOX # 20.101 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ☒ **YES** ☐ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

CUSTOMER COPY

RIZZO
ENVIRONMENTAL SERVICES

52103

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 6.26.13 **PURCHASE ORDER #** _____

CUSTOMER KRATAL SUN

JOBSITE 99ST 101-103 AV QNS

PARKING REGULATIONS _____

★ **DRIVER NAME** DISH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☑ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☒ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 203 **WORK ORDER** _____

PICK UP BOX # 202 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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52104

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 6 26 13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL GNN

JOBSITE 995 101 - 103 Av QNS

PARKING REGULATIONS _____

★ **DRIVER NAME** DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☒ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 202 **WORK ORDER** _____

PICK UP BOX # 233 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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ENVIRONMENTAL SERVICES

52105

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 6.26.13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL ENN

JOBSITE 995 F 101-102 AV QNS

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	**OTHER**
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☒ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 233 **WORK ORDER** _____

PICK UP BOX # 202 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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ENVIRONMENTAL SERVICES

52106

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 6-26-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL ENN

JOBSITE 995 101 103 Av QUC

PARKING REGULATIONS _____

★ **DRIVER NAME** DASP **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☑ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☑ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 202 **WORK ORDER** _____

PICK UP BOX # 233 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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ENVIRONMENTAL SERVICES

52313

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 7-1-13 PURCHASE ORDER # _____

CUSTOMER Krystal Group

JOBSITE 101-35 99 st Qs

PARKING REGULATIONS _____

★ DRIVER NAME KRIS TRUCK # 14

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ DROP ☒ SWITCH ❑ PICK UP ❑ BULK MATERIAL ❑ HEAVY DEMO

DROP OFF BOX # 268 WORK ORDER _____

PICK UP BOX # 202 WORK ORDER _____

TOLLS: $ _____ TIRE DISPOSAL: _____

CHECK # _____ AMOUNT: $ _____ BALANCE DUE: $ _____

WOOD UNDER WHEELS: ❑ YES ❑ NO

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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ENVIRONMENTAL SERVICES

52340

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 7-10-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL ENV.

JOBSITE 101-35 99st QS

PARKING REGULATIONS _____

★ **DRIVER NAME** KRIS **TRUCK #** 14

ROLL-OFF CONTAINER SIZES:	☐ 10	☐ 15	☒ 20	☐ 30	☐ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

☐ **DROP** ☐ **SWITCH** ☐ **PICK UP** ☐ **BULK MATERIAL** ☐ **HEAVY DEMO**

DROP OFF BOX # 236 **WORK ORDER** _____

PICK UP BOX # 268 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ☐ **YES** ☐ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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53011

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 7-15-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL EN

JOBSITE 101 35 99 St 9

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ☒ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 289 **WORK ORDER** _____

PICK UP BOX # 236 **WORK ORDER** _____

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

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53013

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 7-15-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL EN

JOBSITE 101-35 99 ST QN

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ❑ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 225 **WORK ORDER** _____

PICK UP BOX # 259 **WORK ORDER** Concrete

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

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ENVIRONMENTAL SERVICES

53014

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 7.15.12 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL EN

JOBSITE 101-35 99th QNS

PARKING REGULATIONS _____

★ DRIVER NAME DILSH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	☐ 10	☐ 15	☒ 20	☐ 30	☐ 40	**OTHER**
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

☐ **DROP** ☐ **SWITCH** ☐ **PICK UP** ☐ **BULK MATERIAL** ☐ **HEAVY DEMO**

DROP OFF BOX # 289 **WORK ORDER** _____

PICK UP BOX # 225 **WORK ORDER** CONCRETE

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ☐ **YES** ☐ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

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ENVIRONMENTAL SERVICES

53015

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 7-15-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL GN

JOBSITE 101-35 99 ST &-S

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ DROP ❑ SWITCH ❑ PICK UP ❑ BULK MATERIAL ❑ HEAVY DEMO

DROP OFF BOX # 225 **WORK ORDER** _____

PICK UP BOX # 289 **WORK ORDER** Concrete

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ YES ❑ NO

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

NOTE: CONTAINER SERVICE IS FOR NON-TOXIC AND/OR NON-HAZARDOUS MATERIAL. ARRANGEMENTS FOR THEIR REMOVAL IS BY APPOINTMENT ONLY.

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ENVIRONMENTAL SERVICES

53016

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 7-16-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL

JOBSITE 101 35 99 ST QNS

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ❑ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 289 **WORK ORDER** _____

PICK UP BOX # 225 **WORK ORDER** Concrete

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

ALL CHARGES MUST BE PAID BEFORE CONTAINER IS REMOVED.

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53017

ROLL OFF CONTAINER SERVICE

5700 47th Street • Maspeth • NY • 11378
800-835-1445 • Fax: 718-456-1191
NYC BIC #2778

DATE OF SERVICE 2-16-13 **PURCHASE ORDER #** _____

CUSTOMER KRYSTAL

JOBSITE 101-35 99 ST QNS

PARKING REGULATIONS _____

★ DRIVER NAME DASH **TRUCK #** 2

ROLL-OFF CONTAINER SIZES:	❑ 10	❑ 15	☒ 20	❑ 30	❑ 40	OTHER
WEIGHT LIMIT (TONS):	3	4	5	7	9	

OVERWEIGHT FEE $80/TON OVER WEIGHT LIMIT

❑ **DROP** ❑ **SWITCH** ❑ **PICK UP** ❑ **BULK MATERIAL** ❑ **HEAVY DEMO**

DROP OFF BOX # 112 **WORK ORDER** _____

PICK UP BOX # 289 **WORK ORDER** [redacted]

TOLLS: $ _____ **TIRE DISPOSAL:** _____

CHECK # _____ **AMOUNT: $** _____ **BALANCE DUE: $** _____

WOOD UNDER WHEELS: ❑ **YES** ❑ **NO**

Accepted by _____

Driver or Operator must get ticket signed. Equipment enters at customer's risk.

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CONTAINER SERVICE NOT RESPONSIBLE FOR ALL PERMITS REQUIRED FOR DELIVERY.

CUSTOMER COPY

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NYR000203505
2. Page 1 of: 1
3. Emergency Response Phone: (908) 354-0210
4. Manifest Tracking Number: 008922156 JJK

GENERATOR

5. Generator's Name and Mailing Address: ENDZONE INC.
PO BOX 920
ELMER, NJ 08318
Generator's Phone: (214) 956-3001

Generator's Site Address (if different than mailing address):
101-35 99TH STREET
QUEENS NY 10025

6. Transporter 1 Company Name: CLEAN VENTURE INC.
U.S. EPA ID Number: NJ0000027193

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address: Cycle Chem Inc.
217 South First Street
Elizabeth, NJ 07206
Facility's Phone: (908) 355-5800
U.S. EPA ID Number: NJD002200046

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. UN1897 WASTE TETRACHLOROETHYLENE 6.1 PG III ERG# 160	X 5	DM	2500	P	F002	D039	B
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information: 967831/449/155411/303316 (1)R01-1 TETRACHLORETHYLENE, CONTAM. S
OIL

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: J. Ramos (AECOM) for
Signature: on behalf of Endzone Inc.
Month: 11 Day: 7 Year: 13

INT'L

16. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: RICHARD JACKSON
Signature: Richard Jackson
Month: 11 Day: 07 Year: 13

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H141			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name:
Signature:
Month: 11 Day: 07 Year: 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Seneca Meadows, Inc.

1786 Salcman Road
Waterloo, NY 13165
(315) 539-5624
Fax: (315) 539-0557

Endzone, Inc.
P.O. Box 920
Elmer, NJ 08318

August 2, 2013

SUBJECT: APPROVAL CONDITIONS FOR CONTAMINATED SOIL FROM NYSDEC SITE #: 2-41-033

Dear: Ted Coyle

Seneca Meadows, Inc. (SMI) has reviewed your profile of the above referenced material and has determined it to be suitable for acceptance at our 6 NYCRR Part 360 Solid Waste Management Facility. This material is approved by SMI in accordance with the following:

- Only contaminated soil represented by Alpha Analytical lab numbers L1304791 and L1304925 will be accepted at SMI.
- All waste haulers must have a manifest and a copy of the approval 13-083 upon arriving at the SMI scalehouse. Waste haulers that do not have the appropriate paperwork will be rejected from unloading at SMI.
- All waste haulers must maintain a valid NYSDEC Part 364 Waste Hauler Permit.
- If more than the 2600 estimated tons of contaminated soil is discovered, SMI must be notified immediately and will decide if additional testing will be necessary.

If you have any questions, please feel free to contact me via phone or e-mail (dpannucci@iesi.com).

Sincerely,

SENECA MEADOWS, INC.

David Pannucci
Environmental Engineer

Cycle Chem, Inc.		General Chemical	Material Profile Sheet
217 South First Street Elizabeth, NJ 07206 Phone: (908) 355-5800 Fax: (908) 355-0562	550 Industrial Dr. Lewisberry, PA 17339 Phone: (717) 938-4700 Fax: (717) 938-3301	133 Leland St. Framingham. MA 01701 Phone: (508) 872-5000 Fax: (508) 875-5271	Generator Number: _____ Product Code: _____ Sales Code: _____

A. Generator Information

Generator Name Endzone Inc. **Generator USEPA ID** NYR000203505
Mailing Address P.O. Box 920, Elmer, NJ 08318
Site Address 101-35 99th Street, New York, NY 10025
Generator Contact Ted Coyle **Phone #** 214-956-3001 **Fax #**

Billing Address OP-TECH Environmental Services 1 Adler Drive , East Syracuse NY 13057
Billing Contact Shari Jackson **Phone #** 315-437-2065 **Fax #** 315-437-6973

Name of Waste
Tetrachlorethylene
Contaminated Soil

Process Generating Waste Remediation

B. Physical Characteristics of Waste

Color/PhysicalDescription: Brown **Specific Gravity:** > 1
Strong Incidental Odor Present?: x Yes No **Wastewater?:** ☐ Yes ☒ No
Physical State @ 70°:
Single Phase Multilayered Solid ☐ Semi-solid Gas/Aerosol ☐ Loose Pack
☐ Bi-layered ☐ Powder x Liquid ☐ Sludge Lab Pack

% Sludge _____ % Suspended solids _____ % Solid/Debris _____ % Free Liquids _____
Dumpable: x Yes No Pumpable: Yes ☒No Pourable: Yes x No

Flashpoint: ☐ <70° 70-100° 101-141° x 142-200° >200° No Flash ☐ Exact _____
Ignitable Solid: ☐ Yes ☒No
pH: ☐ <2 ☐ 2.01-5 ☒5.01-9 ☐ 9.01-12.4 ☐ >12.5 ☐ Exact _____

C. Shipping Information

Quantity: 1,600 **Units:** P
Price: _____
Container : 4 x 55 gal.

D. Transport Information

x CCI/GCC to Provide Transportation
Customer to Deliver to CCI/GCC
☐ Customer to Deliver to end facility Via CCI/GCC

E. Chemical Composition

Description	Range Minimum	Range Maximum
Tetrachlorethylen/soil	100	

F. Regulatory Information

EPA Hazardous Waste?: x Yes No **USEPA Code(s):** F002, D039
Applicable Subcategories: _____
State Hazardous Waste?: x Yes No **State Code(s):** F002, D039
D.O.T. Hazardous Waste?: x Yes No **Proper Shipping Name:** UN1897 Waste Tetrachloroethylene
Class: 6.1 **I.D. NO:** _____ **P.G.:** III **R.Q.:** _____

G. Special Handling Considerations

Project Codes:
Special Handling:
Special Handling:
Special Pricing:

H. Other Hazardous Characteristics

			None	Actual
☐ RCRA Reactive	☐ Water Reactive			
☐ Radioactive	☐ Subject to Subpart	PCB's	☒	
☐ Etiological	FF Benzene	Cyanides	☒	
☐ TSCA Regulated	☐ Oxidizing	Phenolics	☒	
☐ Pyrophoric	☐ Explosive	Sulfides	☒	
☒ None		VOC's	☒	

☒ Is this waste characteristically hazardous (EPA Waste Codes D004-D043):
☐ Does this waste contain underlying hazardous constituents As defined In 40 CFR 268(2)(I) at at concentrations exceeding the UTS treatment standards? If yes, list In section C.

GENERATOR CERTIFICATION: I hereby certify that all information submitted In this and attached documents is complete, contains true and accurate descriptions and is representative of the waste material, and that all relevant information regarding known or suspected hazards In the possession of the Generator has been disclosed. If CCI discovers; after having taken delivery of the waste, that any waste does not conform to the identification and description On this MPS then CCI shall provide notice of such condition to the Generator and coordinate the return of the nonconforming waste to the point of origin as Set forth On the manifest or to such other locations designated In writing by the Generator. Generator agrees to reimburse CCI for all handling, packaging, clean-up and transportation costs or charges, damage to equipment, and costs associated with lost time incurred by CCI during the receipt, handling, temporary storage and return of such nonconforming waste to point of origin or to such other location designated by Generator. I hereby authorize CCI to amend and/or correct any information on the MPS with the full understanding that if any amendment or correction is performed, I will be contacted As such to issue any approval.

AUTHORIZED SIGNATURE: Raimundo Matos Agent for ENDZONE **TITLE:** Project Geologist AECOM **DATE:** 10/28/13

Former Ozone Industries, Inc. Site, Ozone Park, Queens, NY

AGENCY AGREEMENT
Authority to Act as Agent for COMPANY

Pursuant to the terms and conditions of the *Design / Build Engineering, Remediation and Project Management Agreement* for Services between AECOM Technical Services, Inc. (hereinafter "CONTRACTOR") and Endzone, Inc. (hereinafter "COMPANY"), dated June 22, 2011, (hereinafter referred to as the "Agreement" or the "MSA"), which Agreement is incorporated herein by this reference between CONTRACTOR and COMPANY.

COMPANY hereby authorizes CONTRACTOR to act as its agent for the purpose of arranging for the transport and/or disposal of waste ("Services") as part of the completion of the remedial work outlined in the Endzone, Inc. approved *Proposal For Remedial Services* (dated June 8, 2012) when the DESCRIPTION OF WORK of a specific Request for Services ("RFS") so states.

COMPANY shall defend, indemnify and hold CONTRACTOR, its employees, agents and subcontractors harmless against any claim, actions, causes of action, liability, judgments, fines, penalties and costs reasonably incurred which arise out of CONTRACTOR's actions within the scope of its authorization as agent for COMPANY for Services in accordance with the MSA, except to the extent such claims, actions, causes of action, liability, judgments, fines, penalties and costs arise out of CONTRACTOR's negligence, breach of contract, or willful misconduct which in whole or in part caused the damage, injury or loss. CONTRACTOR shall defend, indemnify and hold COMPANY, its officers, directors and employees harmless against any claims, actions, causes of action, liability, judgments, fines, penalties and costs reasonably incurred which arise out of CONTRACTOR's negligence, breach of contract or willful misconduct.

For transport and disposal activities undertaken by CONTRACTOR in accordance with this Agreement, it is agreed that CONTRACTOR shall under no circumstances be considered the generator of any Waste from the project site pursuant to any environmental or other law or regulation. It is further agreed that nothing in this authorization is intended to transfer or convey ownership of such Waste to CONTRACTOR.

AUTHORIZED BY:

AECOM, Technical Services, Inc. (CONTRACTOR)		Endzone, Inc. (COMPANY)	
By:		By:	
(Print Name)	David Austin	(Print Name)	Ted Coyle
Title:	Sen. Proj. Man.	Title:	Director HSSE
Date:	5/2/13	Date:	May 2, 2013

AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
1	6/17/2013

Direction Photo Taken:

Description:

Pre-excavation



Photo No.	Date:
2	6/13/2013

Direction Photo Taken:

Description:

Pre-excavation



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
3	6/17/2013

Direction Photo Taken:

Description:

Pre-excavation



Photo No.	Date:
4	6/17/2013

Direction Photo Taken:

Northwest

Description:

Pre-excavation



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
5	6/17/2013

Direction Photo Taken:

Description:

Pre-excavation



Photo No.	Date:
6	6/24/2013

Direction Photo Taken:

Description:

Excavation



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
7	6/24/2013

Direction Photo Taken:

Description:

excavation



Photo No.	Date:
8	6/24/2013

Direction Photo Taken:

Description:

excavation



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
9	6/24/2013

Direction Photo Taken:

Description:

excavation



Photo No.	Date:
10	7/15/2013

Direction Photo Taken:

Description:

Excavation



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
11	7/15/2013

Direction Photo Taken:

Description:

Excavation



Photo No.	Date:
12	7/15/2013

Direction Photo Taken:

Description:

Excavation



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
13	7/15/2013

Direction Photo Taken:

Description:

Excavation



Photo No.	Date:
14	7/15/2013

Direction Photo Taken:

Description:

Excavation



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
15	7/15/2013

Direction Photo Taken:

Description:

Excavation

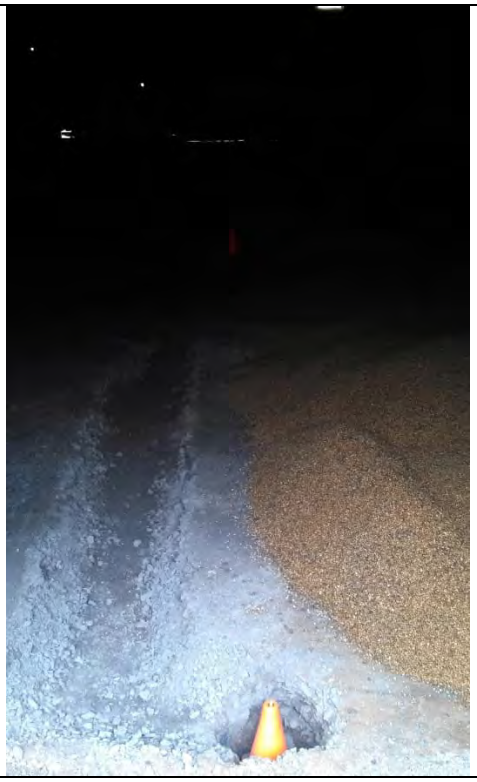


Photo No.	Date:
16	9/3/2013

Direction Photo Taken:

Description:

Bay 15 before pipe laid



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
16	9/3/2013

Direction Photo Taken:

Description:

Bay 12 before pipe



Photo No.	Date:
17	9/6/2013

Direction Photo Taken:

Description:

Bay 15 dryfit of piping



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
17	9/9/2013

Direction Photo Taken:

Description:

Bay 15 unistruts, dry fit pipe



Photo No.	Date:
18	9/9/2013

Direction Photo Taken:

Description:

Bay 13 unistruts, dry fitted pipe



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
18	9/10/2013

Direction Photo Taken:

Description:

Bay 13 pipes, backfill



Photo No.	Date:
19	9/10/2013

Direction Photo Taken:

Description:

Bay 8 unistruts, dry fit piping



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
20	9/11/2013

Direction Photo Taken:

Description:

Bay 11 support bottom



Photo No.	Date:
21	9/11/2013

Direction Photo Taken:

Description:

Bay 13 support bottom



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
22	9/12/2013

Direction Photo Taken:

Description:

Bay 8 SVE wells main trench



Photo No.	Date:
23	9/12/2013

Direction Photo Taken:

Description:

Pressure testing main trench



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
24	9/12/2013

Direction Photo Taken:

Description:

Pressure testing SVE well head

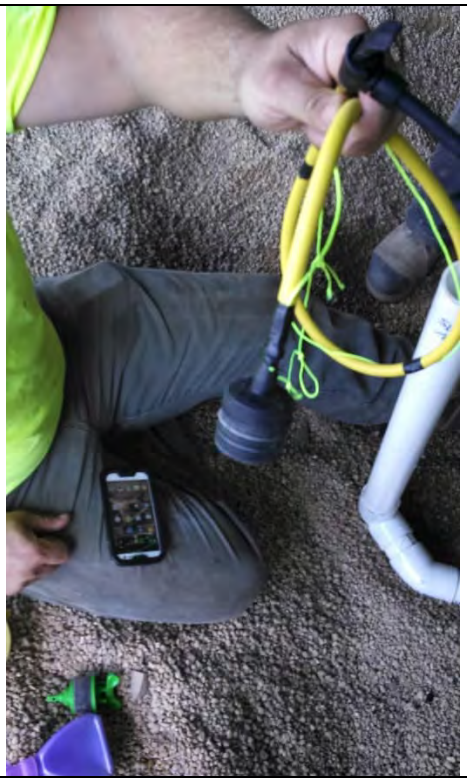


Photo No.	Date:
25	9/6/2013

Direction Photo Taken:

Description:

Pressure testing inflatable plug



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
26	9/13/2013

Direction Photo Taken:

Description:

Bay 15 backfill

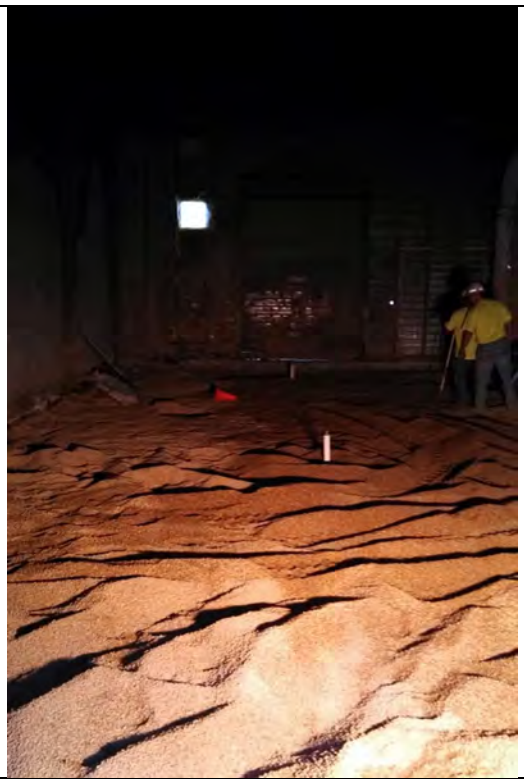


Photo No.	Date:
27	9/13/2013

Direction Photo Taken:

Description:

Bay 8 SVE wells



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
28	9/16/2013

Direction Photo Taken:

Description:

Bay 15 raked backfill



Photo No.	Date:
29	9/16/2013

Direction Photo Taken:

Description:

Bay 9 raked backfill



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
30	9/16/2013

Direction Photo Taken:

Description:

Bay 10 SSDS piping cover

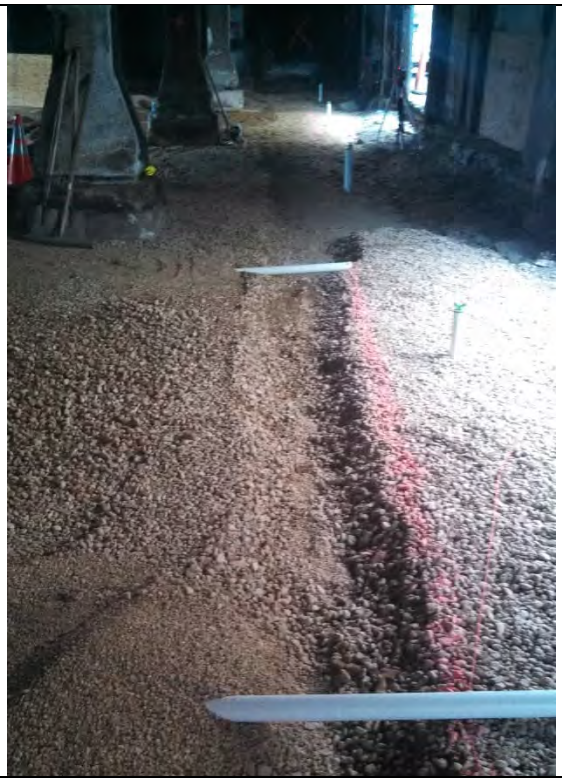


Photo No.	Date:
31	9/16/2013

Direction Photo Taken:

Description:

Bay 10 Main trench



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
32	9/16/2013

Direction Photo Taken:

Description:

Bay 12 SSDS trench



Photo No.	Date:
33	9/16/2013

Direction Photo Taken:

Description:

Bay 8b backfill



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
34	9/17 /2013



Direction Photo Taken:

Description:

Bay 8a backfill staging



Photo No.	Date:
35	9/18/2013

Direction Photo Taken:

Description:

Bay 14 SSDS piping main trench



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PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
36	9/19/2013

Direction Photo Taken:

Description:

Bay 8 stub ups



Photo No.	Date:
37	9/20/2013

Direction Photo Taken:

Description:

Bay 13 SSDS main trench



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
38	9/20/2013

Direction Photo Taken:

Description:

Bay 10 SSDS main trench



Photo No.	Date:
39	9/20/2013

Direction Photo Taken:

Description:

Bay 8 elbows



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
40	9/23/2013

Direction Photo Taken:

Description:

Bay 10 backfilled and tamped



Photo No.	Date:
41	9/25/2013

Direction Photo Taken:

Description:

Geomembrane installation



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PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
42	9/25/2013

Direction Photo Taken:

Description:

Geomembrane installation



Photo No.	Date:
43	9/25/2013

Direction Photo Taken:

Description:

Well boot on geotextile



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
44	9/25/2013

Direction Photo Taken:

Description:

SVE stub ups well boots

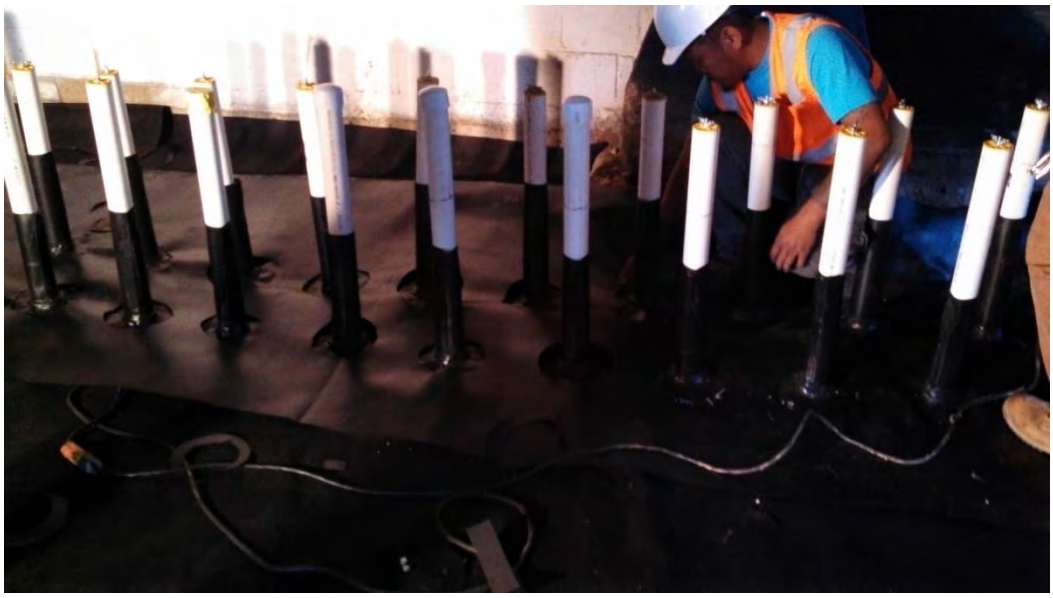


Photo No.	Date:
45	9/25/2013

Direction Photo Taken:

Description:

Liner installation



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
46	9/26  /2013

Direction Photo Taken:

Description:

Liner anchor to walls

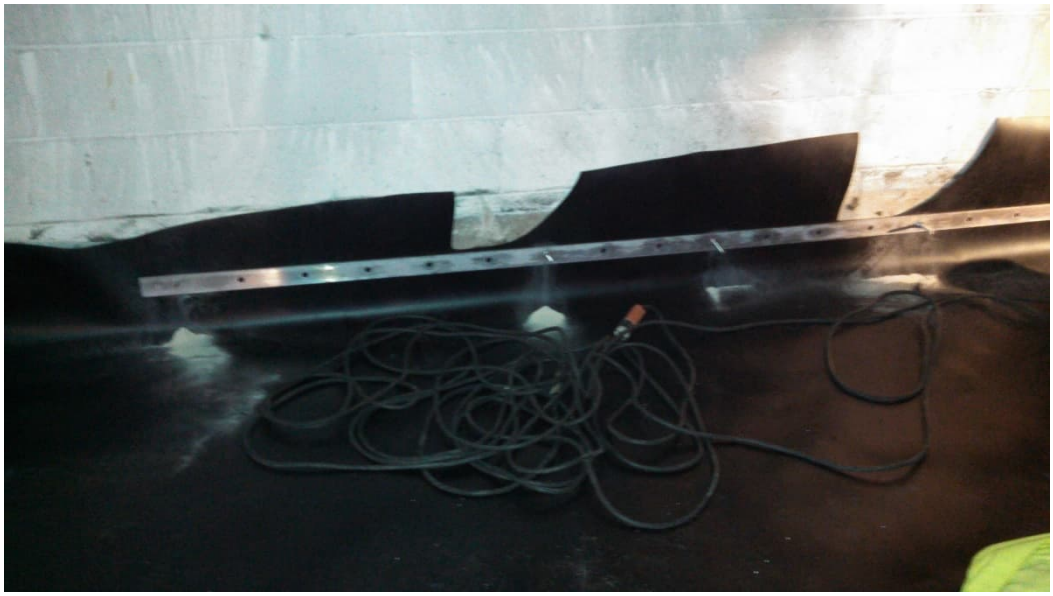


Photo No.	Date:
47	9/6/2013

Direction Photo Taken:

Description:

Liner seal



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
48	9/26/2013

Direction Photo Taken:

Description:

Liner around columns

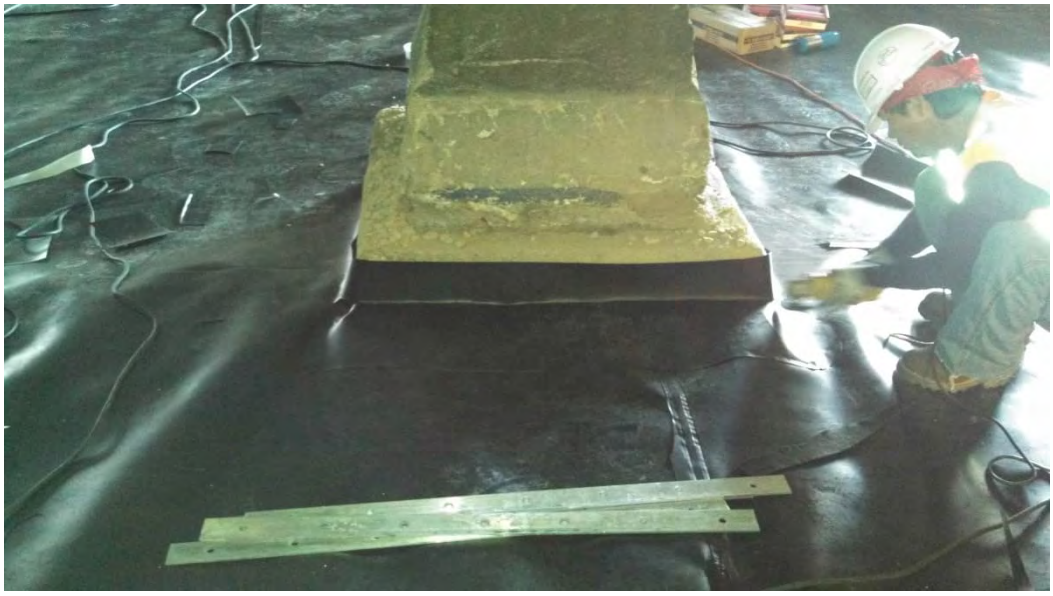
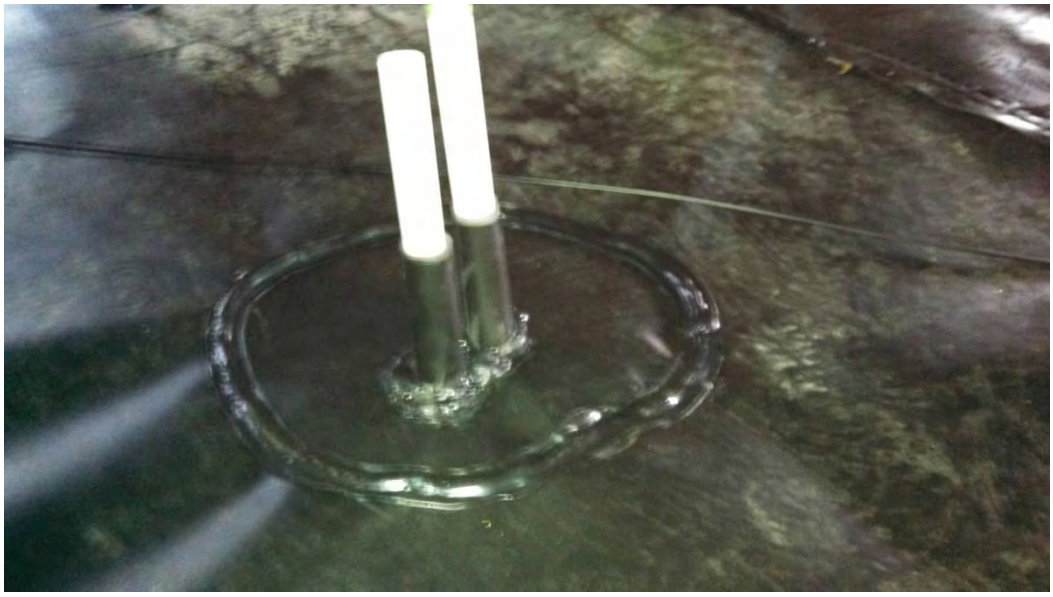


Photo No.	Date:
49	9/26/2013

Direction Photo Taken:

Description:

Liner seal around boots



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
50	9/6/2013

Direction Photo Taken:

Description:

Liner seal around stub ups



Photo No.	Date:
51	12/20/2013

Direction Photo Taken:

Description:

Inside Bay 15



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
52	12/20/2013

Direction Photo Taken:

Description:

Inside Bay 14



Photo No.	Date:
53	12/20/2013

Direction Photo Taken:

Description:

Inside Bay 13



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
54	12/20/2013

Direction Photo Taken:

Description:

Inside Bay 12

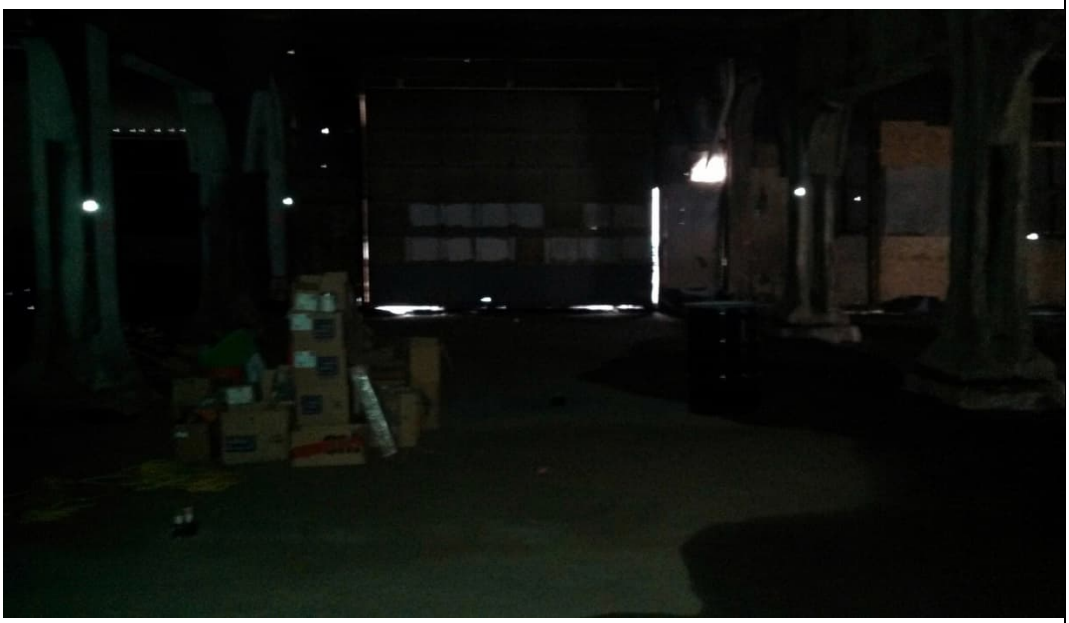


Photo No.	Date:
55	12/20/2013

Direction Photo Taken:

Description:

Inside Bay 11



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
56	12/20/2013

Direction Photo Taken:

Description:

Inside Bay 8



Photo No.	Date:
57	12/20/2013

Direction Photo Taken:

Description:

Bay 8 stub ups



AECOM

PHOTOGRAPH LOG

Facility Name:	Site Location:	Project No.
Former Ozone Industries, Inc.	Ozone Park, Queens, New York	60671903

Photo No.	Date:
58	12/20/2013

Direction Photo Taken:

Description:

Bay 12 before pipe

Photo No.	Date:
58	12/20/2013

Direction Photo Taken:

Description:

Bay 15 dryfit of piping

APPENDIX I

Soil Disposal Manifests and Waste Documentation

APPENDIX J

Laboratory Analytical Data

APPENDIX K

DUSRs

Document Usability Summary Report (2004 – 2006 RI Data)

Former Ozone Industries, Inc. Site

NYSDEC Site # 2-41-033

Order on Consent Index # W2-0922-02-05 (with Endzone, Inc.)

Prepared By
Waverly Braunstein

Reviewed By
David G. Austin

ENSR Corporation
October 2007
10748-001

ENSR | AECOM

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List of Appendices

Appendix A Attachments to Data Usability Summary Report

1.0 Introduction

This Data Usability Summary Report (DUSR) includes a discussion of the usability of the data collected during the Remedial Investigation at the Former Ozone Industries site, located in Queens, NY (between October 2004 and August 2006). A total of 59 soil samples and 69 groundwater samples were collected and analyzed for volatile organic compounds (VOCs) via SW-846 Method 8260B.

The data were validated using the USEPA Region 2 data validation Standard Operating Procedures (SOPs) as guidance. Where necessary, the Region 2 SOPs were modified to incorporate project-specific or method-specific criteria. Data qualifiers applied were consistent with the Region 2 guidance and consisted of the following:

Qualifier	Definition
J	Estimated
U	Not detected
UJ	Not detected, estimated

Elements reviewed in preparing the DUSR were consistent with those specified in the NYSDEC guidance (NYSDEC, 2001).

In general, the data were found to be valid, and may be considered usable for decision making purposes. No data were rejected (R).

Selected data points (approximately four percent of the data) were qualified as estimated (J/UJ) due to QC nonconformances. In addition, less than one half of one percent of the data were negated (U) on the basis of laboratory and field blank contamination. All QC nonconformances are summarized below.

Note that approximately five percent of the data were qualified as estimated (J) only because the results were less than the reporting limit, but greater than the method detection limit. This qualifier was added by the laboratory and retained through the review process. These data are not discussed further.

2.0 QC Nonconformance's

2.1 Holding Times

Holding times were met for the initial analysis of all samples. However, in a small number of cases, samples were reanalyzed at a dilution outside of holding times due to concentrations of target compounds that exceeded the calibration range in the initial analysis. Five trichloroethene (TCE) and one cis-1,2,-dichloroethene results were qualified as estimated (J) on this basis.

2.2 Sample Preservation

All samples were properly preserved and were stored at the proper temperature from the time of laboratory receipt until analysis. All samples were received by the laboratory at the required temperature of 4 ± 2°C.

2.3 Quality Control

Quality control elements were reviewed for compliance with acceptance criteria. Copies of the complete data validation memos and qualified results are included as attachments to this DUSR.

2.4 Initial and Continuing Calibration

Initial calibrations met all acceptance criteria for all analyses. Minor continuing calibration nonconformances resulted in the qualification of approximately three percent of the data. Dichlorodifluoromethane accounted for nearly one third of the nonconformances with the remaining nonconformances spread across 11 miscellaneous compounds. Associated positive and non-detect results were qualified as estimated (J/UJ).

2.5 Blanks

Blanks associated with the samples included laboratory method blanks, equipment blanks, and trip blanks. Contaminants were sporadically detected in various blanks for each of the other analyses. These contaminants are discussed below only if they resulted in the qualification of data.

Low levels of acetone were found in three trip blanks, two equipment blanks, and one or more laboratory method blanks. Consistent with the Region 2 validation guidelines, action levels were established at 10 times the concentrations detected in the blank and compared to the associated sample results. Sample results falling below the action level were qualified as nondetect (U) at the sample quantitation limit (SQL). A total of five acetone results were negated on this basis.

Five low level methyl-tertiary-butyl ether (MTBE) results were negated due to equipment blank contamination. MTBE was detected at the unusually high concentration of 40 µg/L in equipment blank PZ05GWC2, collected April 28, 2005. No explanation has been found for this anomalous result. With the exception of this one equipment blank, the maximum MTBE concentration detected in any sample, in any of the sampling rounds was 1.5 µg/L. MTBE was not detected in any soil samples.

Note that all of the results that were negated due to blank contamination were detected at very low concentrations (all less than the reporting limit). This indicates that the impact on the overall data usability is negligible.

2.6 Surrogates

Surrogate recoveries were acceptable for all groundwater sample analyses. Surrogate recoveries for the soil sample SS32SBAA fell slightly below the lower acceptance limit. Positive and non-detect results for this sample were qualified as estimated (J/UJ) and may be biased low.

2.7 Matrix Spikes/Matrix Spike Duplicates (MS/MSDs)

The percent recoveries (%Rs) and relative percent differences (RPDs) were generally acceptable. No systematic problems were identified.

The non-detect acetone result in groundwater sample MW201SGWA3, the non-detect cyclohexane and methylcyclohexane results in soil sample SS6S6PA, and 12 miscellaneous non-detect results in soil sample SS27SBPA were qualified as estimated (UJ) due to slightly low recoveries.

2.8 Field Duplicates

The following table summarizes the field duplicates collected for this investigation:

Matrix	Parent Sample ID	Duplicate Sample ID
Soil	SS4SBPA	SS4SBPB
Soil	SS8SBAA	SS8SBAB
Soil	SS35SBJA	SS35SBJB
Soil	SS34SBOA	SS34SBOB
Groundwater	MW13SGWA2	MW13SGWB1
Groundwater	PZ09GWA2	PZ09GWB1
Groundwater	MW06SGWA3	MW06SGWB3
Groundwater	MW120DGWA3	MW120DGWB3
Groundwater	MW202GWA3	MW202GWB3

Overall, agreement between field duplicates was acceptable. The results that exceeded the acceptance criteria and which were qualified as estimated (J) are summarized below.

SS8SBAA/SS8SBAB			
Compound	Original Result (µg/kg)	Duplicate Result (µg/kg)	RPD %
Trichloroethene	9300	21000	77

SS35SBJA/SS35SBJB			
Compound	Original Result (µg/kg)	Duplicate Result (µg/kg)	RPD %
Trichloroethene	68	32	72

SS34SBOA/SS34SBOB			
Compound	Original Result (µg/kg)	Duplicate Result (µg/kg)	RPD %
cis -1,2-Dichloroethene	27	53	65

2.9 Laboratory Control Samples

Laboratory control samples (LCSs) were associated with all analyses and all recoveries met the acceptance criteria. No data were qualified on this basis.

2.10 Detection Limits and Sample Results

The percent solids for all soil samples were greater than 50%. No qualifications were required on this basis.

In several instances, analytical dilutions were necessary to quantitate target analytes within the instrument calibration range. Results were combined during validation to report the lowest possible reporting limits for non-detects, while reporting all detected compounds within the calibration range.

2.11 Completeness of Deliverables

The data were reported as NYSDEC ASP Category B deliverables. No significant omissions or deficiencies were noted.

3.0 Conclusions

In general, the data are valid as reported and may be used for decision making purposes. No data points were rejected (R). Selected results were negated (U) for blank contamination and, some detected and nondetected results were qualified as estimated (J and UJ, respectively) based on certain QC nonconformances as described in the sections above.

Appendix A

Attachments to Data Usability Summary Report

Data Validation Memos and Qualified Analytical Results:

12/17/04 (October 2004 Soil Samples)

3/17/05 (January 2005 Groundwater Samples)

6/29/05 (April 2005 Groundwater Samples)

9/20/05 (July 2005 Soil Samples)

9/20/05 (July 2005 Soil Samples)

10/20/05 (November 2004 Soil Samples)

9/27/06 (July 2006 Soil Samples)

10/13/06 (August 2006 Groundwater Samples)

10/15/06 (August 2006 Soil Samples)

ENSR

MEMORANDUM

TO:	David Austin/Westford	**DATE:**	December 17, 2004
FROM:	Sheena Blair/Westford	**FILE:**	OZ001voc 10748-001-0500
RE:	Data Validation VOCs in Soil Former Ozone Industries Queens, NY CAS Project # R2423661	**CC:**	W. Braunstein/Westford

SUMMARY

Limited validation was performed on the data for eight soil samples for volatile organic compounds (VOCs) analyzed using EPA method 8260B. The samples were collected at the Former Ozone Industries site, Queens, NY on October 19, 25 and 26, 2004 and submitted to Columbia Analytical Services (CAS) in Rochester, New York. CAS analyzed and reported the results under project number R2423661.

The sample results were assessed according to the EPA methods and the *"USEPA Region 2, SOP HW-24, Standard Operating Procedure for the Validation of Organic Data Acquired using SW-846 EPA Method 8260B" (Revision 2, December 1999)."*

In general, the data are valid as reported and may be used for decision making purposes. Selected data points were negated (U) due to blank contamination (see discussion below).

SAMPLES

The samples included in this review are listed below:

Sample IDs	Analyses
PZ-01D (33-35) A1	VOC
PZ-01D (53-55) A1	VOC
MW-202 (7-12)	VOC
MW-202 (25-27)	VOC
MW-202 (29-31)	VOC
MW-203 (15-19) A1	VOC
MW-203 (30-32) A1	VOC
MW-203 (40-42) A1	VOC

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with the chain of custody (COC) requests
- Holding times and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/equipment blank/trip blank
- Surrogate spike recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) results

- Field duplicate results
- Laboratory control sample (LCS) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports corresponded to the analytical requests designated on the COC. No discrepancies were noted.

Holding Times and Sample Preservation

The cooler temperatures ranged from 4°C-6°C, which met the QC acceptance criteria of 4°C ± 2°C.

All samples were extracted and analyzed within the QAPP specified holding times.

GC/MS Tunes

The frequency and abundance of the bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within 12 hours from the BFB tunes.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs), the response factors (RFs) and percent differences (%Ds) of all target analytes were within the QC acceptance criteria in the initial and continuing calibration standards.

Method Blanks/Equipment Blank/Trip Blank

No Equipment or trip blanks were submitted with this sample set. No validation action was taken on this basis.

Target compounds were not detected in the laboratory method blanks with the exception of toluene in the laboratory method blank analyzed 11/03/04. The presence of blank contamination indicates that false positive results may exist for this compound in the associated samples. An action Level (AL) was established for toluene at 10x the concentration detected in the blank. The following table summarizes the AL and the associated samples.

Type of Blank	Compound	Conc. Detected (µg/kg)	AL (µg/kg)
Method Blank 11/03/04	Toluene	1.6	16
Associated samples: All samples except MW-202-(7-12)			

Sample results were qualified as follows:

- Sample results < sample quantitation limit (SQL) and ≤ AL were qualified as nondetect (U) at the SQL.
- Sample results ≥ SQL but ≤ AL were qualified as nondetect (U) at the reported concentration.
- Sample results ≥ SQL and ≥ AL were accepted without qualification.

Surrogate Spike Recoveries

The surrogate recoveries were within the QC acceptance limits in all sample analyses.

ENSR

MS/MSD Results

MS/MSD analysis was not performed on a sample from this sample set. Accuracy in the laboratory was demonstrated by the analyses of LCSs.

Internal Standard Performance

Internal standard performance met the QC acceptance criteria in all sample analysis.

Field Duplicate Results

A field duplicate pair was not submitted in this data set. No validation action was taken on this basis.

LCS Results

The %Rs of the spiked target analytes were within the QC acceptance criteria in the LCSs associated with all sample analyses.

Quantitation Limits and Sample Results

All samples were analyzed undiluted. Sample Quantitation Limits (SQLs) for these samples were not affected.

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #01834765
Client Sample ID : PZ-01D (33-35) A1

Date Sampled : 10/25/04 11:15 **Order #:** 770231 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 10/27/04 **Submission #:** R2423661 **Percent Solid:** 80.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.66			Dry Weight
ACETONE	10	4.8 J	UG/KG
BENZENE	5.0	4.1 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.1 U	UG/KG
BROMOFORM	5.0	4.1 U	UG/KG
BROMOMETHANE	5.0	4.1 U	UG/KG
2-BUTANONE (MEK)	10	8.2 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.1 U	UG/KG
CARBON DISULFIDE	10	8.2 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.1 U	UG/KG
CHLOROBENZENE	5.0	4.1 U	UG/KG
CHLOROETHANE	10	8.2 U	UG/KG
CHLOROFORM	5.0	4.1 U	UG/KG
CHLOROMETHANE	5.0	4.1 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.1 U	UG/KG
CYCLOHEXANE	10	8.2 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.1 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.1 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.1 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.1 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.1 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.1 U	UG/KG
1,1-DICHLOROETHANE	5.0	4.1 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.1 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.1 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	4.1 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.1 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.1 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.1 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.1 U	UG/KG
ETHYLBENZENE	5.0	4.1 U	UG/KG
2-HEXANONE	10	8.2 U	UG/KG
ISOPROPYLBENZENE	5.0	4.1 U	UG/KG
METHYL ACETATE	5.0	4.1 U	UG/KG
METHYLCYCLOHEXANE	10	8.2 U	UG/KG
METHYLENE CHLORIDE	5.0	4.1 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	8.2 U	UG/KG
STYRENE	5.0	4.1 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.1 U	UG/KG
TETRACHLOROETHENE	5.0	4.1 U	UG/KG
TOLUENE	5.0	4.1 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.1 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.1 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.1 U	UG/KG

VOLATILE ORGANICS
METHOD 8260B
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ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #01834765
Client Sample ID : PZ-01D (33-35) A1

Date Sampled : 10/25/04 11:15 **Order #:** 770231 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 10/27/04 **Submission #:** R2423661 **Percent Solid:** 80.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.66			Dry Weight
TRICHLOROETHENE	5.0	4.1 U	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.1 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.1 U	UG/KG
VINYL CHLORIDE	5.0	4.1 U	UG/KG
O-XYLENE	5.0	4.1 U	UG/KG
M+P-XYLENE	5.0	4.1 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(68 - 128)	101	%
TOLUENE-D8	(75 - 128)	98	%
DIBROMOFLUOROMETHANE	(62 - 133)	90	%

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #01834765
Client Sample ID : PZ-01D (53-55) A1

Date Sampled : 10/25/04 14:00 **Order #:** 770232 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 10/27/04 **Submission #:** R2423661 **Percent Solid:** 86.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.53			Dry Weight
ACETONE	10	2.9 J	UG/KG
BENZENE	5.0	3.1 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.1 U	UG/KG
BROMOFORM	5.0	3.1 U	UG/KG
BROMOMETHANE	5.0	3.1 U	UG/KG
2-BUTANONE (MEK)	10	6.2 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.1 U	UG/KG
CARBON DISULFIDE	10	6.2 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.1 U	UG/KG
CHLOROBENZENE	5.0	3.1 U	UG/KG
CHLOROETHANE	10	6.2 U	UG/KG
CHLOROFORM	5.0	3.1 U	UG/KG
CHLOROMETHANE	5.0	3.1 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.1 U	UG/KG
CYCLOHEXANE	10	6.2 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.1 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.1 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.1 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.1 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.1 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.1 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.1 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.1 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.1 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.1 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.1 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.1 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.1 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.1 U	UG/KG
ETHYLBENZENE	5.0	3.1 U	UG/KG
2-HEXANONE	10	6.2 U	UG/KG
ISOPROPYLBENZENE	5.0	3.1 U	UG/KG
METHYL ACETATE	5.0	3.1 U	UG/KG
METHYLCYCLOHEXANE	10	6.2 U	UG/KG
METHYLENE CHLORIDE	5.0	3.1 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	6.2 U	UG/KG
STYRENE	5.0	3.1 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.1 U	UG/KG
TETRACHLOROETHENE	5.0	0.84 J	UG/KG
TOLUENE	5.0	3.1 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.1 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.1 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.1 U	UG/KG

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #01834765
Client Sample ID : PZ-01D (53-55) A1

Date Sampled : 10/25/04 14:00 **Order #:** 770232 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 10/27/04 **Submission #:** R2423661 **Percent Solid:** 86.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.53			Dry Weight
TRICHLOROETHENE	5.0	1.3 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.1 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.1 U	UG/KG
VINYL CHLORIDE	5.0	3.1 U	UG/KG
O-XYLENE	5.0	3.1 U	UG/KG
M+P-XYLENE	5.0	3.1 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(68 - 128)	95	%
TOLUENE-D8	(75 - 128)	92	%
DIBROMOFLUOROMETHANE	(62 - 133)	82	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748001200
Client Sample ID : MW-202 (7-12)

Date Sampled : 10/27/04 09:00 **Order #:** 771095 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 10/29/04 **Submission #:** R2423661 **Percent Solid:** 95.4

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/05/04			
ANALYTICAL DILUTION: 0.68			Dry Weight
ACETONE	10	9.6 J	UG/KG
BENZENE	5.0	3.2 J	UG/KG
BROMODICHLOROMETHANE	5.0	3.6 U	UG/KG
BROMOFORM	5.0	3.6 U	UG/KG
BROMOMETHANE	5.0	3.6 U	UG/KG
2-BUTANONE (MEK)	10	7.1 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.6 U	UG/KG
CARBON DISULFIDE	10	7.1 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.6 U	UG/KG
CHLOROBENZENE	5.0	3.6 U	UG/KG
CHLOROETHANE	10	7.1 U	UG/KG
CHLOROFORM	5.0	3.6 U	UG/KG
CHLOROMETHANE	5.0	3.6 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.6 U	UG/KG
CYCLOHEXANE	10	7.1 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.6 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.6 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.6 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.6 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.6 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.6 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.6 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.6 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.6 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.6 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.6 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.6 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.6 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.6 U	UG/KG
ETHYLBENZENE	5.0	3.6 U	UG/KG
2-HEXANONE	10	7.1 U	UG/KG
ISOPROPYLBENZENE	5.0	3.6 U	UG/KG
METHYL ACETATE	5.0	3.6 U	UG/KG
METHYLCYCLOHEXANE	10	7.1 U	UG/KG
METHYLENE CHLORIDE	5.0	3.6 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.1 U	UG/KG
STYRENE	5.0	3.6 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.6 U	UG/KG
TETRACHLOROETHENE	5.0	3.6 U	UG/KG
TOLUENE	5.0	1.5 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.6 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.6 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.6 U	UG/KG

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748001200
Client Sample ID : MW-202 (7-12)

Date Sampled : 10/27/04 09:00 **Order #:** 771095 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 10/29/04 **Submission #:** R2423661 **Percent Solid:** 95.4

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/05/04			
ANALYTICAL DILUTION: 0.68			Dry Weight
TRICHLOROETHENE	5.0	3.6 U	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.6 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.6 U	UG/KG
VINYL CHLORIDE	5.0	3.6 U	UG/KG
O-XYLENE	5.0	3.6 U	UG/KG
M+P-XYLENE	5.0	0.84 J	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(68 - 128)	100	%
TOLUENE-D8	(75 - 128)	94	%
DIBROMOFLUOROMETHANE	(62 - 133)	85	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748001200
Client Sample ID : MW-202 (25-27)

Date Sampled : 10/27/04 09:30 **Order #:** 771096 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 10/29/04 **Submission #:** R2423661 **Percent Solid:** 93.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.69			Dry Weight
ACETONE	10	5.2 J	UG/KG
BENZENE	5.0	0.97 J	UG/KG
BROMODICHLOROMETHANE	5.0	3.7 U	UG/KG
BROMOFORM	5.0	3.7 U	UG/KG
BROMOMETHANE	5.0	3.7 U	UG/KG
2-BUTANONE (MEK)	10	7.4 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.7 U	UG/KG
CARBON DISULFIDE	10	7.4 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.7 U	UG/KG
CHLOROBENZENE	5.0	3.7 U	UG/KG
CHLOROETHANE	10	7.4 U	UG/KG
CHLOROFORM	5.0	3.7 U	UG/KG
CHLOROMETHANE	5.0	3.7 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.7 U	UG/KG
CYCLOHEXANE	10	7.4 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.7 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.7 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.7 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.7 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.7 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.7 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.7 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.7 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.7 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.7 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.7 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.7 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.7 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.7 U	UG/KG
ETHYLBENZENE	5.0	3.7 U	UG/KG
2-HEXANONE	10	7.4 U	UG/KG
ISOPROPYLBENZENE	5.0	3.7 U	UG/KG
METHYL ACETATE	5.0	3.7 U	UG/KG
METHYLCYCLOHEXANE	10	7.4 U	UG/KG
METHYLENE CHLORIDE	5.0	3.7 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.4 U	UG/KG
STYRENE	5.0	3.7 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.7 U	UG/KG
TETRACHLOROETHENE	5.0	3.7 U	UG/KG
TOLUENE	5.0	3.7 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.7 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.7 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.7 U	UG/KG

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748001200
Client Sample ID : MW-202 (25-27)

Date Sampled : 10/27/04 09:30 **Order #:** 771096 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 10/29/04 **Submission #:** R2423661 **Percent Solid:** 93.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.69			Dry Weight
TRICHLOROETHENE	5.0	3.7 U	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.7 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.7 U	UG/KG
VINYL CHLORIDE	5.0	3.7 U	UG/KG
O-XYLENE	5.0	3.7 U	UG/KG
M+P-XYLENE	5.0	3.7 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(68 - 128)	104	%
TOLUENE-D8	(75 - 128)	99	%
DIBROMOFLUOROMETHANE	(62 - 133)	87	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748001200
Client Sample ID : MW-202 (29-31)

Date Sampled : 10/27/04 10:00 **Order #:** 771097 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 10/29/04 **Submission #:** R2423661 **Percent Solid:** 82.7

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.57			Dry Weight
ACETONE	10	4.7 J	UG/KG
BENZENE	5.0	0.75 J	UG/KG
BROMODICHLOROMETHANE	5.0	3.4 U	UG/KG
BROMOFORM	5.0	3.4 U	UG/KG
BROMOMETHANE	5.0	3.4 U	UG/KG
2-BUTANONE (MEK)	10	6.9 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.4 U	UG/KG
CARBON DISULFIDE	10	6.9 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.4 U	UG/KG
CHLOROBENZENE	5.0	3.4 U	UG/KG
CHLOROETHANE	10	6.9 U	UG/KG
CHLOROFORM	5.0	3.4 U	UG/KG
CHLOROMETHANE	5.0	3.4 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.4 U	UG/KG
CYCLOHEXANE	10	6.9 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.4 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.4 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.4 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.4 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.4 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.4 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.4 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.4 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.4 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.4 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.4 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.4 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.4 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.4 U	UG/KG
ETHYLBENZENE	5.0	3.4 U	UG/KG
2-HEXANONE	10	6.9 U	UG/KG
ISOPROPYLBENZENE	5.0	3.4 U	UG/KG
METHYL ACETATE	5.0	3.4 U	UG/KG
METHYLCYCLOHEXANE	10	6.9 U	UG/KG
METHYLENE CHLORIDE	5.0	3.4 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	6.9 U	UG/KG
STYRENE	5.0	3.4 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.4 U	UG/KG
TETRACHLOROETHENE	5.0	3.4 U	UG/KG
TOLUENE	5.0	3.4 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.4 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.4 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.4 U	UG/KG

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748001200
Client Sample ID : MW-202 (29-31)

Date Sampled : 10/27/04 10:00 **Order #:** 771097 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 10/29/04 **Submission #:** R2423661 **Percent Solid:** 82.7

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.57			Dry Weight
TRICHLOROETHENE	5.0	3.4 U	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.4 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.4 U	UG/KG
VINYL CHLORIDE	5.0	3.4 U	UG/KG
O-XYLENE	5.0	3.4 U	UG/KG
M+P-XYLENE	5.0	3.4 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(68 - 128)	108	%
TOLUENE-D8	(75 - 128)	100	%
DIBROMOFLUOROMETHANE	(62 - 133)	93	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #01834765
Client Sample ID : MW-203 (15-19) A1

Date Sampled : 11/01/04 09:55 **Order #:** 771721 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/02/04 **Submission #:** R2423661 **Percent Solid:** 95.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.55			Dry Weight
ACETONE	10	4.4 J	UG/KG
BENZENE	5.0	2.9 U	UG/KG
BROMODICHLOROMETHANE	5.0	2.9 U	UG/KG
BROMOFORM	5.0	2.9 U	UG/KG
BROMOMETHANE	5.0	2.9 U	UG/KG
2-BUTANONE (MEK)	10	5.7 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	2.9 U	UG/KG
CARBON DISULFIDE	10	5.7 U	UG/KG
CARBON TETRACHLORIDE	5.0	2.9 U	UG/KG
CHLOROBENZENE	5.0	2.9 U	UG/KG
CHLOROETHANE	10	5.7 U	UG/KG
CHLOROFORM	5.0	2.9 U	UG/KG
CHLOROMETHANE	5.0	2.9 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	2.9 U	UG/KG
CYCLOHEXANE	10	5.7 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	2.9 U	UG/KG
1,2-DIBROMOETHANE	5.0	2.9 U	UG/KG
1,3-DICHLOROBENZENE	5.0	2.9 U	UG/KG
1,4-DICHLOROBENZENE	5.0	2.9 U	UG/KG
1,2-DICHLOROBENZENE	5.0	2.9 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	2.9 U	UG/KG
1,1-DICHLOROETHANE	5.0	2.9 U	UG/KG
1,2-DICHLOROETHANE	5.0	2.9 U	UG/KG
1,1-DICHLOROETHENE	5.0	2.9 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	2.9 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	2.9 U	UG/KG
1,2-DICHLOROPROPANE	5.0	2.9 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	2.9 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	2.9 U	UG/KG
ETHYLBENZENE	5.0	2.9 U	UG/KG
2-HEXANONE	10	5.7 U	UG/KG
ISOPROPYLBENZENE	5.0	2.9 U	UG/KG
METHYL ACETATE	5.0	2.9 U	UG/KG
METHYLCYCLOHEXANE	10	5.7 U	UG/KG
METHYLENE CHLORIDE	5.0	2.9 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	5.7 U	UG/KG
STYRENE	5.0	2.9 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	2.9 U	UG/KG
TETRACHLOROETHENE	5.0	2.9 U	UG/KG
TOLUENE	5.0	2.9 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	2.9 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	2.9 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	2.9 U	UG/KG

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #01834765
Client Sample ID : MW-203 (15-19) A1

Date Sampled : 11/01/04 09:55 **Order #:** 771721 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/02/04 **Submission #:** R2423661 **Percent Solid:** 95.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.55			Dry Weight
TRICHLOROETHENE	5.0	1.1 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	2.9 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	2.9 U	UG/KG
VINYL CHLORIDE	5.0	2.9 U	UG/KG
O-XYLENE	5.0	2.9 U	UG/KG
M+P-XYLENE	5.0	2.9 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(68 - 128)	106	%
TOLUENE-D8	(75 - 128)	97	%
DIBROMOFLUOROMETHANE	(62 - 133)	91	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #01834765
Client Sample ID : MW-203 (30-32) A1

Date Sampled : 11/01/04 10:15 **Order #:** 771722 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/02/04 **Submission #:** R2423661 **Percent Solid:** 80.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.59			Dry Weight
ACETONE	10	4.0 J	UG/KG
BENZENE	5.0	3.7 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.7 U	UG/KG
BROMOFORM	5.0	3.7 U	UG/KG
BROMOMETHANE	5.0	3.7 U	UG/KG
2-BUTANONE (MEK)	10	7.3 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.7 U	UG/KG
CARBON DISULFIDE	10	7.3 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.7 U	UG/KG
CHLOROBENZENE	5.0	3.7 U	UG/KG
CHLOROETHANE	10	7.3 U	UG/KG
CHLOROFORM	5.0	3.7 U	UG/KG
CHLOROMETHANE	5.0	3.7 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.7 U	UG/KG
CYCLOHEXANE	10	7.3 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.7 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.7 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.7 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.7 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.7 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.7 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.7 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.7 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.7 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.7 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.7 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.7 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.7 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.7 U	UG/KG
ETHYLBENZENE	5.0	3.7 U	UG/KG
2-HEXANONE	10	7.3 U	UG/KG
ISOPROPYLBENZENE	5.0	3.7 U	UG/KG
METHYL ACETATE	5.0	3.7 U	UG/KG
METHYLCYCLOHEXANE	10	7.3 U	UG/KG
METHYLENE CHLORIDE	5.0	3.7 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.3 U	UG/KG
STYRENE	5.0	3.7 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.7 U	UG/KG
TETRACHLOROETHENE	5.0	3.7 U	UG/KG
TOLUENE	5.0	3.7 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.7 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.7 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.7 U	UG/KG

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #01834765
Client Sample ID : MW-203 (30-32) A1

Date Sampled : 11/01/04 10:15 **Order #:** 771722 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/02/04 **Submission #:** R2423661 **Percent Solid:** 80.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.59			Dry Weight
TRICHLOROETHENE	5.0	22	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.7 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.7 U	UG/KG
VINYL CHLORIDE	5.0	3.7 U	UG/KG
O-XYLENE	5.0	3.7 U	UG/KG
M+P-XYLENE	5.0	3.7 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(68 - 128)	107	%
TOLUENE-D8	(75 - 128)	100	%
DIBROMOFLUOROMETHANE	(62 - 133)	92	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #01834765
Client Sample ID : MW-203 (40-42) A1

Date Sampled : 11/01/04 11:00 **Order #:** 771723 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/02/04 **Submission #:** R2423661 **Percent Solid:** 84.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.59			Dry Weight
ACETONE	10	7.0 U	UG/KG
BENZENE	5.0	3.5 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.5 U	UG/KG
BROMOFORM	5.0	3.5 U	UG/KG
BROMOMETHANE	5.0	3.5 U	UG/KG
2-BUTANONE (MEK)	10	7.0 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.5 U	UG/KG
CARBON DISULFIDE	10	7.0 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.5 U	UG/KG
CHLOROBENZENE	5.0	3.5 U	UG/KG
CHLOROETHANE	10	7.0 U	UG/KG
CHLOROFORM	5.0	3.5 U	UG/KG
CHLOROMETHANE	5.0	3.5 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.5 U	UG/KG
CYCLOHEXANE	10	7.0 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.5 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.5 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.5 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.5 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.5 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.5 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.5 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.5 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.5 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.5 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.5 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.5 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.5 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.5 U	UG/KG
ETHYLBENZENE	5.0	3.5 U	UG/KG
2-HEXANONE	10	7.0 U	UG/KG
ISOPROPYLBENZENE	5.0	3.5 U	UG/KG
METHYL ACETATE	5.0	3.5 U	UG/KG
METHYLCYCLOHEXANE	10	7.0 U	UG/KG
METHYLENE CHLORIDE	5.0	3.5 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.0 U	UG/KG
STYRENE	5.0	3.5 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.5 U	UG/KG
TETRACHLOROETHENE	5.0	3.5 U	UG/KG
TOLUENE	5.0	3.5 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.5 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.5 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.5 U	UG/KG

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/03/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #01834765
Client Sample ID : MW-203 (40-42) A1

Date Sampled : 11/01/04 11:00 **Order #:** 771723 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/02/04 **Submission #:** R2423661 **Percent Solid:** 84.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 11/03/04			
ANALYTICAL DILUTION: 0.59			Dry Weight
TRICHLOROETHENE	5.0	8.4	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.5 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.5 U	UG/KG
VINYL CHLORIDE	5.0	3.5 U	UG/KG
O-XYLENE	5.0	3.5 U	UG/KG
M+P-XYLENE	5.0	3.5 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(68 - 128)	106	%
TOLUENE-D8	(75 - 128)	100	%
DIBROMOFLUOROMETHANE	(62 - 133)	93	%

ENSR

MEMORANDUM

TO:	David Austin/Westford	**DATE:**	March 17, 2005
FROM:	Sheena Blair/Westford	**FILE:**	OZ003voc 10748-001-0500
RE:	Data Validation VOCs in Soil Former Ozone Industries Queens, NY CAS Project # R2524654	**CC:**	W. Braunstein/Westford

SUMMARY

Limited validation was performed on the data for twenty aqueous samples, one equipment blank, and one trip blank for volatile organic compounds (VOCs) analyzed using EPA method 8260B. The samples were collected at the Former Ozone Industries site, Queens, NY on January 19 and 20, 2005 and submitted to Columbia Analytical Services (CAS) in Rochester, New York. CAS analyzed and reported the results under project number R2524654.

The sample results were assessed according to the EPA methods and the *"USEPA Region 2, SOP HW-24, Standard Operating Procedure for the Validation of Organic Data Acquired using SW-846 EPA Method 8260B" (Revision 2, December 1999)."*

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were qualified as estimated for certain QC nonconformances (see discussion below).

SAMPLES

The samples included in this review are listed below:

Sample IDs	Analyses
EBGWC1 (equipment blank)	VOC
MW01GWA1	VOC
MW06GWA1	VOC
MW06DGWA1	VOC
MW09GWA1	VOC
MW10SGWA1	VOC
MW13DGWA1	VOC
MW13SGWA1	VOC
MW101GWA1	VOC
MW105GWA1	VOC
MW120DGWA1	VOC
MW120SGWA1	VOC
MW201DGWA1	VOC
MW201SGWA1	VOC
MW202GWA1	VOC
MW203GWA1	VOC
PZ01GWA1	VOC
PZ05GWA1	VOC
PZ08GWA1	VOC

Sample IDs	Analyses
PZ09GWA1	VOC
PZ10GWA1	VOC
TBGW1 (trip blank)	VOC

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with the chain of custody (COC) requests
- Holding times and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/equipment blank/trip blank
- Surrogate spike recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Laboratory control sample (LCS) results
- Quantitation limits and sample results

Agreement of Analyses Conducted with COC Requests

Sample reports corresponded to the analytical requests designated on the COC. The only discrepancies noted were the following:

- Samples P201GWA1, P205GWA1, P208GWA1, P209GWA1, and P210GWA1 were labeled by the laboratory as PZ instead of P2. The sample identifications were corrected on the sample result summary forms during validation.
- Sample MW201SGWA1 was labeled by the laboratory as MW2015GWA1. The sample identification was corrected on the sample result summary form during validation.
- Sample MW10SGWA1 was labeled by the laboratory as MW105GWA1. The sample identification was corrected on the sample result summary form during validation.

Holding Times and Sample Preservation

The cooler temperatures ranged from 3°C-4°C, which met the QC acceptance criteria of 4°C ± 2°C.

All samples were extracted and analyzed within the QAPP specified holding times.

GC/MS Tunes

The frequency and abundance of the bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within 12 hours from the BFB tunes.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs) and the response factors (RFs) of all target analytes were within the QC acceptance criteria in the initial calibration standards. The following table summarizes the percent differences (%Ds) that were outside the QC acceptance criteria in the continuing calibration (CC) standards.

Calibration	Compound	%D
CC (1/28/05) 0912	1,1,2-Trichloro-1,2,2-trifluoroethane	34.2
	Carbon disulfide	23.5

Calibration	Compound	%D
CC (1/28/05) 2242	1,1,2-Trichloro-1,2,2-trifluoroethane	33.9
Associated samples:	all samples in this data set except samples MW01GWA1, MW13DGWA1, EBGWC1, TBGW1	

Sample results were qualified as follows:

- If %D > 20%, estimate positive results (J) and nondetect results (UJ).

Method Blanks/Equipment Blank/Trip Blank

On equipment blank (EBGWC1) and two trip blanks (TBGW1 and TBGW2) were submitted with this sample set. Target compounds were not detected in the laboratory method blanks, equipment blank, or trip blanks.

Surrogate Spike Recoveries

The surrogate recoveries were within the QC acceptance limits in all sample analyses.

MS/MSD Results

MS/MSD analysis was performed on sample MW13SGWA1 from this sample set. All MS/MSD criteria were met.

Internal Standard Performance

Internal standard performance met the QC acceptance criteria in all sample analysis.

Field Duplicate Results

A field duplicate pair was not submitted in this data set. No validation action was taken on this basis.

LCS Results

The percent recoveries (%Rs) of the spiked target analytes were within the QC acceptance criteria in the LCSs associated with all sample analyses, except for 1,1,2-trichloro-1,2,2-trifluoroethane. The percent recovery was 133%, slightly above the QC limits of 70-130%. No qualifications were necessary since 1,1,2-trichloro-1,2,2-trifluoroethane was not detected in the samples.

Quantitation Limits and Sample Results

All samples were analyzed undiluted. Sample Quantitation Limits (SQLs) for these samples were not affected.

Tentatively Identified Compounds (TICs)

Methyl acetate was one of the requested compounds on the site-specific list; however the VOC instrument was not calibrated for the compound at the time of sample receipt. At ENSR's request a library search for the methyl acetate as a TIC was performed. The TIC methyl acetate was not detected in any of the samples in this data set.

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : EBGWC1

Date Sampled : 01/20/05 10:00 **Order #:** 789853 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/29/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.0 U	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : EBGWC1

Date Sampled : 01/20/05 10:00 **Order #:** 789853 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/29/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	99	%
TOLUENE-D8	(88 - 124 %)	107	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	109	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EBGWC1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789853 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8909.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/29/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW01GWA1

Date Sampled : 01/20/05 09:15 **Order #:** 789843 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/29/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.1	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	28	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.5	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	150	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW01GWA1

Date Sampled : 01/20/05 09:15 **Order #:** 789843 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/29/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 UJ	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	99	%
TOLUENE-D8	(88 - 124 %)	105	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	108	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
MW01GWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789843 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8907.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/29/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW06GWA1

Date Sampled : 01/19/05 16:10 **Order #:** 789863 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 UJ	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	4.0	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	2.4	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.70 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	72	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW06GWA1

Date Sampled : 01/19/05 16:10 **Order #:** 789863 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U J	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	107	%
TOLUENE-D8	(88 - 124 %)	107	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	106	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW06GWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789863 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8886.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW06DGWA1

Date Sampled : 01/19/05 14:50 **Order #:** 789864 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 UJ	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.6	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	2.2	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.2	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	7.8	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW06DGWA1

Date Sampled : 01/19/05 14:50 **Order #:** 789864 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U J	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	106	%
TOLUENE-D8	(88 - 124 %)	106	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	106	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW06DGVHI

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789864 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8887.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW09GWA1

Date Sampled : 01/20/05 12:05 **Order #:** 789848 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.1	UG/L
CARBON DISULFIDE	1.0	1.0 U J	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	3.5	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	5.7	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	2.2	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	72	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW09GWA1

Date Sampled : 01/20/05 12:05 **Order #:** 789848 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U J	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	108	%
TOLUENE-D8	(88 - 124 %)	106	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	106	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW09GWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789848 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8892.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW13DGWA1

Date Sampled : 01/20/05 08:20 **Order #:** 789844 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/29/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	4.4	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.89 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	8.2	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW13DGWA1

Date Sampled : 01/20/05 08:20 **Order #:** 789844 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/29/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	99	%
TOLUENE-D8	(88 - 124 %)	105	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	109	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
MW13DGWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789844 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8908.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/29/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW13SGWA1

Date Sampled : 01/20/05 09:50 **Order #:** 789845 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 UJ	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.51 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	3.3	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.77 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	92	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW13SGWA1

Date Sampled : 01/20/05 09:50 **Order #:** 789845 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U J	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	106	%
TOLUENE-D8	(88 - 124 %)	105	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	105	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW13SGWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789845 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8889.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW101GWA1

Date Sampled : 01/19/05 15:30 **Order #:** 789862 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 UJ	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.74 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	2.1	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.67 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	18	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW101GWA1

Date Sampled : 01/19/05 15:30 **Order #:** 789862 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U J	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	108	%
TOLUENE-D8	(88 - 124 %)	107	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	108	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
MW101GWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789862 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8885.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~MW105GWA1~~ MW105GWA1
S

Date Sampled : 01/20/05 13:20 **Order #:** 789849 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 UJ	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.2	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	4.9	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	3.1	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	110	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~MW10~~S~~GWA1~~ MW1056WA1

Date Sampled : 01/20/05 13:20 **Order #:** 789849 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U J	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	99	%
TOLUENE-D8	(88 - 124 %)	107	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	109	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

~~MW10SGWA1~~ MW1056WA1
S

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789849 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8893.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW120DGWA1

Date Sampled : 01/20/05 12:45 **Order #:** 789847 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.55 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	0.89 J	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	34	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW120DGWA1

Date Sampled : 01/20/05 12:45 **Order #:** 789847 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 UJ	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	107	%
TOLUENE-D8	(88 - 124 %)	106	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	110	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW120DGW1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789847 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8891.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW120SGWA1

Date Sampled : 01/20/05 11:50 **Order #:** 789846 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.8	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	49	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW120SGWA1

Date Sampled : 01/20/05 11:50 **Order #:** 789846 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	106	%
TOLUENE-D8	(88 - 124 %)	105	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	105	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW120SGWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789846 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8890.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW201DGWA1

Date Sampled : 01/19/05 12:45 **Order #:** 789859 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 UJ	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.61 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	18	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	48	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW201DGWA1

Date Sampled : 01/19/05 12:45 **Order #:** 789859 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	108	%
TOLUENE-D8	(88 - 124 %)	107	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	108	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW201DGWR1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789859 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8882.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW201SGWA1

Date Sampled : 01/18/05 11:00 **Order #:** 789855 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 UJ	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	4.1	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.8	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	86	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW201SGWA1

Date Sampled : 01/18/05 11:00 **Order #:** 789855 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	105	%
TOLUENE-D8	(88 - 124 %)	105	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	106	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW2015GWA1
6

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789855 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8878.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW202GWA1

Date Sampled : 01/19/05 16:50 **Order #:** 789861 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.5	UG/L
CARBON DISULFIDE	1.0	1.0 U J	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	0.91 J	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.8	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	17	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW202GWA1

Date Sampled : 01/19/05 16:50 **Order #:** 789861 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	106	%
TOLUENE-D8	(88 - 124 %)	106	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	108	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW202GWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789861 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8884.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW203GWA1

Date Sampled : 01/19/05 09:40 **Order #:** 789860 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U J	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.6	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	10	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : MW203GWA1

Date Sampled : 01/19/05 09:40 **Order #:** 789860 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	108	%
TOLUENE-D8	(88 - 124 %)	106	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	107	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW203GWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789860 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8883.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~PZ01GWA1~~ PZ016WA1

Date Sampled : 01/19/05 13:50 **Order #:** 789858 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 UJ	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.1	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.0 U	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~PZ01GWA1~~ PZ01GWA1

Date Sampled : 01/19/05 13:50 **Order #:** 789858 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	107	%
TOLUENE-D8	(88 - 124 %)	106	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	106	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

~~PZ01GWA1~~ PZ01GWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789858 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8881.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~PZ05GWA1~~ PZ056WA1
2

Date Sampled : 01/19/05 11:00 **Order #:** 789856 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 UJ	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	17	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~PZ05GWA1~~ PZ056WA1

Date Sampled : 01/19/05 11:00 **Order #:** 789856 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 UJ	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	107	%
TOLUENE-D8	(88 - 124 %)	106	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	108	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

~~PZ05GWA1~~ 2 PZ05GWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789856 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8879.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~PZ08GWA1~~ PZ08GWA1

Date Sampled : 01/18/05 13:35 **Order #:** 789857 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.4	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	3.4	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	38	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~PZ08GWA1~~ PZ08GWA1
d

Date Sampled : 01/18/05 13:35 **Order #:** 789857 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	105	%
TOLUENE-D8	(88 - 124 %)	106	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	105	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

~~PZ08GWA1~~ 8 PZ08GWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789857 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8880.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~PZ09GWA1~~ PZ09GWA1

Date Sampled : 01/20/05 09:35 **Order #:** 789850 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	5.2 J	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.2	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	25	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.5	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	3.4	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	180	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~PZ09GWA1~~ PZ09GWA1

Date Sampled : 01/20/05 09:35 **Order #:** 789850 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	98	%
TOLUENE-D8	(88 - 124 %)	107	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	110	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

PZ09GWA1
~~PZ09GWA1~~ a2

PZ09GWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789850 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8894.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~P210GWA1~~ P210GWA1

Date Sampled : 01/20/05 12:45 **Order #:** 789851 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 UJ	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.75 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	3.6	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.95 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	78	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : ~~PZ10GWA1~~ PZ10GWA1

Date Sampled : 01/20/05 12:45 **Order #:** 789851 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	98	%
TOLUENE-D8	(88 - 124 %)	107	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	108	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

~~PZ10GWA1~~ 2

PZ10GWA1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789851 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8895.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : TBGW1

Date Sampled : 01/20/05 09:45 **Order #:** 789854 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/29/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.0 U	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : TBGW1

Date Sampled : 01/20/05 09:45 **Order #:** 789854 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/29/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U J	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	99	%
TOLUENE-D8	(88 - 124 %)	106	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	111	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

TBGW1

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789854 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8910.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/29/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : TBGW2

Date Sampled : 01/19/05 08:00 **Order #:** 789865 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

DATE ANALYZED : 01/28/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 UJ	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.0 U	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 02/22/05

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0300
Client Sample ID : TBGW2

Date Sampled : 01/19/05 08:00 **Order #:** 789865 **Sample Matrix:** WATER
Date Received: 01/21/05 **Submission #:** R2524654 **Analytical Run** 113415

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 01/28/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	107	%
TOLUENE-D8	(88 - 124 %)	105	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	107	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

TBGW2

Lab Name: CAS/ROCH Contract: ENSR

Lab Code: 10145 Case No.: R5-24654 SAS No.: SDG No.: MW01GWA1

Matrix: (soil/water) WATER Lab Sample ID: 789865 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: R8888.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 01/28/05

GC Column: DB-624 ID: 0.18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

MeAc not present

ENSR

MEMORANDUM

TO:	David Austin/Westford	**DATE:**	June 29, 2005
FROM:	Lisa Krowitz/Westford	**FILE:**	OZ004voc 10748-001-0500
RE:	Data Validation VOCs in Groundwater Former Ozone Industries Queens, NY CAS Project # R2525978	**CC:**	W. Braunstein/Westford

SUMMARY

Limited validation was performed on the data for 20 aqueous samples, one equipment blank, and one trip blank for volatile organic compounds (VOCs) analyzed using EPA method 8260B. The samples were collected at the Former Ozone Industries site, Queens, NY on April 27 and 28, 2005 and submitted to Columbia Analytical Services (CAS) in Rochester, New York. CAS analyzed and reported the results under project number R2524654.

The sample results were assessed according to the EPA methods and the *"USEPA Region 2, SOP HW-24, Standard Operating Procedure for the Validation of Organic Data Acquired using SW-846 EPA Method 8260B" (Revision 2, December 1999)."*

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were negated (U) due to blank contamination, or were qualified as estimated (J, UJ) due to QC nonconformance (see discussion below).

SAMPLES

The samples included in this review are listed below:

Sample IDs	Analyses
MW01GWA2	VOC
MW6DGWA2	VOC
MW6SGWA2	VOC
MW09GWA2	VOC
MW13DGWA2	VOC
MW13SGWA2	VOC
MW13SGWB1 (Field Duplicate of MW13SGWA2)	VOC
MW101GWA2	VOC
MW105GWA2	VOC
MW120DGWA2	VOC
MW120SGWA2	VOC
MW201DGWA2	VOC
MW201SGWA2	VOC
MW202GWA2	VOC
PZ01DGWA2	VOC
PZ01GWA2	VOC
PZ05GWA2	VOC
PZ05GWC2 (Equipment Blank)	VOC

Sample IDs	Analyses
PZ08GWA2	VOC
PZ09GWA2	VOC
PZ09GWB1 (Field Duplicate of PZ09GWA2)	VOC
TRIP BLANK (Trip Blank)	VOC

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with the chain of custody (COC) requests
- Holding times and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/equipment blank/trip blank
- Surrogate spike recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Laboratory control sample (LCS) results
- Quantitation limits and sample results

Agreement of Analyses Conducted with COC Requests

Sample reports corresponded to the analytical requests designated on the COC. The only discrepancy noted was the following:

- Sample PZ08GWA2 (lab ID 810600) was listed as PZ01GWA2 on Forms 1E, 4A, 5A, and 8A. The sample identification was correct on the sample result summary forms.

The laboratory submitted hand corrected forms on June 20, 2005.

Holding Times and Sample Preservation

The cooler temperature of 5°C met the QC acceptance criteria of 4°C ± 2°C.

All samples were extracted and analyzed within the QAPP specified holding times.

GC/MS Tunes

The frequency and abundance of the bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within 12 hours from the BFB tunes.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs) and the response factors (RFs), or the correlation coefficient of all target analytes were within the QC acceptance criteria in the initial calibration standards.

The following table summarizes the percent differences (%Ds) or percent drifts (%Drifts) that were outside the QC acceptance criteria in the continuing calibration (CC) standards.

Calibration	Compound	%D or %Drift
CC (5/4/05) 0845	Dichlorodifluoromethane	16.2 %Drift
	Chloromethane	22.7 %D
	4-Methyl-2-pentanone	26.9 %D
	2-Hexanone	30.4 %D

Calibration	Compound	%D or %Drift
Associated samples:	MW6DGWA2, MW6SGWA2, MW13SGWA2, MW120DGWA2, MW120SGWA2, MW201DGWA2, MW201SGWA2	
CC (5/5/05) 0826	Dichlorodifluoromethane	23.9 %Drift
Associated samples:	MW01GWA2, MW09GWA2, MW13DGWA2, MW13SGWB1, MW101GWA2, MW105GWA2, MW202GWA2, PZ01DGWA2, PZ01GWA2, PZ05GWA2, PZ05GWC2, PZ08GWA2, PZ09GWA2, PZ09GWB1	
CC (5/6/05) 0844	Dichlorodifluoromethane	27.6 %Drift
Associated samples:	TRIP BLANK	

Sample results were qualified as follows:

- If %D or %Drift > 20%, estimate positive results (J) and nondetect results (UJ).

Note that the laboratory did not calibrate for methyl acetate, therefore, this compound was searched for as a tentatively identified compound (TIC). No other TICs were searched or reported on Form IE.

Method Blanks/Equipment Blank/Trip Blank

One equipment blank (PZ05GWC2) and one trip blank (TRIP BLANK) were submitted with this sample set. Target compounds were not detected in the laboratory method blanks, but were detected in the trip and equipment blanks. The presence of blank contamination indicates that false positive results may exist for this compound in the associated samples. Action Levels (ALs) were established at 5 or 10 times the concentration detected in the blank depending on the compound. The following table summarizes the AL and the associated samples.

Type of Blank	Compound	Conc. Detected (µg/L)	AL (µg/L)
Trip Blank	Acetone	2.2	22
Equipment Blank	Acetone	1.9	19
	Methyl tert butyl ether	40	200
	Toluene	0.57	2.85
Associated samples: All samples			

Sample results were qualified as follows:

- Sample results < sample quantitation limit (SQL) and ≤ AL were qualified as nondetect (U) at the SQL.
- Sample results ≥ SQL but ≤ AL were qualified as nondetect (U) at the reported concentration.
- Sample results ≥ SQL and ≥ AL were accepted without qualification.

Surrogate Spike Recoveries

The surrogate recoveries were within the QC acceptance limits in all sample analyses.

MS/MSD Results

MS/MSD analysis was performed on sample PZ05GWA2 from this sample set. All MS/MSD criteria were met.

Field Duplicate Results

Two field duplicate pairs were submitted with this data set: samples PZ09GWA2/PZ09GWB1 and samples MW13SGWA2/MW13SGWB1.

The results for detected compounds, the associated relative percent differences (RPDs), and actions taken are tabulated below for field duplicate pair PZ09GWA2 and PZ09GWB1.

Compound	PZ09GWA2 (ug/L)	PZ09GWB1 (ug/L)	RPD (%)	Action
Chloroform	0.72 J	0.71 J	1.4	None
cis-1,2-Dichloroethene	4.8	5.0	4.0	None
Tetrachloroethene	1.5	1.2	22	None
1,1,1-Trichloroethane	0.57 J	0.51 J	11	None
Trichloroethene	99	98	1.0	None

The results for detected compounds, the associated relative percent differences (RPDs), and actions taken are tabulated below for field duplicate pair MW13SGWA2 and MW13SGWB1.

Compound	MW13SGWA2 (ug/L)	MW13SGWB1 (ug/L)	RPD (%)	Action
Chloroform	0.49 J	0.56 J	13	None
cis-1,2-Dichloroethene	1.6	1.8	12	None
Tetrachloroethene	0.36 J	0.36 J	0	None
1,1,1-Trichloroethane	0.39 J	0.41 J	5	None
Trichloroethene	51	51	0	None

LCS Results

The percent recoveries (%Rs) of the spiked target analytes were within the QC acceptance criteria in the LCSs associated with all sample analyses.

Quantitation Limits and Sample Results

All samples were analyzed undiluted. Sample Quantitation Limits (SQLs) for these samples were not affected.

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW01GWA2

Date Sampled : 04/28/05 16:50 **Order #:** 810611 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.56 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	9.3	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.43 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.68 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	59	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW01GWA2

Date Sampled : 04/28/05 16:50 **Order #:** 810611 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	111	%
TOLUENE-D8	(88 - 124 %)	112	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	102	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

mw01gwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810611 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5409.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW6DGWA2

Date Sampled : 04/27/05 16:35 **Order #:** 810580 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

DATE ANALYZED : 05/04/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.2	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.6	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	7.5	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW6DGWA2

Date Sampled : 04/27/05 16:35 **Order #:** 810580 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/04/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	111	%
TOLUENE-D8	(88 - 124 %)	114	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	101	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

mw6dgwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810580 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5389.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/04/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW6SGWA2

Date Sampled : 04/27/05 16:30 **Order #:** 810579 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

DATE ANALYZED : 05/04/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	~~0.65 J~~ 1.0U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.2	UG/L
CHLOROMETHANE	2.0	2.0 UJ	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	2.1	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 UJ	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.36 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.87 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	60	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW6SGWA2

Date Sampled : 04/27/05 16:30 **Order #:** 810579 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/04/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	109	%
TOLUENE-D8	(88 - 124 %)	115	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	100	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

mw6sgwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810579 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5388.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/04/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW09GWA2

Date Sampled : 04/28/05 13:05 **Order #:** 810606 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	~~0.92 J~~ 1.0U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	2.3	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	0.65 J	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	0.52 J	UG/L
CIS-1,2-DICHLOROETHENE	1.0	6.6	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.49 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	4.5	UG/L
1,1,2-TRICHLOROETHANE	1.0	0.39 J	UG/L
TRICHLOROETHENE	1.0	170	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW09GWA2

Date Sampled : 04/28/05 13:05 **Order #:** 810606 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	113	%
TOLUENE-D8	(88 - 124 %)	110	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	103	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

mw09gwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810606 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5406.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW13DGWA2

Date Sampled : 04/27/05 18:10 **Order #:** 810582 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	2.5	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.6	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	3.4	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.58 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	12	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW13DGWA2

Date Sampled : 04/27/05 18:10 **Order #:** 810582 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	110	%
TOLUENE-D8	(88 - 124 %)	114	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	101	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

mw13dgwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810582 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5398.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW13SGWA2

Date Sampled : 04/27/05 18:10 **Order #:** 810581 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/04/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	~~0.33 J~~ 1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.49 J	UG/L
CHLOROMETHANE	2.0	2.0 UJ	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.6	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 UJ	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.36 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.39 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	51	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW13SGWA2

Date Sampled : 04/27/05 18:10 **Order #:** 810581 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/04/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	110	%
TOLUENE-D8	(88 - 124 %)	111	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	101	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

mw13sgwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: _____ SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810581 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5390.D

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 05/04/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW13SGWB1

Date Sampled : 04/27/05 18:15 **Order #:** 810583 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.56 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.8	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.36 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.41 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	51	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW13SGWB1

Date Sampled : 04/27/05 18:15 **Order #:** 810583 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	108	%
TOLUENE-D8	(88 - 124 %)	112	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	100	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
mw13sgwb1

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810583 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5399.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW101GWA2

Date Sampled : 04/28/05 16:15 **Order #:** 810610 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.59 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.88 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.81 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	16	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW101GWA2

Date Sampled : 04/28/05 16:15 **Order #:** 810610 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	112	%
TOLUENE-D8	(88 - 124 %)	113	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	103	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
mw101gwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810610 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5408.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW105GWA2

Date Sampled : 04/28/05 13:50 **Order #:** 810609 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.3	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	6.3	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.45 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	4.0	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	130	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW105GWA2

Date Sampled : 04/28/05 13:50 **Order #:** 810609 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	109	%
TOLUENE-D8	(88 - 124 %)	111	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	105	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

mw105gwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810609 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5407.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW120DGWA2

Date Sampled : 04/27/05 13:25 **Order #:** 810578 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

DATE ANALYZED : 05/04/05
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 UJ	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	0.86 J	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 UJ	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.33 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.44 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	30	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW120DGWA2

Date Sampled : 04/27/05 13:25 **Order #:** 810578 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/04/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	112	%
TOLUENE-D8	(88 - 124 %)	112	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	103	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

mw120dgwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810578 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5387.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/04/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW120SGWA2

Date Sampled : 04/27/05 13:20 **Order #:** 810577 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/04/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.86 J	UG/L
CHLOROMETHANE	2.0	2.0 UJ	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	2.1	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 UJ	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.48 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	41	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW120SGWA2

Date Sampled : 04/27/05 13:20 **Order #:** 810577 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/04/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	109	%
TOLUENE-D8	(88 - 124 %)	114	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	104	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

mw120sgwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810577 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5386.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/04/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW201DGWA2

Date Sampled : 04/27/05 11:20 **Order #:** 810575 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/04/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.54 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	28	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	44	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW201DGWA2

Date Sampled : 04/27/05 11:20 **Order #:** 810575 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/04/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	109	%
TOLUENE-D8	(88 - 124 %)	110	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	102	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
mw201dgwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810575 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5384.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/04/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW201SGWA2

Date Sampled : 04/27/05 11:25 **Order #:** 810576 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/04/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.64 J	UG/L
CHLOROMETHANE	2.0	2.0 UJ	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	5.3	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 UJ	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	2.3	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.51 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	110	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW201SGWA2

Date Sampled : 04/27/05 11:25 **Order #:** 810576 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/04/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	112	%
TOLUENE-D8	(88 - 124 %)	113	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	102	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
mw201sgwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810576 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5385.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/04/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW202GWA2

Date Sampled : 04/28/05 18:05 **Order #:** 810612 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	~~0.62 J~~ 1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	2.5	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.67 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.6	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	29	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : MW202GWA2

Date Sampled : 04/28/05 18:05 **Order #:** 810612 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	110	%
TOLUENE-D8	(88 - 124 %)	112	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	101	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET EPA SAMPLE NO.

TENTATIVELY IDENTIFIED COMPOUNDS

mw202gwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810612 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5410.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ01DGWA2

Date Sampled : 04/28/05 10:35 **Order #:** 810602 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.53 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.62 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	23	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ01DGWA2

Date Sampled : 04/28/05 10:35 **Order #:** 810602 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	108	%
TOLUENE-D8	(88 - 124 %)	111	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	103	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
pz01dgwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810602 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5402.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ01GWA2

Date Sampled : 04/28/05 09:50 **Order #:** 810584 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.73 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.0 U	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ01GWA2

Date Sampled : 04/28/05 09:50 **Order #:** 810584 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	112	%
TOLUENE-D8	(88 - 124 %)	111	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	100	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

pz01gwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810584 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5400.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ05GWA2

Date Sampled : 04/28/05 13:10 **Order #:** 810607 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	~~0.41 J~~ 1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.94 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.56 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	8.7	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ05GWA2

Date Sampled : 04/28/05 13:10 **Order #:** 810607 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	108	%
TOLUENE-D8	(88 - 124 %)	113	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	103	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

pz05gwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810607 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5397.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ05GWC2

Date Sampled : 04/28/05 12:50 **Order #:** 810605 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	1.9 J	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	40	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U J	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	0.57 J	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.0 U	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ05GWC2

Date Sampled : 04/28/05 12:50 **Order #:** 810605 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	111	%
TOLUENE-D8	(88 - 124 %)	114	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	102	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

pz05gwc2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810605 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5405.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ08GWA2

Date Sampled : 04/28/05 11:00 **Order #:** 810600 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.9	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	3.9	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.74 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.40 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	40	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ08GWA2

Date Sampled : 04/28/05 11:00 **Order #:** 810600 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	112	%
TOLUENE-D8	(88 - 124 %)	112	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	100	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
8/
pz01gwa2

LWE 01/20/05

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810600 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5401.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ09GWA2

Date Sampled : 04/28/05 11:40 **Order #:** 810603 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.72 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	4.8	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.5	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.57 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	99	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ09GWA2

Date Sampled : 04/28/05 11:40 **Order #:** 810603 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	110	%
TOLUENE-D8	(88 - 124 %)	114	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	103	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

pz09gwa2

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810603 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5403.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ09GWB1

Date Sampled : 04/28/05 11:40 **Order #:** 810604 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.71 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	5.0	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.2	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.51 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	98	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : PZ09GWB1

Date Sampled : 04/28/05 11:40 **Order #:** 810604 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/05/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	109	%
TOLUENE-D8	(88 - 124 %)	112	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	100	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

pz09gwb1

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810604 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5404.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/05/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : TRIP BLANK

Date Sampled : 04/27/05 17:30 **Order #:** 810613 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/06/05			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	2.2 J	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.0 U	UG/L
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 06/03/05

ENSR International
Project Reference: OZONE PARK PROJECT #10748-001-300
Client Sample ID : TRIP BLANK

Date Sampled : 04/27/05 17:30 **Order #:** 810613 **Sample Matrix:** WATER
Date Received: 04/29/05 **Submission #:** R2525978 **Analytical Run** 115835

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 05/06/05			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(83 - 119 %)	109	%
TOLUENE-D8	(88 - 124 %)	113	%
DIBROMOFLUOROMETHANE	(91 - 113 %)	104	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

trip blank

Lab Name: cas/roch Contract: ensracton

Lab Code: 10145 Case No.: r5-25978 SAS No.: SDG No.: mw201dg

Matrix: (soil/water) WATER Lab Sample ID: 810613 1.0

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: E5421.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 05/06/05

GC Column: db-624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

ENSR

MEMORANDUM

TO:	David Austin/Westford	**DATE:**	September 20, 2005
FROM:	Sheena Blair/Westford	**FILE:**	OZ006voc 10748-001-0500
RE:	Data Validation VOCs in Soil Former Ozone Industries Queens, NY CAS Project # R2527034	**CC:**	W. Braunstein/Westford

SUMMARY

Limited validation was performed on the data for 12 soil samples for site-specific volatile organic compounds (VOCs) analyzed using EPA method 8260B. The samples were collected at the Former Ozone Industries site, Queens, NY from July 18 through 22, 2005 and submitted to Columbia Analytical Services (CAS) in Rochester, New York. CAS analyzed and reported the results under project number R2527034.

The data were assessed according to the EPA methods and the *"USEPA Region 2, SOP HW-24, Standard Operating Procedure for the Validation of Organic Data Acquired using SW-846 EPA Method 8260B" (Revision 2, December 1999).*"

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were negated (U) due to blank contamination or qualified for certain other QC nonconformances (see discussion below).

SAMPLES

The samples included in this review are listed below:

Sample IDs	Sample IDs
SS1SBAA	SS3SBPA
SS1SBPA	SS4SBAA
SS2SBAA	SS4SBPA
SS2SBEA	SS4SBPB (field duplicate of SS4SBPA)
SS2SBNA	SS6S6AA
SS3SBAA	SS6S6PA

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with the chain of custody (COC) requests
- Holding times and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/equipment blank/trip blank
- Surrogate spike recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) results

- Field duplicate results
- Laboratory control sample (LCS) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports corresponded to the analytical requests designated on the COC. No discrepancies were noted.

Holding Times and Sample Preservation

The cooler temperature was 5°C upon receipt at the laboratory, which met the QC acceptance criteria of 4°C ± 2°C.

The QAPP specified holding time was exceeded for cis-1,2-dichloroethene and trichloroethene for sample SS2SBAA, and trichloroethene for samples SS1SBAA, SS2SBEA and SS3SBAA. The initial analysis for these samples, for all compounds, was performed within holding time. Due to the concentrations of the noted compounds in the samples, which exceeded the calibration in the initial analysis, the samples were re-analyzed at dilutions out of holding time. Cis-1,2-dichloroethene and trichloroethene for sample SS2SBAA, and trichloroethene for samples SS1SBAA, SS2SBEA and SS3SBAA were therefore qualified as estimated, biased low (J).

GC/MS Tunes

The frequency and abundance of the bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within 12 hours from the BFB tunes.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs), the response factors (RFs), and percent differences (%Ds) of all target analytes were within the QC acceptance criteria in the initial and continuing calibration standards.

Method Blanks/Equipment Blank/Trip Blank

No equipment or trip blanks were submitted with this sample set. No validation action was taken on this basis.

Acetone was detected in the several of laboratory method blanks. The presence of blank contamination indicates that false positive results may exist for this compound in the associated samples. An action Level (AL) was established for acetone at 10x the concentration detected in the blank. The following tables summarize the AL and the associated samples.

Type of Blank	Compound	Conc. Detected (µg/kg)	AL (µg/kg)
Method Blank 7/29/05	Acetone	220	2200
Associated sample: SS4SBAA, SS6S6PA(DL)			

Type of Blank	Compound	Conc. Detected (µg/kg)	AL (µg/kg)
Method Blank 8/1/05	Acetone	180	1800
Associated sample: SS1SBAA(DL), SS2SBAA(DL), SS2SBEA(DL), SS3SBAA(DL)			

Type of Blank	Compound	Conc. Detected (µg/kg)	AL (µg/kg)
Method Blank 8/2/05	Acetone	260	2600
Associated sample: SS6S6AA			

Sample results were qualified as follows:

- Sample results < sample quantitation limit (SQL) and ≤ AL were qualified as nondetect (U) at the SQL.
- Sample results ≥ SQL but ≤ AL were qualified as nondetect (U) at the reported concentration.
- Sample results ≥ SQL and ≥ AL were accepted without qualification.

Surrogate Spike Recoveries

The surrogate recoveries were within the QC acceptance limits in all sample analyses.

MS/MSD Results

Sample SS6S6PA was submitted for MS/MSD analyses with this sample set. The MS/MSD percent recoveries (%Rs) and relative percent differences (RPDs) of the compounds reported were within the QC acceptance criteria, with the following exceptions summarized in the table below.

Compound	SS6S6PA MS (%R)	SS6S6PA MSD (%R)	RPD (%)
Cyclohexane	35	35	ok
Methylcyclohexane	35	35	ok

Cyclohexane and methylcyclohexane were nondetect in sample SS6S6PA; therefore these nondetect results were qualified as estimated, biased low (UJ).

Field Duplicate Results

Samples SS4SBPA and SS4SBPB were submitted as a field duplicate pair with this data set. The results for detected compounds, the associated relative percent differences (RPDs), and actions taken are tabulated below.

Compound	SS4SBPA (ug/kg)	SS4SBPB (ug/kg)	RPD (%)	Action
Acetone	6.8 J	4.5 J	41	None
2-Butanone	1.3 J	9.6 U	NC	None
Cis-1,2-dichloroethene	0.64 J	4.8 U	NC	None
Tetrachloroethene	4.8 J	6.9	36	None
Trichloroethene	14	12	15	None

The RPDs for 2-butanone and cis-1,2-dichloroethane were not calculable (NC) due to the nondetect duplicate results. Precision was deemed acceptable since the positive results in the sample was <5x the SQL. All other RPDs met the QC acceptance criteria.

LCS Results

The %Rs of the spiked target analytes were within the QC acceptance criteria in the LCSs associated with all sample analyses.

ENSR

Quantitation Limits and Sample Results

Several samples were analyzed at dilutions due to the concentration of target analytes which would have exceeded the calibration range if analyzed undiluted. Detected results and the reporting limits for nondetect compounds were elevated accordingly by the laboratory. The following table summarizes the samples and the dilution factor.

Sample ID	Dilution Factor
SS1SBAA	290
SS2SBAA	1020
SS2SBEA	130
SS3SBAA	716
SS4SBAA	268
SS6S6AA	69
SS6S6PA	69

The results from both the diluted and undiluted analyses for samples SS1SBAA, SS2SBAA, SS2SBEA, SS3SBAA and SS6S6PA were combined by the data validator in order to report the lowest possible SQLs and all results within the calibration range.

Tentatively Identified Compounds (TICs)

Methyl acetate was one of the requested compounds on the site-specific list; however the VOC instrument was not calibrated for the compound at the time of sample receipt. At ENSR's request a library search for the methyl acetate as a TIC was performed. The TIC methyl acetate as a TIC was not detected in any of the samples in this data set.

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS1SBAA

Date Sampled : 07/18/05 12:00 **Order #:** 829362 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 93.7

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/27/05			
ANALYTICAL DILUTION: 0.73			Dry Weight
ACETONE	10	43	UG/KG
BENZENE	5.0	1.1 J	UG/KG
BROMODICHLOROMETHANE	5.0	3.9 U	UG/KG
BROMOFORM	5.0	3.9 U	UG/KG
BROMOMETHANE	5.0	3.9 U	UG/KG
2-BUTANONE (MEK)	10	4.3 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.9 U	UG/KG
CARBON DISULFIDE	10	1.0 J	UG/KG
CARBON TETRACHLORIDE	5.0	3.9 U	UG/KG
CHLOROBENZENE	5.0	3.9 U	UG/KG
CHLOROETHANE	10	7.8 U	UG/KG
CHLOROFORM	5.0	1.6 J	UG/KG
CHLOROMETHANE	5.0	3.9 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.9 U	UG/KG
CYCLOHEXANE	10	0.42 J	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.9 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.9 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.9 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.9 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.9 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.9 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.9 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.9 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.9 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	68	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	0.78 J	UG/KG
1,2-DICHLOROPROPANE	5.0	3.9 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.9 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.9 U	UG/KG
ETHYLBENZENE	5.0	3.9 U	UG/KG
2-HEXANONE	10	7.8 U	UG/KG
ISOPROPYLBENZENE	5.0	3.9 U	UG/KG
METHYLCYCLOHEXANE	10	0.83 J	UG/KG
METHYLENE CHLORIDE	5.0	3.9 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.8 U	UG/KG
STYRENE	5.0	3.9 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.9 U	UG/KG
TETRACHLOROETHENE	5.0	44	UG/KG
TOLUENE	5.0	0.37 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.9 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	5.0 J	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.9 U	UG/KG
TRICHLOROETHENE	5.0	2000 E	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.9 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS1SBAA

Date Sampled : 07/18/05 12:00 **Order #:** 829362 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 93.7

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/27/05			
ANALYTICAL DILUTION: 0.73			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.9 U	UG/KG
VINYL CHLORIDE	5.0	3.9 U	UG/KG
O-XYLENE	5.0	3.9 U	UG/KG
M+P-XYLENE	5.0	3.9 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	82	%
TOLUENE-D8	(75 - 128 %)	115	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	103	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1SBAA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: SDG No.: SS1SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 829362 0.734

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X3943.D

Level: (low/med) LOW Date Received: 7/23/05

% Moisture: not dec. 6.3 Date Analyzed: 7/27/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: ~~1.0~~ 0.734

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS1SBAA

Date Sampled : 07/18/05 12:00 **Order #:** 829362 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 93.7

DATE ANALYZED : 08/01/05
ANALYTICAL DILUTION: 290.00

Report Trichloroethene only from this page 9/6/05 BS

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	3100 U	UG/KG
BENZENE	5.0	1500 U	UG/KG
BROMODICHLOROMETHANE	5.0	1500 U	UG/KG
BROMOFORM	5.0	1500 U	UG/KG
BROMOMETHANE	5.0	1500 U	UG/KG
2-BUTANONE (MEK)	10	3100 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	1500 U	UG/KG
CARBON DISULFIDE	10	3100 U	UG/KG
CARBON TETRACHLORIDE	5.0	1500 U	UG/KG
CHLOROBENZENE	5.0	1500 U	UG/KG
CHLOROETHANE	10	3100 U	UG/KG
CHLOROFORM	5.0	1500 U	UG/KG
CHLOROMETHANE	5.0	1500 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	1500 U	UG/KG
CYCLOHEXANE	10	3100 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	1500 U	UG/KG
1,2-DIBROMOETHANE	5.0	1500 U	UG/KG
1,3-DICHLOROBENZENE	5.0	1500 U	UG/KG
1,4-DICHLOROBENZENE	5.0	1500 U	UG/KG
1,2-DICHLOROBENZENE	5.0	1500 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	1500 U	UG/KG
1,1-DICHLOROETHANE	5.0	1500 U	UG/KG
1,2-DICHLOROETHANE	5.0	1500 U	UG/KG
1,1-DICHLOROETHENE	5.0	1500 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	860 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	1500 U	UG/KG
1,2-DICHLOROPROPANE	5.0	1500 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	1500 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	1500 U	UG/KG
ETHYLBENZENE	5.0	1500 U	UG/KG
2-HEXANONE	10	3100 U	UG/KG
ISOPROPYLBENZENE	5.0	1500 U	UG/KG
METHYLCYCLOHEXANE	10	3100 U	UG/KG
METHYLENE CHLORIDE	5.0	1500 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	3100 U	UG/KG
STYRENE	5.0	1500 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	1500 U	UG/KG
TETRACHLOROETHENE	5.0	1100 J	UG/KG
TOLUENE	5.0	1500 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	1500 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	1500 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	1500 U	UG/KG
TRICHLOROETHENE	5.0	51000 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	1500 U	UG/KG

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS1SBAA

Date Sampled : 07/18/05 12:00 **Order #:** 829362 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 93.7

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/01/05			
ANALYTICAL DILUTION: 290.00			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	1500 U	UG/KG
VINYL CHLORIDE	5.0	1500 U	UG/KG
O-XYLENE	5.0	1500 U	UG/KG
M+P-XYLENE	5.0	1500 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	99	%
TOLUENE-D8	(75 - 128 %)	94	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	97	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1SBAA DL

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: SDG No.: Y98AS

Matrix: (soil/water) SOIL Lab Sample ID: 829362 290

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4046.D

Level: (low/med) MED Date Received: 7/23/05

% Moisture: not dec. 6.3 Date Analyzed: 8/1/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: ~~1.0~~ 290

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS1SBPA

Date Sampled : 07/18/05 14:30 **Order #:** 829363 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 87.7

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/28/05			
ANALYTICAL DILUTION: 0.55			Dry Weight
ACETONE	10	5.4 J	UG/KG
BENZENE	5.0	3.1 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.1 U	UG/KG
BROMOFORM	5.0	3.1 U	UG/KG
BROMOMETHANE	5.0	3.1 U	UG/KG
2-BUTANONE (MEK)	10	6.3 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.1 U	UG/KG
CARBON DISULFIDE	10	6.3 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.1 U	UG/KG
CHLOROBENZENE	5.0	3.1 U	UG/KG
CHLOROETHANE	10	6.3 U	UG/KG
CHLOROFORM	5.0	3.1 U	UG/KG
CHLOROMETHANE	5.0	3.1 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.1 U	UG/KG
CYCLOHEXANE	10	6.3 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.1 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.1 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.1 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.1 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.1 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.1 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.1 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.1 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.1 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.86 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.1 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.1 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.1 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.1 U	UG/KG
ETHYLBENZENE	5.0	3.1 U	UG/KG
2-HEXANONE	10	6.3 U	UG/KG
ISOPROPYLBENZENE	5.0	3.1 U	UG/KG
METHYLCYCLOHEXANE	10	6.3 U	UG/KG
METHYLENE CHLORIDE	5.0	3.1 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	6.3 U	UG/KG
STYRENE	5.0	3.1 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.1 U	UG/KG
TETRACHLOROETHENE	5.0	0.47 J	UG/KG
TOLUENE	5.0	3.1 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.1 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.1 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.1 U	UG/KG
TRICHLOROETHENE	5.0	23	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.1 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS1SBPA

Date Sampled : 07/18/05 14:30 **Order #:** 829363 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 87.7

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/28/05			
ANALYTICAL DILUTION: 0.55			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.1 U	UG/KG
VINYL CHLORIDE	5.0	3.1 U	UG/KG
O-XYLENE	5.0	3.1 U	UG/KG
M+P-XYLENE	5.0	3.1 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	97	%
TOLUENE-D8	(75 - 128 %)	101	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	105	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1SBPA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: SDG No.: SS1SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 829363 0.549

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X3957.D

Level: (low/med) LOW Date Received: 7/23/05

% Moisture: not dec. 12.4 Date Analyzed: 7/28/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: ~~10~~ 0.549

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS2SBAA

Date Sampled : 07/19/05 10:50 **Order #:** 829364 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 95.1

DATE ANALYZED : 07/27/05
ANALYTICAL DILUTION: 0.74

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	59	UG/KG
BENZENE	5.0	0.73 J	UG/KG
BROMODICHLOROMETHANE	5.0	3.9 U	UG/KG
BROMOFORM	5.0	3.9 U	UG/KG
BROMOMETHANE	5.0	3.9 U	UG/KG
2-BUTANONE (MEK)	10	6.7 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.9 U	UG/KG
CARBON DISULFIDE	10	0.78 J	UG/KG
CARBON TETRACHLORIDE	5.0	3.9 U	UG/KG
CHLOROBENZENE	5.0	3.9 U	UG/KG
CHLOROETHANE	10	7.7 U	UG/KG
CHLOROFORM	5.0	1.4 J	UG/KG
CHLOROMETHANE	5.0	3.9 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.9 U	UG/KG
CYCLOHEXANE	10	0.44 J	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.9 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.9 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.9 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.9 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.9 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.9 U	UG/KG
1,1-DICHLOROETHANE	5.0	0.59 J	UG/KG
1,2-DICHLOROETHANE	5.0	3.9 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.9 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	200 E	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	1.7 J	UG/KG
1,2-DICHLOROPROPANE	5.0	3.9 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.9 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.9 U	UG/KG
ETHYLBENZENE	5.0	3.9 U	UG/KG
2-HEXANONE	10	7.7 U	UG/KG
ISOPROPYLBENZENE	5.0	3.9 U	UG/KG
METHYLCYCLOHEXANE	10	0.73 J	UG/KG
METHYLENE CHLORIDE	5.0	3.9 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.7 U	UG/KG
STYRENE	5.0	3.9 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.9 U	UG/KG
TETRACHLOROETHENE	5.0	57	UG/KG
TOLUENE	5.0	3.9 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.9 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	8.2	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.9 U	UG/KG
TRICHLOROETHENE	5.0	2500 E	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.9 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS2SBAA

Date Sampled : 07/19/05 10:50 **Order #:** 829364 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 95.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/27/05			
ANALYTICAL DILUTION: 0.74			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.9 U	UG/KG
VINYL CHLORIDE	5.0	3.9 U	UG/KG
O-XYLENE	5.0	3.9 U	UG/KG
M+P-XYLENE	5.0	3.9 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	85	%
TOLUENE-D8	(75 - 128 %)	115	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	98	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

2SBAA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: SDG No.: SS1SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 829364 0.736

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X3945.D

Level: (low/med) LOW Date Received: 7/23/05

% Moisture: not dec. 4.9 Date Analyzed: 7/27/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0 0.736

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS2SBAA

Date Sampled : 07/19/05 10:50 **Order #:** 829364 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 95.1

DATE ANALYZED : 08/01/05
ANALYTICAL DILUTION: 1020.00

Report Cis-1,2-Dichloroethene and Trichloroethene only from this page
SJ 9/6/05

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	11000 U	UG/KG
BENZENE	5.0	5400 U	UG/KG
BROMODICHLOROMETHANE	5.0	5400 U	UG/KG
BROMOFORM	5.0	5400 U	UG/KG
BROMOMETHANE	5.0	5400 U	UG/KG
2-BUTANONE (MEK)	10	11000 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	5400 U	UG/KG
CARBON DISULFIDE	10	11000 U	UG/KG
CARBON TETRACHLORIDE	5.0	5400 U	UG/KG
CHLOROBENZENE	5.0	5400 U	UG/KG
CHLOROETHANE	10	11000 U	UG/KG
CHLOROFORM	5.0	5400 U	UG/KG
CHLOROMETHANE	5.0	5400 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	5400 U	UG/KG
CYCLOHEXANE	10	11000 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	5400 U	UG/KG
1,2-DIBROMOETHANE	5.0	5400 U	UG/KG
1,3-DICHLOROBENZENE	5.0	5400 U	UG/KG
1,4-DICHLOROBENZENE	5.0	5400 U	UG/KG
1,2-DICHLOROBENZENE	5.0	5400 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	5400 U	UG/KG
1,1-DICHLOROETHANE	5.0	5400 U	UG/KG
1,2-DICHLOROETHANE	5.0	5400 U	UG/KG
1,1-DICHLOROETHENE	5.0	5400 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3000 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	5400 U	UG/KG
1,2-DICHLOROPROPANE	5.0	5400 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	5400 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	5400 U	UG/KG
ETHYLBENZENE	5.0	5400 U	UG/KG
2-HEXANONE	10	11000 U	UG/KG
ISOPROPYLBENZENE	5.0	5400 U	UG/KG
METHYLCYCLOHEXANE	10	11000 U	UG/KG
METHYLENE CHLORIDE	5.0	5400 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	11000 U	UG/KG
STYRENE	5.0	5400 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	5400 U	UG/KG
TETRACHLOROETHENE	5.0	1900 J	UG/KG
TOLUENE	5.0	5400 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	5400 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	5400 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	5400 U	UG/KG
TRICHLOROETHENE	5.0	150000	UG/KG
TRICHLOROFLUOROMETHANE	5.0	5400 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS2SBAA

Date Sampled : 07/19/05 10:50 **Order #:** 829364 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 95.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/01/05			
ANALYTICAL DILUTION: 1020.00			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	5400 U	UG/KG
VINYL CHLORIDE	5.0	5400 U	UG/KG
O-XYLENE	5.0	5400 U	UG/KG
M+P-XYLENE	5.0	5400 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	96	%
TOLUENE-D8	(75 - 128 %)	93	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	98	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

2SBAA DL

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: _____ SDG No.: Y98AS

Matrix: (soil/water) SOIL Lab Sample ID: 829364 1020

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4047.D

Level: (low/med) MED Date Received: 7/23/05

% Moisture: not dec. 4.9 Date Analyzed: 8/1/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0 1020

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS2SBEA

Date Sampled : 07/19/05 13:19 **Order #:** 829365 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 97.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/27/05			
ANALYTICAL DILUTION: 0.94			Dry Weight
ACETONE	10	41	UG/KG
BENZENE	5.0	0.48 J	UG/KG
BROMODICHLOROMETHANE	5.0	4.8 U	UG/KG
BROMOFORM	5.0	4.8 U	UG/KG
BROMOMETHANE	5.0	4.8 U	UG/KG
2-BUTANONE (MEK)	10	6.1 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.8 U	UG/KG
CARBON DISULFIDE	10	1.2 J	UG/KG
CARBON TETRACHLORIDE	5.0	4.8 U	UG/KG
CHLOROBENZENE	5.0	4.8 U	UG/KG
CHLOROETHANE	10	9.6 U	UG/KG
CHLOROFORM	5.0	4.8 U	UG/KG
CHLOROMETHANE	5.0	4.8 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.8 U	UG/KG
CYCLOHEXANE	10	9.6 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.8 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.8 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.8 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.8 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.8 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.8 U	UG/KG
1,1-DICHLOROETHANE	5.0	4.8 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.8 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.8 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	56	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	0.47 J	UG/KG
1,2-DICHLOROPROPANE	5.0	4.8 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.8 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.8 U	UG/KG
ETHYLBENZENE	5.0	4.8 U	UG/KG
2-HEXANONE	10	9.6 U	UG/KG
ISOPROPYLBENZENE	5.0	4.8 U	UG/KG
METHYLCYCLOHEXANE	10	9.6 U	UG/KG
METHYLENE CHLORIDE	5.0	4.8 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	9.6 U	UG/KG
STYRENE	5.0	4.8 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.8 U	UG/KG
TETRACHLOROETHENE	5.0	16	UG/KG
TOLUENE	5.0	0.62 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.8 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	1.7 J	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.8 U	UG/KG
TRICHLOROETHENE	5.0	1300 E	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.8 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS2SBEA

Date Sampled : 07/19/05 13:19 **Order #:** 829365 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 97.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/27/05			
ANALYTICAL DILUTION: 0.94			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.8 U	UG/KG
VINYL CHLORIDE	5.0	4.8 U	UG/KG
O-XYLENE	5.0	4.8 U	UG/KG
M+P-XYLENE	5.0	4.8 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	86	%
TOLUENE-D8	(75 - 128 %)	111	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	102	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

2SBEA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: SDG No.: SS1SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 829365 0.938

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X3946.D

Level: (low/med) LOW Date Received: 7/23/05

% Moisture: not dec. 2.2 Date Analyzed: 7/27/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0 0.936

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS2SBEA

Date Sampled : 07/19/05 13:19 **Order #:** 829365 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 97.8

DATE ANALYZED : 08/01/05
ANALYTICAL DILUTION: 130.00

Report Tetrachloroethene only from this page 83 9/6/05

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	1300 U	UG/KG
BENZENE	5.0	660 U	UG/KG
BROMODICHLOROMETHANE	5.0	660 U	UG/KG
BROMOFORM	5.0	660 U	UG/KG
BROMOMETHANE	5.0	660 U	UG/KG
2-BUTANONE (MEK)	10	1300 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	660 U	UG/KG
CARBON DISULFIDE	10	1300 U	UG/KG
CARBON TETRACHLORIDE	5.0	660 U	UG/KG
CHLOROBENZENE	5.0	660 U	UG/KG
CHLOROETHANE	10	1300 U	UG/KG
CHLOROFORM	5.0	660 U	UG/KG
CHLOROMETHANE	5.0	660 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	660 U	UG/KG
CYCLOHEXANE	10	1300 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	660 U	UG/KG
1,2-DIBROMOETHANE	5.0	660 U	UG/KG
1,3-DICHLOROBENZENE	5.0	660 U	UG/KG
1,4-DICHLOROBENZENE	5.0	660 U	UG/KG
1,2-DICHLOROBENZENE	5.0	660 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	660 U	UG/KG
1,1-DICHLOROETHANE	5.0	660 U	UG/KG
1,2-DICHLOROETHANE	5.0	660 U	UG/KG
1,1-DICHLOROETHENE	5.0	660 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	460 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	660 U	UG/KG
1,2-DICHLOROPROPANE	5.0	660 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	660 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	660 U	UG/KG
ETHYLBENZENE	5.0	660 U	UG/KG
2-HEXANONE	10	1300 U	UG/KG
ISOPROPYLBENZENE	5.0	660 U	UG/KG
METHYLCYCLOHEXANE	10	1300 U	UG/KG
METHYLENE CHLORIDE	5.0	660 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	1300 U	UG/KG
STYRENE	5.0	660 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	660 U	UG/KG
TETRACHLOROETHENE	5.0	310 J	UG/KG
TOLUENE	5.0	660 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	660 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	660 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	660 U	UG/KG
TRICHLOROETHENE	5.0	20000 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	660 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS2SBEA

Date Sampled : 07/19/05 13:19 **Order #:** 829365 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 97.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/01/05			Dry Weight
ANALYTICAL DILUTION: 130.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	660 U	UG/KG
VINYL CHLORIDE	5.0	660 U	UG/KG
O-XYLENE	5.0	660 U	UG/KG
M+P-XYLENE	5.0	660 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	98	%
TOLUENE-D8	(75 - 128 %)	94	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	98	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

2SBEA DL

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: SDG No.: Y98AS

Matrix: (soil/water) SOIL Lab Sample ID: 829365 130

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4048.D

Level: (low/med) MED Date Received: 7/23/05

% Moisture: not dec. 2.2 Date Analyzed: 8/1/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0 130

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS2SBNA

Date Sampled : 07/19/05 14:01 **Order #:** 829366 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 89.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/27/05			
ANALYTICAL DILUTION: 0.59			Dry Weight
ACETONE	10	3.9 J	UG/KG
BENZENE	5.0	3.3 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.3 U	UG/KG
BROMOFORM	5.0	3.3 U	UG/KG
BROMOMETHANE	5.0	3.3 U	UG/KG
2-BUTANONE (MEK)	10	6.7 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.3 U	UG/KG
CARBON DISULFIDE	10	6.7 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.3 U	UG/KG
CHLOROBENZENE	5.0	3.3 U	UG/KG
CHLOROETHANE	10	6.7 U	UG/KG
CHLOROFORM	5.0	3.3 U	UG/KG
CHLOROMETHANE	5.0	3.3 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.3 U	UG/KG
CYCLOHEXANE	10	6.7 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.3 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.3 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.3 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.3 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.3 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.3 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.3 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.3 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.3 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	4.9 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.3 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.3 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.3 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.3 U	UG/KG
ETHYLBENZENE	5.0	3.3 U	UG/KG
2-HEXANONE	10	6.7 U	UG/KG
ISOPROPYLBENZENE	5.0	3.3 U	UG/KG
METHYLCYCLOHEXANE	10	6.7 U	UG/KG
METHYLENE CHLORIDE	5.0	3.3 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	6.7 U	UG/KG
STYRENE	5.0	3.3 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.3 U	UG/KG
TETRACHLOROETHENE	5.0	0.79 J	UG/KG
TOLUENE	5.0	3.3 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.3 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	0.53 J	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.3 U	UG/KG
TRICHLOROETHENE	5.0	61	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.3 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS2SBNA

Date Sampled : 07/19/05 14:01 **Order #:** 829366 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 89.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/27/05			
ANALYTICAL DILUTION: 0.59			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.3 U	UG/KG
VINYL CHLORIDE	5.0	3.3 U	UG/KG
O-XYLENE	5.0	3.3 U	UG/KG
M+P-XYLENE	5.0	3.3 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	101	%
TOLUENE-D8	(75 - 128 %)	98	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	99	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

2SBNA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: _____ SDG No.: SS1SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 829366 0.592

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X3947.D

Level: (low/med) LOW Date Received: 7/23/05

% Moisture: not dec. 11 Date Analyzed: 7/27/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: ~~1.0~~ 0.592

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS3SBAA

Date Sampled : 07/20/05 09:50 **Order #:** 829367 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 92.9

DATE ANALYZED : 07/27/05
ANALYTICAL DILUTION: 0.80

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	11	UG/KG
BENZENE	5.0	4.3 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.3 U	UG/KG
BROMOFORM	5.0	4.3 U	UG/KG
BROMOMETHANE	5.0	4.3 U	UG/KG
2-BUTANONE (MEK)	10	8.6 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.3 U	UG/KG
CARBON DISULFIDE	10	0.40 J	UG/KG
CARBON TETRACHLORIDE	5.0	4.3 U	UG/KG
CHLOROBENZENE	5.0	4.3 U	UG/KG
CHLOROETHANE	10	8.6 U	UG/KG
CHLOROFORM	5.0	0.51 J	UG/KG
CHLOROMETHANE	5.0	4.3 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.3 U	UG/KG
CYCLOHEXANE	10	8.6 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.3 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.3 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.3 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.3 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.3 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.3 U	UG/KG
1,1-DICHLOROETHANE	5.0	4.3 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.3 U	UG/KG
1,1-DICHLOROETHENE	5.0	79	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.72 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.3 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.3 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.3 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.3 U	UG/KG
ETHYLBENZENE	10	8.6 U	UG/KG
2-HEXANONE	5.0	4.3 U	UG/KG
ISOPROPYLBENZENE	10	0.40 J	UG/KG
METHYLCYCLOHEXANE	5.0	4.3 U	UG/KG
METHYLENE CHLORIDE	10	8.6 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	5.0	4.3 U	UG/KG
STYRENE	5.0	4.3 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	23	UG/KG
TETRACHLOROETHENE	5.0	4.3 U	UG/KG
TOLUENE	5.0	4.3 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.0 J	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.3 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	1500 E	UG/KG
TRICHLOROETHENE	5.0	4.3 U	UG/KG
TRICHLOROFLUOROMETHANE			

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS3SBAA

Date Sampled : 07/20/05 09:50 **Order #:** 829367 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 92.9

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/27/05			Dry Weight
ANALYTICAL DILUTION: 0.80			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.3 U	UG/KG
VINYL CHLORIDE	5.0	4.3 U	UG/KG
O-XYLENE	5.0	4.3 U	UG/KG
M+P-XYLENE	5.0	4.3 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	87	%
TOLUENE-D8	(75 - 128 %)	114	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	105	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

3SBAA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: _____ SDG No.: SS1SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 829367 0.803

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X3948.D

Level: (low/med) LOW Date Received: 7/23/05

% Moisture: not dec. 7.1 Date Analyzed: 7/27/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: ~~1.0~~ 0.803

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS3SBAA

Date Sampled : 07/20/05 09:50 **Order #:** 829367 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 92.9

DATE ANALYZED : 08/01/05
ANALYTICAL DILUTION: 716.00

Report Trichloroethene only from this page SS 9/6/05

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	7700 U	UG/KG
BENZENE	5.0	3900 U	UG/KG
BROMODICHLOROMETHANE	5.0	3900 U	UG/KG
BROMOFORM	5.0	3900 U	UG/KG
BROMOMETHANE	5.0	3900 U	UG/KG
2-BUTANONE (MEK)	10	7700 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3900 U	UG/KG
CARBON DISULFIDE	10	7700 U	UG/KG
CARBON TETRACHLORIDE	5.0	3900 U	UG/KG
CHLOROBENZENE	5.0	3900 U	UG/KG
CHLOROETHANE	10	7700 U	UG/KG
CHLOROFORM	5.0	3900 U	UG/KG
CHLOROMETHANE	5.0	3900 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3900 U	UG/KG
CYCLOHEXANE	10	7700 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3900 U	UG/KG
1,2-DIBROMOETHANE	5.0	3900 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3900 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3900 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3900 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3900 U	UG/KG
1,1-DICHLOROETHANE	5.0	3900 U	UG/KG
1,2-DICHLOROETHANE	5.0	3900 U	UG/KG
1,1-DICHLOROETHENE	5.0	3600 J	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3900 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3900 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3900 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3900 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3900 U	UG/KG
ETHYLBENZENE	10	7700 U	UG/KG
2-HEXANONE	5.0	3900 U	UG/KG
ISOPROPYLBENZENE	10	7700 U	UG/KG
METHYLCYCLOHEXANE	5.0	3900 U	UG/KG
METHYLENE CHLORIDE	10	7700 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	5.0	3900 U	UG/KG
STYRENE	5.0	3900 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	2200 J	UG/KG
TETRACHLOROETHENE	5.0	3900 U	UG/KG
TOLUENE	5.0	3900 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3900 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3900 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	120000 J	UG/KG
TRICHLOROETHENE	5.0	3900 U	UG/KG
TRICHLOROFLUOROMETHANE			

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS3SBAA

Date Sampled : 07/20/05 09:50 **Order #:** 829367 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 92.9

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/01/05			Dry Weight
ANALYTICAL DILUTION: 716.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3900 U	UG/KG
VINYL CHLORIDE	5.0	3900 U	UG/KG
O-XYLENE	5.0	3900 U	UG/KG
M+P-XYLENE	5.0	3900 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	96	%
TOLUENE-D8	(75 - 128 %)	94	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	100	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

3SBAA DL

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: _____ SDG No.: Y98AS

Matrix: (soil/water) SOIL Lab Sample ID: 829367 716

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4049.D

Level: (low/med) MED Date Received: 7/23/05

% Moisture: not dec. 7.1 Date Analyzed: 8/1/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0 10

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS3SBPA

Date Sampled : 07/20/05 12:15 **Order #:** 829368 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 87.0

DATE ANALYZED : 07/27/05
ANALYTICAL DILUTION: 0.64

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	4.3 J	UG/KG
BENZENE	5.0	3.7 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.7 U	UG/KG
BROMOFORM	5.0	3.7 U	UG/KG
BROMOMETHANE	5.0	3.7 U	UG/KG
2-BUTANONE (MEK)	10	7.4 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.7 U	UG/KG
CARBON DISULFIDE	10	7.4 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.7 U	UG/KG
CHLOROBENZENE	5.0	3.7 U	UG/KG
CHLOROETHANE	10	7.4 U	UG/KG
CHLOROFORM	5.0	3.7 U	UG/KG
CHLOROMETHANE	5.0	3.7 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.7 U	UG/KG
CYCLOHEXANE	10	7.4 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.7 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.7 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.7 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.7 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.7 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.7 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.7 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.7 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.7 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	4.9 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.7 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.7 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.7 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.7 U	UG/KG
ETHYLBENZENE	5.0	3.7 U	UG/KG
2-HEXANONE	10	7.4 U	UG/KG
ISOPROPYLBENZENE	5.0	3.7 U	UG/KG
METHYLCYCLOHEXANE	10	7.4 U	UG/KG
METHYLENE CHLORIDE	5.0	3.7 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.4 U	UG/KG
STYRENE	5.0	3.7 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.7 U	UG/KG
TETRACHLOROETHENE	5.0	6.9	UG/KG
TOLUENE	5.0	0.31 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.7 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.7 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.7 U	UG/KG
TRICHLOROETHENE	5.0	59	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.7 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS3SBPA

Date Sampled : 07/20/05 12:15 **Order #:** 829368 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 87.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/27/05			
ANALYTICAL DILUTION: 0.64			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.7 U	UG/KG
VINYL CHLORIDE	5.0	3.7 U	UG/KG
O-XYLENE	5.0	3.7 U	UG/KG
M+P-XYLENE	5.0	3.7 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	102	%
TOLUENE-D8	(75 - 128 %)	100	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	101	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

3SBPA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: _____ SDG No.: SS1SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 829368 0.641

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X3949.D

Level: (low/med) LOW Date Received: 7/23/05

% Moisture: not dec. 13 Date Analyzed: 7/27/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: ~~1.0~~ 0.641

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS4SBAA

Date Sampled : 07/20/05 13:45 **Order #:** 829369 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 94.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/29/05			
ANALYTICAL DILUTION: 268.00			Dry Weight
ACETONE	10	2900 U	UG/KG
BENZENE	5.0	1400 U	UG/KG
BROMODICHLOROMETHANE	5.0	1400 U	UG/KG
BROMOFORM	5.0	1400 U	UG/KG
BROMOMETHANE	5.0	1400 U	UG/KG
2-BUTANONE (MEK)	10	2900 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	1400 U	UG/KG
CARBON DISULFIDE	10	2900 U	UG/KG
CARBON TETRACHLORIDE	5.0	1400 U	UG/KG
CHLOROBENZENE	5.0	1400 U	UG/KG
CHLOROETHANE	10	2900 U	UG/KG
CHLOROFORM	5.0	1400 U	UG/KG
CHLOROMETHANE	5.0	1400 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	1400 U	UG/KG
CYCLOHEXANE	10	2900 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	1400 U	UG/KG
1,2-DIBROMOETHANE	5.0	1400 U	UG/KG
1,3-DICHLOROBENZENE	5.0	1400 U	UG/KG
1,4-DICHLOROBENZENE	5.0	1400 U	UG/KG
1,2-DICHLOROBENZENE	5.0	1400 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	1400 U	UG/KG
1,1-DICHLOROETHANE	5.0	1400 U	UG/KG
1,2-DICHLOROETHANE	5.0	1400 U	UG/KG
1,1-DICHLOROETHENE	5.0	1400 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	2200	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	1400 U	UG/KG
1,2-DICHLOROPROPANE	5.0	1400 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	1400 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	1400 U	UG/KG
ETHYLBENZENE	5.0	1400 U	UG/KG
2-HEXANONE	10	2900 U	UG/KG
ISOPROPYLBENZENE	5.0	1400 U	UG/KG
METHYLCYCLOHEXANE	10	2900 U	UG/KG
METHYLENE CHLORIDE	5.0	1400 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	2900 U	UG/KG
STYRENE	5.0	1400 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	1400 U	UG/KG
TETRACHLOROETHENE	5.0	1100 J	UG/KG
TOLUENE	5.0	1400 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	1400 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	1400 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	1400 U	UG/KG
TRICHLOROETHENE	5.0	46000	UG/KG
TRICHLOROFLUOROMETHANE	5.0	1400 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS4SBAA

Date Sampled : 07/20/05 13:45 **Order #:** 829369 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 94.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/29/05			
ANALYTICAL DILUTION: 268.00			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	1400 U	UG/KG
VINYL CHLORIDE	5.0	1400 U	UG/KG
O-XYLENE	5.0	1400 U	UG/KG
M+P-XYLENE	5.0	1400 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	103	%
TOLUENE-D8	(75 - 128 %)	95	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	100	%

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
4SBAA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: _____ SDG No.: Y98AS

Matrix: (soil/water) SOIL Lab Sample ID: 829369 268

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4004.D

Level: (low/med) MED Date Received: 7/23/05

% Moisture: not dec. 6 Date Analyzed: 7/29/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 10268

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS4SBPA

Date Sampled : 07/21/05 13:46 **Order #:** 829370 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 77.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/28/05			
ANALYTICAL DILUTION: 0.80			Dry Weight
ACETONE	10	6.8 J	UG/KG
BENZENE	5.0	5.1 U	UG/KG
BROMODICHLOROMETHANE	5.0	5.1 U	UG/KG
BROMOFORM	5.0	5.1 U	UG/KG
BROMOMETHANE	5.0	5.1 U	UG/KG
2-BUTANONE (MEK)	10	1.3 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	5.1 U	UG/KG
CARBON DISULFIDE	10	10 U	UG/KG
CARBON TETRACHLORIDE	5.0	5.1 U	UG/KG
CHLOROBENZENE	5.0	5.1 U	UG/KG
CHLOROETHANE	10	10 U	UG/KG
CHLOROFORM	5.0	5.1 U	UG/KG
CHLOROMETHANE	5.0	5.1 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	5.1 U	UG/KG
CYCLOHEXANE	10	10 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	5.1 U	UG/KG
1,2-DIBROMOETHANE	5.0	5.1 U	UG/KG
1,3-DICHLOROBENZENE	5.0	5.1 U	UG/KG
1,4-DICHLOROBENZENE	5.0	5.1 U	UG/KG
1,2-DICHLOROBENZENE	5.0	5.1 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	5.1 U	UG/KG
1,1-DICHLOROETHANE	5.0	5.1 U	UG/KG
1,2-DICHLOROETHANE	5.0	5.1 U	UG/KG
1,1-DICHLOROETHENE	5.0	5.1 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.64 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	5.1 U	UG/KG
1,2-DICHLOROPROPANE	5.0	5.1 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	5.1 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	5.1 U	UG/KG
ETHYLBENZENE	5.0	5.1 U	UG/KG
2-HEXANONE	10	10 U	UG/KG
ISOPROPYLBENZENE	5.0	5.1 U	UG/KG
METHYLCYCLOHEXANE	10	10 U	UG/KG
METHYLENE CHLORIDE	5.0	5.1 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	10 U	UG/KG
STYRENE	5.0	5.1 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	5.1 U	UG/KG
TETRACHLOROETHENE	5.0	4.8 J	UG/KG
TOLUENE	5.0	5.1 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	5.1 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	5.1 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	5.1 U	UG/KG
TRICHLOROETHENE	5.0	14	UG/KG
TRICHLOROFLUOROMETHANE	5.0	5.1 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS4SBPA

Date Sampled : 07/21/05 13:46 **Order #:** 829370 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 77.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/28/05			
ANALYTICAL DILUTION: 0.80			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	5.1 U	UG/KG
VINYL CHLORIDE	5.0	5.1 U	UG/KG
O-XYLENE	5.0	5.1 U	UG/KG
M+P-XYLENE	5.0	5.1 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	99	%
TOLUENE-D8	(75 - 128 %)	98	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	100	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

4SBPA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: _____ SDG No.: SS1SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 829370 0.796

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X3958.D

Level: (low/med) LOW Date Received: 7/23/05

% Moisture: not dec. 22.2 Date Analyzed: 7/28/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 10 0.796

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS4SBPB

Date Sampled : 07/21/05 13:46 **Order #:** 829371 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 83.9

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/28/05			
ANALYTICAL DILUTION: 0.81			Dry Weight
ACETONE	10	4.5 J	UG/KG
BENZENE	5.0	4.8 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.8 U	UG/KG
BROMOFORM	5.0	4.8 U	UG/KG
BROMOMETHANE	5.0	4.8 U	UG/KG
2-BUTANONE (MEK)	10	9.6 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.8 U	UG/KG
CARBON DISULFIDE	10	9.6 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.8 U	UG/KG
CHLOROBENZENE	5.0	4.8 U	UG/KG
CHLOROETHANE	10	9.6 U	UG/KG
CHLOROFORM	5.0	4.8 U	UG/KG
CHLOROMETHANE	5.0	4.8 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.8 U	UG/KG
CYCLOHEXANE	10	9.6 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.8 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.8 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.8 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.8 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.8 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.8 U	UG/KG
1,1-DICHLOROETHANE	5.0	4.8 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.8 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.8 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	4.8 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.8 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.8 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.8 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.8 U	UG/KG
ETHYLBENZENE	5.0	4.8 U	UG/KG
2-HEXANONE	10	9.6 U	UG/KG
ISOPROPYLBENZENE	5.0	4.8 U	UG/KG
METHYLCYCLOHEXANE	10	9.6 U	UG/KG
METHYLENE CHLORIDE	5.0	4.8 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	9.6 U	UG/KG
STYRENE	5.0	4.8 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.8 U	UG/KG
TETRACHLOROETHENE	5.0	6.9	UG/KG
TOLUENE	5.0	4.8 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.8 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.8 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.8 U	UG/KG
TRICHLOROETHENE	5.0	12	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.8 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS4SBPB

Date Sampled : 07/21/05 13:46 **Order #:** 829371 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 83.9

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/28/05			
ANALYTICAL DILUTION: 0.81			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.8 U	UG/KG
VINYL CHLORIDE	5.0	4.8 U	UG/KG
O-XYLENE	5.0	4.8 U	UG/KG
M+P-XYLENE	5.0	4.8 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	100	%
TOLUENE-D8	(75 - 128 %)	100	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	98	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
4SBPB

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: SDG No.: SS1SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 829371 0.809

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X3959.D

Level: (low/med) LOW Date Received: 7/23/05

% Moisture: not dec. 16.2 Date Analyzed: 7/28/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: ~~1.0~~ 0.809

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS6S6AA

Date Sampled : 07/22/05 10:30 **Order #:** 829372 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 94.0

DATE ANALYZED : 08/02/05
ANALYTICAL DILUTION: 69.00

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	~~130 J~~ 730 U	UG/KG
BENZENE	5.0	370 U	UG/KG
BROMODICHLOROMETHANE	5.0	370 U	UG/KG
BROMOFORM	5.0	370 U	UG/KG
BROMOMETHANE	5.0	370 U	UG/KG
2-BUTANONE (MEK)	10	730 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	370 U	UG/KG
CARBON DISULFIDE	10	730 U	UG/KG
CARBON TETRACHLORIDE	5.0	370 U	UG/KG
CHLOROBENZENE	5.0	370 U	UG/KG
CHLOROETHANE	10	730 U	UG/KG
CHLOROFORM	5.0	370 U	UG/KG
CHLOROMETHANE	5.0	370 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	370 U	UG/KG
CYCLOHEXANE	10	730 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	370 U	UG/KG
1,2-DIBROMOETHANE	5.0	370 U	UG/KG
1,3-DICHLOROBENZENE	5.0	370 U	UG/KG
1,4-DICHLOROBENZENE	5.0	370 U	UG/KG
1,2-DICHLOROBENZENE	5.0	370 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	370 U	UG/KG
1,1-DICHLOROETHANE	5.0	370 U	UG/KG
1,2-DICHLOROETHANE	5.0	370 U	UG/KG
1,1-DICHLOROETHENE	5.0	370 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	140 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	370 U	UG/KG
1,2-DICHLOROPROPANE	5.0	370 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	370 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	370 U	UG/KG
ETHYLBENZENE	5.0	370 U	UG/KG
2-HEXANONE	10	730 U	UG/KG
ISOPROPYLBENZENE	5.0	370 U	UG/KG
METHYLCYCLOHEXANE	10	730 U	UG/KG
METHYLENE CHLORIDE	5.0	370 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	730 U	UG/KG
STYRENE	5.0	370 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	370 U	UG/KG
TETRACHLOROETHENE	5.0	77 J	UG/KG
TOLUENE	5.0	370 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	370 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	370 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	370 U	UG/KG
TRICHLOROETHENE	5.0	2000	UG/KG
TRICHLOROFLUOROMETHANE	5.0	370 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS6S6AA

Date Sampled : 07/22/05 10:30 **Order #:** 829372 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 94.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/02/05			Dry Weight
ANALYTICAL DILUTION: 69.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	370 U	UG/KG
VINYL CHLORIDE	5.0	370 U	UG/KG
O-XYLENE	5.0	370 U	UG/KG
M+P-XYLENE	5.0	370 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	98	%
TOLUENE-D8	(75 - 128 %)	92	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	98	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

6S6AA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: _____ SDG No.: Y98AS

Matrix: (soil/water) SOIL Lab Sample ID: 829372 69.0

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4060.D

Level: (low/med) MED Date Received: 7/23/05

% Moisture: not dec. 6 Date Analyzed: 8/2/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0 lg

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS6S6PA

Date Sampled : 07/22/05 12:10 **Order #:** 829373 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 82.0

DATE ANALYZED : 07/28/05
ANALYTICAL DILUTION: 0.67

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	9.4 J	UG/KG
BENZENE	5.0	4.1 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.1 U	UG/KG
BROMOFORM	5.0	4.1 U	UG/KG
BROMOMETHANE	5.0	4.1 U	UG/KG
2-BUTANONE (MEK)	10	1.5 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.1 U	UG/KG
CARBON DISULFIDE	10	8.1 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.1 U	UG/KG
CHLOROBENZENE	5.0	4.1 U	UG/KG
CHLOROETHANE	10	8.1 U	UG/KG
CHLOROFORM	5.0	4.1 U	UG/KG
CHLOROMETHANE	5.0	4.1 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.1 U	UG/KG
CYCLOHEXANE	10	8.1 U J	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.1 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.1 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.1 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.1 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.1 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.1 U	UG/KG
1,1-DICHLOROETHANE	5.0	0.83 J	UG/KG
1,2-DICHLOROETHANE	5.0	4.1 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.1 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	43	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	0.57 J	UG/KG
1,2-DICHLOROPROPANE	5.0	4.1 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.1 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.1 U	UG/KG
ETHYLBENZENE	5.0	4.1 U	UG/KG
2-HEXANONE	10	8.1 U	UG/KG
ISOPROPYLBENZENE	5.0	4.1 U	UG/KG
METHYLCYCLOHEXANE	10	8.1 U J	UG/KG
METHYLENE CHLORIDE	5.0	4.1 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	8.1 U	UG/KG
STYRENE	5.0	4.1 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.1 U	UG/KG
TETRACHLOROETHENE	5.0	4.0 J	UG/KG
TOLUENE	5.0	4.1 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.1 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.8 J	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.1 U	UG/KG
TRICHLOROETHENE	5.0	220 E	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.1 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

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Client Sample ID : SS6S6PA

Date Sampled : 07/22/05 12:10 **Order #:** 829373 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 82.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/28/05			Dry Weight
ANALYTICAL DILUTION: 0.67			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.1 U	UG/KG
VINYL CHLORIDE	5.0	4.1 U	UG/KG
O-XYLENE	5.0	4.1 U	UG/KG
M+P-XYLENE	5.0	4.1 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	102	%
TOLUENE-D8	(75 - 128 %)	100	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	98	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

6S6PA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: SDG No.: SS1SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 829373 0.668

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X3960.D

Level: (low/med) LOW Date Received: 7/23/05

% Moisture: not dec. 18 Date Analyzed: 7/28/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: ~~1.0~~ 0.606

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS6S6PA

Date Sampled : 07/22/05 12:10 **Order #:** 829373 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 82.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/29/05			Dry Weight
ANALYTICAL DILUTION: 69.00			
Report Trichloroethene only from this page SB 9/6/05			
~~ACETONE~~	10	150 JB	~~UG/KG~~
BENZENE	5.0	420 U	UG/KG
BROMODICHLOROMETHANE	5.0	420 U	UG/KG
BROMOFORM	5.0	420 U	UG/KG
BROMOMETHANE	5.0	420 U	UG/KG
2-BUTANONE (MEK)	10	840 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	420 U	UG/KG
CARBON DISULFIDE	10	840 U	UG/KG
CARBON TETRACHLORIDE	5.0	420 U	UG/KG
CHLOROBENZENE	5.0	420 U	UG/KG
CHLOROETHANE	10	840 U	UG/KG
CHLOROFORM	5.0	420 U	UG/KG
CHLOROMETHANE	5.0	420 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	420 U	UG/KG
CYCLOHEXANE	10	840 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	420 U	UG/KG
1,2-DIBROMOETHANE	5.0	420 U	UG/KG
1,3-DICHLOROBENZENE	5.0	420 U	UG/KG
1,4-DICHLOROBENZENE	5.0	420 U	UG/KG
1,2-DICHLOROBENZENE	5.0	420 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	420 U	UG/KG
1,1-DICHLOROETHANE	5.0	420 U	UG/KG
1,2-DICHLOROETHANE	5.0	420 U	UG/KG
1,1-DICHLOROETHENE	5.0	50 J	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	420 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	420 U	UG/KG
1,2-DICHLOROPROPANE	5.0	420 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	420 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	420 U	UG/KG
ETHYLBENZENE	10	840 U	UG/KG
2-HEXANONE	5.0	420 U	UG/KG
ISOPROPYLBENZENE	10	840 U	UG/KG
METHYLCYCLOHEXANE	5.0	420 U	UG/KG
METHYLENE CHLORIDE	10	840 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	5.0	420 U	UG/KG
STYRENE	5.0	420 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	420 U	UG/KG
TETRACHLOROETHENE	5.0	420 U	UG/KG
TOLUENE	5.0	420 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	420 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	420 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	340 J	UG/KG
TRICHLOROETHENE	5.0	420 U	UG/KG
TRICHLOROFLUOROMETHANE			

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/24/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-200
Client Sample ID : SS6S6PA

Date Sampled : 07/22/05 12:10 **Order #:** 829373 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/23/05 **Submission #:** R2527034 **Percent Solid:** 82.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/29/05			Dry Weight
ANALYTICAL DILUTION: 69.00			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	420 U	UG/KG
VINYL CHLORIDE	5.0	420 U	UG/KG
O-XYLENE	5.0	420 U	UG/KG
M+P-XYLENE	5.0	420 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	99	%
TOLUENE-D8	(75 - 128 %)	94	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	97	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

6S6PA DL

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27034 SAS No.: _____ SDG No.: Y98AS

Matrix: (soil/water) SOIL Lab Sample ID: 829373 69.0

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4006.D

Level: (low/med) MED Date Received: 7/23/05

% Moisture: not dec. 18 Date Analyzed: 7/29/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0 69

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

ENSR

MEMORANDUM

TO:	David Austin/Westford	**DATE:**	September 20, 2005
FROM:	Sheena Blair/Westford	**FILE:**	OZ005voc 10748-001-0500
RE:	Data Validation VOCs in Soil Former Ozone Industries Queens, NY CAS Project # R2527157	**CC:**	W. Braunstein/Westford

SUMMARY

Limited validation was performed on the data for six soil samples for site-specific volatile organic compounds (VOCs) analyzed using EPA method 8260B. The samples were collected at the Former Ozone Industries site, Queens, NY on July 25 and 26, 2005 and submitted to Columbia Analytical Services (CAS) in Rochester, New York. CAS analyzed and reported the results under project number R2527157.

The data were assessed according to the EPA methods and the *"USEPA Region 2, SOP HW-24, Standard Operating Procedure for the Validation of Organic Data Acquired using SW-846 EPA Method 8260B" (Revision 2, December 1999).*"

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were negated (U) due to blank contamination or qualified for certain other QC nonconformances (see discussion below).

SAMPLES

The samples included in this review are listed below:

Sample IDs	Sample IDs
SS8SBAA	SS5SBPA
SS5SBAA	SS8SBPA
SS8SBCA	SS8SBAB (field duplicate of SS8SBAA)

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with the chain of custody (COC) requests
- Holding times and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/equipment blank/trip blank
- Surrogate spike recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Laboratory control sample (LCS) results
- Quantitation limits and sample results

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DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports corresponded to the analytical requests designated on the COC. No discrepancies were noted.

Holding Times and Sample Preservation

The cooler temperature was 1°C, which fell slightly below the QC acceptance criteria of 4°C ± 2°C. No validation action was taken for this minor nonconformance other than this notation.

All samples were extracted and analyzed within the QAPP specified holding time except sample SS8SBAB which exceeded the calibration range for trichloroethene in the initial analysis. The sample was re-analyzed at a higher dilution, for trichloroethene only, one day past the method recommended holding time of 10 days; therefore the trichloroethene result for SS8SBAB was qualified as estimated, biased low (J).

GC/MS Tunes

The frequency and abundance of the bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within 12 hours from the BFB tunes.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs), the response factors (RFs), and percent differences (%Ds) of all target analytes were within the QC acceptance criteria in the initial and continuing calibration (CC) standards except for CC 7/29/05. The following table summarizes %Ds that were outside the QC acceptance criteria in the CC standard 7/29/05.

Calibration	Compound	%D
CC (7/29/05)	Acetone	24.5
	2-Butanone	23.3
	Methylcyclohexane	23.7
	1,2,4-Trichlorobenzene	21.7
Associated sample: SS8SBAA		

Sample results were qualified as follows:

- If %D > 20%, estimate positive results (J) and nondetect results (UJ).

Method Blanks/Equipment Blank/Trip Blank

No equipment or trip blanks were submitted with this sample set. No validation action was taken on this basis.

Acetone was detected in the several of laboratory method blanks. The presence of blank contamination indicates that false positive results may exist for this compound in the associated samples. An action Level (AL) was established for acetone at 10x the concentration detected in the blank. The following tables summarize the AL and the associated samples.

Type of Blank	Compound	Conc. Detected (µg/kg)	AL (µg/kg)
Method Blank 7/30/05	Acetone	180	1800
Associated sample: SS3SBAA			

Type of Blank	Compound	Conc. Detected (µg/kg)	AL (µg/kg)
Method Blank 8/2/05	Acetone	260	2600
Associated sample: SS5SBAA, SS8SBPADL			

Type of Blank	Compound	Conc. Detected (µg/kg)	AL (µg/kg)
Method Blank 8/6/05	Acetone	200	2000
Associated sample: SS8SBAB REP			

Sample results were qualified as follows:

- Sample results < sample quantitation limit (SQL) and ≤ AL were qualified as nondetect (U) at the SQL.
- Sample results ≥ SQL but ≤ AL were qualified as nondetect (U) at the reported concentration.
- Sample results ≥ SQL and ≥ AL were accepted without qualification.

Surrogate Spike Recoveries

The surrogate recoveries were within the QC acceptance limits in all sample analyses.

MS/MSD Results

MS/MSD analysis was not performed on a sample from this sample set. Accuracy in the laboratory was demonstrated by the analyses of LCSs.

Field Duplicate Results

Samples SS8SBAA and SS8SBAB were submitted as a field duplicate pair with this data set. The results for detected compounds, the associated relative percent differences (RPDs), and actions taken are tabulated below.

Compound	SS8SBAA (ug/kg)	SS8SBAB (ug/kg)	RPD (%)	Action
Cis-1,2-dichloroethene	160 J	310 J	64	None
Methylcyclohexane	72 J	74 J	3	None
Tetrachloroethene	400	820	69	None
Toluene	31 J	480 U	NC	None
1,1,1-Trichloroethane	630	270 J	80	None
Trichloroethene	9300	21000	77	J

The RPD for toluene was not calculable (NC) due to the nondetect duplicate result. Precision was deemed acceptable since the positive toluene result in the sample was <5x the SQL. The RPD for trichloroethene exceeded QC acceptance criteria; therefore the positive trichloroethene results for samples SS8SBAA and SS8SBAB were qualified as estimated, biased low (J). All other RPDs met the QC acceptance criteria.

LCS Results

The %Rs of the spiked target analytes were within the QC acceptance criteria in the LCSs associated with all sample analyses.

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Quantitation Limits and Sample Results

Several samples were analyzed at dilutions due to the concentration of target analytes which would have exceeded the calibration range if analyzed undiluted. Detected results and the reporting limits for nondetect compounds were elevated accordingly by the laboratory. The following table summarizes the samples and the dilution factors.

Sample ID	Dilution Factor
SS8SBAA	71.0
SS5SBAA	648
SS8SBPA	76.0
SS8SBAB	86.5/173

It should be noted that the results from both the diluted and undiluted analyses for samples SS8SBPA and SS8SBAB were combined by the data validator in order to report the lowest possible SQLs and all results within the calibration range.

Tentatively Identified Compounds (TICs)

Methyl acetate was one of the requested compounds on the site-specific list; however the VOC instrument was not calibrated for the compound at the time of sample receipt. At ENSR's request a library search for the methyl acetate as a TIC was performed. The TIC methyl acetate was not detected in any of the samples in this data set.

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBAA

Date Sampled : 07/26/05 09:30 **Order #:** 830792 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 90.3

DATE ANALYZED : 07/30/05
ANALYTICAL DILUTION: 71.00

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	~~240 JB~~ 790 UJ	UG/KG
BENZENE	5.0	390 U	UG/KG
BROMODICHLOROMETHANE	5.0	390 U	UG/KG
BROMOFORM	5.0	390 U	UG/KG
BROMOMETHANE	5.0	390 U	UG/KG
2-BUTANONE (MEK)	10	790 UJ	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	390 U	UG/KG
CARBON DISULFIDE	10	790 U	UG/KG
CARBON TETRACHLORIDE	5.0	390 U	UG/KG
CHLOROBENZENE	5.0	390 U	UG/KG
CHLOROETHANE	10	790 U	UG/KG
CHLOROFORM	5.0	390 U	UG/KG
CHLOROMETHANE	5.0	390 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	390 U	UG/KG
CYCLOHEXANE	10	790 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	390 U	UG/KG
1,2-DIBROMOETHANE	5.0	390 U	UG/KG
1,3-DICHLOROBENZENE	5.0	390 U	UG/KG
1,4-DICHLOROBENZENE	5.0	390 U	UG/KG
1,2-DICHLOROBENZENE	5.0	390 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	390 U	UG/KG
1,1-DICHLOROETHANE	5.0	390 U	UG/KG
1,2-DICHLOROETHANE	5.0	390 U	UG/KG
1,1-DICHLOROETHENE	5.0	390 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	160 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	390 U	UG/KG
1,2-DICHLOROPROPANE	5.0	390 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	390 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	390 U	UG/KG
ETHYLBENZENE	5.0	390 U	UG/KG
2-HEXANONE	10	790 U	UG/KG
ISOPROPYLBENZENE	5.0	390 U	UG/KG
METHYLCYCLOHEXANE	10	~~72 J~~ J	UG/KG
METHYLENE CHLORIDE	5.0	390 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	790 U	UG/KG
STYRENE	5.0	390 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	390 U	UG/KG
TETRACHLOROETHENE	5.0	400	UG/KG
TOLUENE	5.0	31 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	390 UJ	UG/KG
1,1,1-TRICHLOROETHANE	5.0	630	UG/KG
1,1,2-TRICHLOROETHANE	5.0	390 U	UG/KG
TRICHLOROETHENE	5.0	9300 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	390 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBAA

Date Sampled : 07/26/05 09:30 **Order #:** 830792 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 90.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 07/30/05			
ANALYTICAL DILUTION: 71.00			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	390 U	UG/KG
VINYL CHLORIDE	5.0	390 U	UG/KG
O-XYLENE	5.0	390 U	UG/KG
M+P-XYLENE	5.0	390 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	102	%
TOLUENE-D8	(75 - 128 %)	93	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	99	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

8SBAA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27157 SAS No.: SDG No.: SS8SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 830792 71.0

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4024.D

Level: (low/med) MED Date Received: 7/28/05

% Moisture: not dec. 9.7 Date Analyzed: 7/30/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0 71.5

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS5SBAA

Date Sampled : 07/25/05 11:10 **Order #:** 830793 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 92.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/02/05			
ANALYTICAL DILUTION: 648.00			Dry Weight
ACETONE	10	7000 U	UG/KG
BENZENE	5.0	3500 U	UG/KG
BROMODICHLOROMETHANE	5.0	3500 U	UG/KG
BROMOFORM	5.0	3500 U	UG/KG
BROMOMETHANE	5.0	3500 U	UG/KG
2-BUTANONE (MEK)	10	7000 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3500 U	UG/KG
CARBON DISULFIDE	10	7000 U	UG/KG
CARBON TETRACHLORIDE	5.0	3500 U	UG/KG
CHLOROBENZENE	5.0	3500 U	UG/KG
CHLOROETHANE	10	7000 U	UG/KG
CHLOROFORM	5.0	3500 U	UG/KG
CHLOROMETHANE	5.0	3500 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3500 U	UG/KG
CYCLOHEXANE	10	7000 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3500 U	UG/KG
1,2-DIBROMOETHANE	5.0	3500 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3500 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3500 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3500 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3500 U	UG/KG
1,1-DICHLOROETHANE	5.0	3500 U	UG/KG
1,2-DICHLOROETHANE	5.0	3500 U	UG/KG
1,1-DICHLOROETHENE	5.0	3500 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	110000	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	1600 J	UG/KG
1,2-DICHLOROPROPANE	5.0	3500 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3500 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3500 U	UG/KG
ETHYLBENZENE	5.0	3500 U	UG/KG
2-HEXANONE	10	7000 U	UG/KG
ISOPROPYLBENZENE	5.0	3500 U	UG/KG
METHYLCYCLOHEXANE	10	7000 U	UG/KG
METHYLENE CHLORIDE	5.0	3500 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7000 U	UG/KG
STYRENE	5.0	3500 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3500 U	UG/KG
TETRACHLOROETHENE	5.0	680 J	UG/KG
TOLUENE	5.0	3500 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3500 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3500 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3500 U	UG/KG
TRICHLOROETHENE	5.0	30000	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3500 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS5SBAA

Date Sampled : 07/25/05 11:10 **Order #:** 830793 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 92.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/02/05			
ANALYTICAL DILUTION: 648.00			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3500 U	UG/KG
VINYL CHLORIDE	5.0	3500 U	UG/KG
O-XYLENE	5.0	3500 U	UG/KG
M+P-XYLENE	5.0	3500 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	100	%
TOLUENE-D8	(75 - 128 %)	96	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	97	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBCA

Date Sampled : 07/26/05 10:00 **Order #:** 830794 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 96.9

DATE ANALYZED : 08/04/05
ANALYTICAL DILUTION: 0.77

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	7.4 J	UG/KG
BENZENE	5.0	4.0 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.0 U	UG/KG
BROMOFORM	5.0	4.0 U	UG/KG
BROMOMETHANE	5.0	4.0 U	UG/KG
2-BUTANONE (MEK)	10	7.9 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.0 U	UG/KG
CARBON DISULFIDE	10	7.9 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.0 U	UG/KG
CHLOROBENZENE	5.0	4.0 U	UG/KG
CHLOROETHANE	10	7.9 U	UG/KG
CHLOROFORM	5.0	4.0 U	UG/KG
CHLOROMETHANE	5.0	4.0 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.0 U	UG/KG
CYCLOHEXANE	10	7.9 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.0 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.0 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.0 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.0 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.0 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.0 U	UG/KG
1,1-DICHLOROETHANE	5.0	4.0 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.0 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.0 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.56 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.0 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.0 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.0 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.0 U	UG/KG
ETHYLBENZENE	5.0	4.0 U	UG/KG
2-HEXANONE	10	7.9 U	UG/KG
ISOPROPYLBENZENE	5.0	4.0 U	UG/KG
METHYLCYCLOHEXANE	10	7.9 U	UG/KG
METHYLENE CHLORIDE	5.0	4.0 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.9 U	UG/KG
STYRENE	5.0	4.0 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.0 U	UG/KG
TETRACHLOROETHENE	5.0	5.6	UG/KG
TOLUENE	5.0	4.0 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.0 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.0 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.0 U	UG/KG
TRICHLOROETHENE	5.0	10	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.0 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBCA

Date Sampled : 07/26/05 10:00 **Order #:** 830794 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 96.9

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/04/05			
ANALYTICAL DILUTION: 0.77			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.0 U	UG/KG
VINYL CHLORIDE	5.0	4.0 U	UG/KG
O-XYLENE	5.0	4.0 U	UG/KG
M+P-XYLENE	5.0	4.0 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	100	%
TOLUENE-D8	(75 - 128 %)	97	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	97	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBCA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27157 SAS No.: _____ SDG No.: SS8SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 830794 0.766

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4116.D

Level: (low/med) LOW Date Received: 7/28/05

% Moisture: not dec. 0 Date Analyzed: 8/4/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 10 0.766

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS5SBPA

Date Sampled : 07/25/05 13:30 **Order #:** 830795 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 80.4

DATE ANALYZED : 08/04/05
ANALYTICAL DILUTION: 0.87

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	31	UG/KG
BENZENE	5.0	0.52 J	UG/KG
BROMODICHLOROMETHANE	5.0	5.4 U	UG/KG
BROMOFORM	5.0	5.4 U	UG/KG
BROMOMETHANE	5.0	5.4 U	UG/KG
2-BUTANONE (MEK)	10	1.4 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	5.4 U	UG/KG
CARBON DISULFIDE	10	11 U	UG/KG
CARBON TETRACHLORIDE	5.0	5.4 U	UG/KG
CHLOROBENZENE	5.0	5.4 U	UG/KG
CHLOROETHANE	10	11 U	UG/KG
CHLOROFORM	5.0	5.4 U	UG/KG
CHLOROMETHANE	5.0	5.4 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	5.4 U	UG/KG
CYCLOHEXANE	10	11 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	5.4 U	UG/KG
1,2-DIBROMOETHANE	5.0	5.4 U	UG/KG
1,3-DICHLOROBENZENE	5.0	5.4 U	UG/KG
1,4-DICHLOROBENZENE	5.0	5.4 U	UG/KG
1,2-DICHLOROBENZENE	5.0	5.4 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	5.4 U	UG/KG
1,1-DICHLOROETHANE	5.0	5.4 U	UG/KG
1,2-DICHLOROETHANE	5.0	5.4 U	UG/KG
1,1-DICHLOROETHENE	5.0	5.4 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	15	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	5.4 U	UG/KG
1,2-DICHLOROPROPANE	5.0	5.4 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	5.4 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	5.4 U	UG/KG
ETHYLBENZENE	5.0	0.49 J	UG/KG
2-HEXANONE	10	11 U	UG/KG
ISOPROPYLBENZENE	5.0	5.4 U	UG/KG
METHYLCYCLOHEXANE	10	11 U	UG/KG
METHYLENE CHLORIDE	5.0	5.4 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	11 U	UG/KG
STYRENE	5.0	5.4 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	5.4 U	UG/KG
TETRACHLOROETHENE	5.0	15	UG/KG
TOLUENE	5.0	5.3 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	5.4 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	1.5 J	UG/KG
1,1,2-TRICHLOROETHANE	5.0	5.4 U	UG/KG
TRICHLOROETHENE	5.0	95	UG/KG
TRICHLOROFLUOROMETHANE	5.0	5.4 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS5SBPA

Date Sampled : 07/25/05 13:30 **Order #:** 830795 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 80.4

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/04/05			
ANALYTICAL DILUTION: 0.87			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	5.4 U	UG/KG
VINYL CHLORIDE	5.0	5.4 U	UG/KG
O-XYLENE	5.0	0.46 J	UG/KG
M+P-XYLENE	5.0	1.4 J	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	99	%
TOLUENE-D8	(75 - 128 %)	95	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	96	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

5SBPA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27157 SAS No.: SDG No.: SS8SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 830795 0.867

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4117.D

Level: (low/med) LOW Date Received: 7/28/05

% Moisture: not dec. 0 Date Analyzed: 8/4/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0 0.867

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBPA

Date Sampled : 07/26/05 11:05 **Order #:** 830796 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 80.4

DATE ANALYZED : 08/04/05
ANALYTICAL DILUTION: 0.77

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	8.1 J	UG/KG
BENZENE	5.0	4.8 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.8 U	UG/KG
BROMOFORM	5.0	4.8 U	UG/KG
BROMOMETHANE	5.0	4.8 U	UG/KG
2-BUTANONE (MEK)	10	9.5 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.8 U	UG/KG
CARBON DISULFIDE	10	9.5 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.8 U	UG/KG
CHLOROBENZENE	5.0	4.8 U	UG/KG
CHLOROETHANE	10	9.5 U	UG/KG
CHLOROFORM	5.0	4.8 U	UG/KG
CHLOROMETHANE	5.0	4.8 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.8 U	UG/KG
CYCLOHEXANE	10	9.5 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.8 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.8 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.8 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.8 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.8 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	0.75 J	UG/KG
1,1-DICHLOROETHANE	5.0	2.5 J	UG/KG
1,2-DICHLOROETHANE	5.0	4.8 U	UG/KG
1,1-DICHLOROETHENE	5.0	58	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.55 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.8 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.8 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.8 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.8 U	UG/KG
ETHYLBENZENE	10	9.5 U	UG/KG
2-HEXANONE	5.0	4.8 U	UG/KG
ISOPROPYLBENZENE	10	9.5 U	UG/KG
METHYLCYCLOHEXANE	5.0	4.8 U	UG/KG
METHYLENE CHLORIDE	10	9.5 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	5.0	4.8 U	UG/KG
STYRENE	5.0	4.8 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	10	UG/KG
TETRACHLOROETHENE	5.0	4.8 U	UG/KG
TOLUENE	5.0	4.8 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.8 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.8 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.8 U	UG/KG
~~TRICHLOROETHENE~~ DNR	~~5.0~~	~~300 E~~	~~UG/KG~~
TRICHLOROFLUOROMETHANE	5.0	4.8 U	UG/KG

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DNR = DO NOT REPORT SR 9/6/05

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBPA

Date Sampled : 07/26/05 11:05 **Order #:** 830796 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 80.4

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/04/05			Dry Weight
ANALYTICAL DILUTION: 0.77			
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.8 U	UG/KG
VINYL CHLORIDE	5.0	4.8 U	UG/KG
O-XYLENE	5.0	4.8 U	UG/KG
M+P-XYLENE	5.0	4.8 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	97	%
TOLUENE-D8	(75 - 128 %)	94	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	97	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

8SBPA DL

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27157 SAS No.: SDG No.: SS8SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 830796 76.0

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4062.D

Level: (low/med) MED Date Received: 7/28/05

% Moisture: not dec. 19.6 Date Analyzed: 8/2/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 10 76.0

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBPA

Date Sampled : 07/26/05 11:05 **Order #:** 830796 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 80.4

DATE ANALYZED : 08/02/05
ANALYTICAL DILUTION: 76.00

Dry Weight

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	~~210 JB~~ 950 U	UG/KG
BENZENE	5.0	470 U	UG/KG
BROMODICHLOROMETHANE	5.0	470 U	UG/KG
BROMOFORM	5.0	470 U	UG/KG
BROMOMETHANE	5.0	470 U	UG/KG
2-BUTANONE (MEK)	10	950 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	470 U	UG/KG
CARBON DISULFIDE	10	950 U	UG/KG
CARBON TETRACHLORIDE	5.0	470 U	UG/KG
CHLOROBENZENE	5.0	470 U	UG/KG
CHLOROETHANE	10	950 U	UG/KG
CHLOROFORM	5.0	470 U	UG/KG
CHLOROMETHANE	5.0	470 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	470 U	UG/KG
CYCLOHEXANE	10	950 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	470 U	UG/KG
1,2-DIBROMOETHANE	5.0	470 U	UG/KG
1,3-DICHLOROBENZENE	5.0	470 U	UG/KG
1,4-DICHLOROBENZENE	5.0	470 U	UG/KG
1,2-DICHLOROBENZENE	5.0	470 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	470 U	UG/KG
1,1-DICHLOROETHANE	5.0	470 U	UG/KG
1,2-DICHLOROETHANE	5.0	470 U	UG/KG
1,1-DICHLOROETHENE	5.0	470 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	87 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	470 U	UG/KG
1,2-DICHLOROPROPANE	5.0	470 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	470 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	470 U	UG/KG
ETHYLBENZENE	5.0	470 U	UG/KG
2-HEXANONE	10	950 U	UG/KG
ISOPROPYLBENZENE	5.0	470 U	UG/KG
METHYLCYCLOHEXANE	10	950 U	UG/KG
METHYLENE CHLORIDE	5.0	470 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	950 U	UG/KG
STYRENE	5.0	470 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	470 U	UG/KG
TETRACHLOROETHENE	5.0	470 U	UG/KG
TOLUENE	5.0	470 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	470 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	470 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	470 U	UG/KG
TRICHLOROETHENE	5.0	390 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	470 U	UG/KG

Only Report Tentatively Identified Items Above Reporting Limit
SB 9/16/05

950

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBPA

Date Sampled : 07/26/05 11:05 **Order #:** 830796 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 80.4

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/02/05			
ANALYTICAL DILUTION: 76.00			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	470 U	UG/KG
VINYL CHLORIDE	5.0	470 U	UG/KG
O-XYLENE	5.0	470 U	UG/KG
M+P-XYLENE	5.0	470 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	97	%
TOLUENE-D8	(75 - 128 %)	93	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	95	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

8SBPA

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27157 SAS No.: SDG No.: SS8SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 830796 0.766

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4118.D

Level: (low/med) LOW Date Received: 7/28/05

% Moisture: not dec. 0 Date Analyzed: 8/4/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 10 0.766

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBAB

Date Sampled : 07/26/05 09:30 **Order #:** 830797 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 90.4

DATE ANALYZED : 08/06/05
ANALYTICAL DILUTION: 173.00

Dry Weight

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	370 JB	UG/KG
BENZENE	5.0	960 U	UG/KG
BROMODICHLOROMETHANE	5.0	960 U	UG/KG
BROMOFORM	5.0	960 U	UG/KG
BROMOMETHANE	5.0	960 U	UG/KG
2-BUTANONE (MEK)	10	1900 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	960 U	UG/KG
CARBON DISULFIDE	10	1900 U	UG/KG
CARBON TETRACHLORIDE	5.0	960 U	UG/KG
CHLOROBENZENE	5.0	960 U	UG/KG
CHLOROETHANE	10	1900 U	UG/KG
CHLOROFORM	5.0	960 U	UG/KG
CHLOROMETHANE	5.0	960 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	960 U	UG/KG
CYCLOHEXANE	10	1900 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	960 U	UG/KG
1,2-DIBROMOETHANE	5.0	960 U	UG/KG
1,3-DICHLOROBENZENE	5.0	960 U	UG/KG
1,4-DICHLOROBENZENE	5.0	960 U	UG/KG
1,2-DICHLOROBENZENE	5.0	960 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	960 U	UG/KG
1,1-DICHLOROETHANE	5.0	960 U	UG/KG
1,2-DICHLOROETHANE	5.0	960 U	UG/KG
1,1-DICHLOROETHENE	5.0	320 J	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	960 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	960 U	UG/KG
1,2-DICHLOROPROPANE	5.0	960 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	960 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	960 U	UG/KG
ETHYLBENZENE	10	1900 U	UG/KG
2-HEXANONE	5.0	960 U	UG/KG
ISOPROPYLBENZENE	10	110 J	UG/KG
METHYLCYCLOHEXANE	5.0	960 U	UG/KG
METHYLENE CHLORIDE	10	1900 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	5.0	960 U	UG/KG
STYRENE	5.0	960 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	800 J	UG/KG
TETRACHLOROETHENE	5.0	960 U	UG/KG
TOLUENE	5.0	960 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	300 J	UG/KG
1,1,1-TRICHLOROETHANE	5.0	960 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	21000 J	UG/KG
TRICHLOROETHENE	5.0	960 U	UG/KG
TRICHLOROFLUOROMETHANE			

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REPORT TRICHLOROETHENE ONLY FROM THIS PAGE 83 9/6/05

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBAB

Date Sampled : 07/26/05 09:30 **Order #:** 830797 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 90.4

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/06/05			
ANALYTICAL DILUTION: 173.00			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	960 U	UG/KG
VINYL CHLORIDE	5.0	960 U	UG/KG
O-XYLENE	5.0	960 U	UG/KG
M+P-XYLENE	5.0	960 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	98	%
TOLUENE-D8	(75 - 128 %)	91	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	95	%

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

8SBAB REP

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27157 SAS No.: SDG No.: SS8SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 830797 173

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4196.D

Level: (low/med) MED Date Received: 7/28/05

% Moisture: not dec. 9.6 Date Analyzed: 8/6/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 10 173

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBAB

Date Sampled : 07/26/05 09:30 **Order #:** 830797 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 90.4

DATE ANALYZED : 08/02/05
ANALYTICAL DILUTION: 86.50

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	~~270 JB~~ 960U	UG/KG
BENZENE	5.0	480 U	UG/KG
BROMODICHLOROMETHANE	5.0	480 U	UG/KG
BROMOFORM	5.0	480 U	UG/KG
BROMOMETHANE	5.0	480 U	UG/KG
2-BUTANONE (MEK)	10	960 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	480 U	UG/KG
CARBON DISULFIDE	10	960 U	UG/KG
CARBON TETRACHLORIDE	5.0	480 U	UG/KG
CHLOROBENZENE	5.0	480 U	UG/KG
CHLOROETHANE	10	960 U	UG/KG
CHLOROFORM	5.0	480 U	UG/KG
CHLOROMETHANE	5.0	480 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	480 U	UG/KG
CYCLOHEXANE	10	960 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	480 U	UG/KG
1,2-DIBROMOETHANE	5.0	480 U	UG/KG
1,3-DICHLOROBENZENE	5.0	480 U	UG/KG
1,4-DICHLOROBENZENE	5.0	480 U	UG/KG
1,2-DICHLOROBENZENE	5.0	480 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	480 U	UG/KG
1,1-DICHLOROETHANE	5.0	480 U	UG/KG
1,2-DICHLOROETHANE	5.0	480 U	UG/KG
1,1-DICHLOROETHENE	5.0	310 J	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	480 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	480 U	UG/KG
1,2-DICHLOROPROPANE	5.0	480 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	480 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	480 U	UG/KG
ETHYLBENZENE	10	960 U	UG/KG
2-HEXANONE	5.0	480 U	UG/KG
ISOPROPYLBENZENE	10	74 J	UG/KG
METHYLCYCLOHEXANE	5.0	480 U	UG/KG
METHYLENE CHLORIDE	10	960 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	5.0	480 U	UG/KG
STYRENE	5.0	480 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	820	UG/KG
TETRACHLOROETHENE	5.0	480 U	UG/KG
TOLUENE	5.0	480 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	270 J	UG/KG
1,1,1-TRICHLOROETHANE	5.0	480 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	21000 E	UG/KG
~~TRICHLOROETHENE~~ DNR	5.0	480 U	UG/KG
TRICHLOROFLUOROMETHANE			

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 08/26/05

ENSR International
Project Reference: OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : SS8SBAB

Date Sampled : 07/26/05 09:30 **Order #:** 830797 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 07/28/05 **Submission #:** R2527157 **Percent Solid:** 90.4

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/02/05			
ANALYTICAL DILUTION: 86.50			Dry Weight
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	480 U	UG/KG
VINYL CHLORIDE	5.0	480 U	UG/KG
O-XYLENE	5.0	480 U	UG/KG
M+P-XYLENE	5.0	480 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	100	%
TOLUENE-D8	(75 - 128 %)	93	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	95	%

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

8SBAB

Lab Name: CAS/ROCH Contract: ENSRACT

Lab Code: 10145 Case No.: R5-27157 SAS No.: SDG No.: SS8SBAA

Matrix: (soil/water) SOIL Lab Sample ID: 830797 86.5

Sample wt/vol: 5.0 (g/ml) G Lab File ID: X4063.D

Level: (low/med) MED Date Received: 7/28/05

% Moisture: not dec. 9.6 Date Analyzed: 8/2/05

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: ~~1.0~~ 86.5

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 0

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q

ENSR

MEMORANDUM

TO:	David Austin/Westford	**DATE:**	October 20, 2005
FROM:	Sheena Blair/Westford	**FILE:**	OZ002voc 10748-001-0500
RE:	Data Validation VOCs in Soil Former Ozone Industries Queens, NY CAS Project # R2423942	**CC:**	W. Braunstein/Westford

SUMMARY

Limited validation was performed on the data for three soil samples for site-specific volatile organic compounds (VOCs) analyzed using EPA method 8260B. The samples were collected at the Former Ozone Industries site, Queens, NY on November 19, 2004 and submitted to Columbia Analytical Services (CAS) in Rochester, New York. CAS analyzed and reported the results under project number R2423942.

The data were assessed according to the EPA methods and the *"USEPA Region 2, SOP HW-24, Standard Operating Procedure for the Validation of Organic Data Acquired using SW-846 EPA Method 8260B" (Revision 2, December 1999).*"

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were qualified as estimated for certain QC nonconformances (see discussion below).

SAMPLES

The samples included in this review are listed below:

Sample IDs
MW-201 (30-35) A1
MW-201 (65-70) A1
MW-201 (70-75) A1

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with the chain of custody (COC) requests
- Holding times and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/equipment blank/trip blank
- Surrogate spike recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Laboratory control sample (LCS) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports corresponded to the analytical requests designated on the COC. No discrepancies were noted.

Holding Times and Sample Preservation

The cooler temperature was 5°C, which met the QC acceptance criteria of 4 ± 2°C.

All samples were extracted and analyzed within the QAPP specified holding time.

GC/MS Tunes

The frequency and abundance of the bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within 12 hours from the BFB tunes.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs), the response factors (RFs), and percent differences (%Ds) of all target analytes were within the QC acceptance criteria in the initial and continuing calibration (CC) standards except for CC 12/02/04. The following table summarizes the %D that was outside the QC acceptance criteria in the CC standard 12/02/04.

Calibration	Compound	%D
CC12/02/04	Methyl Acetate	74.6
Associated samples: MW-201 (30-35) A1, MW-201 (65-70) A1, MW-201 (70-75) A1		

Sample results were qualified as follows:

- If %D > 20%, estimate positive results (J) and nondetect results (UJ).

Method Blanks/Equipment Blank/Trip Blank

No equipment or trip blanks were submitted with this sample set. No validation action was taken on this basis.

No target compounds were detected in the method blank.

Surrogate Spike Recoveries

The surrogate recoveries were within the QC acceptance limits in all sample analyses.

MS/MSD Results

MS/MSD analysis was not performed on a sample from this sample set. Accuracy in the laboratory was demonstrated by the analyses of the LCS.

Field Duplicate Results

No field duplicates were submitted with the samples in this data set. No validation action was taken on this basis.

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LCS Results

The percent recoveries (%Rs) of the spiked target analytes were within the QC acceptance criteria in the LCS associated with all sample analyses.

Quantitation Limits and Sample Results

All samples were analyzed undiluted. Sample Quantitation Limits (SQLs) for these samples were not affected.

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/23/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : MW-201 (30-35) A1

Date Sampled : 11/19/04 09:45 **Order #:** 777790 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/20/04 **Submission #:** R2423942 **Percent Solid:** 79.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 12/02/04			
ANALYTICAL DILUTION: 0.55			Dry Weight
ACETONE	10	5.8 J	UG/KG
BENZENE	5.0	3.5 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.5 U	UG/KG
BROMOFORM	5.0	3.5 U	UG/KG
BROMOMETHANE	5.0	3.5 U	UG/KG
2-BUTANONE (MEK)	10	6.9 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.5 U	UG/KG
CARBON DISULFIDE	10	6.9 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.5 U	UG/KG
CHLOROBENZENE	5.0	3.5 U	UG/KG
CHLOROETHANE	10	6.9 U	UG/KG
CHLOROFORM	5.0	3.5 U	UG/KG
CHLOROMETHANE	5.0	3.5 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.5 U	UG/KG
CYCLOHEXANE	10	6.9 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.5 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.5 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.5 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.5 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.5 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.5 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.5 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.5 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.5 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.5 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.5 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.5 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.5 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.5 U	UG/KG
ETHYLBENZENE	5.0	3.5 U	UG/KG
2-HEXANONE	10	6.9 U	UG/KG
ISOPROPYLBENZENE	5.0	3.5 U	UG/KG
METHYL ACETATE	5.0	3.5 UJ	UG/KG
METHYLCYCLOHEXANE	10	6.9 U	UG/KG
METHYLENE CHLORIDE	5.0	3.5 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	6.9 U	UG/KG
STYRENE	5.0	3.5 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.5 U	UG/KG
TETRACHLOROETHENE	5.0	3.5 U	UG/KG
TOLUENE	5.0	3.5 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.5 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.5 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.5 U	UG/KG

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VOLATILE ORGANICS
METHOD 8260B
Reported: 12/23/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : MW-201 (30-35) A1

Date Sampled : 11/19/04 09:45 **Order #:** 777790 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/20/04 **Submission #:** R2423942 **Percent Solid:** 79.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 12/02/04			
ANALYTICAL DILUTION: 0.55			Dry Weight
TRICHLOROETHENE	5.0	8.8	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.5 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.5 U	UG/KG
VINYL CHLORIDE	5.0	3.5 U	UG/KG
O-XYLENE	5.0	3.5 U	UG/KG
M+P-XYLENE	5.0	3.5 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(68 - 128)	94	%
TOLUENE-D8	(75 - 128)	94	%
DIBROMOFLUOROMETHANE	(62 - 133)	95	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/23/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : MW-201 (70-75) A1

Date Sampled : 11/19/04 13:00 **Order #:** 777791 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/20/04 **Submission #:** R2423942 **Percent Solid:** 85.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 12/02/04			
ANALYTICAL DILUTION: 0.71			Dry Weight
ACETONE	10	9.9 J	UG/KG
BENZENE	5.0	4.2 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.2 U	UG/KG
BROMOFORM	5.0	4.2 U	UG/KG
BROMOMETHANE	5.0	4.2 U	UG/KG
2-BUTANONE (MEK)	10	8.3 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.2 U	UG/KG
CARBON DISULFIDE	10	8.3 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.2 U	UG/KG
CHLOROBENZENE	5.0	4.2 U	UG/KG
CHLOROETHANE	10	8.3 U	UG/KG
CHLOROFORM	5.0	4.2 U	UG/KG
CHLOROMETHANE	5.0	4.2 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.2 U	UG/KG
CYCLOHEXANE	10	8.3 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.2 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.2 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.2 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.2 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.2 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.2 U	UG/KG
1,1-DICHLOROETHANE	5.0	4.2 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.2 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.2 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	4.2 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.2 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.2 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.2 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.2 U	UG/KG
ETHYLBENZENE	5.0	4.2 U	UG/KG
2-HEXANONE	10	8.3 U	UG/KG
ISOPROPYLBENZENE	5.0	4.2 U	UG/KG
METHYL ACETATE	5.0	4.2 U J	UG/KG
METHYLCYCLOHEXANE	10	8.3 U	UG/KG
METHYLENE CHLORIDE	5.0	4.2 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	8.3 U	UG/KG
STYRENE	5.0	4.2 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.2 U	UG/KG
TETRACHLOROETHENE	5.0	1.1 J	UG/KG
TOLUENE	5.0	1.1 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.2 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.2 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.2 U	UG/KG

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/23/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : MW-201 (70-75) A1

Date Sampled : 11/19/04 13:00 **Order #:** 777791 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/20/04 **Submission #:** R2423942 **Percent Solid:** 85.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 12/02/04			
ANALYTICAL DILUTION: 0.71			Dry Weight
TRICHLOROETHENE	5.0	2.4 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.2 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.2 U	UG/KG
VINYL CHLORIDE	5.0	4.2 U	UG/KG
O-XYLENE	5.0	4.2 U	UG/KG
M+P-XYLENE	5.0	4.2 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(68 - 128)	94	%
TOLUENE-D8	(75 - 128)	101	%
DIBROMOFLUOROMETHANE	(62 - 133)	93	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/23/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : MW-201 (65-70) A1

Date Sampled : 11/19/04 12:30 **Order #:** 777792 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/20/04 **Submission #:** R2423942 **Percent Solid:** 92.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 12/02/04			
ANALYTICAL DILUTION: 0.65			Dry Weight
ACETONE	10	7.0 J	UG/KG
BENZENE	5.0	3.5 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.5 U	UG/KG
BROMOFORM	5.0	3.5 U	UG/KG
BROMOMETHANE	5.0	3.5 U	UG/KG
2-BUTANONE (MEK)	10	7.1 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.5 U	UG/KG
CARBON DISULFIDE	10	7.1 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.5 U	UG/KG
CHLOROBENZENE	5.0	3.5 U	UG/KG
CHLOROETHANE	10	7.1 U	UG/KG
CHLOROFORM	5.0	3.5 U	UG/KG
CHLOROMETHANE	5.0	3.5 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.5 U	UG/KG
CYCLOHEXANE	10	7.1 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.5 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.5 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.5 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.5 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.5 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.5 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.5 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.5 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.5 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.5 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.5 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.5 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.5 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.5 U	UG/KG
ETHYLBENZENE	5.0	3.5 U	UG/KG
2-HEXANONE	10	7.1 U	UG/KG
ISOPROPYLBENZENE	5.0	3.5 U	UG/KG
METHYL ACETATE	5.0	3.5 U J	UG/KG
METHYLCYCLOHEXANE	10	7.1 U	UG/KG
METHYLENE CHLORIDE	5.0	3.5 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.1 U	UG/KG
STYRENE	5.0	3.5 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.5 U	UG/KG
TETRACHLOROETHENE	5.0	3.5 U	UG/KG
TOLUENE	5.0	0.80 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.5 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.5 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.5 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 12/23/04

ENSR International
Project Reference: FORMER OZONE INDUSTRIES PROJECT #10748-001-0200
Client Sample ID : MW-201 (65-70) A1

Date Sampled : 11/19/04 12:30 **Order #:** 777792 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 11/20/04 **Submission #:** R2423942 **Percent Solid:** 92.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 12/02/04			
ANALYTICAL DILUTION: 0.65			Dry Weight
TRICHLOROETHENE	5.0	7.1	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.5 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.5 U	UG/KG
VINYL CHLORIDE	5.0	3.5 U	UG/KG
O-XYLENE	5.0	3.5 U	UG/KG
M+P-XYLENE	5.0	3.5 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(68 - 128)	98	%
TOLUENE-D8	(75 - 128)	97	%
DIBROMOFLUOROMETHANE	(62 - 133)	93	%

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Memorandum

Date: September 27, 2006

To: David Austin/Westford

From: Vinora Nicholls/Westford

Subject: Data Validation, VOC Analyses
Former Ozone Industries, Queens, NY
CAS SDG R2632657

Distribution: W. Braunstein/Westford

10748-001-0501 File
OZ007vocvn

SUMMARY

Limited validation was performed on the data for 19 soil samples analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by SW-846 method 8260B. The samples were collected at the Former Ozone Industries site in Queens, NY on July 12, 13, 14, and 17, 2006 and were submitted to Columbia Analytical Services (CAS) in Rochester, NY for analysis. CAS processed the samples and reported the results under sample delivery group (SDG) R2632657.

The analytical data were evaluated with reference to the EPA methods and the *"USEPA Region 2, SOP HW-24, Standard Operating Procedure for the Validation of Organic Data Acquired using SW-846 EPA Method 8260B" (Revision 2, December 1999)."*

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were qualified as estimated (J, UJ) due to QC nonconformance (see discussion below).

SAMPLES

The samples included in this review are listed below.

Sample IDs	Sample IDs
SS20SBAA	SS33SBJA
SS20SBJA	SS35SBAA
SS24SBAA	SS35SBJA
SS24SBSA	SS35SBJB (Field Duplicate of SS35BJA)
SS26SBAA	SS25SBAA
SS26SBRA	SS27SBPA
SS28SBAA	SS22SBQA

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Sample IDs	Sample IDs
SS28SBQA	SS22SBAA
SS33SBAA	SS25SBRA
	SS27SBAA

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with the chain of custody (COC) requests
- Holding times and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/equipment blank/trip blank
- Surrogate spike recoveries
- Internal Standard Performance
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Laboratory control sample (LCS) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted With COC Requests

Sample reports corresponded to the analytical requests designated on the COC. No discrepancies were noted.

Holding Times/Sample Preservation

The cooler temperature was 4°C, which met the QC acceptance criteria of 4°C ± 2°C.

All samples were extracted and analyzed within the QAPP specified holding times.

GC/MS Tunes

The frequency and abundance of the bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within 12 hours from the BFB tunes.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs) and the response factors (RFs) of all target analytes were within the QC acceptance criteria in the initial calibration standards. The following table summarizes the percent differences (%Ds) that were outside the QC acceptance criteria in the continuing calibration (CC) standards.

Calibration	Compound	%D
CC (07/19/06)	Dichlorodifluoromethane	25.3

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Calibration	Compound	%D
	Chloromethane	20.2
Associated samples: SS20SBAA, SS20SBJA, SS24SBAA, SS24SBSA, SS26SBAA, SS26SBRA, SS28SBAA, SS28SBQA, SS33SBAA, SS33SBJA, SS35SBAA SS35SBJA, SS35SBJB.		
CC (07/24/06)	Dichlorodifluoromethane	29.4
	Chloromethane	21.4
Associated samples: SS25SBAA, SS27SBPA, SS22SBQA, SS22SBAA, SS25SBRA, SS27SBAA.		

Sample results were qualified as follows:

- If %D > 20%, estimate positive results (J) and nondetect results (UJ).
- Based on professional judgment, the %D result for chloromethane for calibration CC (07/19/06) was accepted and qualification of the data was not necessary.

Method Blanks/Equipment Blank/Trip Blank

No equipment or trip blanks were submitted with this sample set. No validation action was taken on this basis.

No target compounds were detected in the method blank.

Surrogate Spike Recoveries

All surrogate recoveries were within the QC acceptance limits in all sample analyses.

Internal Standard Performance

Internal standard performance met the QC acceptance criteria in all sample analyses.

MS/MSD Results

Sample SS27SBPA was submitted for MS/MSD analyses with this sample set. The MS/MSD percent recoveries (%Rs) and relative percent differences (RPDs) of the compounds reported were within the QC acceptance criteria, with the following exceptions summarized in the table below.

Compound	MS %R	MSD %R	RPD	QC limits		Action (Detects/ Nondetects)
				%R	RPD	
Bromomethane	43	43	ok	50-150	30	J/UJ
Methyl-tert-butyl-ether	53	51	ok	70-130	30	J/UJ
Carbon Disulfide	43	42	ok	70-130	30	J/UJ
Chloroethane	46	47	ok	70-130	30	J/UJ
Chloromethane	51	48	ok	70-130	30	J/UJ
Cyclohexane	47	46	ok	70-130	30	J/UJ
Dichlorodifluoromethane	51	50	ok	70-130	30	J/UJ

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				QC limits		
Methylcyclohexane	45	45	ok	50-150	30	J/UJ
1,2,4-Trichlorobenzene	61	83	31	70-130	30	J/UJ
Trichlorofluoromethane	48	46	ok	70-130	30	J/UJ
1,1,2-Trichloro,1,2,2-Trifluoroethane	48	48	ok	70-130	30	J/UJ
Vinyl Chloride	48	47	ok	70-130	30	J/UJ

The results were qualified as estimated (J/UJ). Please note that the laboratory failed to spike the sample for acetone, 2-butanone, 2-hexanone, and 4-methyl, 2-pentanone. Accuracy in the laboratory was demonstrated by the analyses of LCSs.

Field Duplicate Results

Samples SS35SBJA and SS35SBJB were submitted as a field duplicate pair with this data set. The results for detected compounds, the associated relative percent differences (RPDs), and actions taken are tabulated below.

Compound	SS35SBJA (ug/kg)	SS35SBJB (ug/kg)	RPD (%)	Action
Acetone	3.2 J	3.8 J	17	None
Chloroform	0.90 J	0.31 J	98	None
Cis-1,2-Dichloroethene	0.72 J	0.70 J	2.8	None
Ethylbenzene	2.4 J	5.0 U	NC	None
Isopropylbenzene	0.37 J	5.0 U	NC	None
Tetrachloroethene	6.6	1.5 J	126	None
Trichloroethene	68	32	72	J/UJ

No action was necessary for the results for acetone, chloroform, and cis-1, 2-dichloroethene since precision was deemed acceptable. The RPDs for ethylbenzene and isopropyl benzene were not calculable (NC) due to the nondetect duplicate results. Precision was deemed acceptable since the positive results in the sample were <5x the SQL. The RPD for tetrachloroethene exceeded the QC acceptance criteria; however precision was deemed acceptable since both sample results were <5x the SQL. The RPD for trichloroethene exceeded QC acceptance criteria; therefore the positive results for samples SS35SBJA and SS35SBJB were qualified as estimated (J). All other RPDs met the QC acceptance criteria.

LCS Results

The %Rs of the spiked target analytes were within the QC acceptance criteria in the LCSs associated with all sample analyses.

Quantitation Limits and Sample Results

All samples were analyzed undiluted. Sample Quantitation Limits (SQLs) for these samples were not affected.

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Tentatively Identified Compounds (TICs)

TICs were not found in any sample in this data set.

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS20SBAA

Date Sampled : 07/12/06 09:45 **Order #:** 921915 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 96.2

DATE ANALYZED: 07/19/06
ANALYTICAL DILUTION: 0.67

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	8.5 J	UG/KG
BENZENE	5.0	3.5 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.5 U	UG/KG
BROMOFORM	5.0	3.5 U	UG/KG
BROMOMETHANE	5.0	3.5 U	UG/KG
2-BUTANONE (MEK)	10	7.0 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.5 U	UG/KG
CARBON DISULFIDE	10	7.0 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.5 U	UG/KG
CHLOROBENZENE	5.0	0.30 J	UG/KG
CHLOROETHANE	10	7.0 U	UG/KG
CHLOROFORM	5.0	3.5 U	UG/KG
CHLOROMETHANE	5.0	3.5 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.5 U	UG/KG
CYCLOHEXANE	10	7.0 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.5 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.5 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.5 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.5 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.5 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.5 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	3.5 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.5 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.5 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.5 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.5 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.5 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.5 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.5 U	UG/KG
ETHYLBENZENE	5.0	3.5 U	UG/KG
2-HEXANONE	10	7.0 U	UG/KG
ISOPROPYLBENZENE	5.0	3.5 U	UG/KG
METHYL ACETATE	5.0	3.5 U	UG/KG
METHYLCYCLOHEXANE	10	7.0 U	UG/KG
METHYLENE CHLORIDE	5.0	3.5 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.0 U	UG/KG
STYRENE	5.0	3.5 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.5 U	UG/KG
TETRACHLOROETHENE	5.0	3.5 U	UG/KG
TOLUENE	5.0	0.44 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.5 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.5 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.5 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS20SBAA

Date Sampled : 07/12/06 09:45 **Order #:** 921915 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 96.2

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.67			Dry Weight
TRICHLOROETHENE	5.0	0.52 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.5 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.5 U	UG/KG
VINYL CHLORIDE	5.0	3.5 U	UG/KG
O-XYLENE	5.0	3.5 U	UG/KG
M+P-XYLENE	5.0	3.5 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	101	%
TOLUENE-D8	(75 - 128)	95	%
DIBROMOFLUOROMETHANE	(62 - 133)	97	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS20SBJA

Date Sampled : 07/12/06 10:40 **Order #:** 921916 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 91.8

DATE ANALYZED: 07/19/06
ANALYTICAL DILUTION: 0.83

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	9.0 U	UG/KG
BENZENE	5.0	4.5 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.5 U	UG/KG
BROMOFORM	5.0	4.5 U	UG/KG
BROMOMETHANE	5.0	4.5 U	UG/KG
2-BUTANONE (MEK)	10	9.0 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.5 U	UG/KG
CARBON DISULFIDE	10	9.0 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.5 U	UG/KG
CHLOROBENZENE	5.0	4.5 U	UG/KG
CHLOROETHANE	10	9.0 U	UG/KG
CHLOROFORM	5.0	0.58 J	UG/KG
CHLOROMETHANE	5.0	4.5 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.5 U	UG/KG
CYCLOHEXANE	10	9.0 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.5 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.5 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.5 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.5 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.5 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.5 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	4.5 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.5 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.5 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	4.5 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.5 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.5 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.5 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.5 U	UG/KG
ETHYLBENZENE	5.0	4.5 U	UG/KG
2-HEXANONE	10	9.0 U	UG/KG
ISOPROPYLBENZENE	5.0	4.5 U	UG/KG
METHYL ACETATE	5.0	4.5 U	UG/KG
METHYLCYCLOHEXANE	10	9.0 U	UG/KG
METHYLENE CHLORIDE	5.0	4.5 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	9.0 U	UG/KG
STYRENE	5.0	4.5 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.5 U	UG/KG
TETRACHLOROETHENE	5.0	4.5 U	UG/KG
TOLUENE	5.0	0.38 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.5 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.5 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.5 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS20SBJA

Date Sampled : 07/12/06 10:40 **Order #:** 921916 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 91.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.83			Dry Weight
TRICHLOROETHENE	5.0	1.2 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.5 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.5 U	UG/KG
VINYL CHLORIDE	5.0	4.5 U	UG/KG
O-XYLENE	5.0	4.5 U	UG/KG
M+P-XYLENE	5.0	4.5 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	101	%
TOLUENE-D8	(75 - 128)	98	%
DIBROMOFLUOROMETHANE	(62 - 133)	96	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS24SBAA

Date Sampled : 07/12/06 12:40 **Order #:** 921917 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 96.5

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.91			Dry Weight
ACETONE	10	29	UG/KG
BENZENE	5.0	0.32 J	UG/KG
BROMODICHLOROMETHANE	5.0	4.7 U	UG/KG
BROMOFORM	5.0	4.7 U	UG/KG
BROMOMETHANE	5.0	4.7 U	UG/KG
2-BUTANONE (MEK)	10	6.7 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.7 U	UG/KG
CARBON DISULFIDE	10	9.4 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.7 U	UG/KG
CHLOROBENZENE	5.0	4.7 U	UG/KG
CHLOROETHANE	10	9.4 U	UG/KG
CHLOROFORM	5.0	4.7 U	UG/KG
CHLOROMETHANE	5.0	4.7 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.7 U	UG/KG
CYCLOHEXANE	10	9.4 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.7 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.7 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.7 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.7 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.7 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.7 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	4.7 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.7 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.7 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	4.7 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.7 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.7 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.7 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.7 U	UG/KG
ETHYLBENZENE	5.0	4.7 U	UG/KG
2-HEXANONE	10	9.4 U	UG/KG
ISOPROPYLBENZENE	5.0	4.7 U	UG/KG
METHYL ACETATE	5.0	4.7 U	UG/KG
METHYLCYCLOHEXANE	10	9.4 U	UG/KG
METHYLENE CHLORIDE	5.0	4.7 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	9.4 U	UG/KG
STYRENE	5.0	4.7 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.7 U	UG/KG
TETRACHLOROETHENE	5.0	0.33 J	UG/KG
TOLUENE	5.0	0.54 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.7 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.7 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.7 U	UG/KG

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS24SBAA

Date Sampled : 07/12/06 12:40 **Order #:** 921917 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 96.5

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.91			Dry Weight
TRICHLOROETHENE	5.0	3.0 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.7 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.7 U	UG/KG
VINYL CHLORIDE	5.0	4.7 U	UG/KG
O-XYLENE	5.0	4.7 U	UG/KG
M+P-XYLENE	5.0	4.7 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	101	%
TOLUENE-D8	(75 - 128)	96	%
DIBROMOFLUOROMETHANE	(62 - 133)	93	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS24SBSA

Date Sampled : 07/12/06 13:25 **Order #:** 921918 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 96.5

DATE ANALYZED: 07/19/06
ANALYTICAL DILUTION: 0.85

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	8.8 U	UG/KG
BENZENE	5.0	4.4 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.4 U	UG/KG
BROMOFORM	5.0	4.4 U	UG/KG
BROMOMETHANE	5.0	4.4 U	UG/KG
2-BUTANONE (MEK)	10	8.8 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.4 U	UG/KG
CARBON DISULFIDE	10	8.8 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.4 U	UG/KG
CHLOROBENZENE	5.0	4.4 U	UG/KG
CHLOROETHANE	10	8.8 U	UG/KG
CHLOROFORM	5.0	4.4 U	UG/KG
CHLOROMETHANE	5.0	4.4 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.4 U	UG/KG
CYCLOHEXANE	10	0.75 J	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.4 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.4 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.4 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.4 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.4 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.4 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	4.4 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.4 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.4 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	4.4 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.4 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.4 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.4 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.4 U	UG/KG
ETHYLBENZENE	5.0	4.4 U	UG/KG
2-HEXANONE	10	8.8 U	UG/KG
ISOPROPYLBENZENE	5.0	4.4 U	UG/KG
METHYL ACETATE	5.0	4.4 U	UG/KG
METHYLCYCLOHEXANE	10	8.8 U	UG/KG
METHYLENE CHLORIDE	5.0	0.32 J	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	8.8 U	UG/KG
STYRENE	5.0	4.4 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.4 U	UG/KG
TETRACHLOROETHENE	5.0	0.27 J	UG/KG
TOLUENE	5.0	1.9 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.4 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.4 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.4 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS24SBSA

Date Sampled : 07/12/06 13:25 **Order #:** 921918 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 96.5

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.85			Dry Weight
TRICHLOROETHENE	5.0	3.0 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.4 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.4 U	UG/KG
VINYL CHLORIDE	5.0	4.4 U	UG/KG
O-XYLENE	5.0	4.4 U	UG/KG
M+P-XYLENE	5.0	4.4 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	98	%
TOLUENE-D8	(75 - 128)	97	%
DIBROMOFLUOROMETHANE	(62 - 133)	95	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS26SBAA

Date Sampled : 07/13/06 09:30 **Order #:** 921919 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 97.3

DATE ANALYZED: 07/19/06
ANALYTICAL DILUTION: 0.91

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	4.6 J	UG/KG
BENZENE	5.0	4.7 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.7 U	UG/KG
BROMOFORM	5.0	4.7 U	UG/KG
BROMOMETHANE	5.0	4.7 U	UG/KG
2-BUTANONE (MEK)	10	9.4 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.7 U	UG/KG
CARBON DISULFIDE	10	9.4 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.7 U	UG/KG
CHLOROBENZENE	5.0	4.7 U	UG/KG
CHLOROETHANE	10	9.4 U	UG/KG
CHLOROFORM	5.0	4.7 U	UG/KG
CHLOROMETHANE	5.0	4.7 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.7 U	UG/KG
CYCLOHEXANE	10	9.4 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.7 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.7 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.7 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.7 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.7 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.7 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	4.7 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.7 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.7 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	4.7 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.7 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.7 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.7 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.7 U	UG/KG
ETHYLBENZENE	5.0	4.7 U	UG/KG
2-HEXANONE	10	9.4 U	UG/KG
ISOPROPYLBENZENE	5.0	4.7 U	UG/KG
METHYL ACETATE	5.0	4.7 U	UG/KG
METHYLCYCLOHEXANE	10	9.4 U	UG/KG
METHYLENE CHLORIDE	5.0	4.7 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	9.4 U	UG/KG
STYRENE	5.0	4.7 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.7 U	UG/KG
TETRACHLOROETHENE	5.0	4.7 U	UG/KG
TOLUENE	5.0	0.42 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.7 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.7 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.7 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS26SBAA

Date Sampled : 07/13/06 09:30 **Order #:** 921919 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 97.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.91			Dry Weight
TRICHLOROETHENE	5.0	3.5 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.7 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.7 U	UG/KG
VINYL CHLORIDE	5.0	4.7 U	UG/KG
O-XYLENE	5.0	4.7 U	UG/KG
M+P-XYLENE	5.0	4.7 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	96	%
TOLUENE-D8	(75 - 128)	94	%
DIBROMOFLUOROMETHANE	(62 - 133)	91	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS26SBRA

Date Sampled : 07/13/06 10:15 **Order #:** 921920 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 89.0

DATE ANALYZED: 07/19/06
ANALYTICAL DILUTION: 0.65

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	1.6 J	UG/KG
BENZENE	5.0	3.7 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.7 U	UG/KG
BROMOFORM	5.0	3.7 U	UG/KG
BROMOMETHANE	5.0	3.7 U	UG/KG
2-BUTANONE (MEK)	10	7.3 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.7 U	UG/KG
CARBON DISULFIDE	10	7.3 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.7 U	UG/KG
CHLOROBENZENE	5.0	3.7 U	UG/KG
CHLOROETHANE	10	7.3 U	UG/KG
CHLOROFORM	5.0	3.7 U	UG/KG
CHLOROMETHANE	5.0	3.7 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.7 U	UG/KG
CYCLOHEXANE	10	7.3 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.7 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.7 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.7 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.7 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.7 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.7 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	3.7 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.7 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.7 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	2.0 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.7 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.7 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.7 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.7 U	UG/KG
ETHYLBENZENE	5.0	3.7 U	UG/KG
2-HEXANONE	10	7.3 U	UG/KG
ISOPROPYLBENZENE	5.0	3.7 U	UG/KG
METHYL ACETATE	5.0	3.7 U	UG/KG
METHYLCYCLOHEXANE	10	7.3 U	UG/KG
METHYLENE CHLORIDE	5.0	3.7 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.3 U	UG/KG
STYRENE	5.0	3.7 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.7 U	UG/KG
TETRACHLOROETHENE	5.0	0.78 J	UG/KG
TOLUENE	5.0	0.24 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.7 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.7 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.7 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS26SBRA

Date Sampled : 07/13/06 10:15 **Order #:** 921920 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 89.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.65			Dry Weight
TRICHLOROETHENE	5.0	30	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.7 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.7 U	UG/KG
VINYL CHLORIDE	5.0	3.7 U	UG/KG
O-XYLENE	5.0	3.7 U	UG/KG
M+P-XYLENE	5.0	3.7 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	98	%
TOLUENE-D8	(75 - 128)	94	%
DIBROMOFLUOROMETHANE	(62 - 133)	92	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS28SBAA

Date Sampled : 07/13/06 11:15 **Order #:** 921921 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 96.7

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.81			Dry Weight
ACETONE	10	28	UG/KG
BENZENE	5.0	4.2 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.2 U	UG/KG
BROMOFORM	5.0	4.2 U	UG/KG
BROMOMETHANE	5.0	4.2 U	UG/KG
2-BUTANONE (MEK)	10	2.6 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.2 U	UG/KG
CARBON DISULFIDE	10	8.4 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.2 U	UG/KG
CHLOROBENZENE	5.0	4.2 U	UG/KG
CHLOROETHANE	10	8.4 U	UG/KG
CHLOROFORM	5.0	4.2 U	UG/KG
CHLOROMETHANE	5.0	4.2 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.2 U	UG/KG
CYCLOHEXANE	10	8.4 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.2 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.2 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.2 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.2 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.2 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.2 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	4.2 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.2 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.2 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.31 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.2 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.2 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.2 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.2 U	UG/KG
ETHYLBENZENE	5.0	4.2 U	UG/KG
2-HEXANONE	10	8.4 U	UG/KG
ISOPROPYLBENZENE	5.0	4.2 U	UG/KG
METHYL ACETATE	5.0	4.2 U	UG/KG
METHYLCYCLOHEXANE	10	8.4 U	UG/KG
METHYLENE CHLORIDE	5.0	4.2 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	8.4 U	UG/KG
STYRENE	5.0	4.2 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.2 U	UG/KG
TETRACHLOROETHENE	5.0	0.51 J	UG/KG
TOLUENE	5.0	0.25 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.2 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.2 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.2 U	UG/KG

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS28SBAA

Date Sampled : 07/13/06 11:15 **Order #:** 921921 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 96.7

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.81			Dry Weight
TRICHLOROETHENE	5.0	13	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.2 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.2 U	UG/KG
VINYL CHLORIDE	5.0	4.2 U	UG/KG
O-XYLENE	5.0	4.2 U	UG/KG
M+P-XYLENE	5.0	4.2 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	97	%
TOLUENE-D8	(75 - 128)	96	%
DIBROMOFLUOROMETHANE	(62 - 133)	97	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS28SBQA

Date Sampled : 07/13/06 12:00 **Order #:** 921922 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 85.3

DATE ANALYZED: 07/19/06
ANALYTICAL DILUTION: 0.79

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	5.2 J	UG/KG
BENZENE	5.0	4.6 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.6 U	UG/KG
BROMOFORM	5.0	4.6 U	UG/KG
BROMOMETHANE	5.0	4.6 U	UG/KG
2-BUTANONE (MEK)	10	9.3 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.6 U	UG/KG
CARBON DISULFIDE	10	9.3 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.6 U	UG/KG
CHLOROBENZENE	5.0	4.6 U	UG/KG
CHLOROETHANE	10	9.3 U	UG/KG
CHLOROFORM	5.0	4.6 U	UG/KG
CHLOROMETHANE	5.0	4.6 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.6 U	UG/KG
CYCLOHEXANE	10	9.3 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.6 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.6 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.6 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.6 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.6 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.6 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	4.6 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.6 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.6 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	9.0	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.6 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.6 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.6 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.6 U	UG/KG
ETHYLBENZENE	5.0	4.6 U	UG/KG
2-HEXANONE	10	9.3 U	UG/KG
ISOPROPYLBENZENE	5.0	4.6 U	UG/KG
METHYL ACETATE	5.0	4.6 U	UG/KG
METHYLCYCLOHEXANE	10	9.3 U	UG/KG
METHYLENE CHLORIDE	5.0	4.6 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	9.3 U	UG/KG
STYRENE	5.0	4.6 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.6 U	UG/KG
TETRACHLOROETHENE	5.0	1.6 J	UG/KG
TOLUENE	5.0	0.34 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.6 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.6 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.6 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS28SBQA

Date Sampled : 07/13/06 12:00 **Order #:** 921922 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 85.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.79			Dry Weight
TRICHLOROETHENE	5.0	80	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.6 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.6 U	UG/KG
VINYL CHLORIDE	5.0	4.6 U	UG/KG
O-XYLENE	5.0	4.6 U	UG/KG
M+P-XYLENE	5.0	4.6 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	99	%
TOLUENE-D8	(75 - 128)	96	%
DIBROMOFLUOROMETHANE	(62 - 133)	94	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS33SBAA

Date Sampled : 07/14/06 09:15 **Order #:** 921923 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 95.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.75			Dry Weight
ACETONE	10	23	UG/KG
BENZENE	5.0	3.9 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.9 U	UG/KG
BROMOFORM	5.0	3.9 U	UG/KG
BROMOMETHANE	5.0	3.9 U	UG/KG
2-BUTANONE (MEK)	10	3.6 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.9 U	UG/KG
CARBON DISULFIDE	10	7.9 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.9 U	UG/KG
CHLOROBENZENE	5.0	3.9 U	UG/KG
CHLOROETHANE	10	7.9 U	UG/KG
CHLOROFORM	5.0	3.9 U	UG/KG
CHLOROMETHANE	5.0	3.9 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.9 U	UG/KG
CYCLOHEXANE	10	7.9 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.9 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.9 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.9 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.9 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.9 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.9 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	3.9 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.9 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.9 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.9 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.9 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.9 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.9 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.9 U	UG/KG
ETHYLBENZENE	5.0	3.9 U	UG/KG
2-HEXANONE	10	7.9 U	UG/KG
ISOPROPYLBENZENE	5.0	3.9 U	UG/KG
METHYL ACETATE	5.0	3.9 U	UG/KG
METHYLCYCLOHEXANE	10	7.9 U	UG/KG
METHYLENE CHLORIDE	5.0	3.9 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.9 U	UG/KG
STYRENE	5.0	3.9 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.9 U	UG/KG
TETRACHLOROETHENE	5.0	3.9 U	UG/KG
TOLUENE	5.0	3.9 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.9 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.9 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.9 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS33SBAA

Date Sampled : 07/14/06 09:15 **Order #:** 921923 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 95.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.75			Dry Weight
TRICHLOROETHENE	5.0	1.2 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	3.9 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.9 U	UG/KG
VINYL CHLORIDE	5.0	3.9 U	UG/KG
O-XYLENE	5.0	3.9 U	UG/KG
M+P-XYLENE	5.0	3.9 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	102	%
TOLUENE-D8	(75 - 128)	96	%
DIBROMOFLUOROMETHANE	(62 - 133)	95	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS33SBJA

Date Sampled : 07/14/06 09:55 **Order #:** 921924 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 85.6

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.70			Dry Weight
ACETONE	10	2.8 J	UG/KG
BENZENE	5.0	4.1 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.1 U	UG/KG
BROMOFORM	5.0	4.1 U	UG/KG
BROMOMETHANE	5.0	4.1 U	UG/KG
2-BUTANONE (MEK)	10	8.2 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.1 U	UG/KG
CARBON DISULFIDE	10	8.2 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.1 U	UG/KG
CHLOROBENZENE	5.0	4.1 U	UG/KG
CHLOROETHANE	10	8.2 U	UG/KG
CHLOROFORM	5.0	4.1 U	UG/KG
CHLOROMETHANE	5.0	4.1 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.1 U	UG/KG
CYCLOHEXANE	10	8.2 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.1 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.1 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.1 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.1 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.1 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.1 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	4.1 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.1 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.1 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.29 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.1 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.1 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.1 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.1 U	UG/KG
ETHYLBENZENE	5.0	4.1 U	UG/KG
2-HEXANONE	10	8.2 U	UG/KG
ISOPROPYLBENZENE	5.0	4.1 U	UG/KG
METHYL ACETATE	5.0	4.1 U	UG/KG
METHYLCYCLOHEXANE	10	8.2 U	UG/KG
METHYLENE CHLORIDE	5.0	4.1 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	8.2 U	UG/KG
STYRENE	5.0	4.1 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.1 U	UG/KG
TETRACHLOROETHENE	5.0	0.40 J	UG/KG
TOLUENE	5.0	4.1 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.1 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.1 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.1 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS33SBJA

Date Sampled : 07/14/06 09:55 **Order #:** 921924 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 85.6

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.70			Dry Weight
TRICHLOROETHENE	5.0	16	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.1 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.1 U	UG/KG
VINYL CHLORIDE	5.0	4.1 U	UG/KG
O-XYLENE	5.0	4.1 U	UG/KG
M+P-XYLENE	5.0	4.1 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	103	%
TOLUENE-D8	(75 - 128)	98	%
DIBROMOFLUOROMETHANE	(62 - 133)	96	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS35SBAA

Date Sampled : 07/14/06 11:10 **Order #:** 921925 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 96.3

DATE ANALYZED: 07/19/06
ANALYTICAL DILUTION: 0.85

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	18	UG/KG
BENZENE	5.0	4.4 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.4 U	UG/KG
BROMOFORM	5.0	4.4 U	UG/KG
BROMOMETHANE	5.0	4.4 U	UG/KG
2-BUTANONE (MEK)	10	8.8 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.4 U	UG/KG
CARBON DISULFIDE	10	8.8 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.4 U	UG/KG
CHLOROBENZENE	5.0	4.4 U	UG/KG
CHLOROETHANE	10	8.8 U	UG/KG
CHLOROFORM	5.0	4.4 U	UG/KG
CHLOROMETHANE	5.0	4.4 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.4 U	UG/KG
CYCLOHEXANE	10	8.8 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.4 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.4 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.4 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.4 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.4 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.4 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	4.4 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.4 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.4 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.65 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.4 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.4 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.4 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.4 U	UG/KG
ETHYLBENZENE	5.0	4.4 U	UG/KG
2-HEXANONE	10	8.8 U	UG/KG
ISOPROPYLBENZENE	5.0	4.4 U	UG/KG
METHYL ACETATE	5.0	4.4 U	UG/KG
METHYLCYCLOHEXANE	10	8.8 U	UG/KG
METHYLENE CHLORIDE	5.0	4.4 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	8.8 U	UG/KG
STYRENE	5.0	4.4 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.4 U	UG/KG
TETRACHLOROETHENE	5.0	4.4 U	UG/KG
TOLUENE	5.0	4.4 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.4 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.4 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.4 U	UG/KG

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS35SBAA

Date Sampled : 07/14/06 11:10 **Order #:** 921925 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 96.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.85			Dry Weight
TRICHLOROETHENE	5.0	11	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.4 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.4 U	UG/KG
VINYL CHLORIDE	5.0	4.4 U	UG/KG
O-XYLENE	5.0	4.4 U	UG/KG
M+P-XYLENE	5.0	4.4 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	103	%
TOLUENE-D8	(75 - 128)	97	%
DIBROMOFLUOROMETHANE	(62 - 133)	98	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS35SBJA

Date Sampled : 07/14/06 11:55 **Order #:** 921926 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 83.4

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.80			Dry Weight
ACETONE	10	3.2 J J	UG/KG
BENZENE	5.0	4.8 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.8 U	UG/KG
BROMOFORM	5.0	4.8 U	UG/KG
BROMOMETHANE	5.0	4.8 U	UG/KG
2-BUTANONE (MEK)	10	9.6 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.8 U	UG/KG
CARBON DISULFIDE	10	9.6 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.8 U	UG/KG
CHLOROBENZENE	5.0	4.8 U	UG/KG
CHLOROETHANE	10	9.6 U	UG/KG
CHLOROFORM	5.0	0.90 J	UG/KG
CHLOROMETHANE	5.0	4.8 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.8 U	UG/KG
CYCLOHEXANE	10	9.6 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.8 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.8 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.8 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.8 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.8 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.8 U J	UG/KG
1,1-DICHLOROETHANE	5.0	4.8 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.8 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.8 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.72 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.8 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.8 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.8 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.8 U	UG/KG
ETHYLBENZENE	5.0	2.4 J	UG/KG
2-HEXANONE	10	9.6 U	UG/KG
ISOPROPYLBENZENE	5.0	0.37 J	UG/KG
METHYL ACETATE	5.0	4.8 U	UG/KG
METHYLCYCLOHEXANE	10	9.6 U	UG/KG
METHYLENE CHLORIDE	5.0	4.8 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	9.6 U	UG/KG
STYRENE	5.0	4.8 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.8 U	UG/KG
TETRACHLOROETHENE	5.0	6.6	UG/KG
TOLUENE	5.0	4.8 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.8 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.8 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.8 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS35SBJA

Date Sampled : 07/14/06 11:55 **Order #:** 921926 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 83.4

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.80			Dry Weight
TRICHLOROETHENE	5.0	68 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.8 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.8 U	UG/KG
VINYL CHLORIDE	5.0	4.8 U	UG/KG
O-XYLENE	5.0	4.8 U	UG/KG
M+P-XYLENE	5.0	4.8 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	98	%
TOLUENE-D8	(75 - 128)	95	%
DIBROMOFLUOROMETHANE	(62 - 133)	90	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS35SBJB

Date Sampled : 07/14/06 11:55 **Order #:** 921927 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 84.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.84			Dry Weight
ACETONE	10	3.8 J	UG/KG
BENZENE	5.0	5.0 U	UG/KG
BROMODICHLOROMETHANE	5.0	5.0 U	UG/KG
BROMOFORM	5.0	5.0 U	UG/KG
BROMOMETHANE	5.0	5.0 U	UG/KG
2-BUTANONE (MEK)	10	10 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	5.0 U	UG/KG
CARBON DISULFIDE	10	10 U	UG/KG
CARBON TETRACHLORIDE	5.0	5.0 U	UG/KG
CHLOROBENZENE	5.0	5.0 U	UG/KG
CHLOROETHANE	10	10 U	UG/KG
CHLOROFORM	5.0	0.31 J	UG/KG
CHLOROMETHANE	5.0	5.0 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	5.0 U	UG/KG
CYCLOHEXANE	10	10 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	5.0 U	UG/KG
1,2-DIBROMOETHANE	5.0	5.0 U	UG/KG
1,3-DICHLOROBENZENE	5.0	5.0 U	UG/KG
1,4-DICHLOROBENZENE	5.0	5.0 U	UG/KG
1,2-DICHLOROBENZENE	5.0	5.0 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	5.0 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	5.0 U	UG/KG
1,2-DICHLOROETHANE	5.0	5.0 U	UG/KG
1,1-DICHLOROETHENE	5.0	5.0 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.70 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	5.0 U	UG/KG
1,2-DICHLOROPROPANE	5.0	5.0 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	5.0 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	5.0 U	UG/KG
ETHYLBENZENE	5.0	5.0 U	UG/KG
2-HEXANONE	10	10 U	UG/KG
ISOPROPYLBENZENE	5.0	5.0 U	UG/KG
METHYL ACETATE	5.0	5.0 U	UG/KG
METHYLCYCLOHEXANE	10	10 U	UG/KG
METHYLENE CHLORIDE	5.0	5.0 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	10 U	UG/KG
STYRENE	5.0	5.0 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	5.0 U	UG/KG
TETRACHLOROETHENE	5.0	1.5 J	UG/KG
TOLUENE	5.0	5.0 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	5.0 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	5.0 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	5.0 U	UG/KG

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS35SBJB

Date Sampled : 07/14/06 11:55 **Order #:** 921927 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/15/06 **Submission #:** R2632657 **Percent Solid:** 84.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/19/06			
ANALYTICAL DILUTION: 0.84			Dry Weight
TRICHLOROETHENE	5.0	32 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	5.0 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	5.0 U	UG/KG
VINYL CHLORIDE	5.0	5.0 U	UG/KG
O-XYLENE	5.0	5.0 U	UG/KG
M+P-XYLENE	5.0	5.0 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	100	%
TOLUENE-D8	(75 - 128)	96	%
DIBROMOFLUOROMETHANE	(62 - 133)	93	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS25SBAA

Date Sampled : 07/17/06 14:10 **Order #:** 922898 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 85.7

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 0.91			Dry Weight
ACETONE	10	100	UG/KG
BENZENE	5.0	0.36 J	UG/KG
BROMODICHLOROMETHANE	5.0	5.3 U	UG/KG
BROMOFORM	5.0	5.3 U	UG/KG
BROMOMETHANE	5.0	5.3 U	UG/KG
2-BUTANONE (MEK)	10	16	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	5.3 U	UG/KG
CARBON DISULFIDE	10	11 U	UG/KG
CARBON TETRACHLORIDE	5.0	5.3 U	UG/KG
CHLOROBENZENE	5.0	5.3 U	UG/KG
CHLOROETHANE	10	11 U	UG/KG
CHLOROFORM	5.0	5.3 U	UG/KG
CHLOROMETHANE	5.0	5.3 UJ WB 10/4/07	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	5.3 U	UG/KG
CYCLOHEXANE	10	11 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	5.3 U	UG/KG
1,2-DIBROMOETHANE	5.0	5.3 U	UG/KG
1,3-DICHLOROBENZENE	5.0	5.3 U	UG/KG
1,4-DICHLOROBENZENE	5.0	0.48 J	UG/KG
1,2-DICHLOROBENZENE	5.0	5.3 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	5.3 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	5.3 U	UG/KG
1,2-DICHLOROETHANE	5.0	5.3 U	UG/KG
1,1-DICHLOROETHENE	5.0	5.3 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	5.3 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	5.3 U	UG/KG
1,2-DICHLOROPROPANE	5.0	5.3 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	5.3 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	5.3 U	UG/KG
ETHYLBENZENE	5.0	5.3 U	UG/KG
2-HEXANONE	10	11 U	UG/KG
ISOPROPYLBENZENE	5.0	5.3 U	UG/KG
METHYL ACETATE	5.0	5.3 U	UG/KG
METHYLCYCLOHEXANE	10	11 U	UG/KG
METHYLENE CHLORIDE	5.0	5.3 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	11 U	UG/KG
STYRENE	5.0	5.3 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	5.3 U	UG/KG
TETRACHLOROETHENE	5.0	5.3 U	UG/KG
TOLUENE	5.0	0.86 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	5.3 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	5.3 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	5.3 U	UG/KG

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ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS25SBAA

Date Sampled : 07/17/06 14:10 **Order #:** 922898 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 85.7

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 0.91			Dry Weight
TRICHLOROETHENE	5.0	4.7 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	5.3 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	5.3 U	UG/KG
VINYL CHLORIDE	5.0	5.3 U	UG/KG
O-XYLENE	5.0	5.3 U	UG/KG
M+P-XYLENE	5.0	5.3 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	104	%
TOLUENE-D8	(75 - 128)	98	%
DIBROMOFLUOROMETHANE	(62 - 133)	96	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS27SBPA

Date Sampled : 07/17/06 12:20 **Order #:** 922899 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 77.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 0.72			Dry Weight
ACETONE	10	14	UG/KG
BENZENE	5.0	4.7 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.7 U	UG/KG
BROMOFORM	5.0	4.7 U	UG/KG
BROMOMETHANE	5.0	4.7 UJ	UG/KG
2-BUTANONE (MEK)	10	9.4 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.7 UJ	UG/KG
CARBON DISULFIDE	10	9.4 UJ	UG/KG
CARBON TETRACHLORIDE	5.0	4.7 U	UG/KG
CHLOROBENZENE	5.0	4.7 U	UG/KG
CHLOROETHANE	10	9.4 UJ	UG/KG
CHLOROFORM	5.0	4.7 U	UG/KG
CHLOROMETHANE	5.0	4.7 UJ	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.7 U	UG/KG
CYCLOHEXANE	10	9.4 UJ	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.7 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.7 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.7 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.7 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.7 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.7 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	4.7 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.7 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.7 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	18	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	0.31 J	UG/KG
1,2-DICHLOROPROPANE	5.0	4.7 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.7 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.7 U	UG/KG
ETHYLBENZENE	5.0	4.7 U	UG/KG
2-HEXANONE	10	9.4 U	UG/KG
ISOPROPYLBENZENE	5.0	4.7 U	UG/KG
METHYL ACETATE	5.0	4.7 U	UG/KG
METHYLCYCLOHEXANE	10	9.4 UJ	UG/KG
METHYLENE CHLORIDE	5.0	4.7 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	9.4 U	UG/KG
STYRENE	5.0	4.7 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.7 U	UG/KG
TETRACHLOROETHENE	5.0	1.2 J	UG/KG
TOLUENE	5.0	4.7 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.7 UJ	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.7 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.7 U	UG/KG

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS27SBPA

Date Sampled : 07/17/06 12:20 **Order #:** 922899 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 77.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 0.72			Dry Weight
TRICHLOROETHENE	5.0	84	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.7 UJ	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.7 UJ	UG/KG
VINYL CHLORIDE	5.0	4.7 UJ	UG/KG
O-XYLENE	5.0	4.7 U	UG/KG
M+P-XYLENE	5.0	4.7 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	100	%
TOLUENE-D8	(75 - 128)	92	%
DIBROMOFLUOROMETHANE	(62 - 133)	91	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS22SBQA

Date Sampled : 07/17/06 10:30 **Order #:** 922900 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 90.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 0.90			Dry Weight
ACETONE	10	10 U	UG/KG
BENZENE	5.0	11	UG/KG
BROMODICHLOROMETHANE	5.0	5.0 U	UG/KG
BROMOFORM	5.0	5.0 U	UG/KG
BROMOMETHANE	5.0	5.0 U	UG/KG
2-BUTANONE (MEK)	10	10 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	5.0 U	UG/KG
CARBON DISULFIDE	10	10 U	UG/KG
CARBON TETRACHLORIDE	5.0	5.0 U	UG/KG
CHLOROBENZENE	5.0	5.0 U	UG/KG
CHLOROETHANE	10	10 U	UG/KG
CHLOROFORM	5.0	5.0 U	UG/KG
CHLOROMETHANE	5.0	5.0 UJ	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	5.0 U	UG/KG
CYCLOHEXANE	10	10 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	5.0 U	UG/KG
1,2-DIBROMOETHANE	5.0	5.0 U	UG/KG
1,3-DICHLOROBENZENE	5.0	5.0 U	UG/KG
1,4-DICHLOROBENZENE	5.0	5.0 U	UG/KG
1,2-DICHLOROBENZENE	5.0	5.0 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	5.0 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	5.0 U	UG/KG
1,2-DICHLOROETHANE	5.0	5.0 U	UG/KG
1,1-DICHLOROETHENE	5.0	5.0 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	5.0 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	5.0 U	UG/KG
1,2-DICHLOROPROPANE	5.0	5.0 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	5.0 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	5.0 U	UG/KG
ETHYLBENZENE	5.0	67	UG/KG
2-HEXANONE	10	10 U	UG/KG
ISOPROPYLBENZENE	5.0	2.5 J	UG/KG
METHYL ACETATE	5.0	5.0 U	UG/KG
METHYLCYCLOHEXANE	10	10 U	UG/KG
METHYLENE CHLORIDE	5.0	5.0 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	10 U	UG/KG
STYRENE	5.0	5.0 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	5.0 U	UG/KG
TETRACHLOROETHENE	5.0	5.0 U	UG/KG
TOLUENE	5.0	0.94 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	5.0 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	5.0 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	5.0 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS22SBQA

Date Sampled : 07/17/06 10:30 **Order #:** 922900 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 90.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 0.90			Dry Weight
TRICHLOROETHENE	5.0	2.6 J	UG/KG
TRICHLOROFLUOROMETHANE	5.0	5.0 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	5.0 U	UG/KG
VINYL CHLORIDE	5.0	5.0 U	UG/KG
O-XYLENE	5.0	19	UG/KG
M+P-XYLENE	5.0	42	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	104	%
TOLUENE-D8	(75 - 128)	96	%
DIBROMOFLUOROMETHANE	(62 - 133)	95	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS22SBAA

Date Sampled : 07/17/06 09:50 **Order #:** 922902 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 85.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 1.07			Dry Weight
ACETONE	10	110	UG/KG
BENZENE	5.0	6.3 U	UG/KG
BROMODICHLOROMETHANE	5.0	6.3 U	UG/KG
BROMOFORM	5.0	6.3 U	UG/KG
BROMOMETHANE	5.0	6.3 U	UG/KG
2-BUTANONE (MEK)	10	7.9 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	6.3 U	UG/KG
CARBON DISULFIDE	10	0.73 J	UG/KG
CARBON TETRACHLORIDE	5.0	6.3 U	UG/KG
CHLOROBENZENE	5.0	6.3 U	UG/KG
CHLOROETHANE	10	13 U	UG/KG
CHLOROFORM	5.0	6.3 U	UG/KG
CHLOROMETHANE	5.0	0.98 J	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	6.3 U	UG/KG
CYCLOHEXANE	10	13 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	6.3 U	UG/KG
1,2-DIBROMOETHANE	5.0	6.3 U	UG/KG
1,3-DICHLOROBENZENE	5.0	6.3 U	UG/KG
1,4-DICHLOROBENZENE	5.0	6.3 U	UG/KG
1,2-DICHLOROBENZENE	5.0	6.3 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	6.3 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	6.3 U	UG/KG
1,2-DICHLOROETHANE	5.0	6.3 U	UG/KG
1,1-DICHLOROETHENE	5.0	6.3 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	6.3 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	6.3 U	UG/KG
1,2-DICHLOROPROPANE	5.0	6.3 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	6.3 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	6.3 U	UG/KG
ETHYLBENZENE	5.0	6.3 U	UG/KG
2-HEXANONE	10	13 U	UG/KG
ISOPROPYLBENZENE	5.0	6.3 U	UG/KG
METHYL ACETATE	5.0	6.3 U	UG/KG
METHYLCYCLOHEXANE	10	13 U	UG/KG
METHYLENE CHLORIDE	5.0	6.3 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	13 U	UG/KG
STYRENE	5.0	6.3 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	6.3 U	UG/KG
TETRACHLOROETHENE	5.0	1.6 J	UG/KG
TOLUENE	5.0	6.3 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	6.3 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	6.3 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	6.3 U	UG/KG

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS22SBAA

Date Sampled : 07/17/06 09:50 **Order #:** 922902 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 85.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 1.07			Dry Weight
TRICHLOROETHENE	5.0	10	UG/KG
TRICHLOROFLUOROMETHANE	5.0	6.3 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	6.3 U	UG/KG
VINYL CHLORIDE	5.0	6.3 U	UG/KG
O-XYLENE	5.0	6.3 U	UG/KG
M+P-XYLENE	5.0	6.3 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	103	%
TOLUENE-D8	(75 - 128)	97	%
DIBROMOFLUOROMETHANE	(62 - 133)	94	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS25SBRA

Date Sampled : 07/17/06 15:00 **Order #:** 922905 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 86.6

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 0.93			Dry Weight
ACETONE	10	6.1 J	UG/KG
BENZENE	5.0	5.4 U	UG/KG
BROMODICHLOROMETHANE	5.0	5.4 U	UG/KG
BROMOFORM	5.0	5.4 U	UG/KG
BROMOMETHANE	5.0	5.4 U	UG/KG
2-BUTANONE (MEK)	10	11 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	5.4 U	UG/KG
CARBON DISULFIDE	10	11 U	UG/KG
CARBON TETRACHLORIDE	5.0	5.4 U	UG/KG
CHLOROBENZENE	5.0	5.4 U	UG/KG
CHLOROETHANE	10	11 U	UG/KG
CHLOROFORM	5.0	5.4 U	UG/KG
CHLOROMETHANE	5.0	5.4 UJ	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	5.4 U	UG/KG
CYCLOHEXANE	10	11 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	5.4 U	UG/KG
1,2-DIBROMOETHANE	5.0	5.4 U	UG/KG
1,3-DICHLOROBENZENE	5.0	5.4 U	UG/KG
1,4-DICHLOROBENZENE	5.0	0.66 J	UG/KG
1,2-DICHLOROBENZENE	5.0	5.4 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	5.4 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	5.4 U	UG/KG
1,2-DICHLOROETHANE	5.0	5.4 U	UG/KG
1,1-DICHLOROETHENE	5.0	5.4 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.52 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	5.4 U	UG/KG
1,2-DICHLOROPROPANE	5.0	5.4 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	5.4 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	5.4 U	UG/KG
ETHYLBENZENE	5.0	5.4 U	UG/KG
2-HEXANONE	10	11 U	UG/KG
ISOPROPYLBENZENE	5.0	5.4 U	UG/KG
METHYL ACETATE	5.0	5.4 U	UG/KG
METHYLCYCLOHEXANE	10	11 U	UG/KG
METHYLENE CHLORIDE	5.0	5.4 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	11 U	UG/KG
STYRENE	5.0	5.4 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	5.4 U	UG/KG
TETRACHLOROETHENE	5.0	5.4 U	UG/KG
TOLUENE	5.0	5.4 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	5.4 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	5.4 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	5.4 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS25SBRA

Date Sampled : 07/17/06 15:00 **Order #:** 922905 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 86.6

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 0.93			Dry Weight
TRICHLOROETHENE	5.0	12	UG/KG
TRICHLOROFLUOROMETHANE	5.0	5.4 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	5.4 U	UG/KG
VINYL CHLORIDE	5.0	5.4 U	UG/KG
O-XYLENE	5.0	5.4 U	UG/KG
M+P-XYLENE	5.0	5.4 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	103	%
TOLUENE-D8	(75 - 128)	95	%
DIBROMOFLUOROMETHANE	(62 - 133)	94	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS27SBAA

Date Sampled : 07/17/06 11:30 **Order #:** 922906 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 92.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 0.85			Dry Weight
ACETONE	10	48	UG/KG
BENZENE	5.0	4.6 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.6 U	UG/KG
BROMOFORM	5.0	4.6 U	UG/KG
BROMOMETHANE	5.0	4.6 U	UG/KG
2-BUTANONE (MEK)	10	4.3 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.6 U	UG/KG
CARBON DISULFIDE	10	0.53 J	UG/KG
CARBON TETRACHLORIDE	5.0	4.6 U	UG/KG
CHLOROBENZENE	5.0	4.6 U	UG/KG
CHLOROETHANE	10	9.2 U	UG/KG
CHLOROFORM	5.0	4.6 U	UG/KG
CHLOROMETHANE	5.0	4.6 UJ	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.6 U	UG/KG
CYCLOHEXANE	10	9.2 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.6 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.6 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.6 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.6 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.6 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.6 UJ	UG/KG
1,1-DICHLOROETHANE	5.0	4.6 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.6 U	UG/KG
1,1-DICHLOROETHENE	5.0	4.6 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	2.7 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.6 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.6 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.6 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.6 U	UG/KG
ETHYLBENZENE	5.0	4.6 U	UG/KG
2-HEXANONE	10	9.2 U	UG/KG
ISOPROPYLBENZENE	5.0	4.6 U	UG/KG
METHYL ACETATE	5.0	4.6 U	UG/KG
METHYLCYCLOHEXANE	10	9.2 U	UG/KG
METHYLENE CHLORIDE	5.0	4.6 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	9.2 U	UG/KG
STYRENE	5.0	4.6 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.6 U	UG/KG
TETRACHLOROETHENE	5.0	0.29 J	UG/KG
TOLUENE	5.0	0.28 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.6 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.6 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.6 U	UG/KG

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/28/06

ENSR International
Project Reference: OZONE PARK PROJECT #107480010202
Client Sample ID : SS27SBAA

Date Sampled : 07/17/06 11:30 **Order #:** 922906 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 07/19/06 **Submission #:** R2632657 **Percent Solid:** 92.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED: 07/24/06			
ANALYTICAL DILUTION: 0.85			Dry Weight
TRICHLOROETHENE	5.0	13	UG/KG
TRICHLOROFLUOROMETHANE	5.0	4.6 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.6 U	UG/KG
VINYL CHLORIDE	5.0	4.6 U	UG/KG
O-XYLENE	5.0	4.6 U	UG/KG
M+P-XYLENE	5.0	4.6 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129)	101	%
TOLUENE-D8	(75 - 128)	97	%
DIBROMOFLUOROMETHANE	(62 - 133)	95	%

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Memorandum

Date: October 13, 2006

To: David Austin/Westford

From: Vinora Nicholls/Westford

Subject: Data Validation, VOC Analyses
Former Ozone Industries, Queens, NY
CAS SDG R2633157

Distribution: W. Braunstein/Westford

10748-001-0501 File
OZ009vocvn

SUMMARY

Limited validation was performed on the data for 24 groundwater samples and three trip blanks analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by SW-846 method 8260B. The samples were collected at the Former Ozone Industries site in Queens, NY on August 8, 9, 10, 11, 14, and 15, 2006 and were submitted to Columbia Analytical Services (CAS) in Rochester, NY for analysis. CAS processed the samples and reported the results under sample delivery group (SDG) R2633157.

The analytical data were evaluated with reference to the EPA methods and the *"USEPA Region 2, SOP HW-24, Standard Operating Procedure for the Validation of Organic Data Acquired using SW-846 EPA Method 8260B" (Revision 2, December 1999).*"

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were negated (U) due to blank contamination or qualified for certain other QC nonconformances (see discussion below).

SAMPLES

The samples included in this review are listed below.

Sample IDs	Sample IDs
MW120DGWA3	MW06DGWA3
MW120DGWB3 (Field Duplicate of MW120DGWA3)	MW06SGWA3
PZ10GWA3	MW06SGWB3 (Field Duplicate of MW06SGWA3)
MW120SGWA3	PZ05GWA3
PZ09GWA3	PZ08GWA3
MW101GWA3	081106TB (Trip blank)
MW201SGWA3	MW203GWA3

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Sample IDs	Sample IDs
PZ01GWA3	MW09GWA3
MW105GWA3	MW202GWA3
MW201DGWA3	MW202GWB3 (Field Duplicate of MW202GWA3)
PZ01DGWA3	MW01GWA3
MW13SGWA3	081406TB (Trip blank)
MW13DGWA3	MW202GWC3
	081006TB (Trip blank)

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with the chain of custody (COC) requests
- Holding times and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/equipment blank/trip blank
- Surrogate spike recoveries
- Internal Standard Performance
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Laboratory control sample (LCS) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports corresponded to the analytical requests designated on the COC. Trip Blank 2006 was changed to 081006TB, as indicated on the chain-of custody. No discrepancies were noted.

Holding Times/Sample Preservation

The cooler temperatures ranged from 4°C-6°C, which met the QC acceptance criteria of 4°C ± 2°C.

All samples were extracted and analyzed within the QAPP specified holding times.

GC/MS Tunes

The frequency and abundance of the bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within 12 hours from the BFB tunes.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs) and the response factors (RFs) of all target analytes were within the QC acceptance criteria in the initial calibration standards. The following table summarizes the percent differences (%Ds) that were outside the QC acceptance criteria in the

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continuing calibration (CC) standards.

Calibration	Compound	%D
CC (08/17/06)	Dichlorodifluoromethane	34.8
Associated samples: All samples except: PZ10GWA3, MW13SGWA3, 081006TB, PZ05GWA3, PZ08GWA3, 081106TB, MW203GWA3, MW09GWA3, MW202GWA3,MW202GWB3, MW01GWA3, 081406TB, MW202GWC3, 081106TB		
CC (08/18/06)	Dichlorodifluoromethane	35.0
	2-Butanone	20.0
	2-Hexanone	20.2
Associated samples: 081006TB, PZ05GWA3, PZ08GWA3, MW203GWA3, MW09GWA3, MW202GWA3,MW202GWB3, MW01GWA3, 081406TB, MW202GWC3		

Sample results were qualified as follows:

- If %D > 20%, estimate positive results (J) and nondetect results (UJ).

  Based on professional judgment, the %D results for 2-butanone, and 2-hexanone for calibration CC (08/18/06) were accepted as rounded to 20% and qualification of the data was not necessary.

Method Blanks/Equipment Blank/Trip Blank

Three trip blanks (081006TB, 081106TB, 081406TB) were submitted with this sample set. No equipment blanks were submitted with this sample set. Target compounds were not detected in the laboratory method blanks, but were detected in the trip blanks 081006TB and 081106TB. The presence of blank contamination indicates that false positive results may exist for this compound in the associated samples. Action Levels (ALs) were established at 10 times the concentration detected in the blank. The following table summarizes the AL and the associated samples.

Type of Blank	Compound	Conc. Detected (µg/L)	AL (µg/L)
Trip Blank	Acetone	2.3	23
Associated samples: All samples collected before 8/14/06.			

Sample results were qualified as follows:

- Sample results < sample quantitation limit (SQL) and ≤ AL were qualified as nondetect (U) at the SQL.
- Sample results ≥ SQL but ≤ AL were qualified as nondetect (U) at the reported concentration.
- Sample results ≥ SQL and ≥ AL were accepted without qualification.

Surrogate Spike Recoveries

All surrogate recoveries were within the QC acceptance limits in all sample analyses.

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Internal Standard Performance

Internal standard performance met the QC acceptance criteria in all sample analyses.

MS/MSD Results

Sample MW201SGWA3 was submitted for MS/MSD analyses with this sample set. The MS/MSD percent recoveries (%Rs) and relative percent differences (RPDs) of the compounds reported were within the QC acceptance criteria, with the following exceptions summarized in the table below.

Compound	MS %R	MSD %R	RPD	QC limits		Action (Detects/ Nondetects)
				%R	RPD	
Acetone	72	52	32	50-150	30	J/UJ

The result was qualified as estimated (J/UJ).

Field Duplicate Results

Samples MW06SGWA3 and MW06SGWB3, MW202GWA3 and MW202GWB3, MW120DGWA3 and MW120DGWB3 were submitted as field duplicate pairs with this data set. The results for detected compounds, the associated relative percent differences (RPDs), and actions taken are tabulated below.

Compound	MW06SGWA3 (ug/L)	MW06SGB3 (ug/L)	RPD (%)	Action
Chloroform	4.6	4.6	0	None
Cis-1,2-Dichloroethene	3.8	4.0	5	None
Tetrachloroethene	0.47 J	0.50 J	6	None
Trichloroethene	46	49	6	None

The RPDs for chloroform, cis-1, 2-dichloroethene, tetrachloroethene, and trichloroethene were within the quality control criteria. All other RPDs met the QC acceptance criteria.

Compound	MW202GWA3 (ug/L)	MW202GWB3 (ug/L)	RPD (%)	Action
Chloroform	1.7	1.7	0	None
Cis-1,2-Dichloroethene	7.8	8.4	7	None
Tetrachloroethene	1.5	1.7	13	None
Trichloroethene	74	77	4	None

The RPDs for chloroform, cis-1, 2-dichloroethene, tetrachloroethene, and trichloroethene were within the quality control criteria. All other RPDs met the QC acceptance criteria.

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Compound	MW120DGWA3 (ug/L)	MW120DGWB3 (ug/L)	RPD (%)	Action
Chloroform	0.34 J	0.36 J	6	None
Chloromethane	0.45 J	2.0 U	NC	None
cis-1, 2-Dichloroethene	0.34 J	0.38 J	11	None
Trichloroethene	20	21	5	None

The RPDS for chloroform, chloromethane, cis-1, 2-dichloroethene, and trichloroethene were within acceptance criteria. All other RPDs met the QC acceptance criteria.

LCS Results

The %Rs of the spiked target analytes were within the QC acceptance criteria in the LCSs associated with all sample analyses.

Quantitation Limits and Sample Results

Sample MW13SGWA3 was analyzed at a 2-fold dilution due to the concentration of cis-1, 2-dichloroethane, and sample PZ10GWAS was analyzed at a 2-fold dilution due to the concentration of trichloroethene. The laboratory supplied both the diluted and the undiluted results for both samples. The results were combined during validation to provide the lowest reporting limits and all results within the calibration range. The results for both sets of results were included in the data package. The remaining samples were analyzed undiluted.

Tentatively Identified Compounds (TICs)

TICs were not reported for any of the samples in this data set.

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW120DGWA3

Date Sampled : 08/10/06 12:45 **Order #:** 929178 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

DATE ANALYZED : 08/17/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.34 J	UG/L
CHLOROMETHANE	2.0	0.45 J	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	0.34 J	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	20	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW120DGWA3

Date Sampled : 08/10/06 12:45 **Order #:** 929178 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	94	%
TOLUENE-D8	(88 - 124 %)	100	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	99	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW120DGWB3

Date Sampled : 08/10/06 12:45 **Order #:** 929179 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.36 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	0.38 J	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	21	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW120DGWB3

Date Sampled : 08/10/06 12:45 **Order #:** 929179 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	97	%
TOLUENE-D8	(88 - 124 %)	105	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	99	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ10GWA3

Date Sampled : 08/10/06 11:00 **Order #:** 929180 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

DATE ANALYZED : 08/17/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.81 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	7.5	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.6	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	2.0	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
~~TRICHLOROETHENE~~ DO NOT Report	1.0	~~300 E~~	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ10GWA3

Date Sampled : 08/10/06 11:00 **Order #:** 929180 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	95	%
TOLUENE-D8	(88 - 124 %)	104	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	98	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ10GWA3

Date Sampled : 08/10/06 11:00 **Order #:** 929180 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/23/06			
ANALYTICAL DILUTION: 2.00			
ACETONE	10	3.3 J	UG/L
BENZENE	1.0	2.0 U	UG/L
BROMODICHLOROMETHANE	1.0	2.0 U	UG/L
BROMOFORM	1.0	2.0 U	UG/L
BROMOMETHANE	2.0	4.0 U	UG/L
2-BUTANONE (MEK)	5.0	10 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	2.0 U	UG/L
CARBON DISULFIDE	1.0	1.5 J	UG/L
CARBON TETRACHLORIDE	1.0	2.0 U	UG/L
CHLOROBENZENE	1.0	2.0 U	UG/L
CHLOROETHANE	2.0	4.0 U	UG/L
CHLOROFORM	1.0	2.0 U	UG/L
CHLOROMETHANE	2.0	4.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	4.0 U	UG/L
CYCLOHEXANE	1.0	2.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	2.0 U	UG/L
1,2-DIBROMOETHANE	1.0	2.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	2.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	2.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	2.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	2.0 U	UG/L
1,1-DICHLOROETHANE	1.0	2.0 U	UG/L
1,2-DICHLOROETHANE	1.0	2.0 U	UG/L
1,1-DICHLOROETHENE	1.0	2.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	6.3	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	2.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	2.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	2.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	2.0 U	UG/L
ETHYLBENZENE	1.0	2.0 U	UG/L
2-HEXANONE	5.0	10 U	UG/L
ISOPROPYLBENZENE	1.0	2.0 U	UG/L
METHYL ACETATE	10	20 U	UG/L
METHYLCYCLOHEXANE	1.0	2.0 U	UG/L
METHYLENE CHLORIDE	1.0	2.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	10 U	UG/L
STYRENE	1.0	2.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	2.0 U	UG/L
TETRACHLOROETHENE	1.0	1.4 J	UG/L
TOLUENE	1.0	2.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	2.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.7 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	2.0 U	UG/L
TRICHLOROETHENE	1.0	260 D	UG/L

Do not Report

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ10GWA3

Date Sampled : 08/10/06 11:00 **Order #:** 929180 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/23/06			
ANALYTICAL DILUTION: 2.00			
~~TRICHLOROFLUOROMETHANE~~	1.0	2.0 U	~~UG/L~~
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	2.0 U	UG/L
VINYL CHLORIDE	1.0	2.0 U	UG/L
O-XYLENE	1.0	2.0 U	UG/L
~~M+P-XYLENE~~	1.0	2.0 U	~~UG/L~~

Do not Report

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	99	%
TOLUENE-D8	(88 - 124 %)	99	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	100	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW120SGWA3

Date Sampled : 08/10/06 12:50 **Order #:** 929181 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.4	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	22	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW120SGWA3

Date Sampled : 08/10/06 12:50 **Order #:** 929181 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	0.52 J	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	94	%
TOLUENE-D8	(88 - 124 %)	103	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	96	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ09GWA3

Date Sampled : 08/10/06 11:05 **Order #:** 929182 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

DATE ANALYZED : 08/17/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	100 ~~53 J~~	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	2.1	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	14	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.2	UG/L
TOLUENE	1.0	0.36 J	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.7	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	110	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ09GWA3

Date Sampled : 08/10/06 11:05 **Order #:** 929182 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	95	%
TOLUENE-D8	(88 - 124 %)	103	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	96	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW101GWA3

Date Sampled : 08/10/06 14:40 **Order #:** 929183 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

DATE ANALYZED : 08/17/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	~~2.0~~ 100 J	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.30 J	UG/L
CHLOROMETHANE	2.0	0.55 J	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U 05	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	12	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.38 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	12	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW101GWA3

Date Sampled : 08/10/06 14:40 **Order #:** 929183 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	96	%
TOLUENE-D8	(88 - 124 %)	104	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	97	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW201SGWA3

Date Sampled : 08/09/06 10:40 **Order #:** 929184 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

DATE ANALYZED : 08/17/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U UJ	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.43 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	3.1	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	2.7	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	71	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW201SGWA3

Date Sampled : 08/09/06 10:40 **Order #:** 929184 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	95	%
TOLUENE-D8	(88 - 124 %)	111	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	99	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ01GWA3

Date Sampled : 08/09/06 13:00 **Order #:** 929185 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

DATE ANALYZED : 08/17/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT		UNITS
ACETONE	10	10 U		UG/L
BENZENE	1.0	1.0 U		UG/L
BROMODICHLOROMETHANE	1.0	1.0 U		UG/L
BROMOFORM	1.0	1.0 U		UG/L
BROMOMETHANE	2.0	2.0 U		UG/L
2-BUTANONE (MEK)	5.0	5.0 U		UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U		UG/L
CARBON DISULFIDE	1.0	1.0 U		UG/L
CARBON TETRACHLORIDE	1.0	1.0 U		UG/L
CHLOROBENZENE	1.0	1.0 U		UG/L
CHLOROETHANE	2.0	2.0 U		UG/L
CHLOROFORM	1.0	1.0		UG/L
CHLOROMETHANE	2.0	2.0 U		UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U		UG/L
CYCLOHEXANE	1.0	1.0 U		UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U		UG/L
1,2-DIBROMOETHANE	1.0	1.0 U		UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U		UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U		UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U		UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U		UG/L
1,2-DICHLOROETHANE	1.0	1.0 U		UG/L
1,1-DICHLOROETHENE	1.0	1.0 U		UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U		UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U		UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U		UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U		UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U		UG/L
ETHYLBENZENE	1.0	1.0 U		UG/L
2-HEXANONE	5.0	5.0 U		UG/L
ISOPROPYLBENZENE	1.0	1.0 U		UG/L
METHYL ACETATE	10	10 U		UG/L
METHYLCYCLOHEXANE	1.0	1.0 U		UG/L
METHYLENE CHLORIDE	1.0	1.0 U		UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U		UG/L
STYRENE	1.0	1.0 U		UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U		UG/L
TETRACHLOROETHENE	1.0	1.0 U		UG/L
TOLUENE	1.0	1.0 U		UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U		UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U		UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U		UG/L
TRICHLOROETHENE	1.0	1.0 U		UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ01GWA3

Date Sampled : 08/09/06 13:00 **Order #:** 929185 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	94	%
TOLUENE-D8	(88 - 124 %)	101	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	97	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW105GWA3

Date Sampled : 08/10/06 14:35 **Order #:** 929186 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.67 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U UJ	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	3.8	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.37 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.9	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	63	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW105GWA3

Date Sampled : 08/10/06 14:35 **Order #:** 929186 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	94	%
TOLUENE-D8	(88 - 124 %)	102	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	97	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW201DGWA3

Date Sampled : 08/09/06 10:50 **Order #:** 929187 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.39 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	20	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	30	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW201DGWA3

Date Sampled : 08/09/06 10:50 **Order #:** 929187 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	95	%
TOLUENE-D8	(88 - 124 %)	105	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	96	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ01DGWA3

Date Sampled : 08/09/06 13:05 **Order #:** 929188 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.3	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.75 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	8.0	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ01DGWA3

Date Sampled : 08/09/06 13:05 **Order #:** 929188 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	95	%
TOLUENE-D8	(88 - 124 %)	99	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	96	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW13SGWA3

Date Sampled : 08/09/06 14:45 **Order #:** 929189 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

DATE ANALYZED : 08/17/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.5	UG/L
CHLOROMETHANE	2.0	0.79 J	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	4.6	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	0.50 J	UG/L
CIS-1,2-DICHLOROETHENE	1.0	310 E	UG/L DO NOT REPORT
TRANS-1,2-DICHLOROETHENE	1.0	0.74 J	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.60 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	3.3	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	63	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW13SGWA3

Date Sampled : 08/09/06 14:45 **Order #:** 929189 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	95	%
TOLUENE-D8	(88 - 124 %)	105	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	95	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW13SGWA3

Date Sampled : 08/09/06 14:45 **Order #:** 929189 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/23/06			
ANALYTICAL DILUTION: 2.00			
ACETONE	10	20 U	UG/L
BENZENE	1.0	2.0 U	UG/L
BROMODICHLOROMETHANE	1.0	2.0 U	UG/L
BROMOFORM	1.0	2.0 U	UG/L
BROMOMETHANE	2.0	4.0 U	UG/L
2-BUTANONE (MEK)	5.0	10 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	2.0 U	UG/L
CARBON DISULFIDE	1.0	2.0 U	UG/L
CARBON TETRACHLORIDE	1.0	2.0 U	UG/L
CHLOROBENZENE	1.0	2.0 U	UG/L
CHLOROETHANE	2.0	4.0 U	UG/L
CHLOROFORM	1.0	1.5 J	UG/L
CHLOROMETHANE	2.0	4.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	4.0 U	UG/L
CYCLOHEXANE	1.0	2.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	2.0 U	UG/L
1,2-DIBROMOETHANE	1.0	2.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	2.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	2.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	2.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	2.0 U	UG/L
1,1-DICHLOROETHANE	1.0	4.3	UG/L
1,2-DICHLOROETHANE	1.0	2.0 U	UG/L
1,1-DICHLOROETHENE	1.0	2.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	240 D	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.4 J	UG/L
1,2-DICHLOROPROPANE	1.0	2.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	2.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	2.0 U	UG/L
ETHYLBENZENE	1.0	2.0 U	UG/L
2-HEXANONE	5.0	10 U	UG/L
ISOPROPYLBENZENE	1.0	2.0 U	UG/L
METHYL ACETATE	10	20 U	UG/L
METHYLCYCLOHEXANE	1.0	2.0 U	UG/L
METHYLENE CHLORIDE	1.0	2.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	10 U	UG/L
STYRENE	1.0	2.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	2.0 U	UG/L
TETRACHLOROETHENE	1.0	0.78 J	UG/L
TOLUENE	1.0	2.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	2.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	3.2 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	2.0 U	UG/L
TRICHLOROETHENE	1.0	52	UG/L

Do not Repeat

Do not Repeat

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW13SGWA3

Date Sampled : 08/09/06 14:45 **Order #:** 929189 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/23/06			
ANALYTICAL DILUTION: 2.00			
~~TRICHLOROFLUOROMETHANE~~	1.0	2.0 U	~~UG/L~~
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	2.0 U	UG/L
VINYL CHLORIDE	1.0	2.0 U	UG/L
O-XYLENE	1.0	2.0 U	UG/L
M+P-XYLENE	1.0	2.0 U	UG/L

Do not report

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	100	%
TOLUENE-D8	(88 - 124 %)	101	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	99	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW13DGWA3

Date Sampled : 08/09/06 14:50 **Order #:** 929190 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.5	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	0.42 J	UG/L
CIS-1,2-DICHLOROETHENE	1.0	0.50 J	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	2.6	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	9.5	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW13DGWA3

Date Sampled : 08/09/06 14:50 **Order #:** 929190 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	90	%
TOLUENE-D8	(88 - 124 %)	103	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	97	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW06SGWA3

Date Sampled : 08/08/06 15:25 **Order #:** 929191 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

DATE ANALYZED : 08/17/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	4.6	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U V5	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	3.8	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.47 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.35 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	46	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW06SGWA3

Date Sampled : 08/08/06 15:25 **Order #:** 929191 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	90	%
TOLUENE-D8	(88 - 124 %)	99	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	94	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW06DGWA3

Date Sampled : 08/08/06 15:20 **Order #:** 929192 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.5	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.3	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	4.6	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW06DGWA3

Date Sampled : 08/08/06 15:20 **Order #:** 929192 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	91	%
TOLUENE-D8	(88 - 124 %)	102	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	94	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW06SGWB3

Date Sampled : 08/08/06 15:30 **Order #:** 929193 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

DATE ANALYZED : 08/17/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	4.6	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	4.0	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.50 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.41 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	49	UG/L

05

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW06SGWB3

Date Sampled : 08/08/06 15:30 **Order #:** 929193 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134279

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/17/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	97	%
TOLUENE-D8	(88 - 124 %)	109	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	103	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : 081006TB

Date Sampled : 08/10/06 **Order #:** 929194 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
		~~10U~~ 2.2J (WB 10/4/07) (VDB update KW 10/9)	
ACETONE	10	2.2 J	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 UJ	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : 081006TB

Date Sampled : 08/10/06 **Order #:** 929194 **Sample Matrix:** WATER
Date Received: 08/11/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	91	%
TOLUENE-D8	(88 - 124 %)	102	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	96	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ05GWA3

Date Sampled : 08/11/06 10:00 **Order #:** 929428 **Sample Matrix:** WATER
Date Received: 08/12/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U UJ	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.46 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.8	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ05GWA3

Date Sampled : 08/11/06 10:00 **Order #:** 929428 **Sample Matrix:** WATER
Date Received: 08/12/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	94	%
TOLUENE-D8	(88 - 124 %)	103	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	93	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ08GWA3

Date Sampled : 08/11/06 10:40 **Order #:** 929429 **Sample Matrix:** WATER
Date Received: 08/12/06 **Submission #:** R2633157 **Analytical Run** 134288

DATE ANALYZED : 08/18/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U UJ	UG/L
2-BUTANONE (MEK)	5.0	5.0 U UJ	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	2.7	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U UJ	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.32 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	7.0	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : PZ08GWA3

Date Sampled : 08/11/06 10:40 **Order #:** 929429 **Sample Matrix:** WATER
Date Received: 08/12/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	93	%
TOLUENE-D8	(88 - 124 %)	103	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	99	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : 081106TB

Date Sampled : 08/11/06 **Order #:** 929533 **Sample Matrix:** WATER
Date Received: 08/12/06 **Submission #:** R2633157 **Analytical Run** 134288

DATE ANALYZED : 08/18/06
ANALYTICAL DILUTION: 1.00

2.3J LOB 10/4/07 DB updated 10/9/07 LOB

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	~~2.3 J~~ 100	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : 081106TB

Date Sampled : 08/11/06 **Order #:** 929533 **Sample Matrix:** WATER
Date Received: 08/12/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	96	%
TOLUENE-D8	(88 - 124 %)	107	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	96	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW203GWA3

Date Sampled : 08/14/06 12:00 **Order #:** 929976 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.3	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.43 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	8.3	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW203GWA3

Date Sampled : 08/14/06 12:00 **Order #:** 929976 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	96	%
TOLUENE-D8	(88 - 124 %)	107	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	96	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW09GWA3

Date Sampled : 08/14/06 14:00 **Order #:** 929977 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

DATE ANALYZED : 08/18/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	2.4	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	2.2	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.3	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	56	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW09GWA3

Date Sampled : 08/14/06 14:00 **Order #:** 929977 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	93	%
TOLUENE-D8	(88 - 124 %)	103	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	96	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW202GWA3

Date Sampled : 08/15/06 11:55 **Order #:** 929978 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U UJ	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.7	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	7.8	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.5	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.5	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	74	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW202GWA3

Date Sampled : 08/15/06 11:55 **Order #:** 929978 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	90	%
TOLUENE-D8	(88 - 124 %)	102	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	95	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW202GWB3

Date Sampled : 08/15/06 11:55 **Order #:** 929979 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U UJ	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.7	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	8.4	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.7	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.5	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	77	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW202GWB3

Date Sampled : 08/15/06 11:55 **Order #:** 929979 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	97	%
TOLUENE-D8	(88 - 124 %)	106	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	96	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW01GWA3

Date Sampled : 08/15/06 12:45 **Order #:** 929980 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

DATE ANALYZED : 08/18/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U UJ	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	0.95 J	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	9.3	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	0.81 J	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	0.76 J	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	72	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW01GWA3

Date Sampled : 08/15/06 12:45 **Order #:** 929980 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	91	%
TOLUENE-D8	(88 - 124 %)	102	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	95	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : 081406TB

Date Sampled : 08/14/06 10:00 **Order #:** 929981 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U UJ	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U UJ	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : 081406TB

Date Sampled : 08/14/06 10:00 **Order #:** 929981 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	96	%
TOLUENE-D8	(88 - 124 %)	103	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	97	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW202GWC3

Date Sampled : 08/15/06 11:55 **Order #:** 929984 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

DATE ANALYZED : 08/18/06
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	~~100~~ ~~3.7 J~~ 3.7J	UG/L
BENZENE	1.0	1.0 U	UG/L
BROMODICHLOROMETHANE	1.0	1.0 U	UG/L
BROMOFORM	1.0	1.0 U	UG/L
BROMOMETHANE	2.0	2.0 U	UG/L
2-BUTANONE (MEK)	5.0	5.0 U ~~U~~	UG/L
METHYL-TERT-BUTYL ETHER	1.0	1.0 U	UG/L
CARBON DISULFIDE	1.0	1.0 U	UG/L
CARBON TETRACHLORIDE	1.0	1.0 U	UG/L
CHLOROBENZENE	1.0	1.0 U	UG/L
CHLOROETHANE	2.0	2.0 U	UG/L
CHLOROFORM	1.0	1.0 U	UG/L
CHLOROMETHANE	2.0	2.0 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	2.0	2.0 U	UG/L
CYCLOHEXANE	1.0	1.0 U	UG/L
DIBROMOCHLOROMETHANE	1.0	1.0 U	UG/L
1,2-DIBROMOETHANE	1.0	1.0 U	UG/L
1,3-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,4-DICHLOROBENZENE	1.0	1.0 U	UG/L
1,2-DICHLOROBENZENE	1.0	1.0 U	UG/L
DICHLORODIFLUOROMETHANE	1.0	1.0 U UJ	UG/L
1,1-DICHLOROETHANE	1.0	1.0 U	UG/L
1,2-DICHLOROETHANE	1.0	1.0 U	UG/L
1,1-DICHLOROETHENE	1.0	1.0 U	UG/L
CIS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
TRANS-1,2-DICHLOROETHENE	1.0	1.0 U	UG/L
1,2-DICHLOROPROPANE	1.0	1.0 U	UG/L
CIS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1.0	1.0 U	UG/L
ETHYLBENZENE	1.0	1.0 U	UG/L
2-HEXANONE	5.0	5.0 U ~~U~~	UG/L
ISOPROPYLBENZENE	1.0	1.0 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	1.0	1.0 U	UG/L
METHYLENE CHLORIDE	1.0	1.0 U	UG/L
4-METHYL-2-PENTANONE (MIBK)	5.0	5.0 U	UG/L
STYRENE	1.0	1.0 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1.0	1.0 U	UG/L
TETRACHLOROETHENE	1.0	1.0 U	UG/L
TOLUENE	1.0	1.0 U	UG/L
1,2,4-TRICHLOROBENZENE	1.0	1.0 U	UG/L
1,1,1-TRICHLOROETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLOROETHANE	1.0	1.0 U	UG/L
TRICHLOROETHENE	1.0	1.0 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/07/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : MW202GWC3

Date Sampled : 08/15/06 11:55 **Order #:** 929984 **Sample Matrix:** WATER
Date Received: 08/16/06 **Submission #:** R2633157 **Analytical Run** 134288

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/18/06			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	1.0	1.0 U	UG/L
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	1.0	1.0 U	UG/L
VINYL CHLORIDE	1.0	1.0 U	UG/L
O-XYLENE	1.0	1.0 U	UG/L
M+P-XYLENE	1.0	1.0 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(80 - 123 %)	91	%
TOLUENE-D8	(88 - 124 %)	100	%
DIBROMOFLUOROMETHANE	(91 - 115 %)	96	%

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Memorandum

Date: October 15, 2006

To: David Austin/Westford

From: Vinora Nicholls/Westford

Subject: Data Validation, VOC Analyses
Former Ozone Industries, Queens, NY
CAS SDG R2633158

Distribution: W. Braunstein/Westford

10748-001-0501 File
OZ008vocvn

SUMMARY

Limited validation was performed on the data for 11 soil samples analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by SW-846 method 8260B. The samples were collected at the Former Ozone Industries site in Queens, NY on August 8, 9, 10, 11, and 15, 2006 and were submitted to Columbia Analytical Services (CAS) in Rochester, NY for analysis. CAS processed the samples and reported the results under sample delivery group (SDG) R2633158.

The analytical data were evaluated with reference to the EPA methods and the *"USEPA Region 2, SOP HW-24, Standard Operating Procedure for the Validation of Organic Data Acquired using SW-846 EPA Method 8260B" (Revision 2, December 1999)."*

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were qualified as estimated (J, UJ) due to QC nonconformance (see discussion below).

SAMPLES

The samples included in this review are listed below.

Sample IDs	Sample IDs
SS21SBAA	SS34SBAA
SS21SBOA	SS34SBOA
SS23SBAA	SS34SBOB (Field Duplicate of SS34SBOA)
SS32SBAA	SS30SBAA
SS32SBOA	SS30SBVA
SS23SBOA	

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REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method:

- Agreement of analyses conducted with the chain of custody (COC) requests
- Holding times and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/equipment blank/trip blank
- Surrogate spike recoveries
- Internal Standard Performance
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Field duplicate results
- Laboratory control sample (LCS) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted With COC Requests

Sample reports corresponded to the analytical requests designated on the COC. Sample SS24SBAA and SS24SBOA were changed to SS32SBAA and SS32SBOA at ENSR's request and indicated on the chain-of custody. No discrepancies were noted.

Holding Times/Sample Preservation

The cooler temperatures ranged from 3°C-6°C, which met the QC acceptance criteria of 4°C ± 2°C.

All samples were extracted and analyzed within the QAPP specified holding times.

GC/MS Tunes

The frequency and abundance of the bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within 12 hours from the BFB tunes.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs) and the response factors (RFs) of all target analytes were within the QC acceptance criteria in the initial calibration standards. The following table summarizes the percent differences (%Ds) that were outside the QC acceptance criteria in the continuing calibration (CC) standards.

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Calibration	Compound	%D
CC (08/16/06)	Bromomethane	32.8
	Methyl Acetate	24.0
	1,1,1,-Trichloroethane	22.7
	1,2-Dichloroethane	22.9
	2-Hexanone	22.2
Associated samples: All samples.		
CC (08/22/06)	Cyclohexane	24.6
Associated samples: SS32SBAA (reanalysis for trichloroethene only).		

Sample results were qualified as follows:

- If %D > 20%, estimate positive results (J) and nondetect results (UJ).

Method Blanks/Equipment Blank/Trip Blank

No equipment or trip blanks were submitted with this sample set. No validation action was taken on this basis.

No target compounds were detected in the method blank.

Surrogate Spike Recoveries

All surrogates met the QC acceptance criteria except 4-bromofluorobenzene in samples SS23SBAA and SS32SBAA. Sample SS23SBAA was reanalyzed using slightly less sample weight and QC acceptance criteria were met. Results from this reanalysis were accepted and used for data validation, no qualification of the data was necessary. Sample SS32SBAA was reanalyzed at a dilution; however the reanalysis was performed out of hold time. The results from the initial analysis were used for data validation for all compounds except trichloroethene since the concentration of this compound exceeded the calibration range. The original results for all compounds, except trichloroethene, were therefore qualified as estimated (J/UJ). All surrogates met the QC acceptance limit for the reanalyzed trichloroethene, qualification was not necessary on this basis.

Internal Standard Performance

All internal standard performance met the QC acceptance criteria except d4-1, 4-dichlorobenzene in samples SS23SBAA and SS32SBAA. Sample SS23SBAA was reanalyzed using slightly less sample weight and QC acceptance criteria were met. Results from this reanalysis were accepted and used for data validation, no qualification of the data was necessary. Sample SS32SBAA was reanalyzed at a dilution; however the reanalysis was performed out of hold time. The results from the initial analysis were used for data validation for all compounds except trichloroethene since the concentration of this compound exceeded the calibration range. The original results for all compounds, except trichloroethene, were therefore qualified as estimated (J/UJ). All internal standard performance met the QC acceptance limit for the reanalyzed trichloroethene, qualification was not necessary on this basis.

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MS/MSD Results

MS/MSD analysis was not performed on a sample from this sample set.

Field Duplicate Results

Samples SS34SBOA and SS34SBOB were submitted as a field duplicate pair with this data set. The results for detected compounds, the associated relative percent differences (RPDs), and actions taken are tabulated below.

Compound	SS34SBOA (ug/kg)	SS34SBOB (ug/kg)	RPD (%)	Action
Acetone	12 J	7.8 J	42	None
Chloroform	0.27 J	0.37 J	31	None
cis-1,2-Dichloroethene	27	53	65	J/UJ
Methylene Chloride	1.6 J	2.7 J	51	None
4-Methyl -2 pentanone	0.57 J	8.8 U	NC	None
Toluene	0.68 J	1.3 J	63	None
Trichloroethene	9.4	7.8	19	None
1,1-Dichloroethene	4.4 U	0.43 J	NC	None
o-Xylene	4.4 U	0.40 J	NC	None
Chlorobenzene	1.2 J	4.4 U	NC	None

The RPDs for acetone, chloroform, methylene chloride, toluene, and trichloroethene were within QC acceptance criteria; therefore no qualification was necessary. The RPDs for 4-methyl -2 pentanone, and chlorobenzene were not calculable (NC) due to the nondetect duplicate sample results. Precision was deemed acceptable since the positive results in the sample were <5x the SQL. The RPDs for 1, 1-dichloroethene, and o-xylene, were not calculable (NC) due to the nondetect sample results. Precision was deemed acceptable since the positive results in the duplicate sample were <5x the SQL. The RPD for cis-1, 2-dichloroethene exceeded the QC acceptance criteria; therefore the results for samples SS35SBJA and SS35SBJB were qualified as estimated (J). All other RPDs met the QC acceptance criteria.

LCS Results

The %Rs of the spiked target analytes were within the QC acceptance criteria in the LCSs associated with all sample analyses.

Quantitation Limits and Sample Results

Sample SS32SBAA was reanalyzed at a 128-fold dilution; the quantitation limit for the only compound used, trichloroethene, was adjusted accordingly. All other samples were analyzed undiluted. Sample Quantitation Limits (SQLs) for these samples were not affected.

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Tentatively Identified Compounds (TICs)

TICs were not reported for any of the samples in this data set.

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS21SBAA

Date Sampled : 08/08/06 11:30 **Order #:** 929195 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 91.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.92			Dry Weight
ACETONE	20	16 J	UG/KG
BENZENE	5.0	5.1 U	UG/KG
BROMODICHLOROMETHANE	5.0	5.1 U	UG/KG
BROMOFORM	5.0	5.1 U	UG/KG
BROMOMETHANE	5.0	5.1 U UJ	UG/KG
2-BUTANONE (MEK)	10	10 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	5.1 U	UG/KG
CARBON DISULFIDE	10	10 U	UG/KG
CARBON TETRACHLORIDE	5.0	5.1 U	UG/KG
CHLOROBENZENE	5.0	5.1 U	UG/KG
CHLOROETHANE	10	10 U	UG/KG
CHLOROFORM	5.0	5.1 U	UG/KG
CHLOROMETHANE	5.0	5.1 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	5.1 U	UG/KG
CYCLOHEXANE	5.0	5.1 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	5.1 U	UG/KG
1,2-DIBROMOETHANE	5.0	5.1 U	UG/KG
1,3-DICHLOROBENZENE	5.0	5.1 U	UG/KG
1,4-DICHLOROBENZENE	5.0	5.1 U	UG/KG
1,2-DICHLOROBENZENE	5.0	5.1 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	5.1 U	UG/KG
1,1-DICHLOROETHANE	5.0	5.1 U	UG/KG
1,2-DICHLOROETHANE	5.0	5.1 U UJ	UG/KG
1,1-DICHLOROETHENE	5.0	5.1 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	5.1 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	5.1 U	UG/KG
1,2-DICHLOROPROPANE	5.0	5.1 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	5.1 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	5.1 U	UG/KG
ETHYLBENZENE	5.0	5.1 U	UG/KG
2-HEXANONE	10	10 U UJ	UG/KG
ISOPROPYLBENZENE	5.0	5.1 U	UG/KG
METHYL ACETATE	10	10 U UJ	UG/KG
METHYLCYCLOHEXANE	5.0	5.1 U	UG/KG
METHYLENE CHLORIDE	5.0	5.1 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	10 U	UG/KG
STYRENE	5.0	5.1 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	5.1 U	UG/KG
TETRACHLOROETHENE	5.0	5.1 U	UG/KG
TOLUENE	5.0	5.1 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	5.1 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	5.1 U UJ	UG/KG
1,1,2-TRICHLOROETHANE	5.0	5.1 U	UG/KG
TRICHLOROETHENE	5.0	4.4 J	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS21SBAA

Date Sampled : 08/08/06 11:30 **Order #:** 929195 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 91.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.92			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	5.1 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	5.1 U	UG/KG
VINYL CHLORIDE	5.0	5.1 U	UG/KG
O-XYLENE	5.0	5.1 U	UG/KG
M+P-XYLENE	5.0	5.1 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	96	%
TOLUENE-D8	(75 - 128 %)	94	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	96	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS21SBOA

Date Sampled : 08/08/06 13:50 **Order #:** 929196 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 97.9

DATE ANALYZED : 08/16/06
ANALYTICAL DILUTION: 0.81

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	20	17 U	UG/KG
BENZENE	5.0	4.1 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.1 U	UG/KG
BROMOFORM	5.0	4.1 U	UG/KG
BROMOMETHANE	5.0	4.1 U UJ	UG/KG
2-BUTANONE (MEK)	10	8.3 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.1 U	UG/KG
CARBON DISULFIDE	10	8.3 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.1 U	UG/KG
CHLOROBENZENE	5.0	4.1 U	UG/KG
CHLOROETHANE	10	8.3 U	UG/KG
CHLOROFORM	5.0	4.1 U	UG/KG
CHLOROMETHANE	5.0	4.1 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.1 U	UG/KG
CYCLOHEXANE	5.0	4.1 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.1 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.1 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.1 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.1 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.1 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.1 U	UG/KG
1,1-DICHLOROETHANE	5.0	4.1 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.1 U UJ	UG/KG
1,1-DICHLOROETHENE	5.0	4.1 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	4.1 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.1 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.1 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.1 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.1 U	UG/KG
ETHYLBENZENE	5.0	4.1 U	UG/KG
2-HEXANONE	10	8.3 U UJ	UG/KG
ISOPROPYLBENZENE	5.0	4.1 U	UG/KG
METHYL ACETATE	10	8.3 U UJ	UG/KG
METHYLCYCLOHEXANE	5.0	4.1 U	UG/KG
METHYLENE CHLORIDE	5.0	4.1 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	8.3 U	UG/KG
STYRENE	5.0	4.1 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.1 U	UG/KG
TETRACHLOROETHENE	5.0	4.1 U	UG/KG
TOLUENE	5.0	4.1 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.1 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.1 U UJ	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.1 U	UG/KG
TRICHLOROETHENE	5.0	0.88 J	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #31074800102O2
Client Sample ID : SS21SBOA

Date Sampled : 08/08/06 13:50 **Order #:** 929196 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 97.9

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.81			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	4.1 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.1 U	UG/KG
VINYL CHLORIDE	5.0	4.1 U	UG/KG
O-XYLENE	5.0	4.1 U	UG/KG
M+P-XYLENE	5.0	4.1 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	97	%
TOLUENE-D8	(75 - 128 %)	92	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	94	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS23SBAA

Date Sampled : 08/09/06 13:20 **Order #:** 929197 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 91.9

DATE ANALYZED : 08/16/06
ANALYTICAL DILUTION: 0.80

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	20	12 J	UG/KG
BENZENE	5.0	0.33 J	UG/KG
BROMODICHLOROMETHANE	5.0	4.4 U	UG/KG
BROMOFORM	5.0	4.4 U	UG/KG
BROMOMETHANE	5.0	4.4 U UJ	UG/KG
2-BUTANONE (MEK)	10	8.7 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.4 U	UG/KG
CARBON DISULFIDE	10	0.27 J	UG/KG
CARBON TETRACHLORIDE	5.0	4.4 U	UG/KG
CHLOROBENZENE	5.0	4.4 U	UG/KG
CHLOROETHANE	10	8.7 U	UG/KG
CHLOROFORM	5.0	4.4 U	UG/KG
CHLOROMETHANE	5.0	0.32 J	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.4 U	UG/KG
CYCLOHEXANE	5.0	0.28 J	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.4 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.4 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.4 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.4 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.4 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.4 U	UG/KG
1,1-DICHLOROETHANE	5.0	4.4 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.4 U UJ	UG/KG
1,1-DICHLOROETHENE	5.0	4.4 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	4.4 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.4 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.4 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.4 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.4 U	UG/KG
ETHYLBENZENE	5.0	4.4 U	UG/KG
2-HEXANONE	10	8.7 U UJ	UG/KG
ISOPROPYLBENZENE	5.0	4.4 U	UG/KG
METHYL ACETATE	10	8.7 U UJ	UG/KG
METHYLCYCLOHEXANE	5.0	0.46 J	UG/KG
METHYLENE CHLORIDE	5.0	4.4 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	8.7 U	UG/KG
STYRENE	5.0	4.4 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.4 U	UG/KG
TETRACHLOROETHENE	5.0	0.66 J	UG/KG
TOLUENE	5.0	4.4 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.4 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.4 U UJ	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.4 U	UG/KG
TRICHLOROETHENE	5.0	33	UG/KG

Do not report
WB 10/17/06

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS23SBAA

Date Sampled : 08/09/06 13:20 **Order #:** 929197 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 91.9

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.80			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	4.4 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.4 U	UG/KG
VINYL CHLORIDE	5.0	4.4 U	UG/KG
O-XYLENE	5.0	4.4 U	UG/KG
M+P-XYLENE	5.0	4.4 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	58 *	%
TOLUENE-D8	(75 - 128 %)	89	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	99	%

Do not report
WOB 10/17/06

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS23SBAA

Date Sampled : 08/09/06 13:20 **Order #:** 929197 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 91.9

DATE ANALYZED : 08/16/06
ANALYTICAL DILUTION: 0.72

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	20	25	UG/KG
BENZENE	5.0	0.86 J	UG/KG
BROMODICHLOROMETHANE	5.0	3.9 U	UG/KG
BROMOFORM	5.0	3.9 U	UG/KG
BROMOMETHANE	5.0	3.9 U UJ	UG/KG
2-BUTANONE (MEK)	10	4.4 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.9 U	UG/KG
CARBON DISULFIDE	10	0.52 J	UG/KG
CARBON TETRACHLORIDE	5.0	3.9 U	UG/KG
CHLOROBENZENE	5.0	3.9 U	UG/KG
CHLOROETHANE	10	7.8 U	UG/KG
CHLOROFORM	5.0	0.24 J	UG/KG
CHLOROMETHANE	5.0	0.83 J	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.9 U	UG/KG
CYCLOHEXANE	5.0	0.46 J	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.9 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.9 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.9 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.9 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.9 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.9 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.9 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.9 U UJ	UG/KG
1,1-DICHLOROETHENE	5.0	3.9 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.29 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.9 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.9 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.9 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.9 U	UG/KG
ETHYLBENZENE	5.0	3.9 U	UG/KG
2-HEXANONE	10	7.8 U UJ	UG/KG
ISOPROPYLBENZENE	5.0	3.9 U	UG/KG
METHYL ACETATE	10	7.8 U UJ	UG/KG
METHYLCYCLOHEXANE	5.0	0.33 J	UG/KG
METHYLENE CHLORIDE	5.0	3.9 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.8 U	UG/KG
STYRENE	5.0	3.9 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.9 U	UG/KG
TETRACHLOROETHENE	5.0	4.2 J	UG/KG
TOLUENE	5.0	0.51 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.9 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.9 U UJ	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.9 U	UG/KG
TRICHLOROETHENE	5.0	130	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS23SBAA

Date Sampled: 08/09/06 13:20 **Order #:** 929197 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 91.9

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.72			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	3.9 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.9 U	UG/KG
VINYL CHLORIDE	5.0	3.9 U	UG/KG
O-XYLENE	5.0	3.9 U	UG/KG
M+P-XYLENE	5.0	3.9 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	66	%
TOLUENE-D8	(75 - 128 %)	93	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	99	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS32SBAA

Date Sampled : 08/10/06 11:20 **Order #:** 929198 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 89.2

DATE ANALYZED : 08/16/06
ANALYTICAL DILUTION: 0.56

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	20	16 J J	UG/KG
BENZENE	5.0	3.1 U UJ	UG/KG
BROMODICHLOROMETHANE	5.0	3.1 U UJ	UG/KG
BROMOFORM	5.0	3.1 U UJ	UG/KG
BROMOMETHANE	5.0	3.1 U UJ	UG/KG
2-BUTANONE (MEK)	10	6.3 U UJ	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.1 U UJ	UG/KG
CARBON DISULFIDE	10	0.28 J J	UG/KG
CARBON TETRACHLORIDE	5.0	3.1 U UJ	UG/KG
CHLOROBENZENE	5.0	3.1 U UJ	UG/KG
CHLOROETHANE	10	6.3 U UJ	UG/KG
CHLOROFORM	5.0	0.43 J J	UG/KG
CHLOROMETHANE	5.0	3.1 U UJ	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.1 U UJ	UG/KG
CYCLOHEXANE	5.0	3.1 U UJ	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.1 U UJ	UG/KG
1,2-DIBROMOETHANE	5.0	3.1 U UJ	UG/KG
1,3-DICHLOROBENZENE	5.0	3.1 U UJ	UG/KG
1,4-DICHLOROBENZENE	5.0	3.1 U UJ	UG/KG
1,2-DICHLOROBENZENE	5.0	3.1 U UJ	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.1 U UJ	UG/KG
1,1-DICHLOROETHANE	5.0	3.1 U UJ	UG/KG
1,2-DICHLOROETHANE	5.0	3.1 U UJ	UG/KG
1,1-DICHLOROETHENE	5.0	3.1 U UJ	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.6 J J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.1 U UJ	UG/KG
1,2-DICHLOROPROPANE	5.0	3.1 U UJ	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.1 U UJ	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.1 U UJ	UG/KG
ETHYLBENZENE	5.0	3.1 U UJ	UG/KG
2-HEXANONE	10	6.3 U UJ	UG/KG
ISOPROPYLBENZENE	5.0	3.1 U UJ	UG/KG
METHYL ACETATE	10	6.3 U UJ	UG/KG
METHYLCYCLOHEXANE	5.0	0.22 J J	UG/KG
METHYLENE CHLORIDE	5.0	3.1 U UJ	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	6.3 U UJ	UG/KG
STYRENE	5.0	3.1 U UJ	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.1 U UJ	UG/KG
TETRACHLOROETHENE	5.0	2.7 J J	UG/KG
TOLUENE	5.0	3.1 U UJ	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.1 U UJ	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.1 U UJ	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.1 U UJ	UG/KG
~~TRICHLOROETHENE~~ DO Not Report	~~5.0~~	~~580 E~~	~~UG/KG~~

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS32SBAA

Date Sampled : 08/10/06 11:20 **Order #:** 929198 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 89.2

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.56			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	3.1 U U5	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.1 U U5	UG/KG
VINYL CHLORIDE	5.0	3.1 U U5	UG/KG
O-XYLENE	5.0	3.1 U U5	UG/KG
M+P-XYLENE	5.0	3.1 U U5	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	59 *	%
TOLUENE-D8	(75 - 128 %)	92	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	101	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS32SBAA

Date Sampled : 08/10/06 11:20 **Order #:** 929198 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 89.2

DATE ANALYZED : 08/22/06
ANALYTICAL DILUTION: 128.00

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	20	2900 U	UG/KG
BENZENE	5.0	720 U	UG/KG
BROMODICHLOROMETHANE	5.0	720 U	UG/KG
BROMOFORM	5.0	720 U	UG/KG
BROMOMETHANE	5.0	720 U	UG/KG
2-BUTANONE (MEK)	10	1400 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	720 U	UG/KG
CARBON DISULFIDE	10	1400 U	UG/KG
CARBON TETRACHLORIDE	5.0	720 U	UG/KG
CHLOROBENZENE	5.0	720 U	UG/KG
CHLOROETHANE	10	1400 U	UG/KG
CHLOROFORM	5.0	720 U	UG/KG
CHLOROMETHANE	5.0	720 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	720 U	UG/KG
CYCLOHEXANE	5.0	720 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	720 U	UG/KG
1,2-DIBROMOETHANE	5.0	720 U	UG/KG
1,3-DICHLOROBENZENE	5.0	720 U	UG/KG
1,4-DICHLOROBENZENE	5.0	720 U	UG/KG
1,2-DICHLOROBENZENE	5.0	720 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	720 U	UG/KG
1,1-DICHLOROETHANE	5.0	720 U	UG/KG
1,2-DICHLOROETHANE	5.0	720 U	UG/KG
1,1-DICHLOROETHENE	5.0	720 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	720 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	720 U	UG/KG
1,2-DICHLOROPROPANE	5.0	720 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	720 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	720 U	UG/KG
ETHYLBENZENE	5.0	720 U	UG/KG
2-HEXANONE	10	1400 U	UG/KG
ISOPROPYLBENZENE	5.0	720 U	UG/KG
METHYL ACETATE	10	1400 U	UG/KG
METHYLCYCLOHEXANE	5.0	720 U	UG/KG
METHYLENE CHLORIDE	5.0	720 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	1400 U	UG/KG
STYRENE	5.0	720 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	720 U	UG/KG
TETRACHLOROETHENE	5.0	720 U	UG/KG
TOLUENE	5.0	720 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	720 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	720 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	720 U	UG/KG
TRICHLOROETHENE	5.0	21000 D J	UG/KG

No NDI Report

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS32SBAA

Date Sampled : 08/10/06 11:20 **Order #:** 929198 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 89.2

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/22/06			
ANALYTICAL DILUTION: 128.00			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	720 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	720 U	UG/KG
VINYL CHLORIDE	5.0	720 U	UG/KG
O-XYLENE	5.0	720 U	UG/KG
M+P-XYLENE	5.0	720 U	UG/KG

Do not report

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	109	%
TOLUENE-D8	(75 - 128 %)	103	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	97	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS32SBOA

Date Sampled : 08/10/06 13:00 **Order #:** 929199 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 81.9

DATE ANALYZED : 08/16/06
ANALYTICAL DILUTION: 0.78

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	20	19 U	UG/KG
BENZENE	5.0	4.8 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.8 U	UG/KG
BROMOFORM	5.0	4.8 U	UG/KG
BROMOMETHANE	5.0	4.8 U UJ	UG/KG
2-BUTANONE (MEK)	10	9.5 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.8 U	UG/KG
CARBON DISULFIDE	10	9.5 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.8 U	UG/KG
CHLOROBENZENE	5.0	4.8 U	UG/KG
CHLOROETHANE	10	9.5 U	UG/KG
CHLOROFORM	5.0	4.8 U	UG/KG
CHLOROMETHANE	5.0	4.8 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.8 U	UG/KG
CYCLOHEXANE	5.0	4.8 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.8 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.8 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.8 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.8 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.8 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.8 U	UG/KG
1,1-DICHLOROETHANE	5.0	4.8 U UJ	UG/KG
1,2-DICHLOROETHANE	5.0	4.8 U UJ	UG/KG
1,1-DICHLOROETHENE	5.0	4.8 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.32 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.8 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.8 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.8 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.8 U	UG/KG
ETHYLBENZENE	5.0	4.8 U	UG/KG
2-HEXANONE	10	9.5 U UJ	UG/KG
ISOPROPYLBENZENE	5.0	4.8 U	UG/KG
METHYL ACETATE	10	9.5 U UJ	UG/KG
METHYLCYCLOHEXANE	5.0	4.8 U	UG/KG
METHYLENE CHLORIDE	5.0	4.8 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	9.5 U	UG/KG
STYRENE	5.0	4.8 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.8 U	UG/KG
TETRACHLOROETHENE	5.0	4.8 U	UG/KG
TOLUENE	5.0	4.8 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.8 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.8 U UJ	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.8 U	UG/KG
TRICHLOROETHENE	5.0	22	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS32SBOA

Date Sampled : 08/10/06 13:00 **Order #:** 929199 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 81.9

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.78			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	4.8 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.8 U	UG/KG
VINYL CHLORIDE	5.0	4.8 U	UG/KG
O-XYLENE	5.0	4.8 U	UG/KG
M+P-XYLENE	5.0	4.8 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	99	%
TOLUENE-D8	(75 - 128 %)	97	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	97	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS23SBOA

Date Sampled : 08/09/06 14:20 **Order #:** 929200 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 97.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.70			Dry Weight
ACETONE	20	14 U	UG/KG
BENZENE	5.0	3.6 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.6 U	UG/KG
BROMOFORM	5.0	3.6 U	UG/KG
BROMOMETHANE	5.0	3.6 U	UG/KG
2-BUTANONE (MEK)	10	7.2 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.6 U	UG/KG
CARBON DISULFIDE	10	7.2 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.6 U	UG/KG
CHLOROBENZENE	5.0	3.6 U	UG/KG
CHLOROETHANE	10	7.2 U	UG/KG
CHLOROFORM	5.0	3.6 U	UG/KG
CHLOROMETHANE	5.0	3.6 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.6 U	UG/KG
CYCLOHEXANE	5.0	3.6 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.6 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.6 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.6 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.6 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.6 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.6 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.6 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.6 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.6 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.6 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.6 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.6 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.6 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.6 U	UG/KG
ETHYLBENZENE	5.0	3.6 U	UG/KG
2-HEXANONE	10	7.2 U	UG/KG
ISOPROPYLBENZENE	5.0	3.6 U	UG/KG
METHYL ACETATE	10	7.2 U	UG/KG
METHYLCYCLOHEXANE	5.0	3.6 U	UG/KG
METHYLENE CHLORIDE	5.0	3.6 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.2 U	UG/KG
STYRENE	5.0	3.6 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.6 U	UG/KG
TETRACHLOROETHENE	5.0	3.6 U	UG/KG
TOLUENE	5.0	3.6 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.6 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.6 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.6 U	UG/KG
TRICHLOROETHENE	5.0	1.0 J	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS23SBOA

Date Sampled : 08/09/06 14:20 **Order #:** 929200 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/11/06 **Submission #:** R2633158 **Percent Solid:** 97.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.70			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	3.6 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.6 U	UG/KG
VINYL CHLORIDE	5.0	3.6 U	UG/KG
O-XYLENE	5.0	3.6 U	UG/KG
M+P-XYLENE	5.0	3.6 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	103	%
TOLUENE-D8	(75 - 128 %)	98	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	95	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS34SBAA

Date Sampled : 08/11/06 11:20 **Order #:** 929430 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/12/06 **Submission #:** R2633158 **Percent Solid:** 87.3

DATE ANALYZED : 08/16/06
ANALYTICAL DILUTION: 0.92

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	20	16 J	UG/KG
BENZENE	5.0	4.0 J	UG/KG
BROMODICHLOROMETHANE	5.0	5.3 U	UG/KG
BROMOFORM	5.0	5.3 U	UG/KG
BROMOMETHANE	5.0	5.3 U	UG/KG
2-BUTANONE (MEK)	10	8.0 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	5.3 U	UG/KG
CARBON DISULFIDE	10	0.63 J	UG/KG
CARBON TETRACHLORIDE	5.0	5.3 U	UG/KG
CHLOROBENZENE	5.0	5.3 U	UG/KG
CHLOROETHANE	10	11 U	UG/KG
CHLOROFORM	5.0	5.3 U	UG/KG
CHLOROMETHANE	5.0	5.3 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	5.3 U	UG/KG
CYCLOHEXANE	5.0	0.52 J	UG/KG
DIBROMOCHLOROMETHANE	5.0	5.3 U	UG/KG
1,2-DIBROMOETHANE	5.0	5.3 U	UG/KG
1,3-DICHLOROBENZENE	5.0	5.3 U	UG/KG
1,4-DICHLOROBENZENE	5.0	5.3 U	UG/KG
1,2-DICHLOROBENZENE	5.0	5.3 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	5.3 U	UG/KG
1,1-DICHLOROETHANE	5.0	5.3 U	UG/KG
1,2-DICHLOROETHANE	5.0	5.3 U	UG/KG
1,1-DICHLOROETHENE	5.0	5.3 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	5.3 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	5.3 U	UG/KG
1,2-DICHLOROPROPANE	5.0	5.3 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	5.3 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	5.3 U	UG/KG
ETHYLBENZENE	5.0	0.85 J	UG/KG
2-HEXANONE	10	11 U	UG/KG
ISOPROPYLBENZENE	5.0	5.3 U	UG/KG
METHYL ACETATE	10	11 U	UG/KG
METHYLCYCLOHEXANE	5.0	0.65 J	UG/KG
METHYLENE CHLORIDE	5.0	2.2 J	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	11 U	UG/KG
STYRENE	5.0	5.3 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	5.3 U	UG/KG
TETRACHLOROETHENE	5.0	5.3 U	UG/KG
TOLUENE	5.0	4.0 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	5.3 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	5.3 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	5.3 U	UG/KG
TRICHLOROETHENE	5.0	11	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

"ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS34SBAA

Date Sampled : 08/11/06 11:20 **Order #:** 929430 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/12/06 **Submission #:** R2633158 **Percent Solid:** 87.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.92			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	5.3 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	5.3 U	UG/KG
VINYL CHLORIDE	5.0	5.3 U	UG/KG
O-XYLENE	5.0	0.61 J	UG/KG
M+P-XYLENE	5.0	1.5 J	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	73	%
TOLUENE-D8	(75 - 128 %)	95	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	99	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS34SBOA

Date Sampled : 08/11/06 13:10 **Order #:** 929431 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/12/06 **Submission #:** R2633158 **Percent Solid:** 81.0

DATE ANALYZED : 08/16/06
ANALYTICAL DILUTION: 0.72

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	20	12 J	UG/KG
BENZENE	5.0	4.4 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.4 U	UG/KG
BROMOFORM	5.0	4.4 U	UG/KG
BROMOMETHANE	5.0	4.4 U UJ	UG/KG
2-BUTANONE (MEK)	10	8.9 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.4 U	UG/KG
CARBON DISULFIDE	10	8.9 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.4 U	UG/KG
CHLOROBENZENE	5.0	1.2 J	UG/KG
CHLOROETHANE	10	8.9 U	UG/KG
CHLOROFORM	5.0	0.27 J	UG/KG
CHLOROMETHANE	5.0	4.4 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.4 U	UG/KG
CYCLOHEXANE	5.0	4.4 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.4 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.4 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.4 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.4 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.4 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.4 U	UG/KG
1,1-DICHLOROETHANE	5.0	4.4 U	UG/KG
1,2-DICHLOROETHANE	5.0	4.4 U UJ	UG/KG
1,1-DICHLOROETHENE	5.0	4.4 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	27 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.4 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.4 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.4 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.4 U	UG/KG
ETHYLBENZENE	5.0	4.4 U	UG/KG
2-HEXANONE	10	8.9 U UJ	UG/KG
ISOPROPYLBENZENE	5.0	4.4 U	UG/KG
METHYL ACETATE	10	8.9 U UJ	UG/KG
METHYLCYCLOHEXANE	5.0	4.4 U	UG/KG
METHYLENE CHLORIDE	5.0	1.6 J	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	0.57 J	UG/KG
STYRENE	5.0	4.4 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.4 U	UG/KG
TETRACHLOROETHENE	5.0	4.4 U	UG/KG
TOLUENE	5.0	0.68 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.4 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.4 U UJ	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.4 U	UG/KG
TRICHLOROETHENE	5.0	9.4	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS34SBOA

Date Sampled : 08/11/06 13:10 **Order #:** 929431 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/12/06 **Submission #:** R2633158 **Percent Solid:** 81.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.72			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	4.4 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.4 U	UG/KG
VINYL CHLORIDE	5.0	4.4 U	UG/KG
O-XYLENE	5.0	4.4 U	UG/KG
M+P-XYLENE	5.0	4.4 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	101	%
TOLUENE-D8	(75 - 128 %)	96	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	94	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS34SBOB

Date Sampled: 08/11/06 13:10 **Order #:** 929432 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/12/06 **Submission #:** R2633158 **Percent Solid:** 77.4

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.68			Dry Weight
ACETONE	20	7.8 J	UG/KG
BENZENE	5.0	4.4 U	UG/KG
BROMODICHLOROMETHANE	5.0	4.4 U	UG/KG
BROMOFORM	5.0	4.4 U	UG/KG
BROMOMETHANE	5.0	4.4 U UJ	UG/KG
2-BUTANONE (MEK)	10	8.8 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	4.4 U	UG/KG
CARBON DISULFIDE	10	8.8 U	UG/KG
CARBON TETRACHLORIDE	5.0	4.4 U	UG/KG
CHLOROBENZENE	5.0	4.4 U	UG/KG
CHLOROETHANE	10	8.8 U	UG/KG
CHLOROFORM	5.0	0.37 J	UG/KG
CHLOROMETHANE	5.0	4.4 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	4.4 U	UG/KG
CYCLOHEXANE	5.0	4.4 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	4.4 U	UG/KG
1,2-DIBROMOETHANE	5.0	4.4 U	UG/KG
1,3-DICHLOROBENZENE	5.0	4.4 U	UG/KG
1,4-DICHLOROBENZENE	5.0	4.4 U	UG/KG
1,2-DICHLOROBENZENE	5.0	4.4 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	4.4 U	UG/KG
1,1-DICHLOROETHANE	5.0	0.43 J	UG/KG
1,2-DICHLOROETHANE	5.0	4.4 U UJ	UG/KG
1,1-DICHLOROETHENE	5.0	4.4 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	53 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	4.4 U	UG/KG
1,2-DICHLOROPROPANE	5.0	4.4 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	4.4 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	4.4 U	UG/KG
ETHYLBENZENE	5.0	4.4 U	UG/KG
2-HEXANONE	10	8.8 U UJ	UG/KG
ISOPROPYLBENZENE	5.0	4.4 U	UG/KG
METHYL ACETATE	10	8.8 U UJ	UG/KG
METHYLCYCLOHEXANE	5.0	4.4 U	UG/KG
METHYLENE CHLORIDE	5.0	2.7 J	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	8.8 U	UG/KG
STYRENE	5.0	4.4 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	4.4 U	UG/KG
TETRACHLOROETHENE	5.0	4.4 U	UG/KG
TOLUENE	5.0	1.3 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	4.4 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	4.4 U UJ	UG/KG
1,1,2-TRICHLOROETHANE	5.0	4.4 U	UG/KG
TRICHLOROETHENE	5.0	7.8	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS34SBOB

Date Sampled : 08/11/06 13:10 **Order #:** 929432 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/12/06 **Submission #:** R2633158 **Percent Solid:** 77.4

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.68			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	4.4 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	4.4 U	UG/KG
VINYL CHLORIDE	5.0	4.4 U	UG/KG
O-XYLENE	5.0	0.40 J	UG/KG
M+P-XYLENE	5.0	4.4 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	96	%
TOLUENE-D8	(75 - 128 %)	95	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	92	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS30SBAA

Date Sampled : 08/15/06 09:40 **Order #:** 929974 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/16/06 **Submission #:** R2633158 **Percent Solid:** 97.2

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.66			Dry Weight
ACETONE	20	25	UG/KG
BENZENE	5.0	0.76 J	UG/KG
BROMODICHLOROMETHANE	5.0	3.4 U	UG/KG
BROMOFORM	5.0	3.4 U	UG/KG
BROMOMETHANE	5.0	3.4 U	UG/KG
2-BUTANONE (MEK)	10	2.5 J	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.4 U	UG/KG
CARBON DISULFIDE	10	0.27 J	UG/KG
CARBON TETRACHLORIDE	5.0	3.4 U	UG/KG
CHLOROBENZENE	5.0	3.4 U	UG/KG
CHLOROETHANE	10	6.8 U	UG/KG
CHLOROFORM	5.0	3.4 U	UG/KG
CHLOROMETHANE	5.0	3.4 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.4 U	UG/KG
CYCLOHEXANE	5.0	0.23 J	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.4 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.4 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.4 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.4 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.4 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.4 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.4 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.4 U	UG/KG
1,1-DICHLOROETHENE	5.0	3.4 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	3.4 U	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.4 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.4 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.4 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.4 U	UG/KG
ETHYLBENZENE	5.0	3.4 U	UG/KG
2-HEXANONE	10	6.8 U	UG/KG
ISOPROPYLBENZENE	5.0	3.4 U	UG/KG
METHYL ACETATE	10	1.00 J	UG/KG
METHYLCYCLOHEXANE	5.0	0.27 J	UG/KG
METHYLENE CHLORIDE	5.0	3.4 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	6.8 U	UG/KG
STYRENE	5.0	3.4 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.4 U	UG/KG
TETRACHLOROETHENE	5.0	1.3 J	UG/KG
TOLUENE	5.0	1.1 J	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.4 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.4 U	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.4 U	UG/KG
TRICHLOROETHENE	5.0	22	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS30SBAA

Date Sampled : 08/15/06 09:40 **Order #:** 929974 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/16/06 **Submission #:** R2633158 **Percent Solid:** 97.2

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.66			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	3.4 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.4 U	UG/KG
VINYL CHLORIDE	5.0	3.4 U	UG/KG
O-XYLENE	5.0	3.4 U	UG/KG
M+P-XYLENE	5.0	3.4 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	81	%
TOLUENE-D8	(75 - 128 %)	93	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	95	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS30SBVA

Date Sampled : 08/15/06 11:00 **Order #:** 929975 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/16/06 **Submission #:** R2633158 **Percent Solid:** 90.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.67			Dry Weight
ACETONE	20	3.2 J	UG/KG
BENZENE	5.0	3.7 U	UG/KG
BROMODICHLOROMETHANE	5.0	3.7 U	UG/KG
BROMOFORM	5.0	3.7 U	UG/KG
BROMOMETHANE	5.0	3.7 UJ	UG/KG
2-BUTANONE (MEK)	10	7.4 U	UG/KG
METHYL-TERT-BUTYL ETHER	5.0	3.7 U	UG/KG
CARBON DISULFIDE	10	7.4 U	UG/KG
CARBON TETRACHLORIDE	5.0	3.7 U	UG/KG
CHLOROBENZENE	5.0	3.7 U	UG/KG
CHLOROETHANE	10	7.4 U	UG/KG
CHLOROFORM	5.0	3.7 U	UG/KG
CHLOROMETHANE	5.0	3.7 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	5.0	3.7 U	UG/KG
CYCLOHEXANE	5.0	3.7 U	UG/KG
DIBROMOCHLOROMETHANE	5.0	3.7 U	UG/KG
1,2-DIBROMOETHANE	5.0	3.7 U	UG/KG
1,3-DICHLOROBENZENE	5.0	3.7 U	UG/KG
1,4-DICHLOROBENZENE	5.0	3.7 U	UG/KG
1,2-DICHLOROBENZENE	5.0	3.7 U	UG/KG
DICHLORODIFLUOROMETHANE	5.0	3.7 U	UG/KG
1,1-DICHLOROETHANE	5.0	3.7 U	UG/KG
1,2-DICHLOROETHANE	5.0	3.7 UJ	UG/KG
1,1-DICHLOROETHENE	5.0	3.7 U	UG/KG
CIS-1,2-DICHLOROETHENE	5.0	0.97 J	UG/KG
TRANS-1,2-DICHLOROETHENE	5.0	3.7 U	UG/KG
1,2-DICHLOROPROPANE	5.0	3.7 U	UG/KG
CIS-1,3-DICHLOROPROPENE	5.0	3.7 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	5.0	3.7 U	UG/KG
ETHYLBENZENE	5.0	3.7 U	UG/KG
2-HEXANONE	10	7.4 UJ	UG/KG
ISOPROPYLBENZENE	5.0	3.7 U	UG/KG
METHYL ACETATE	10	7.4 UJ	UG/KG
METHYLCYCLOHEXANE	5.0	3.7 U	UG/KG
METHYLENE CHLORIDE	5.0	3.7 U	UG/KG
4-METHYL-2-PENTANONE (MIBK)	10	7.4 U	UG/KG
STYRENE	5.0	3.7 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	5.0	3.7 U	UG/KG
TETRACHLOROETHENE	5.0	0.53 J	UG/KG
TOLUENE	5.0	3.7 U	UG/KG
1,2,4-TRICHLOROBENZENE	5.0	3.7 U	UG/KG
1,1,1-TRICHLOROETHANE	5.0	3.7 UJ	UG/KG
1,1,2-TRICHLOROETHANE	5.0	3.7 U	UG/KG
TRICHLOROETHENE	5.0	13	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/06/06

ENSR International
Project Reference: OZONE PARK PROJECT #3107480010202
Client Sample ID : SS30SBVA

Date Sampled : 08/15/06 11:00 **Order #:** 929975 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 08/16/06 **Submission #:** R2633158 **Percent Solid:** 90.8

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/06			
ANALYTICAL DILUTION: 0.67			Dry Weight
TRICHLOROFLUOROMETHANE	5.0	3.7 U	UG/KG
1,1,2-TRICHLORO1,2,2-TRIFLUOROETHA	5.0	3.7 U	UG/KG
VINYL CHLORIDE	5.0	3.7 U	UG/KG
O-XYLENE	5.0	3.7 U	UG/KG
M+P-XYLENE	5.0	3.7 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
4-BROMOFLUOROBENZENE	(65 - 129 %)	102	%
TOLUENE-D8	(75 - 128 %)	98	%
DIBROMOFLUOROMETHANE	(62 - 133 %)	98	%

APPENDIX L

Backfill Submittals and Approvals

SUBMITTAL COVER SHEET

CONTRACTOR: OP-TECH Environmental Services, Inc.
SUBMITTAL NO.: 021 A
ADDRESS: PO Box 633 – 3851 Western Turnpike
DATE OF SUBMITTAL: 8/30/13
Duanesburg, New York

CONTRACT NO.: 40623ACM

MANUFACTURER:

NAME OF PROJECT: Former Ozone Industries Site Remediation Project

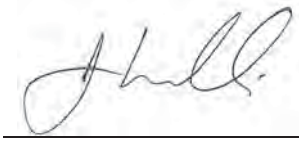
Submittal for 3/8" and 3/4" pea gravel

SUBMITTAL DESCRIPTION:

REFERENCES:

Specification Section(s) 023000 Paragraph(s) 1.04

Contract Drawing(s)

CONTRACTOR SIGNATURE 

AECOM REVIEW

AECOM

DOCUMENT REVIEW STATUS

STATUS NO:

1 ☐ APPROVED
2 ☒ APPROVED AS NOTED
3 ☐ APPROVED AS NOTED / CONFIRM
4 ☐ APPROVED AS NOTED / RESUBMIT
5 ☐ NOT APPROVED
6 ☐ COMMENTS ATTACHED

REVIEWED BY: Sean Crowell TITLE: PE

DATE: 9/9/13

REMARKS: Approved, pending DEP concurance

110 Sand Company - Materials

3/8" Grit

Sample Weight : 12.10 lbs.

Sieve Size	Weight retained	Percent retained	Percent pass
1/2"	0.00	0.00	100.00
3/8"	0.02	0.17	99.83
1/4"	5.26	43.47	56.36
#4	4.97	41.07	15.29
#8	1.50	12.40	2.89
#10	0.03	0.25	2.64
#16	0.06	0.50	2.15
Pan	0.23	1.90	
Total	12.07	99.75	

3/4" Commercial Gravel

Sample Weight : 15.57 lbs.

Sieve Size	Weight retained	Percent retained	Percent pass
2"	0.00	0.00	100.00
1"	0.14	0.90	99.10
3/4"	6.88	44.19	54.91
5/8"	3.53	22.67	32.24
1/2"	3.80	24.41	7.84
3/8"	0.93	5.97	1.86
1/4"	0.08	0.51	1.35
10	0.03	0.19	1.16
20	0.01	0.06	1.09
Pan	0.17	1.09	
Total	15.57	100.00	

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
250 VETERANS MEMORIAL HIGHWAY
HAUPPAUGE, N.Y. 11788
www.nysdot.gov

SUBIMAL CHAKRABORTI, PE
REGIONAL DIRECTOR

JOAN MCDONALD
COMMISSIONER

July 25, 2013

110 Sand Company
136 Spagnoli Rd.
Melville, NY 11747

To Whom it May Concern:

Updated Department Test Number(s)

Source # 10-34G
Gravel Test # 13AG 8

The above test number(s) are to be used for the next two years at which time the source will be sampled and tested again. If there are any questions regarding your aggregate approval, please contact Mr. Gary Manns of my staff at (631) 952-6060.

Very truly yours,

Sid Bhattacharya, P.E.
Materials Engineer
N.Y.S.D.O.T., Region 10

cc: Kuros Sorbi

Techincal Services Supervisor

110 Sand Company

170 Cabot Street
West Babylon, New York 11704
631-249-4108 Fax 631-249-4126

PIT LOCATION: BETHPAGE/SPAGNOLI ROAD, MELVILLE, N.Y. 11747 (631) 694-2822 FAX (631) 694-2832

September 5, 2013

OP-TECH Environmental Services, Inc.
PO Box 633 – 3851 Western Tpke
Duanesburg, NY 12056

Re: ¾" Commercial Gravel
Ozone Park Work Site
Queens, NY

To Whom It May Concern:

Kindly be advised the 3/4" commercial gravel provided by the 110 Sand Company in Melville, New York is naturally mined from a virgin source, washed and free of contaminants. In addition, it contains no recycled materials.

If you need any further information regarding this material, please contact me at the

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3

TICKET NO. 016735

GROSS WEIGHT ACKNOWLEDGED — SEE PRODUCT WARNING ON REVERSE

TRUCKERS SIGNATURE

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEYS' FEES.

HANSON Aggregates
JAMESVILLE

RECEIVERS INITIALS

4800 Jamesville Rd
Jamesville, NY 13078

CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

DRIVE SAFE&SENSIBLE

CUSTOMER NUMBER 1524148 SALES ORDER NUMBER
DATE 7/24/2013 TIME 1:57 PM

PRODUCT NO. DESCRIPTION
074335
Crusher Run

JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : 50375
S.O. INFO : OPTECH QUEENS NY
JOB LOC. :

LOAD # 2

Scale 1 * Predetermined Tare

WEIGHTS

	-LBS-	-KILO-
GROSS	112520	51038
TARE	43820	19876
NET	68700	31162
TONS	34.35	31.16

TONS TODAY 68.28
TONS TO DATE 0.00

TONNES TODAY 61.94
TONNES TO DATE

CASH SALE ONLY

MATERIAL PER TONS
TAX
HAUL PER TONS
TOTAL

TRUCKING INFO.

HAUL / TRUCK NUMBER
/354X840

HAULER NAME :
TRUCK NAME CCELLI ENT
MGW 117000

WEIGHMASTER LICENSE NUMBER

TICKET NO. 1116735

WEIGHMASTER SIGNATURE Tony Barletta

R-63-K REV 3 05/09

AN EQUAL OPPORTUNITY EMPLOYER M/F

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3

TICKET NO. 016731

GROSS WEIGHT ACKNOWLEDGED
TRUCKERS SIGNATURE

SEE PRODUCT WARNING ON REVERSE

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEY'S FEES

RECEIVERS INITIALS

HANSON Aggregates
JAMESVILLE
4800 Jamesville Rd
Jamesville, NY 13078

CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

DRIVE SAFE&SENSIBLE

(888) 252-7172

WGR ASSOCIATES

CUSTOMER NUMBER 1524148
SALES ORDER NUMBER
DATE 7/24/2013 TIME 1:49 PM

PRODUCT NO. DESCRIPTION
074335
Crusher Run

JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : 50375
S.O. INFO : OPTECH QUEENS NY
JOB LOC. :
LOAD # 1

Scale 1 * Predetermined WEIGHTS

	-LBS-	-KILO-
GROSS	110360	50058
TARE	42500	19278
NET	67860	30781
TONS	33.93	30.78

TONS TODAY 33.93
TONS TO DATE 0.00
TONNES TODAY 30.78
TONNES TO DATE

CASH SALE ONLY

MATERIAL	PER TONS
TAX	
HAUL	PER TONS
TOTAL	

TRUCKING INFO.

HAUL / TRUCK NUMBER
/354X836

HAULER NAME :
TRUCK NAME RICCELLI ENT.
MGW 117000

WEIGHMASTER LICENSE NUMBER

TICKET NO. 1116731

WEIGHMASTER SIGNATURE Tony Barletta

R-63-K REV 3 05/09

AN EQUAL OPPORTUNITY EMPLOYER M/F

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3

TICKET NO. 016740

GROSS WEIGHT ACKNOWLEDGED

TRUCKERS SIGNATURE

SEE PRODUCT WARNING ON REVERSE

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEYS' FEES

HANSON Aggregates
JAMESVILLE

RECEIVERS INITIALS

4800 Jamesville Rd
Jamesville, NY 13078

CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

DRIVE SAFE&SENSIBLE

CUSTOMER NUMBER 1524148 SALES ORDER NUMBER

DATE 7/24/2013 TIME 2:04 PM

PRODUCT NO. DESCRIPTION
074335
Crusher Run

JOB/ITEM#

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : 50375
S.O. INFO : OPTECH QUEENS NY
JOB LOC. :

LOAD # 3

Scale 1 * Predetermine

WEIGHTS

	-LBS-	-KILO-
GROSS	115380	52335
TARE	44960	20394
NET	70420	31942
TONS	35.21	31.94

TONS TODAY 103.49
TONS TO DATE 0.00
TONNES TODAY 93.88
TONNES TO DATE

CASH SALE ONLY

MATERIAL PER TONS
TAX
HAUL PER TONS
TOTAL

TRUCKING INFO.

HAUL / TRUCK NUMBER
/354X635

HAULER NAME
TRUCK NAME RICCELLI ENT
MGW 117000

WEIGHMASTER LICENSE NUMBER

TICKET NO. 116740

WEIGHMASTER SIGNATURE Tony Barletta

R-63-K REV 3 05/09

AN EQUAL OPPORTUNITY EMPLOYER M/F

WGR ASSOCIATES (888) 252-7492

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3

TICKET NO. 016742

GROSS WEIGHT ACKNOWLEDGED
TRUCKERS SIGNATURE

SEE PRODUCT WARNING ON REVERSE

*BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEYS' FEES.

HANSON Aggregates
JAMESVILLE

RECEIVERS INITIALS

4800 Jamesville Rd
Jamesville, NY 13078

*CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

DRIVE SAFE&SENSIBLE

(888) 252-7742 WGR ASSOCIATES

CUSTOMER NUMBER 1524148 SALES ORDER NUMBER
DATE 7/24/2013 TIME 2:07 PM

PRODUCT NO. DESCRIPTION
074335
Crusher Run

JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : 50375
S.O. INFO : OPTECH QUEENS NY
JOB LOC. :

LOAD # 4

Scale 1 * Predet WEIGHTS re

	-LBS-	-KILO-
GROSS	115640	52453
TARE	43500	19731
NET	72140	32722
TONS	36.07	32.72

TONS TODAY 139.56
TONS TO DATE 0.00

TONNES TODAY 126.61
TONNES TO DATE

✓ CASH SALE ONLY ↘

MATERIAL PER TONS
TAX
HAUL PER TONS
TOTAL

TRUCKING INFO.

✓ HAUL / TRUCK NUMBER ↘
/354X830

HAULER NAME :
TRUCK NAME RICCELLI ENT
MGW 117000

WEIGHMASTER LICENSE NUMBER

TICKET NO. 1116742

WEIGHMASTER SIGNATURE ▶ Tony Barletta

R-63-K REV 3 05/09

AN EQUAL OPPORTUNITY EMPLOYER M/F

3

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

TICKET NO. 893583

GROSS WEIGHT ACKNOWLEDGED
TRUCKERS SIGNATURE

SEE PRODUCT WARNING ON REVERSE

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEYS FEES

HANSON Aggregates
Skaneateles
PO Box 7
Skaneateles NY 13152
315-685-3321
DRIVE SAFE&SENSIBLE

RECEIVERS INITIALS

*CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

(888) 252-7172 WGR ASSOCIATES

CUSTOMER NUMBER 1524148
SALES ORDER NUMBER
DATE 7/29/2013 TIME 3:16 PM

PRODUCT NO. DESCRIPTION
074335 Crusher Run

JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES IN
S.O. DESC : CPU OPTECH ORDER#50237
S.O. INFO :
JOB LOC. :

LOAD # 1

Scale 1

WEIGHTS

	-LBS-	-KILO-		
GROSS	111740	50684	TONS TODAY	34.34
TARE	43060	19532	TONS TO DATE	0.00
NET	68680	31153		
TONS	34.34	31.15	TONNES TODAY	31.15
			TONNES TO DATE	

CASH SALE ONLY

MATERIAL PER TONS
TAX
HAUL PER TONS
TOTAL

TRUCKING INFO.

HAUL / TRUCK NUMBER
7365R840

HAULER NAME :
TRUCK NAME RICCELLI ENTERPRIS
MGW 117000

WEIGHMASTER LICENSE NUMBER

TICKET NO. 893583

WEIGHMASTER SIGNATURE Hill, Christine #600896

R-63-K REV 3 05/09

AN EQUAL OPPORTUNITY EMPLOYER M/F

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3

TICKET NO. 893585

GROSS WEIGHT ACKNOWLEDGED
TRUCKERS SIGNATURE

SEE PRODUCT WARNING ON REVERSE

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEYS' FEES

RECEIVERS INITIALS

*CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

HANSON Aggregates
Skaneateles
PO Box 7
Skaneateles NY 13152
315-685-3321
DRIVE SAFE&SENSIBLE

CUSTOMER NUMBER 1524148
SALES ORDER NUMBER
DATE 7/29/2013 TIME 3:42 PM

PRODUCT NO. DESCRIPTION
074335
Crusher Run

JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : CPU OPTECH ORDER #50237
S.O. INFO :
JOB LOC. :

LOAD # 2

Scale 1 * Predet WEIGHTS are

	-LBS-	-KILO-
GROSS	111320	50494
TARE	42220	19151
NET	69100	31343
TONS	34.55	31.34

TONS TODAY 68.89
TONS TO DATE 0.00
TONNES TODAY 62.50
TONNES TO DATE

✓ CASH SALE ONLY

MATERIAL PER TONS
TAX
HAUL PER TONS
TOTAL

TRUCKING INFO.
✓ HAUL / TRUCK NUMBER
/365R836
HAULER NAME
TRUCK NAME RICCELLI TRUCKING
MGW 117000

WEIGHMASTER LICENSE NUMBER

TICKET NO. 893585

WEIGHMASTER SIGNATURE Hill, Christine #600896

R-63-K REV 3 05/09

AN EQUAL OPPORTUNITY EMPLOYER M/F

(888) 252-7172
WGR ASSOCIATES INC

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3

TICKET NO. 017637

GROSS WEIGHT ACKNOWLEDGED

SEE PRODUCT WARNING ON REVERSE

TRUCKERS SIGNATURE

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEYS' FEES.

RECEIVERS INITIALS

HANSON Aggregates
JAMESVILLE

4800 Jamesville Rd
Jamesville, NY 13078

*CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

DRIVE SAFE&SENSIBLE

(888) 252-7772

WGR ASSOCIATES

CUSTOMER NUMBER 1524148 SALES ORDER NUMBER 857606
DATE 7/30/2013 TIME 3:03 PM

PRODUCT NO. DESCRIPTION
074335 Crusher Run

JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : CPU-OP TECH QUEENS NY
S.O. INFO :
JOB LOC. : CPU-OP TECH QUEENS NY LOAD # 1
Scale 1 * Predetermined Tare

WEIGHTS

	-LBS-	-KILO-
GROSS	112800	51165
TARE	42220	19151
NET	70580	32015
TONS	35.29	32.01

TONS TODAY 35.29
TONS TO DATE 35.29
TONNES TODAY 32.01
TONNES TO DATE

✓ CASH SALE ONLY ↘

MATERIAL PER TONS
TAX
HAUL PER TONS
TOTAL

TRUCKING INFO.

✓ HAUL / TRUCK NUMBER ↘ /354X839

HAULER NAME
TRUCK NAME RICCELLI
MGW 117000

WEIGHMASTER LICENSE NUMBER

TICKET NO. 1117637

WEIGHMASTER SIGNATURE ▶ Tony Barletta

R-63-K REV 3 05/09

AN EQUAL OPPORTUNITY EMPLOYER M/F

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3

TICKET NO. 017640

GROSS WEIGHT ACKNOWLEDGED
TRUCKERS SIGNATURE

SEE PRODUCT WARNING ON REVERSE

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEYS' FEES.

HANSON Aggregates
JAMESVILLE

RECEIVERS INITIALS

4800 Jamesville Rd
Jamesville, NY 13078

CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

DRIVE SAFE&SENSIBLE

(888) 252-7782 WGR ASSOCIATES

CUSTOMER NUMBER 1524148
SALES ORDER NUMBER 857606
DATE 7/30/2013 TIME 3:24 PM

PRODUCT NO. DESCRIPTION
074335
Crusher Run

JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : CPU-OP TECH QUEENS NY
S.O. INFO : Rockaway Job
JOB LOC. : CPU-OP TECH QUEENS NY
LOAD # 2
Scale 1

WEIGHTS

	-LBS-	-KILO-
GROSS	106240	48190
TARE	35340	16030
NET	70900	32160
TONS	35.45	32.16

TONS TODAY 70.74
TONS TO DATE 70.74
TONNES TODAY 64.17
TONNES TO DATE

CASH SALE ONLY

MATERIAL PER TONS
TAX
HAUL PER TONS
TOTAL

TRUCKING INFO.
HAUL / TRUCK NUMBER
/354T-3
HAULER NAME
TRUCK NAME LAND GARDEN PURPL
MGW 107000

WEIGHMASTER LICENSE NUMBER

TICKET NO. 1117640

WEIGHMASTER SIGNATURE Tony Barletta

R-63-K REV 3 05/09

AN EQUAL OPPORTUNITY EMPLOYER M/F

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3

TICKET NO. 893701

GROSS WEIGHT ACKNOWLEDGED
TRUCKERS SIGNATURE

SEE PRODUCT WARNING ON REVERSE

HAUL #833 TRK #209

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEYS' FEES

RECEIVERS INITIALS

*CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

HANSON Aggregates
Skaneateles
PO Box 7
Skaneateles NY 13152
315-685-3321
DRIVE SAFE$SENSIBLE

(866) 253-7122

WGR ASSOCIATES

CUSTOMER NUMBER 1524148
SALES ORDER NUMBER 857972
DATE 7/31/2013 TIME 1:32 PM
PRODUCT NO. DESCRIPTION 074335 Crusher Run
JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : CPU-OPTECH QUEENS NY
S.O. INFO :
JOB LOC. : CPU-OPTECH QUEENS NY
LOAD # 1

Scale 1

WEIGHTS

	-LBS-	-KILO-
GROSS	111820	50721
TARE	43120	19559
NET	68700	31162
TONS	34.35	31.16

TONS TODAY 34.35
TONS TO DATE 34.35
TONNES TODAY 31.16
TONNES TO DATE

CASH SALE ONLY

MATERIAL PER TONS
TAX
HAUL PER TONS
TOTAL

TRUCKING INFO.
HAUL / TRUCK NUMBER 3658030
HAULER NAME :
TRUCK NAME RICCELLI ENTERPRIS
MGW 117000

WEIGHMASTER LICENSE NUMBER

TICKET NO. 893701

WEIGHMASTER SIGNATURE Hill, Christine #600596

R-63-K REV 3 05/09

AN EQUAL OPPORTUNITY EMPLOYER M/F

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3

TICKET NO. 017780

GROSS WEIGHT ACKNOWLEDGED
TRUCKERS SIGNATURE

SEE PRODUCT WARNING ON REVERSE

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEYS' FEES

HANSON Aggregates
JAMESVILLE

4800 Jamesville Rd
Jamesville, NY 13078

RECEIVERS INITIALS

CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

DRIVE SAFE&SENSIBLE

(888) 252-7772 WGR ASSOCIATES

CUSTOMER NUMBER 1524148 SALES ORDER NUMBER 857606
DATE 7/31/2013 TIME 2:01 PM

PRODUCT NO. DESCRIPTION
074335
Crusher Run

JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : CPU-OP TECH QUEENS NY
S.O. INFO :
JOB LOC. : CPU-OP TECH QUEENS NY LOAD # 1
Scale 1 in Manual Weight P.P.

WEIGHTS

	-LBS-	-KILO-
GROSS	116960	53052
TARE	43820	19876
NET	73140	33176
TONS	36.57	33.18

TONS TODAY 36.57
TONS TO DATE 107.31
TONNES TODAY 33.18
TONNES TO DATE

CASH SALE ONLY

TRUCKING INFO.

HAUL / TRUCK NUMBER
/354X840

MATERIAL PER TONS
TAX
HAUL PER TONS
TOTAL

HAULER NAME :
TRUCK NAME RICCELLI ENT
MGW 117000

WEIGHMASTER LICENSE NUMBER

TICKET NO. 1117780

WEIGHMASTER SIGNATURE Tony Barletta

R-63-K REV 3 05/09

AN EQUAL OPPORTUNITY EMPLOYER M/F

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3

TICKET NO. 017782

GROSS WEIGHT ACKNOWLEDGED
TRUCKERS SIGNATURE

SEE PRODUCT WARNING ON REVERSE

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEYS' FEES.

HANSON Aggregates
JAMESVILLE
4800 Jamesville Rd
Jamesville, NY 13078

RECEIVERS INITIALS
CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

DRIVE SAFE&SENSIBLE

(888) 252-7772 WGR ASSOCIATES

CUSTOMER NUMBER 1524148
SALES ORDER NUMBER 857606
DATE 7/31/2013 TIME 2:03 PM
PRODUCT NO. DESCRIPTION 074335 Crusher Run
JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : CPU-OP TECH QUEENS NY
S.O. INFO :
JOB LOC. : CPU-OP TECH QUEENS NY
LOAD # 2

Scale 1 * Predator Ind. File

WEIGHTS

	-LBS-	-KILO-
GROSS	116380	52789
TARE	42740	19387
NET	73640	33403
TONS	36.82	33.40

TONS TODAY 73.39
TONS TO DATE 144.13
TONNES TODAY 66.58
TONNES TO DATE

CASH SALE ONLY

MATERIAL PER TONS
TAX
HAUL PER TONS
TOTAL

TRUCKING INFO.
HAUL / TRUCK NUMBER 7354X837
HAULER NAME
TRUCK NAME RICCELLI ENT
MGW 117000

WEIGHMASTER LICENSE NUMBER
TICKET NO. 1117782
WEIGHMASTER SIGNATURE Tony Barletta

R-63-K REV 3 05/09 AN EQUAL OPPORTUNITY EMPLOYER M/F

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3
TICKET NO. 893810

GROSS WEIGHT ACKNOWLEDGED
TRUCKERS SIGNATURE RScott 825/23

SEE PRODUCT WARNING ON REVERSE.

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEYS' FEES.

HANSON Aggregates
Skaneateles
PO Box 7
Skaneateles NY 13152
315-685-3321
DRIVE SAFE&SENSIBLE

RECEIVERS INITIALS RK

*CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

CUSTOMER NUMBER 1524148
SALES ORDER NUMBER 857972
DATE 8/1/2013 TIME 1:59 PM

PRODUCT NO. DESCRIPTION
074335 Crusher Run
JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : CPU-OPTECH QUEENS NY
S.O. INFO :
JOB LOC. : CPU-OPTECH QUEENS NY LOAD # 2

Scale 1

WEIGHTS

	LBS	KILO
GROSS	111480	50566
TARE	42180	19133
NET	69300	31434
TONS	34.65	31.43

TONS TODAY 68.87
TONS TO DATE 103.22
TONNES TODAY 62.48
TONNES TO DATE

✓ CASH SALE ONLY ↘

MATERIAL PER TONS
TAX
HAUL PER TONS
TOTAL

TRUCKING INFO.
✓ HAUL / TRUCK NUMBER ↘
/365R825
HAULER NAME
TRUCK NAME RICCELLI TRUCKING
MGW 117000

WEIGHTMASTER LICENSE NUMBER
TICKET NO. 893810
WEIGHTMASTER SIGNATURE ▶ Hassett, Peggy #310004

R-63-K REV 3 05/09 AN EQUAL OPPORTUNITY EMPLOYER M/F

WGR ASSOCIATES (888) 282-7172

Hanson

Hanson Aggregates New York, LLC
7660 Imperial Way
Allentown, PA 18195

3

TICKET NO. 893809

GROSS WEIGHT ACKNOWLEDGED — SEE PRODUCT WARNING ON REVERSE

TRUCKERS SIGNATURE

BUYER AGREES TO PAY ALL COSTS OF COLLECTIONS FOR THIS TICKET, INCLUDING ANY REASONABLE ATTORNEY'S FEES.

HANSON Aggregates
Skaneateles
PO Box 7
Skaneateles NY 13152
315-685-3321
DRIVE SAFE&SENSIBLE

RECEIVERS INITIALS

*CURB DELIVERY ONLY. NOT RESPONSIBLE FOR ANY DAMAGE BEYOND CURB.

WGR ASSOCIATES (888) 252-7172

CUSTOMER NUMBER 1524148 — SALES ORDER NUMBER 857972
DATE 8/1/2013 — TIME 1:58 PM

PRODUCT NO. DESCRIPTION: 074335 Crusher Run
JOB/ITEM #

SOLD TO : RICCELLI ENTERPRISES INC
S.O. DESC : CPU-OPTECH QUEENS NY
S.O. INFO. :
JOB LOC. : CPU-OPTECH QUEENS NY — LOAD # 1

Scale 1

WEIGHTS

	-LBS-	-KILO-
GROSS	109920	49859
TARE	41480	18815
NET	68440	31044
TONS	34.22	31.04

TONS TODAY 34.22
TONS TO DATE 68.57
TONNES TODAY 31.04
TONNES TO DATE

✓ CASH SALE ONLY

MATERIAL — PER TONS
TAX
HAUL — PER TONS
TOTAL

TRUCKING INFO.
✓ HAUL / TRUCK NUMBER
/365R846
HAULER NAME
TRUCK NAME RICCELLI TRUCKING
MGW 117000

WEIGHMASTER LICENSE NUMBER

TICKET NO. 893809

WEIGHMASTER SIGNATURE Hassett, Peggy #310004

R-63-K REV 3 05/09

AN EQUAL OPPORTUNITY EMPLOYER M/F

Outlook

Re: Ozone Project - Backfill Submittal

From John Durnin <jedurnin@gw.dec.state.ny.us>
Date Mon 7/8/2013 9:31 AM
To Austin, David <david.austin@aecom.com>
Cc Matos, Raimundo <Raimundo.Matos@aecom.com>; Crowell, Sean <Sean.Crowell@aecom.com>; Janet Brown <jebrown@gw.dec.state.ny.us>

Good morning David,

I have reviewed the July 2, 2013 submission for manufactured crushed virgin limestone originating from Carver Sand and Gravel and Hanson Aggregates. Both NYSDOT approved sources are acceptable and do not require chemical analysis.

If you have any questions, please give me a call at 518-402-9768.

Thanks,

John

>>> "Austin, David" <david.austin@aecom.com> 7/2/2013 11:23 AM >>>
John,

Attached is the submittal for two possible sources of backfill. Both materials included are manufactured by crushing virgin limestone. Per 6NYCRR 375-6.7(d), this is material can be considered exempt from chemical analysis if DEC approves.

Thanks.

Outlook

RE: Ozone Project this week

From John Durnin <jedurnin@gw.dec.state.ny.us>
Date Wed 9/11/2013 8:30 AM
To Crowell, Sean <Sean.Crowell@aecom.com>
Cc Austin, David <david.austin@aecom.com>; Pearsall, Matthew <Matthew.Pearsall@aecom.com>; Matos, Raimundo <Raimundo.Matos@aecom.com>; McKeever, Robert <Robert.McKeever@aecom.com>; Ted Coyle <tcoyle@dallasairmotive.com>; Janet Brown <jebrown@gw.dec.state.ny.us>

Good morning Sean,

Based on my review of OPTECH's Pea Gravel submission and my September 10, 2013 site inspection, the Pea Gravel is acceptable for use at the Ozone Industries Site. I also gave my verbal approval for its use yesterday during my site visit.

If you have any questions, please let me know at 518-402-9768.

Thanks,

John

>>> "Crowell, Sean" <Sean.Crowell@aecom.com> 9/10/2013 6:50 AM >>>
John

I wanted to confirm that you have received/approve use of the peastone/gravel backfill in the attached submittal. Please let us know if you agree that these materials are acceptable for use based on the provided submittal.

Thank You

-----Original Message-----
From: John Durnin [mailto:jedurnin@gw.dec.state.ny.us]
Sent: Monday, September 09, 2013 10:33 AM
To: Austin, David; Crowell, Sean
Cc: Pearsall, Matthew; Matos, Raimundo; McKeever, Robert; Ted Coyle
Subject: RE: Ozone Project this week

Good morning everyone,

I will be stopping by the site tomorrow, September 10th around 10 am. My DEC cell phone will be 518-461-0388.

Thanks,

John

>>> "Crowell, Sean" <Sean.Crowell@aecom.com> 9/9/2013 9:19 AM >>>
Matt's cell phone # if necessary (978) 430-9293

From: Austin, David
Sent: Monday, September 09, 2013 7:41 AM
To: John Durnin
Cc: Pearsall, Matthew; Ted Coyle; Matos, Raimundo; McKeever, Robert; Crowell, Sean
Subject: Ozone Project this week

Hello,

Hope you enjoyed your time off.

At the site they will be working on the piping installation all week. Matt Pearsall is the site supervisor from AECOM this week.

Please contact me if you have any questions.

Thanks.

David G. Austin, LSP, LEP, PG
Senior Project Manager
Remediation Consulting & Engineering
Environment
D 978-905-2114
david.austin@aecom.com<mailto:david.austin@aecom.com>

AECOM
250 Apollo Drive, Chelmsford, MA 01824
T 978-905-2100 F 978-905-2101
www.aecom.com<http://www.aecom.com/>

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Please consider the environment before printing this e-mail.

SUBMITTAL COVER SHEET

CONTRACTOR: OP-TECH Environmental Services, Inc.

ADDRESS: PO Box 633 – 3851 Western Turnpike
Duanesburg, New York

SUBMITTAL NO.: 021

DATE OF SUBMITTAL: 6/27/13

CONTRACT NO.: 40623ACM

MANUFACTURER:

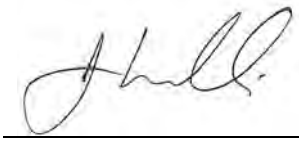
NAME OF PROJECT: Former Ozone Industries Site Remediation Project

SUBMITTAL DESCRIPTION: Submittal for two (2) possible backfill sources to be determined prior to backfilling. Source 1 is from NY Sand and Gravel. Source 2 is from Riccelli Enterprises. Both sources are manufactured by crushing virgin limestone in NYS permitted quarries.

REFERENCES:

Specification Section(s) 023000 Paragraph(s) 1.04

Contract Drawing(s)

CONTRACTOR SIGNATURE 

AECOM REVIEW

AECOM

DOCUMENT REVIEW STATUS

STATUS NO:

1 ☐ APPROVED
2 ☐ APPROVED AS NOTED
3 ☐ APPROVED AS NOTED / CONFIRM
4 ☐ APPROVED AS NOTED / RESUBMIT
5 ☐ NOT APPROVED
6 ☐ COMMENTS ATTACHED

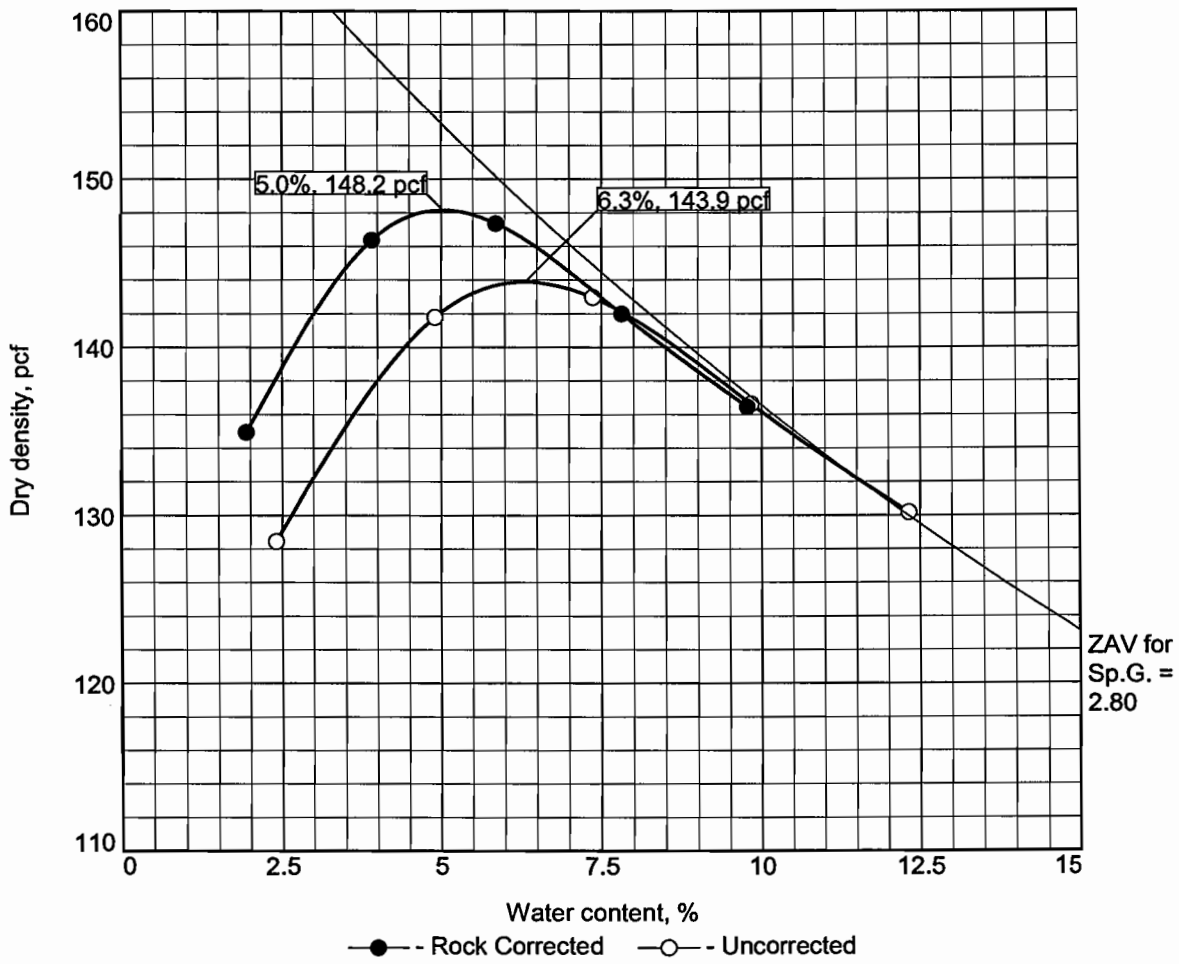
REVIEWED BY: _____ TITLE: _____

DATE: _____

REMARKS: _____

Source 1 - NYS&G

COMPACTION TEST REPORT



Test specification: ASTM D 1557-07 Method C Modified
ASTM D 4718-87 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Received Moist.	Sp.G.	LL	PL	PI	% > 3/4 in.
	USCS	AASHTO						
N/A	---	---	---	2.67	----	----	----	21

ROCK CORRECTED TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 148.2 pcf Optimum moisture = 5.0 %	Grey Type 2, 1-23R

Report No.: AT114SL-71-06-12 **Client:** Carver Sand and Gravel
Project: Laboratory Analysis
Source of Sample: Carver 1-23R
Sample Number: AT114S71 **Date:** 6/29/2012

ATLANTIC TESTING LABORATORIES, LIMITED

Albany, New York

Remarks:
Delivered by the Client on 6/25/2012
ASTM D 1557 modified proctor
PO#LAB1357

Rammer: Mechanical
Specific Gravity: Assumed

Tested by: KH Date: 6/25/12
Reviewed by: REF Date: 6/29/12

CARVER
stone products
sub-base Type2 Gradation

Source 1 - NYS&G

SOURCE : 9-39R Schoharie

PRODUCER:	Carver Sand & Gravel
DATE:	4/29/2013
TIME:	1:00 PM
TECHNICIAN:	WS

WEATHER:		
		SUNNY
	x	CLOUDY
		RAIN/ SNOW

TEST DATE:	4/29/2013	ID # _____
TIME:	4:25	
TECHNICIAN:	WS	

STONE COND.:		
		DRIER THAN SSD
		AT SSD
	x	WETTER THAN SSD
		OTHER

METHOD:		
	x	FLOWING AGG. STREAM
		RANDOM LOCATION
		LOADER DIG
		OTHER

LOCATION:		
		MAIN STOCKPILE
		UNDER BELT
	x	PILE UNDER CONVEYOR

INFEED RATE:			tph (to tunnel)
FEED RATE:			tph (upper screens)
IMPACTOR:		ON	amps
		OFF	
RUBBLE		IN	tph
		OUT	tph

NOTES:

WATER		***NOTES:***		
	ON	NYS DOTSpec Type 2 SB		SHOT ROCK
	OFF	**P&M**		DIRT
				HIGH FRICTION

SIEVE SIZE	WEIGHT	% RETAINED	%PASSING	SPECS
2" (50.0mm)	0.0	0.0	100.0	100%
3/4" (19 mm)	1230.0	10.8	89.2	
3/8" (9.5mm)	4190.0	36.9	52.3	
1/4"(6.3mm)	1795.0	15.8	36.4	25-60
#4 (4.75mm)	923.1	8.1	28.3	
#10 (2.0)mm	1148.3	10.1	18.2	
#40 (425um)	1228.0	10.8	7.4	5-40%
#100 (150um)	415.0	3.7	3.7	
#200 (75.0um)	270.0	2.4	1.3	0-10
PAN	151.8	1.3	0.0	
TOTAL	11351.2	100		

MOISTURE CONTENT

INITIAL WEIGHT	0.0
DRY WEIGHT	0.0
MOISTURE WT.	0.0
% MOISTURE	#DIV/0!

WASH TEST

INITIAL WEIGHT	0.0
DRY WEIGHT	0.0
WEIGHT -200	0.0
% -200	#DIV/0!

Source 2 - Riccelli

Hanson
HEIDELBERGCEMENT Group

Hanson Aggregates NY LLC
P. O. Box 513
Jamesville, NY 13078

06/18/2012

Riccelli Enterprises Inc.
P.O. Box 6418
Syracuse, NY 13217

RE: Jamesville Quarry
NYSDEC Mine ID# 70058

Gentlemen;

Please be advised that all of the crushed limestone products available at the Hanson Aggregates NY, LLC. Jamesville, NY facilities are manufactured from a naturally occurring deposit and contain no additives or chemicals.

Please feel free to contact this office with any questions.

Sincerely,

HANSON AGGREGATES NY LLC

Roger R. Hutchinson
Sales Manager

Source 2 - Riccelli

Hanson
HEIDELBERGCEMENT Group

Hanson Aggregates
P.O. Box 513
Jamesville, NY 13078

AGGREGATE GRADATION REPORT

Jamesville Quarry

NYSDOT SOURCE 3-3RS Limestone

Specific Gravities

Bulk (SSD)	Bulk	Apparent	ABS	HFA	BAL
2.70	2.688	2.728	0.5	NO	NY#

MATERIAL
Type 2 Subbase / Crusher Run
Average Gradation

Sieve Size	% Passing
1 ½"	100
1"	91.9
¾"	78.6
½"	60.5
1/4"	40.7
1/8"	30.6
#10	23.2
#20	14.5
#40	10.4
#80	7.8
#200	6.4

Source 2 - Riccelli

Compaction Test Report

Standard [ ] Modified [X]

Procedure A [ ] B [ ]

C [X]

Preperation Method:

Moist [X] Dry [ ]

Rammer Used:

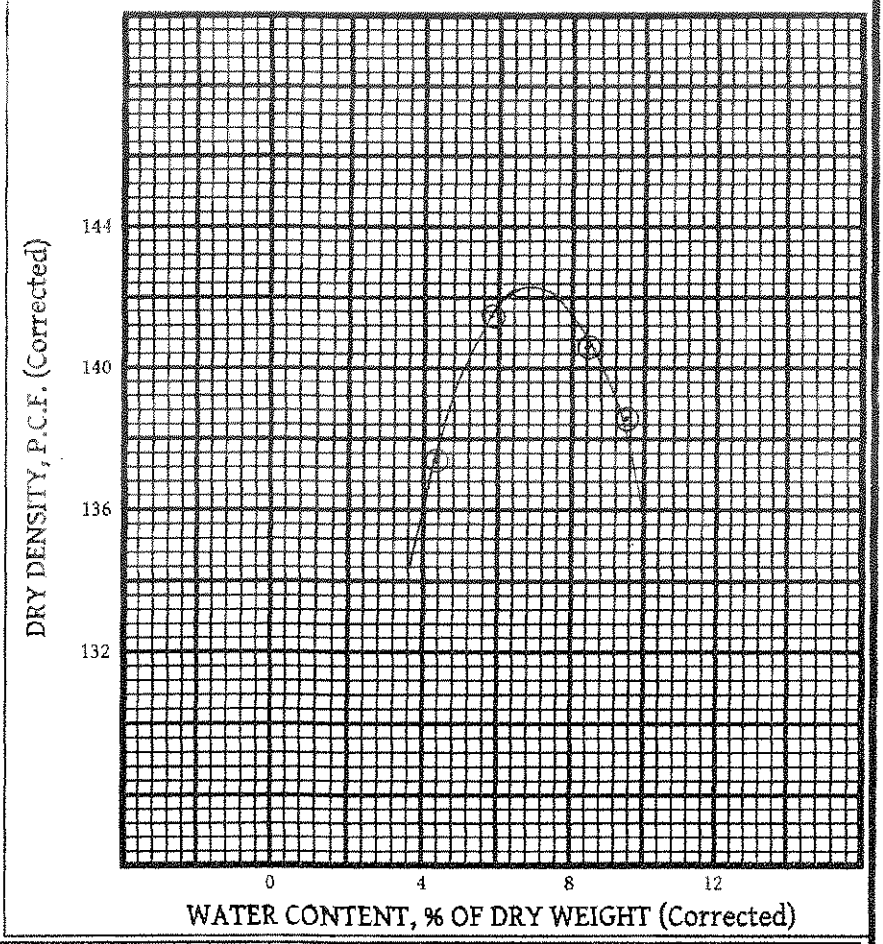
Manual [X] Mechanical [ ]

MAXIMUM DRY DENSITY (P.C.F.)

Corrected: 142.3
Uncorrected: 138.4

OPTIMUM MOISTURE CONTENT (%)

Corrected: 6.8
Uncorrected: 7.6



Performed in accordance with:
ASTM D1557 & D4718
15.0% retained on the 3/4" sieve
Due to the percentage retained on the 3/4" sieve, the zero air voids curve cannot be shown

Apparent Specific Gravity: 2.74

SAMPLE NO.	1	2	3	4			
MOLD + SAMPLE WT.	24.60	25.14	25.37	25.32			
MOLD WEIGHT	14.14	14.14	14.14	14.14			
WET SAMPLE WT.	10.46	11.00	11.23	11.18			
WET DENSITY, P.C.F.	139.2	146.4	149.5	148.8			
MOISTURE CONTENT (1)	4.7	6.5	9.5	10.8			
DRY DENSITY, P.C.F. (1)	133.0	137.5	136.5	134.3			

Note: (1) Actual test data shown in uncorrected form.

Material

Color: Gray
Classification: N/A
Type : - 1 1/2" Crushed Limestone - Satellite Plant
Location: Hanson Aggregates of North America - Jamesville, New York
Lab I.D. #: 26783

Client: Hanson Aggregates of North America
Project Title: Laboratory Testing

Test Date: May 3, 2012
Tested By: AM
Checked By: V.J. Thoma
Project #: L-12044
Report #: 1

p-w labs
PW LABORATORIES, INC.
6544 FREMONT ROAD, EAST SYRACUSE, NY 13057
315-437-1420 • Fax 315-437-1752 • pwlabsinc@hotmail.com

APPENDIX M

SSDS and SVE Operation and Maintenance Manuals

Operation & Maintenance Manual

NES PROJECT NUMBER: 15-152, October 2015
PROJECT NAME: SSDS Equipment & Controls
Former Ozone Industries Site
Queens, NY

Prepared for:

AECOM Environment
250 Apollo Drive
Chelmsford, MA 01824

Sales: (508)226-1100 Option 2
Technical Support: (508)226-1100 Option 3

Phone (508) 226-1100 Fax (508) 226-1180 84 Dunham Street Attleboro, MA 02703
www.nes-inc.biz

OPERATION & MAINTENANCE MANUAL

NES 15-152 SSD SYSTEM - FORMER OZONE INDUSTRIES

SECTION 1 - SUMMARY OF EQUIPMENT

COMPONENT SUMMARY

WARRANTY STATEMENT

SECTION 2 - MECHANICAL DRAWINGS & TABLE(S)

M-1, PROCESS & INSTRUMENTATION DIAGRAM (P&ID)

T-1, INSTRUMENTATION TABLE

M-2, SSD SKID & MANIFOLD LAYOUT DRAWING

M-3, MOISTURE SEPARATOR (MS) DRAWING

M-4, MS LEVEL SWITCH DRAWING

SECTION 3 - BLOWER ENCLOSURE ACCESSORIES

SOUND REDUCTION FOAM - AMERICAN ACOUSTICAL HC1.00EBUA3-ANATIO

EXHAUST FAN, 12"', 1286 CFM @ 0" S.P., 115 VAC, 1-PHASE - DAYTON 10D963

EXHAUST FAN THERMOSTAT, (-)30-90 F ADJUSTABLE - WHITE RODGERS 1687-9

SECTION 4 - PROCESS EQUIPMENT

REGENERATIVE BLOWER (240 SCFM @ 30"W.C. MANIFOLD INLET) - FPZ SCL K08-MS-10-3

MOISTURE SEPARATOR, TANK STYLE, 80 GALLONS - NES 80 GAL

VACUUM RELIEF VALVE, 2" FNPT, ADJUSTABLE - FPZ VRL6

INLINE FILTER, T-STYLE, 4" - SOLBERG CT-235P-400C

DILUTION FILTER SILENCER, 3" - SOLBERG FS-235P-300

SECTION 5 - PROCESS INSTRUMENTATION

MS HIGH LEVEL SWITCH, 1-FLOAT STYLE, SS FLOATS, 0.6 SG - FPI L500-1POS

MANIFOLD VACUUM GAUGES, (-)100-0" WC VAC. - DWYER LPG4-D7722N

INLET VACUUM GAUGES, (-)100-0" WC VAC. - DWYER LPG4-D7722N

INLET PRESSURE TRANSMITTER, 0-15 PSIA - DWYER 626-00-GH-P1-E3-S1

VACUUM SWITCH, 4 - 20 IWC - DWYER 1950-20-2F

INLET FLOWSENSOR PITOT TUBE, 4" - DWYER DS-300-4

PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP - DWYER 605-10

INLINE FILTER DIFFERENTIAL PRESSURE GAUGE, 0-10" WC DP - DWYER 2010

DISCHARGE FLOWSENSOR PITOT TUBE, 4" - DWYER DS-300-4

PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP - DWYER 605-10

TEMPERATURE INDICATORS, 0-250 DEGF - AV 1NFY4

DISCHARGE PRESSURE GAUGES, 0-100" WC PRESS. - DWYER LPG4-D8622N

DISCHARGE TEMPERATURE SWITCH, 0-225 DEGF ADJUSTABLE - UNITED ELECTRIC B54-103

SECTION 6 - ELECTRICAL DRAWINGS & TABLE(S)

T-2, INTERLOCK TABLE

I-1, CONTROL PANEL LAYOUT DRAWING

T-3, CONTROL PANEL BOM

I-2, WIRING DIAGRAMS & TERMINAL DETAILS

E-1, LINE DIAGRAM

T-4, VFD SETTINGS TABLE

SECTION 7 - CONTROL COMPONENTS

ENCLOSURE NEMA4 42 X 36 X 12 - MILD STEEL W/ LOCKING HANDLE - HAMMOND EN4SD423612GY

VENT FAN 210CFM 115VAC 6 IN - HAMMOND FAN150AC115

VENT FAN ADJ. 30-140F BI-METAL TEMP SWITCH N.O. - HAMMOND SKT011419NO

NON-FUSED THROUGH DOOR DISCONNECT 3-PHASE 80 AMP - ABB OT80F3

PROCONTROL PLC 24DI,16AI,30DO,8A - EOS A2

PROVIEW USER'S GUIDE - EOS

PROCONTROL CELL MODEM W/ 80FT ANTENNA CABLE - EOS CELL MODEM

UPS, 350VA, 200W, 120V, 1PH, 3 UPS & SURGE OUTLET 3 SURGE ONLY - APC BE350G

VFD 10 HP 208/230V 33 A 3-PHASE NEMA1 - SQUARE D ATV61HU75M3

QUARTZ DRIVE ANALOG HOUR METER 2.8IN DIAMETER BEZEL 115VAC - ENM T50B212

POWER SUPPLY 24VDC 2.5A - ADI PSC-24-060

MUSHROOM SWITCH RED TRIGGER ACTION - TURN TO RELEASE - SQUARE D ZB5AS844

SECTION 1 - SUMMARY OF EQUIPMENT

COMPONENT SUMMARY

WARRANTY STATEMENT

Phone (508) 226-1100 Fax (508) 226-1180 84 Dunham Street Attleboro, MA 02703
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National Environmental Systems
84 Dunham Street
Attleboro, MA 02703

NES MAJOR COMPONENT SUMMARY **REVISION A** OCTOBER 9, 2015

PROJECT NO.: **15-152** **SSD SYSTEM - FORMER OZONE INDUSTRIES - OZONE PARK, NY**

COMPONENT	TAG	QTY	MANUFACTURER	MODEL	SERIAL NUMBER
SECTION 1 - SUMMARY OF EQUIPMENT					
COMPONENT SUMMARY					
WARRANTY STATEMENT					
SECTION 2 - MECHANICAL DRAWINGS & TABLE(S)					
M-1, PROCESS & INSTRUMENTATION DIAGRAM (P&ID)	M-1				
T-1, INSTRUMENTATION TABLE	T-1				
M-2, SSD SKID & MANIFOLD LAYOUT DRAWING	M-2				
M-3, MOISTURE SEPARATOR (MS) DRAWING	M-3				
M-4, MS LEVEL SWITCH DRAWING	M-4				
SECTION 3 - BLOWER ENCLOSURE ACCESSORIES					
SOUND REDUCTION FOAM		1	AMERICAN ACOUSTICAL	HC1.00EBUA3-ANATIO	N/A
EXHAUST FAN, 12"", 1286 CFM @ 0" S.P., 115 VAC, 1-PHASE	EF-2	1	DAYTON	10D963	13986999
EXHAUST FAN THERMOSTAT, (-)30-90 F ADJUSTABLE	TSTAT	1	WHITE RODGERS	1687-9	N/A
SECTION 4 - PROCESS EQUIPMENT					
REGENERATIVE BLOWER (240 SCFM @ 30"W.C. MANIFOLD INLET)	B-2	1	FPZ	SCL K08-MS-10-3	U13457 2015
BLOWER MOTOR, 10 HP 208 VAC, 3-PHASE, TEFC	B-2	1	LAFERT	AM112MCA2	1105673
MOISTURE SEPARATOR, TANK STYLE, 80 GALLONS	D-2	1	NES	80 GAL	N/A
VACUUM RELIEF VALVE, 2" FNPT, ADJUSTABLE	VRV-02	1	FPZ	VRL6	N/A
INLINE FILTER, T-STYLE, 4"	F-03	1	SOLBERG	CT-235P-400C	N/A
DILUTION FILTER SILENCER, 3"	F-04	1	SOLBERG	FS-235P-300	N/A
HEAT EXCHANGER, PASSIVE, PARALLEL STEEL FINS	H-2	1	NES	CUSTOM	N/A
VAPOR PHASE CARBON VESSELS, 2000 LB MEDIA (BY OTHERS)	GAC-3, 4	2			
SECTION 5 - PROCESS INSTRUMENTATION					
MS HIGH LEVEL SWITCH, 1-FLOAT STYLE, SS FLOATS, 0.6 SG	LSHH-211	1	FPI	L500-1POS	N/A
MANIFOLD VACUUM GAUGES, (-)100-0" WC VAC.	PI-SSD1 / SSD8	8	DWYER	LPG4-D7722N	N/A
INLET VACUUM GAUGES, (-)100-0" WC VAC.	PI-208, 214	2	DWYER	LPG4-D7722N	N/A
INLET PRESSURE TRANSMITTER, 0-15 PSIA	PT-207	1	DWYER	626-00-GH-P1-E3-S1	N/A
INLET LOW VACUUM SWITCH, 4 - 20 IWC	VSL-207	1	DWYER	1950-20-2F	N/A
INLET FLOWSENSOR PITOT TUBE, 4"	DP-210	1	DWYER	DS-300-4	N/A
PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	FI & DPT-210	1	DWYER	605-10	N/A
INLINE FILTER DIFFERENTIAL PRESSURE GAUGE, 0-10" WC DP	DPI-215	1	DWYER	2010	N/A
DISCHARGE FLOWSENSOR PITOT TUBE, 4"	DP-219	1	DWYER	DS-300-4	N/A
PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	FI & DPT-219	1	DWYER	605-10	N/A
TEMPERATURE INDICATORS, 0-250 DEGF	TI-209, 218, 223	3	AV	1NFY4	N/A
DISCHARGE PRESSURE GAUGES, 0-100" WC PRESS.	PI-217, 221	2	DWYER	LPG4-D8622N	N/A
DISCHARGE TEMPERATURE SWITCH, 0-225 DEGF ADJUSTABLE	TS-222	1	UNITED ELECTRIC	B54-103	N/A
SECTION 6 - ELECTRICAL DRAWINGS & TABLE(S)					
T-2, INTERLOCK TABLE	T-2				
I-1, CONTROL PANEL LAYOUT DRAWING	I-1				
T-3, CONTROL PANEL BOM	T-2				
I-2, WIRING DIAGRAMS & TERMINAL DETAILS	I-2				
E-1, LINE DIAGRAM	E-1				
T-4, VFD SETTINGS TABLE	E-1				
SECTION 7 - CONTROL COMPONENTS					
ENCLOSURE NEMA4 42 X 36 X 12 - MILD STEEL/GRAY W/ LOCKING HANDLE	ENCL	1	HAMMOND	EN4SD423612GY	UL: A11975158
BACK-PANEL 42 X 36 MILD STEEL/WHT	ENCL	1	HAMMOND	EP4236	N/A
SWING-PANEL 42 x 36 MILD STEEL/WHT	ENCL	1	HAMMOND	ESP4236	N/A
VENT FAN 6 IN RAIN HOOD NEMA 3R	VF	2	HAMMOND	RH40000GY	N/A
MOUNTING FEET SET OF 4 - ZINC PLATED	ENCL	1	HAMMOND	EZPMFHD	N/A
VENT FAN 210CFM 115VAC 6 IN	VF	1	HAMMOND	FAN150AC115	N/A
VENT FAN ADJ. 30-140F BI-METAL TEMP SWITCH N.O.	VF	1	HAMMOND	SKT011419NO	N/A
VENT FAN FINGER GUARD 6 IN	VF	1	HAMMOND	FAN150FG	N/A
VENT FAN 6 IN RAIN HOOD GRILL & SOLID COVER KIT	VF	2	HAMMOND	RHA40000G	N/A

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NES MAJOR COMPONENT SUMMARY **REVISION A** OCTOBER 9, 2015

PROJECT NO.: **15-152** **SSD SYSTEM - FORMER OZONE INDUSTRIES - OZONE PARK, NY**

COMPONENT	TAG	QTY	MANUFACTURER	MODEL	SERIAL NUMBER
VENT FAN POWER CORD 24 INCH	VF	1	HAMMOND	DNMFC	N/A
NON-FUSED THROUGH DOOR DISCONNECT 3-PHASE 80 AMP	MDS	1	ABB	OT80F3	N/A
NON-FUSED THROUGH DOOR DISCONNECT SHAFT 13 IN	MDS	1	ABB	OXS6X330	N/A
NON-FUSED THROUGH DOOR DISCONNECT HANDLE NEMA3R	MDS	1	ABB	OHBS2AJ	N/A
PROCONTROL PLC 24DI,16AI,30DO,8A	PLC	1	EOS	A2	9845
PROCONTROL CELL MODEM W/ 80FT ANTENNA CABLE	WM	1	EOS	CELL MODEM	184244207 / IP 166.249.126.68
UPS, 350VA, 200W, 120V, 1PH, 3 UPS & SURGE OUTLET 3 SURGE ONLY	UPS	1	APC	BE350G	4B1510P54485
VFD 10 HP 208/230V 33 A 3-PHASE NEMA1	VFD	1	SQUARE D	ATV61HU75M3	6W1529000037
VFD KEYPAD REMOTE MOUNT KIT	VFD	1	SQUARE D	VW3A1102	N/A
RJ45-RJ45 CABLE FOR REMOTE LCD KYPD 3 Meters	VFD	1	SQUARE D	VW3A1104R30	N/A
QUARTZ DRIVE ANALOG HOUR METER 2.8IN DIAMETER BEZEL 115VAC	HM	1	ENM	T50B212	N/A
RELAY 120V 1PDT W/LIGHT BLADE PARALLEL	CR	2	IDEC	RH1B-UL-AC120V	N/A
SOCKET DIN RAIL/SURFACE 5-BLADE FOR RH1B	CR	2	IDEC	SH1B-05	N/A
RELAY 120V 2PDT W/LIGHT BLADE PARALLEL	CR	1	IDEC	RH2B-UL-AC120V	N/A
SOCKET DIN RAIL/SURFACE 5-BLADE FOR RH2B	CR	1	IDEC	SH2B-05	N/A
RELAY 3PDT 120VAC W/INDICATOR LIGHT	CR	1	IDEC	RH3B-UL-AC120V	N/A
SOCKET DIN RAIL/SURFACE 11-BLADE FOR RH3B	CR	1	IDEC	SH3B-05	N/A
POWER SUPPLY 24VDC 2.5A	PS	1	ADI	PSC-24-060	N/A
CIRCUIT BREAKER 6A 1-POLE 120/240 VAC	CB	1	SQUARE D	MG24430	N/A
CIRCUIT BREAKER 50 AMPS 3-POLE 208/240 VAC	CB	1	SQUARE D	QOU350	N/A
CIRCUIT BREAKER 15 AMP 1-POLE 120/240VAC	CB	1	SQUARE D	QOU115	N/A
DUPLEX GFCI RECEPTACLE 125 VAC 15 AMP 2-POLE NEMA 5-15R	RECP	1	LEGRAND	1595-TRWRW	N/A
1-GANG WEATHERPROOF RECEPT. BOX	RECP	1	RED DOT	IHD3- 1	N/A
MUSHROOM SWITCH NON-ILLUM RED TRIGGER ACTION - TURN TO RELEASE	ESTOP	1	SQUARE D	ZB5AS844	N/A
PUSH BUTTON OPERATOR NON-ILLUM BLACK	PB	1	SQUARE D	ZB5AA2	N/A
PILOT LIGHT HEAD RED LED	LT	7	SQUARE D	ZB5AV043	N/A
CONTACT BLOCK 1-N.O. SCREW CLAMP	PB	4	SQUARE D	ZBE101	N/A
CONTACT BLOCK 1-N.C. SCREW CLAMP	PB	2	SQUARE D	ZBE102	N/A
RED LED W/LATCH MODULE 24 V	LT	6	SQUARE D	ZB5AVB4	N/A
MOUNTING BASE,120V RED PROTECTED LED	SW	1	SQUARE D	ZB5AVG4	N/A
2 POS SELECTOR SWITCH ILLUM. GREEN MAINTAINED	SW	1	SQUARE D	ZB5AK1233	N/A
2 POS SELECTOR SWITCH NON-ILLUM. BLACK MAINTAINED	SW	1	SQUARE D	ZB5AD2	N/A
3 POS SELECTOR SWITCH ILLUM. GREEN MOMENTARY	SW	1	SQUARE D	ZB5AK1733	N/A
MOUNTING BASE 120V GREEN PROTECTED LED	SW	2	SQUARE D	ZB5AVG3	N/A
MOUNTING COLLAR LATCH	PB	3	SQUARE D	ZB5AZ009	N/A
TERMINAL BLOCK SCREW CLAMP 20 AMP 600 V GRAY	TB	55	SQUARE D	NSYTRV22	N/A
TERMINAL BLOCK END BARRIERS GRAY	TB	9	SQUARE D	NSYTRAC22	N/A
TERMINAL BLOCK END ANCHORS	TB	4	SQUARE D	NSYTRAABV35	N/A
TERMINAL BLOCK GROUND SCREW CLAMP 20 AMP 600 V GREEN	TB	5	SQUARE D	NSYTRV22PE	N/A
LEGEND PLATE HOLDER	PB	11	SQUARE D	ZBZ33	N/A
LEGEND PLATE LARGE BLACK/RED	PB	11	SQUARE D	ZBY5101	N/A
POWER DISTRIBUTION BLOCK 175 AMP 3-POLE 600 VAC	DB	1	SQUARE D	9080-LBA362104	N/A
COVER DISTRIBUTION BLOCK 3-POLE	DB	1	SQUARE D	9080-LB23	N/A
DISTRIBUTION BLOCK 175 AMP 1-POLE 600 VAC	DB	1	SQUARE D	9080-LBA162104	N/A
COVER DISTRIBUTION BLOCK 1-POLE	DB	1	SQUARE D	9080-LB21	N/A
LOAD CENTER GROUND BAR 15 TERMINALS	GB	1	SQUARE D	PK15GTA	N/A

WARRANTY

All products not manufactured by RapidTech LLC d/b/a National Environmental Systems, carry the original manufacturer's warranty. Copies are available on request.

RapidTech LLC d/b/a National Environmental Systems, warrants its packaged and manufactured equipment against any defect in material or workmanship, under normal use and storage for a period of twelve (12) months from date of manufacture and invoice, regardless of system start-up date. In the event that products are found to be defective within the warranty period, RapidTech LLC d/b/a National Environmental Systems, sole obligation and remedy shall be the furnishing of replacements for any defective parts, and such replacement parts shall be furnished but not installed by RapidTech LLC d/b/a National Environmental Systems RAPIDTECH LLC D/B/A NATIONAL ENVIRONMENTAL SYSTEMS, WILL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES IN ANY CLAIM SUIT OR PROCEEDINGS ARISING UNDER WARRANTY, NOR WILL RAPIDTECH LLC D/B/A NATIONAL ENVIRONMENTAL SYSTEMS, ACCEPT ANY LIABILITY FOR CLAIMS FOR LABOR, LOSS OR PROFIT, REPAIRS OR OTHER EXPENSES INCIDENTAL TO REPLACEMENT.

The warranty requires that the purchaser complete all operations and maintenance as detailed in each section of the Operation & Maintenance Manual supplied with the purchased system. In addition installation must comply with nationally recognized electrical and mechanical standards as well as best engineering practices in effect at the time of purchase.

The product warranty expressed above is our only warranty and may not be verbally changed or modified by any representative of RapidTech LLC d/b/a National Environmental Systems All freight costs incurred in shipping parts to or from RapidTech LLC d/b/a National Environmental Systems, or to the manufacturer if necessary are at the expense of the customer.

RapidTech LLC dba National Environmental Systems, will invoice the cost of any replacement parts. These parts will be credited upon certification the original part was defective and the defective part was returned within one week of notifying RapidTech LLC d/b/a National Environmental Systems, of the malfunction. If the part is found to have been misused no credit will be issued. In order for RapidTech LLC d/b/a National Environmental Systems, to ship a replacement part on account, all outstanding invoices must be current.

RapidTech LLC d/b/a National Environmental Systems, expressly disclaims any warranties, expressed or implied, including any warranty of merchantability or fit for particular purpose or any warranty arising from a course of dealing or usage of trade. Except to the extent required by applicable law. RapidTech LLC d/b/a National Environmental Systems, shall not be liable, in tort, contract or otherwise, for any loss or damage, whether direct, consequential or incidental, of any person or entity arising in connections with the equipment.

SECTION 2 - MECHANICAL DRAWINGS & TABLE(S)

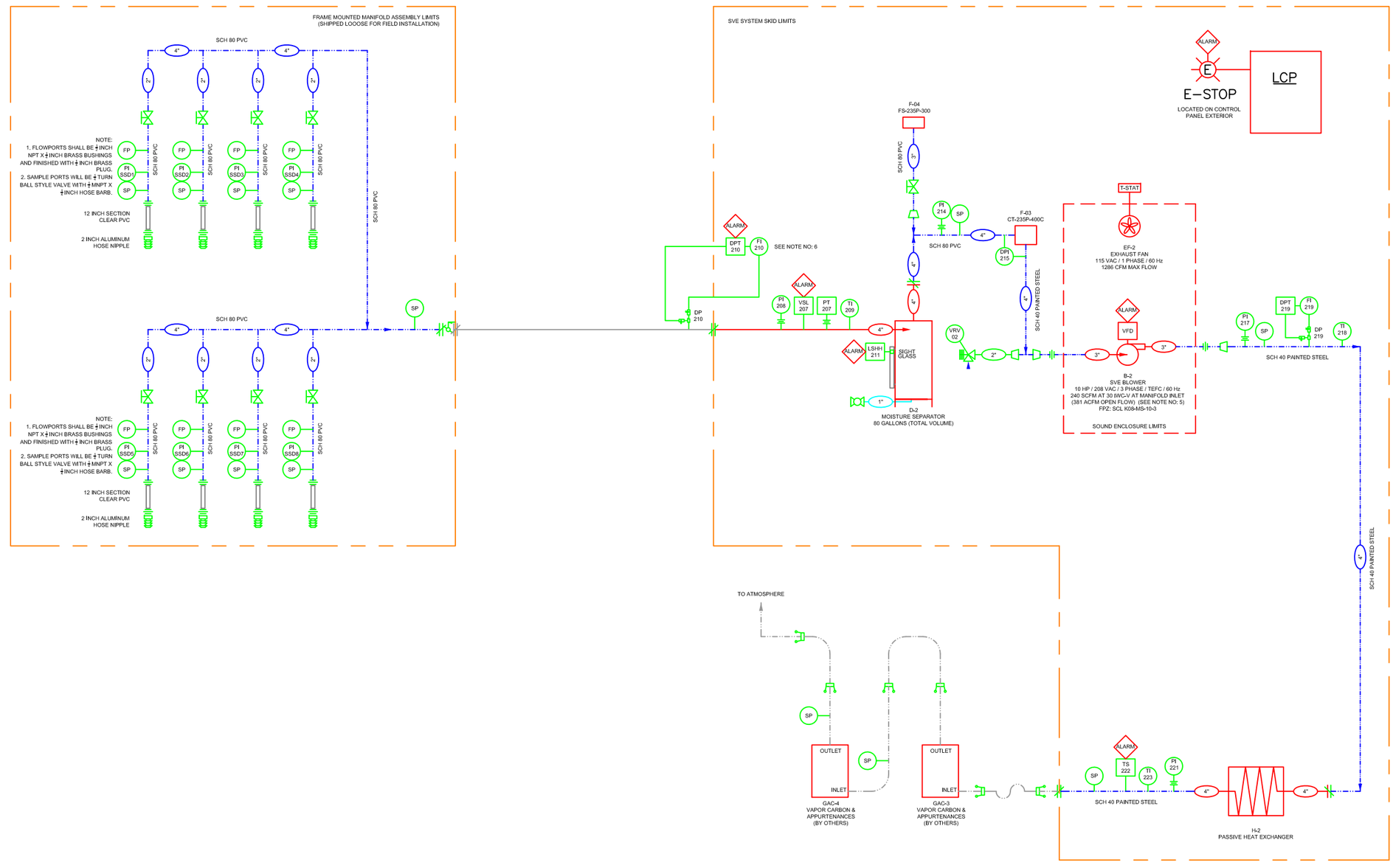
M-1, PROCESS & INSTRUMENTATION DIAGRAM (P&ID)

T-1, INSTRUMENTATION TABLE

M-2, SSD SKID & MANIFOLD LAYOUT DRAWING

M-3, MOISTURE SEPARATOR (MS) DRAWING

M-4, MS LEVEL SWITCH DRAWING



GENERAL NOTES:

1. PROCESS & INSTRUMENTATION DIAGRAM IS A REPRESENTATIVE DRAWING SHOWING EQUIPMENT SPECIFICATIONS, PROCESS PIPING, VALVES AND INSTRUMENTATION NOT TO BE INTERPRETED AS A LAYOUT DRAWING DEPICTING PLUMBING LOCATION, CONNECTIONS, OR FITTINGS.
2. NEC ELECTRICAL CLASSIFICATION
   - SSDS TREATMENT SYSTEM SKID INTERIOR AND EXTERIOR NEC NON-CLASSIFIED LOCATION.
3. REFER TO TABLE 1 FOR INSTRUMENTATION LIST
4. REFER TO TABLE 2 FOR INTERLOCKS
5. BLOWER OPERATION IS BASED UPON FLOWRATE ONLY. VACUUM AND PRESSURE LISTED ARE THE ΔP AVAILABLE AT THE SPECIFIED FLOW
6. FI & DPT-210 WILL BE MOUNTED AND WIRED ON SKID WITH 25' OF TUBING COILED UP FOR FIELD CONNECTION TO DP-210. DP-210 WILL BE SHIPPED LOOSE FOR FIELD INSTALLATION (BY OTHERS).

REV.	DESCRIPTION	DATE	APPROVED
A	AS BUILT	10-08-15	JAD

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508-226-1100 (Phone) / 508-226-1180 (Fax)
WWW.NES-ENC.BIZ

DRWN BY	JAD	DATE	07-14-15
CHK BY	—	DATE	—
APPR BY	—	DATE	—

TITLE: SSDS SYSTEM
PROCESS & INSTRUMENTATION DIAGRAM

AECOM
FORMER OZONE INDUSTRIES SITE - QUEENS, NY

JOB NO. 15-152 (SSDS)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	D	M-1	1 OF 2	A

INSTRUMENT IDENTIFICATION

INSTRUMENT TYPE / INSTRUMENT DESIGNATION (XX / XXX) — LOCALLY MOUNTED INSTRUMENT W / REMOTE DISPLAY

INSTRUMENT TYPE / INSTRUMENT DESIGNATION (XX / XXX) — LOCALLY MOUNTED INSTRUMENT W / DISPLAY

INSTRUMENT TYPE / INSTRUMENT DESIGNATION (XX / XXX) — LOCALLY MOUNTED SWITCH

INSTRUMENTATION ABBREVIATIONS

ADV	AUTOMATIC DRAIN VALVE
CC	CYCLE COUNTER
CF	COALESCING FILTER
DPI	DIFFERENTIAL PRESSURE INDICATOR
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FIT	FLOW INDICATING TRANSMITTER
FM	FLOW METER
FP	FLOW PORT
FS	FLOW SWITCH
FSL	FLOW SWITCH LOW
FT	FLOW TOTALIZER
LI	LEVEL INDICATOR
LIT	LEVEL INDICATING TRANSMITTER
LS	LEVEL SWITCH
LSHH	LEVEL SWITCH HIGH-HIGH
LSH	LEVEL SWITCH HIGH
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW-LOW
LT	LEVEL TRANSMITTER
MOV	MOTOR OPERATED VALVE
OLH	OIL LEVEL HIGH
OLL	OIL LEVEL LOW
PF	PARTICULATE FILTER
PI	PRESSURE INDICATOR
PIT	PRESSURE INDICATING TRANSMITTER
PRV	PRESSURE REGULATING VALVE
PS	PRESSURE SWITCH
PSH	PRESSURE SWITCH HIGH
PSL	PRESSURE SWITCH LOW
PSV	PRESSURE SAFETY VALVE
PT	PRESSURE TRANSMITTER
SP	SAMPLE PORT
SV	SOLENOID VALVE
TE	TEMPERATURE ELEMENT
TI	TEMPERATURE INDICATOR
TIT	TEMPERATURE INDICATING TRANSMITTER
TS	TEMPERATURE SWITCH
TSH	TEMPERATURE SWITCH HIGH
TSL	TEMPERATURE SWITCH LOW
VFD	VARIABLE FREQUENCY DRIVE
VI	VACUUM INDICATOR
VIT	VACUUM INDICATING TRANSMITTER
VS	VACUUM SWITCH
VSH	VACUUM SWITCH HIGH
VSL	VACUUM SWITCH LOW
VSV	VACUUM SAFETY VALVE

PIPE DESIGNATION

- AIR LINE
- WATER LINE
- WATER LINE HEAT TRACED AND INSULATED
- CHEMICAL LINE
- PRODUCT LINE
- VENT LINE
- CONTROL LINE
- INTRINSICALLY SAFE LINE
- ANALOG LINE
- BREAK
- FLOW DIRECTION
- PIPE SIZE (X")

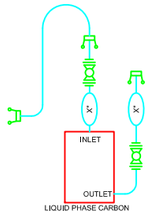
SYMBOLS

- ROTAMETER
- FLOW METER (FM XXX)
- ELAPSED TIME METER (ETM)
- AUTO DIALER (AD)
- TIMER (T)
- MOTOR (M)
- AMP METER (A)
- REMOTE TELEMETRY SYSTEM (RTS)
- VARIABLE FREQUENCY DRIVE (VFD)
- STATIC MIXER
- DISCHARGE SILENCER
- DILUTION AIR FILTER
- INLET/INLINE FILTER
- COALESCING FILTER (CF)
- PARTICULATE FILTER (PF)
- AUTOMATIC CONDENSATE DRAIN (CD)
- ALARM DESGINATION (ALARM)
- WARNING INDICATION (WARN)
- MULTIFUNCTION VALVE
- INJECT NOZZLE
- METERING PUMP INLET CHECK VALVE
- INDUSTRAIL INTERCHANGE COUPLER
- CONDUCTANCE PROBES

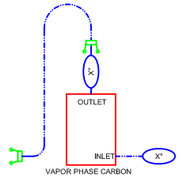
SYMBOLS CONTINUED

- FILTER REGULATOR (FR)
- METERING PUMP (MP)
- GLOBE VALVE
- GATE VALVE
- BALL VALVE/ UNION
- BALL VALVE/DRAIN VALVE
- CHECK VALVE
- RAIN CAP
- BUTTERFLY VALVE
- Y-STRAINER
- RELIEF VALVE
- FEMALE CAMLOCK
- MALE CAMLOCK
- SOLENOID VALVE (SV XXX)
- PRESSURE REGULATOR
- SIPHON BREAK
- UNION
- CLEAR PVC
- MECHANICAL FLOAT
- PULSE-DAMPING SNUBBER
- PITOT TUBE
- SIGHT GLASS
- ALARM LIGHT (AL)
- RUN LIGHT (R)
- E-STOP (E)
- NEEDLE VALVE
- FLANGED CONNECTION
- REQUIRED FIELD CONNECTION
- FLEX CONNECTOR
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- MOTOR OPERATED BUTTERFLY VALVE (MOV XXX)
- AUTOMATIC DRAIN VALVE (ADV XXX)
- MOTOR OPERATED VALVE (MOV XXX)

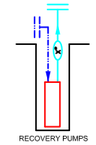
SYMBOLS CONTINUED

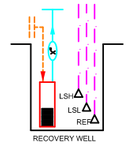


LIQUID PHASE CARBON

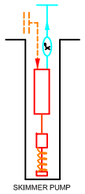


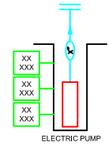
VAPOR PHASE CARBON


RECOVERY PUMPS

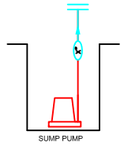


RECOVERY WELL


SKIMMER PUMP

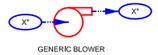


ELECTRIC PUMP


SUMP PUMP



ROTARY CLAW BLOWER

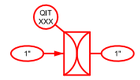


GENERIC BLOWER

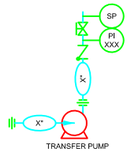

P-XXX
OIL SKIMMER PUMP
MODEL:



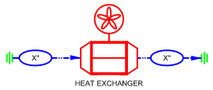
GEAR PUMP



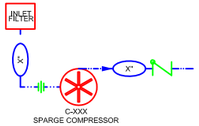
DOUBLE DIAPHRAGM



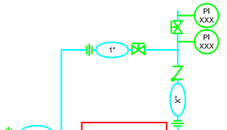
TRANSFER PUMP



HEAT EXCHANGER



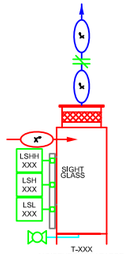
C-XXX
SPARGE COMPRESSOR
XX HP / XXX VAC
X PHASE / TEFC
XXX CFM @ XX PSI
MODEL:



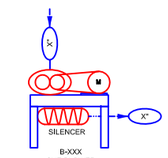
PROGRESSIVE CAVITY PUMP



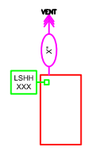
PASSIVE HEAT EXCHANGER



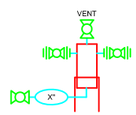
T-XXX
MOISTURE SEPARATOR
XXX GALLONS



B-XXX
SVE BLOWER
XX HP / XXX VAC
X PHASE / TEFC
XXX ACFM @ XX INCHES HgV
BLOWER MODEL:
MOTOR MODEL:

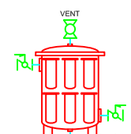


T-XXX
PRODUCT TANK
XXX GALLONS

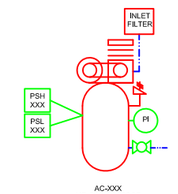


FX-XXX
BAG FILTER
MODEL:

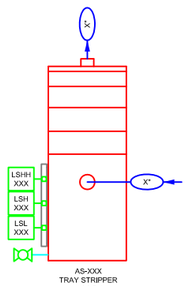




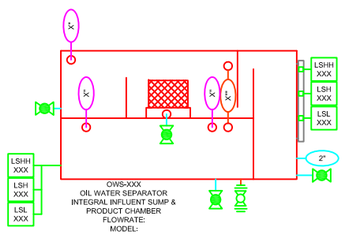
FX-XXX
BAG FILTER
MODEL:



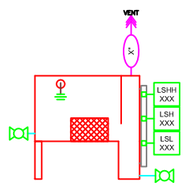
AC-XXX
AIR COMPRESSOR
XX HP / XXX VAC
X PHASE / TEFC
XXX ACFM @ XX PSI
MODEL:



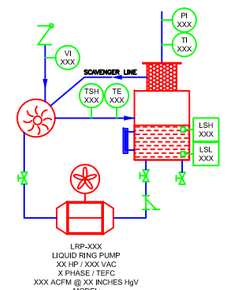
AS-XXX
TRAY STRIPPER
MODEL:



OWS-XXX
OIL WATER SEPARATOR
INTEGRAL INFLUENT SUMP &
PRODUCT CHAMBER
FLOWRATE:
MODEL:



OWS-XXX
OIL WATER SEPARATOR
MODEL:



LRP-XXX
LIQUID RING PUMP
XX HP / XXX VAC
X PHASE / TEFC
XXX ACFM @ XX INCHES HgV
MODEL:

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REV	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	10-08-15	JAD

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DATE	07-14-15
CHK BY	—
DATE	—
APPR BY	—
DATE	—

TITLE: P&ID MASTER LEGEND

AECOM
FORMER OZONE INDUSTRIES SITE - QUEENS, NY

JOB NO. 15-152 (SSDS)

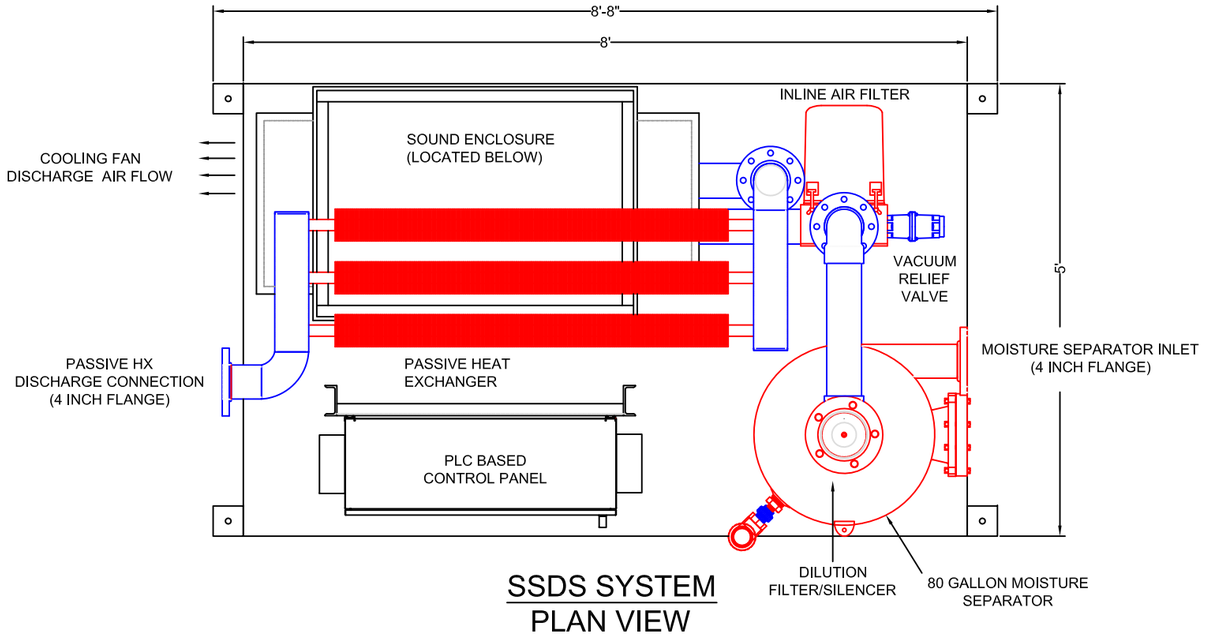
SCALE	SIZE	DWG NO.	SHEET	REV
NTS	D	M-1	2 OF 2	A

TABLE 1
PROCESS INSTRUMENTATION DIAGRAM INSTRUMENT LIST

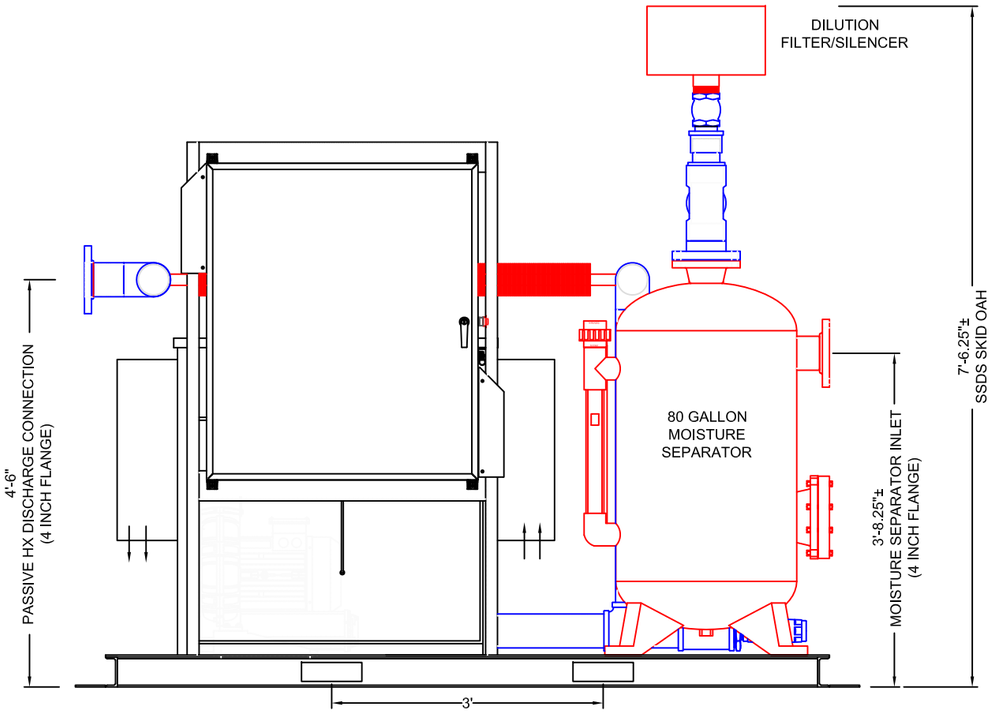
REVISION A OCTOBER 9, 2015

15-152 SSD SYSTEM - FORMER OZONE INDUSTRIES - OZONE PARK, NY

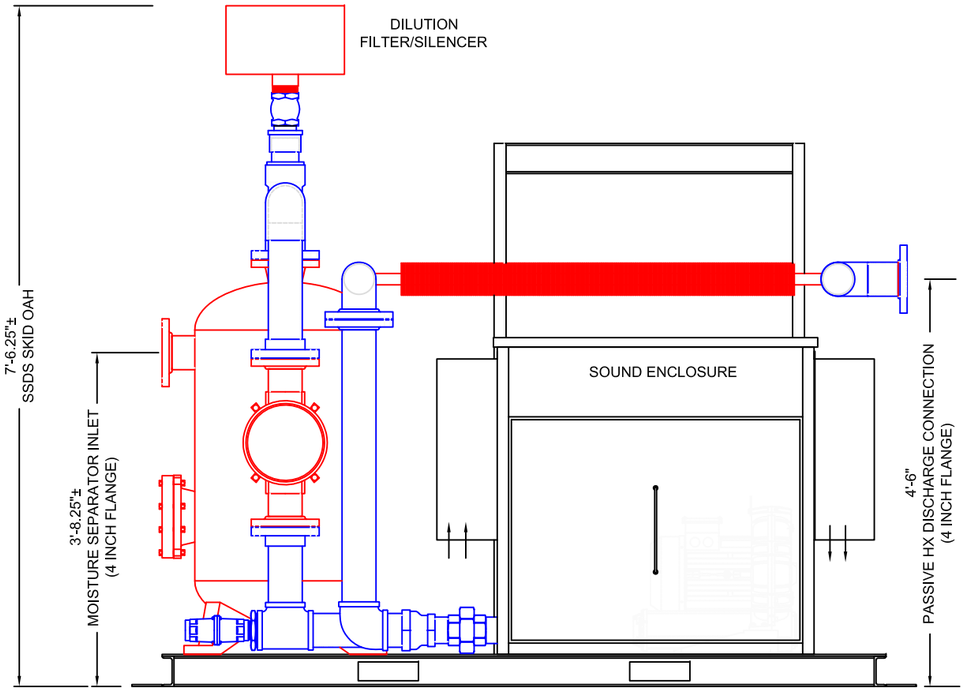
TAG	ITEM	MODEL	MANUFACTURER	SPECIFICATION
LSHH-211	MS HIGH LEVEL SWITCH, 1-FLOAT STYLE, SS FLOATS, 0.6 SG	L500-1POS	FPI	1-FLOAT STYLE / SS ROD / 2 INCH NPT / SS FLOATS - S.G. 0.60 / N.C. - HH / SPDT / 50W
PI-SSD1 / SSD8	MANIFOLD VACUUM GAUGES, (-)100-0" WC VAC.	LPG4-D7722N	DWYER	(-)100 TO 0 IWC-V / 2.5 INCH STEEL CASE / BRASS WETTED PARTS / 0.25 INCH BOTTOM MOUNT CONNECTION
PI-208, 214	INLET VACUUM GAUGES, (-)100-0" WC VAC.	LPG4-D7722N	DWYER	(-)100 TO 0 IWC-V / 2.5 INCH STEEL CASE / BRASS WETTED PARTS / 0.25 INCH BOTTOM MOUNT CONNECTION
PT-207	INLET PRESSURE TRANSMITTER, 0-15 PSIA	626-00-GH-P1-E3-S1	DWYER	PIEZO-RESISTIVE PRESSURE TRANSMITTER / 0-15 PSIA 0.25% ACCURACY / 316L SS / 0 - 175 F TEMP LIMITS / 30 PSIG MAX PRESS / 4 - 20mA OUTPUT - 2 WIRE / 0.25 INCH MNPT / NEMA 4X / 9 FT CABLE
VSL-207	INLET LOW VACUUM SWITCH, 4 - 20 IWC	1950-20-2F	DWYER	PRESSURE SWITCH - XP - ADJUSTABLE / 4 TO 20 IWC / 0.4 MAX DEAD BAND @ 4 IWC / (-)40 TO 140 F TEMP RATING / 45 IWC MAX PRESSURE / SPDT SWITCH TYPE / 15AMP @ 125 VAC SWITCH RATING / 0.125 INCH PROCESS
DP-210	INLET FLOWSENSOR PITOT TUBE, 4"	DS-300-4	DWYER	4 INCH AVERAGING STYLE PITOT TUBE / STAINLESS STEEL CONSTRUCTION W ITH BRASS ISOLATION VALVES / 0 - 200 F TEMP LIMITS
FI & DPT-210	PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	605-10	DWYER	INDICATING DPT / 0-10 IN W.C. +/- 2% / 2 PSI MAX PRESS / 32-120 F TEMP LIMITS / POWER 10-32 VDC IN / 4-20 MA OUT / 0.125 IN PROCESS
DPI-215	INLINE FILTER DIFFERENTIAL PRESSURE GAUGE, 0-10" WC DP	2010	DWYER	0 - 10 IN WC D.P. RANGE (MINOR DIV. 0.20) / CAST ALUMINUM CASE / 4' ACRYLIC COVER / -20 IN Hg TO 15 PSIG PRESSURE LIMITS / 20 - 140 F RANGE / 0.125 IN CONNECTIONS
DP-219	DISCHARGE FLOWSENSOR PITOT TUBE, 4"	DS-300-4	DWYER	4 INCH AVERAGING STYLE PITOT TUBE / STAINLESS STEEL CONSTRUCTION W ITH BRASS ISOLATION VALVES / 0 - 200 F TEMP LIMITS
FI & DPT-219	PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	605-10	DWYER	INDICATING DPT / 0-10 IN W.C. +/- 2% / 2 PSI MAX PRESS / 32-120 F TEMP LIMITS / POWER 10-32 VDC IN / 4-20 MA OUT / 0.125 IN PROCESS
TI-209, 218, 223	TEMPERATURE INDICATORS, 0-250 DEGF	1NFY4	AV	BIMETAL THERMOMETER / 0 TO 250 F / 2.5 INCH STEM / 3 INCH DIAL / 0.5 INCH MNPT BACK-MOUNT / SS CASE
PI-217, 221	DISCHARGE PRESSURE GAUGES, 0-100" WC PRESS.	LPG4-D8622N	DWYER	0 TO 100 IWC / 2.5 INCH STEEL CASE / BRASS WETTED PARTS / 0.25 INCH BOTTOM MOUNT CONNECTION
TS-222	DISCHARGE TEMPERATURE SWITCH, 0-225 DEGF ADJUSTABLE	B54-103	UNITED ELECTRIC	IMMERSION PROBE TEMPERATURE SWITCH / 1-SETPOINT ADJUSTABLE - SPDT / 0° to 225°F / NEMA 1 ALUMINUM INDOOR / NON HAZARDOUS / 2-1/8 IN L BRASS PROBE / 3/8 IN NPT / 15 AMP RATING



SSDS SYSTEM
PLAN VIEW



SSDS SYSTEM
FRONT ELEVATION



SSDS SYSTEM
BACK ELEVATION

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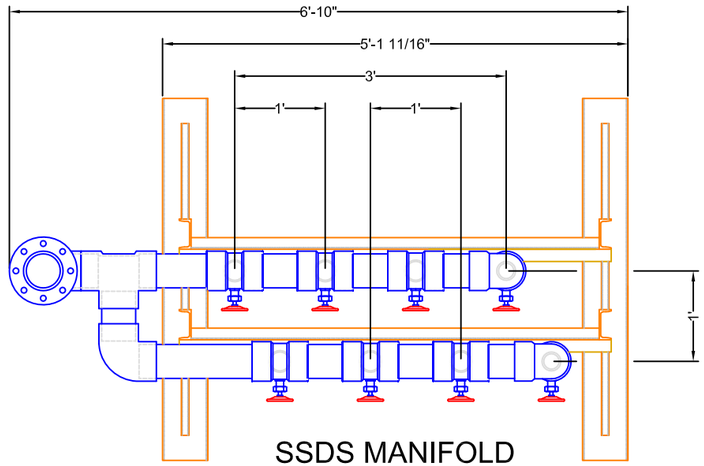
REV	DESCRIPTION	DATE	APPR
A	AS-BUILT	10-08-15	JAD

REVISIONS

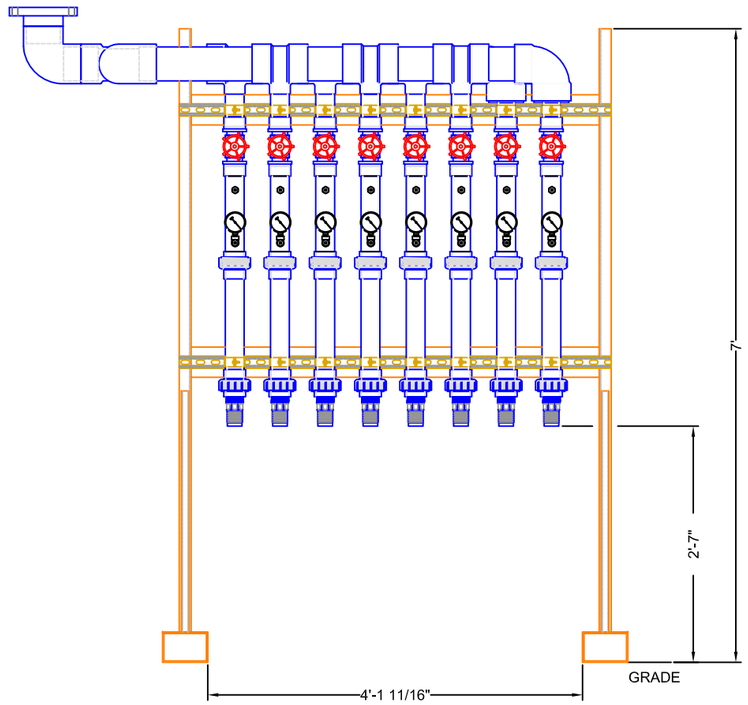
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DRWN BY / DATE	JAD / 07-16-15
CHK BY / DATE	
APPR BY / DATE	
TITLE	SSDS SKID LAYOUT
	AECOM - FORMER OZONE INDUSTRIES SITE, OZONE PARK / QUEENS NY
JOB NO.	15-152 (SSDS)
SCALE / SIZE / DWG NO. / SHEET / REV	N/A / D / M-2 / 1 OF 2 / A

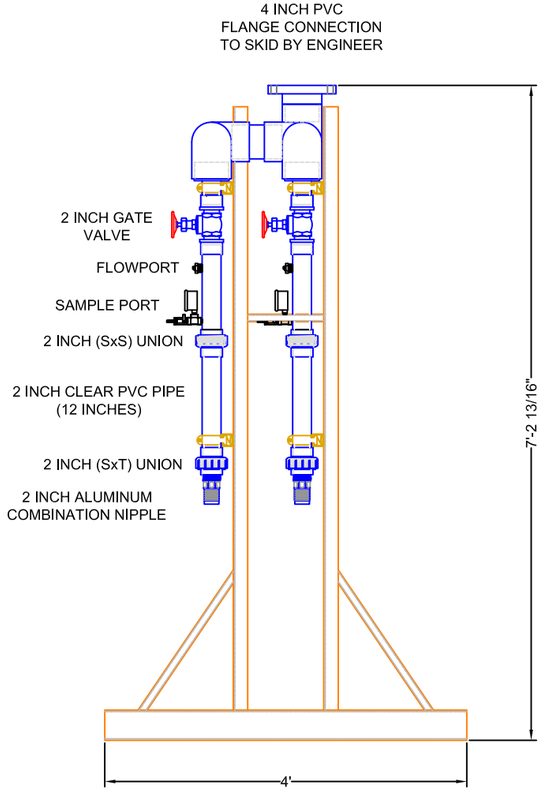
(8 LEG) SSDS MANIFOLD LAYOUT DRAWING



SSDS MANIFOLD
PLAN VIEW



SSDS MANIFOLD
FRONT ELEVATION



SSDS MANIFOLD
SIDE ELEVATION

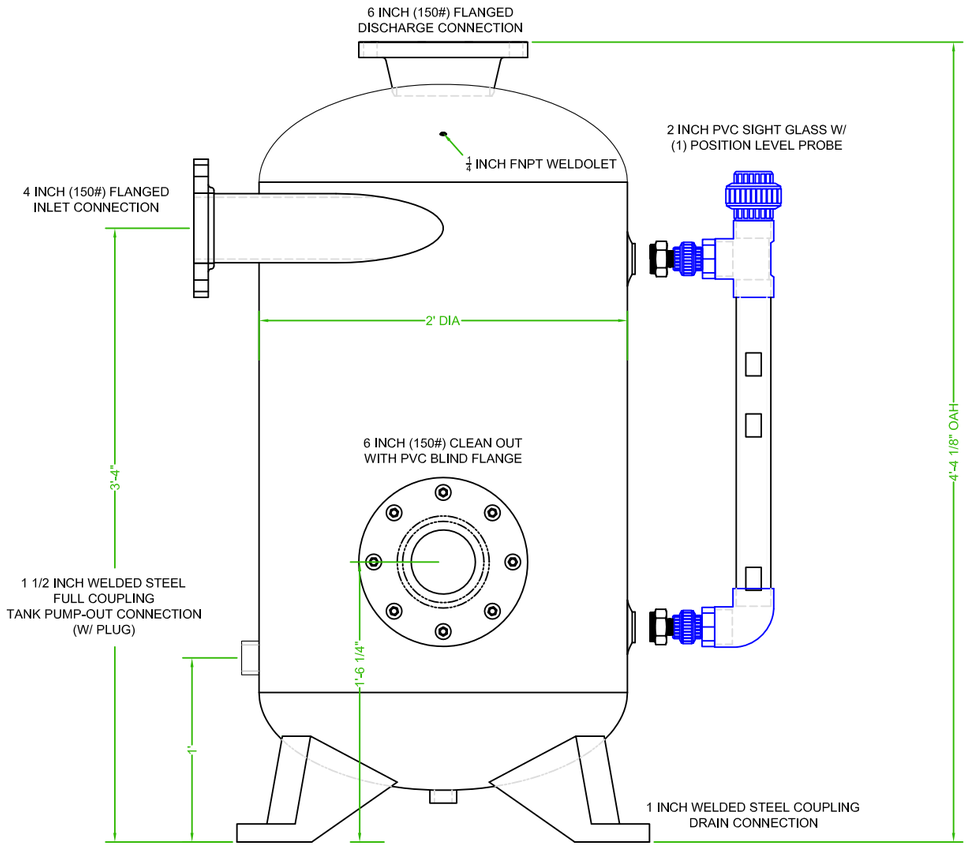
NOTES:
1. DRAWING DEPICTS PRELIMINARY LAYOUT ONLY AND IS SUBJECT TO CHANGES DURING CONSTRUCTION. ANY MAJOR DIFFERENCES WILL BE BROUGHT TO THE ATTENTION OF AECOM FOR REVIEW.
2. THE MANIFOLD WILL BE SUPPLIED WITH A CARBON STEEL FRAME FOR MOUNTING ONCE ON SITE.THE BASE FRAME WILL BE PRIMED AND PAINTED WITH AN INDUSTRIAL GRADE PAINT (RUSTOLEUM 7400 SERIES OR EQUAL)

REVISIONS			
REV.	DESCRIPTION	DATE	APPR
A	AS-BUILT	10-08-15	JAD

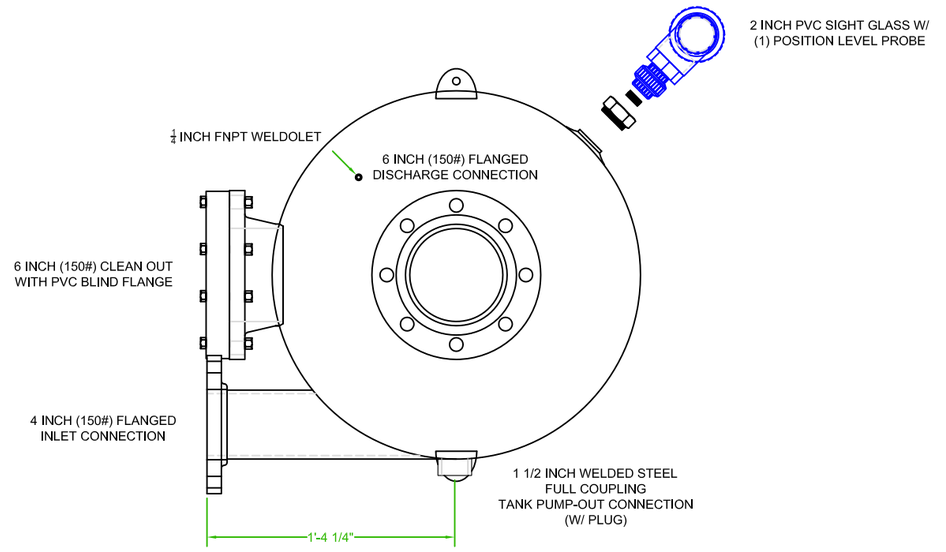
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DRWN BY / DATE	JAD 07-16-15
CHK BY / DATE	
APPR BY / DATE	
TITLE	SSDS MANIFOLD LAYOUT
	AECOM - FORMER OZONE INDUSTRIES SITE OZONE PARK / QUEENS NY
JOB NO.	15-152 (SSDS)
SCALE / SIZE / DWG NO. / SHEET / REV	N/A / D / M-2 / 2 OF 2 / A



(D-2) SEPARATOR TANK
ELEVATIONAL VIEW



(D-2) SEPARATOR TANK
PLAN VIEW

NOTES:
1. TANK CONSTRUCTION - CARBON STEEL, 200 PSI RATED VESSEL
2. EXTERIOR MECHANICALLY PRE-PARED, PRIMED AND PAINTED WITH INDUSTRIAL ENAMEL PAINT (RUSTOLEUM SERIES 7400 OR EQUAL)
3. ESTIMATED CONDENSATE LEVEL:
LSHH-211 - 49 GALLONS

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	10-08-15	JAD

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DATE	07-28-15
CHK BY	---
DATE	---
APPR BY	---
DATE	---

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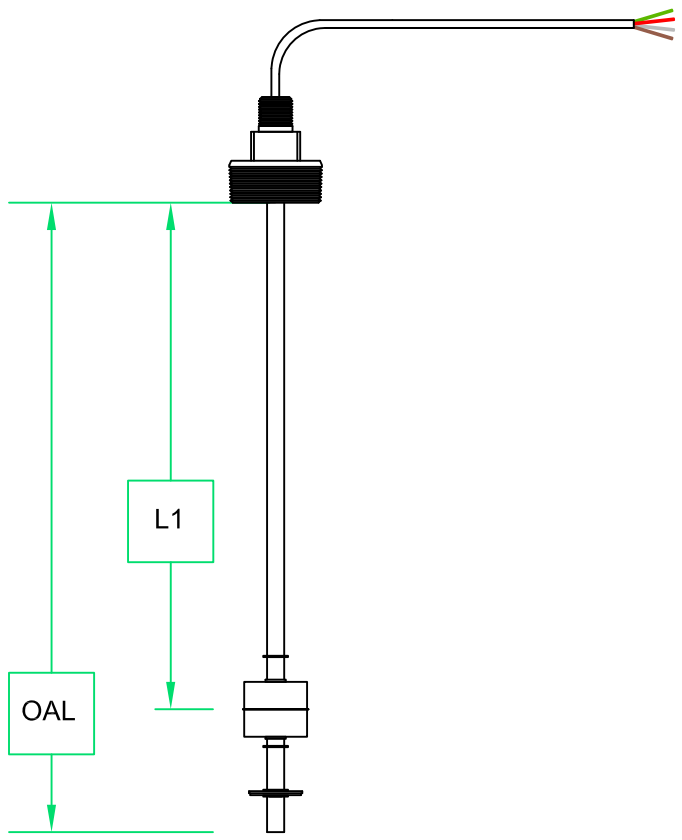
TITLE
80 GALLON MOISTURE SEPARATOR (D-2)

AECOM
FORMER OZONE INDUSTRIES SITE - QUEENS, NY

JOB NO.
15-152 (SSDS)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	M-3	1 OF 1	A

L1	RED BLACK	NORMALLY CLOSED	HIGH-HIGH (1) COMMON



UL LISTED	
HOUSING	N/A
CONDUIT CONNECTION	$\frac{1}{2}$ NPT
FITTING AND STEM MATERIAL	STAINLESS STEEL
STEM DIAMETER	$\frac{1}{2}$ INCH
FITTING SIZE	2 INCH NPT
FLOAT STOP	SNAP RING
FLOAT MATERIAL	STAINLESS STEEL
SWITCH TYPE	SPST
SWITCH RATING	100 WATT
SPECIFIC GRAVITY	0.6
CENTERING DISC	STAINLESS STEEL

OAL - 14 INCHES
L1 - 12 INCHES
CABLE LENGTH - 120 INCHES
U.L. LISTED

GENERAL NOTES:

1. FOR TERMINAL BLOCK LOCATION SEE DRAWING (I-1)
2. FOR WIRING TERMINAL DESIGNATION SEE DRAWING (I-2)

REV	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	10-08-15	JAD

REVISIONS

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CHK BY — DATE
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TITLE: 1 POSITION LEVEL SENSOR
LSHH-211

AECOM
FORMER OZONE INDUSTRIES SITE - QUEENS, NY

JOB NO. 15-152 (SSDS)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	M-4	1 OF 1	A

SECTION 3 - BLOWER ENCLOSURE ACCESSORIES

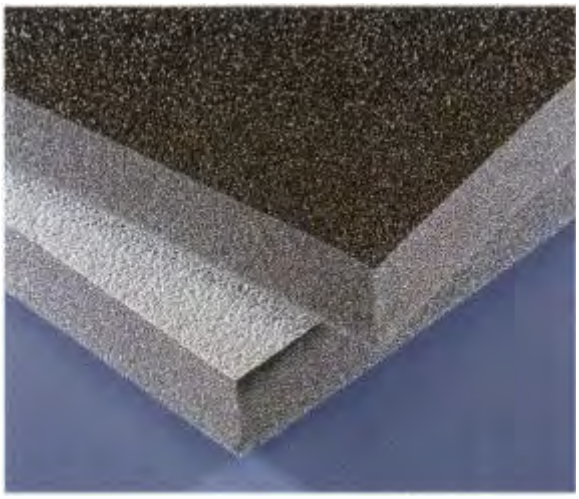
SOUND REDUCTION FOAM - AMERICAN ACOUSTICAL HC1.00EBUA3-ANATIO

EXHAUST FAN, 12"', 1286 CFM @ 0" S.P., 115 VAC, 1-PHASE - DAYTON 10D963

EXHAUST FAN THERMOSTAT, (-)30-90 F ADJUSTABLE - WHITE RODGERS 1687-9

Technical Data Sheet

Hushcloth Urethane Faced Foams



Hushcloth Urethane Faced (***HC BU/BNU***) acoustical foams are designed to provide maximum absorption of airborne sound with minimum thickness and weight. These flexible polyurethane open cell foam products are manufactured to optimize pore size, air flow resistance, and density.

HC BU/BNU foams provide a colorful - standard colors are Black (BU) or Bone White BNU - durable, abrasion and puncture resistant product. These urethane films are heat laminated to form a decorative textured surface and can be made impervious to most petroleum products, moisture, and dirt.

Matte facing can be added to our embossed foam to give a more pronounced decorative rosette pattern. (Type Deco-Foam CF) .

HC BU/BNU Foams can be purchased in rolls or sheets, and can be die cut, or fabricated to customer specifications. They are easily cut with a knife, saw or scissors. The addition of pressure sensitive adhesive provides a convenient method of fastening to most substrates.

Polyurethane Foam - Physical Properties

Property	Polyester Foam	Polyether Foam
Color	Charcoal Grey	
Density	2lb/ft³ (32 kg/m³) ±10% or 4 lb/ft³ (64 kg/m³) ±10% per ASTM D3574-86 test A	
Tear Strength	1.5 ppi (2.6 N/cm) per ASTM D3574-86 test F	1.58 ppi (2.8 N/m) per ASTM D3574-86 test F
Tensile Strength	20 psi (135 kPa) per ASTM D3574-86 test E	13 psi (90 kPa) per ASTM D3574-86 test E
Elongation	120% per ASTM D3574-86 test E	193% per ASTM D3574-86 test E
Compression Set (50% Deflection)	Max 10% ASTM D3574-86 test D	
Heat Resistance	Retention of tensile strength after 22 hours dry heat aging at 140°C min. 70% ASTM D3574-86 test K	
Humidity Resistance	Retention of tensile strength after 6 hours, steam autoclave at 105°C min. 70% ASTM D3574-86 test J	
Chemical Resistance	Good for common fluids, water, petroleum, solvents, and alkalis. Swelling will occur, will return to almost 100% after drying	
Flammability	MVSS 302, UL-94 HF1, and FAR 25.853(b)	
Service Temperature	-40°F (-40°C) to +225°F (107°C) continuous to 275°F(135°C) intermittent	
Thermal Conductivity	BTU-in/ft²h°F 0.25 (36mW/m°K) per ASTM C 177	

HC BU/BNU **Foams** can be made in combination with **Whispermat**™ barrier systems when both absorption and transmission loss is needed (see Whispermat brochure), or **VE**™ damping systems, when enhanced vibration control is required. (see VE damping brochure).

Pressure Sensitive Adhesive

Supported SBR (temps to 60°C/140°F)
Unsupported Acrylic (temps to 120°C/250°F)
Supported Acrylic (temps to 120°C/250°F)

Standard Sizes

Rolls 54" x 50ft (1370mm x 15m)
Sheets 54" x 72" or 36" or 24"(1370mm x 1800 or 900 or 600mm)
Fabricated or Die Cut
Thicknesses ¼" - 2"(6mm - 50mm)

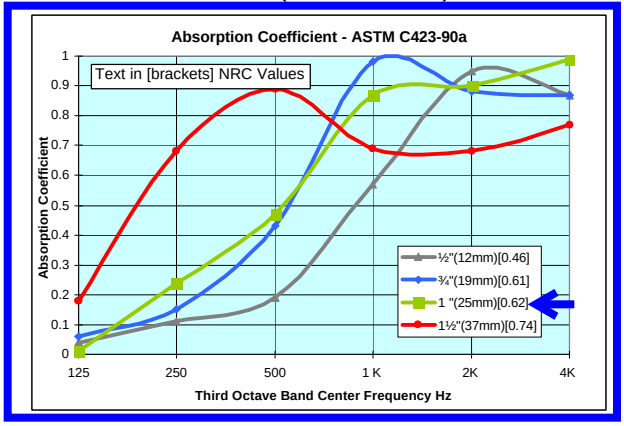


Figure 1 Absorption Performance for various thicknesses of HC BU/BNU Foams

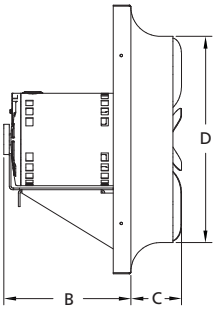
American Acoustical Products, 311 Hopping Brook Road, Holliston, Massachusetts 01746
Telephone (508) 429-1165 FAX (508) 429-8543 email info@aapusa.com
A division of Ward Process Incorporated

Please read and save these instructions. ***Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.***

Dayton® Direct-Drive Exhaust Fans

Description

Dayton exhaust fans are designed for commercial and industrial applications. Commercial units quietly exhaust high volumes of air for ventilating schools, offices, storage facilities and light manufacturing and assembly areas. Industrial units exhaust larger volumes of air at higher static pressures for ventilating factories, foundries and other industrial environments. Mount in vertical or horizontal position (vertical only for fans with intake guards). Construction includes galvanized steel frame, pre-punched mounting holes, and aluminum propeller. Motor is totally enclosed air over, with Class B insulation and ball bearings, except sleeve bearings on 10D952 thru 10D956. All fans have a maximum ambient temperature of 104°F and are UL/cUL Listed Standard 705.



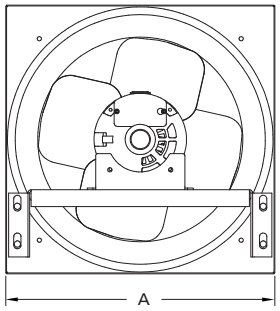


Figure 1 — Quiet-Design and Commercial Dimensions

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Optional Accessories

General or UL 705	
Description	**Model No.'s**
Aluminum Wall Shutter:	4C555-4C559, 3C308-3C310
Fan Guard:	1WBT8, 1WBT9, 1WBU1-1WBU5
Wall Collar:	3FKF3, 1WBV1-1WBV3
Wall Housing:	3FKF4-3FKF9, 3FKG1
Speed Control (For 115V):	1DGV1, 1DGV2

Dayton Electric Mfg. Co. certifies that the fans shown herein are licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

Dimensions and Specifications

Model	Prop. Dia.	Shaft Dia.	A	B	C	D	Blades	Recommended Wall Opening — Direct to Wall	Recommended Wall Opening — Wall Collar, Wall Collar & Guard, or Wall Housing
QUIET-DESIGN AND COMMERCIAL (See Figure 1)									
10E039	12"	1/2"	16"	4½"	3"	12¼"	3	14½ x 14½"	17¼ x 17¼"
10D971	12	1/2	16	4½	3	12¼	4	14½ x 14½	17¼ x 17¼
10E040, 10E041	16	1/2	20	7	3¼	16½	3	18½ x 18½	21¼ x 21¼
10D972	16	1/2	20	7	3¼	16½	4	18½ x 18½	21¼ x 21¼
10D973, 10D974	18	1/2	22	7	3⅛	18½	3	20½ x 20½	23¼ x 23¼
10E042	18	1/2	22	7	3⅛	18½	4	20½ x 20½	23¼ x 23¼
10E043	18	1/2	22	6	3⅛	18½	4	20½ x 20½	23¼ x 23¼
10D975, 10E045	20	1/2	24	7	3¾	20½	3	22½ x 22½	25⅝ x 25⅝
10D976, 10D977, 10E044	20	1/2	24	7½	3¾	20½	3	22½ x 22½	25⅝ x 25⅝
10E046	24	1/2	28	9½	3⅞	24½	3	26½ x 26½	29⅝ x 29⅝
10E047	24	5/8	28	8	3⅞	20½	3	26½ x 26½	29⅝ x 29⅝
10D978, 10D979, 10D980	24	1/2	28	8¾	3⅞	24½	3	26½ x 26½	29⅝ x 29⅝
10E048	24	5/8	28	9	3⅞	24½	3	26½ x 26½	29⅝ x 29⅝
10D981, 10D982	30	5/8	34	8¾	4¾	30½	3	32½ x 32½	35⅝ x 35⅝
10E049	30	5/8	34	9	4¾	30⅜	3	32½ x 32½	35⅝ x 35⅝

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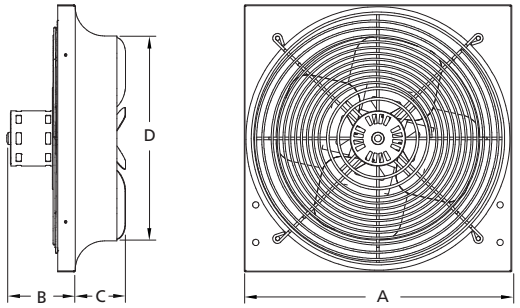


Figure 2 — Commercial With Intake Guard 8-18 Dimensions

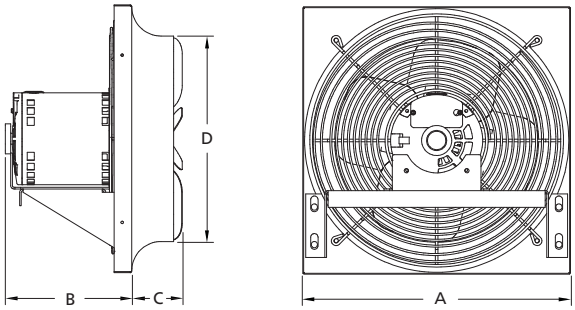


Figure 3 — Commercial With Intake Guard 20-24 Dimensions

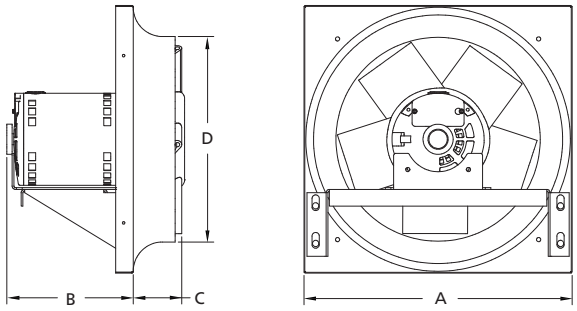


Figure 4 — Industrial Dimensions

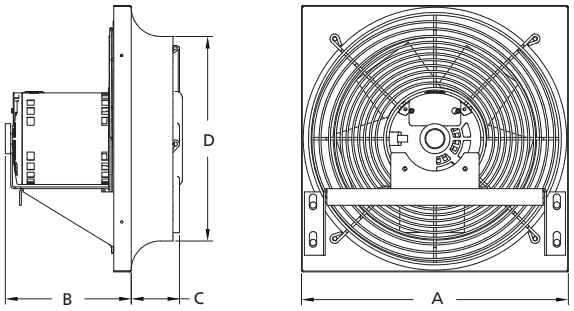


Figure 5 — Industrial With Intake Guard Dimensions

Dimensions and Specifications (Continued)

Model	Prop. Dia.	Shaft Dia.	A	B	C	D	Blades	Recommended Wall Opening: Direct to Wall	Recommended Wall Opening: Wall Collar, Wall Collar & Guard, or Wall Housing
COMMERCIAL WITH INTAKE GUARD 8-18 (See Figure 2)									
10D952	8"	5/16"	12"	4"	3"	8¼"	5	10½ x 10½"	13¼ x 13¼"
10D953	10	5/16	14	4	3½	10¼	5	12½ x 12½	15¼ x 15¼
10D954	12	5/16	16	4½	3	12¼	3	14½ x 14½	17¼ x 17¼
10D955	14	5/16	18	4	3¼	14¼	3	16½ x 16½	19¼ x 19¼
10D956	16	5/16	20	4	3¼	16½	3	18½ x 18½	21¼ x 21¼
10D957	18	1/2	22	7	3⅛	18½	3	20½ x 20½	23¼ x 23¼
10D960	18	1/2	22	7½	3⅛	18½	3	20½ x 20½	23¼ x 23¼
COMMERCIAL WITH INTAKE GUARD 20-24 (See Figure 3)									
10D958, 10D961	20	1/2	24	7	3¾	20½	3	22½ x 22½	25⅝ x 25⅝
10D959, 10D962	24	1/2	28	7	7⅞	24½	3	26½ x 26½	29⅝ x 29⅝

Models 10D952 thru 10D994, 10E039 thru 10E049

Dimensions and Specifications (Continued)

Model	Prop. Dia.	Shaft Dia.	A	B	C	D	Blades	Recommended Wall Opening: Direct to Wall	Recommended Wall Opening: Wall Collar, Wall Collar & Guard, or Wall Housing
INDUSTRIAL (See Figure 4)									
10D983, 10D984	16"	1/2"	20"	7"	3¼"	16½"	3	18½ x 18½"	21¼ x 21¼"
10D985, 10D986	18	1/2	22	7	3⅛	18½	3	20½ x 20½	23¼ x 23¼
10D987, 10D988	20	5/8	24	7	3¾	20½	4	22½ x 22½	25⅝ x 25⅝
10D989	24	1/2	28	8¾	3⅞	24½	6	26½ x 26½	29⅝ x 29⅝
10D990, 10D991	24	5/8	28	8¾	3⅞	24½	3	26½ x 26½	29⅝ x 29⅝
10D992, 10D993	30	5/8	34	9	4¾	30⅜	3	32½ x 32½	35⅝ x 35⅝
10D994	36	5/8	40	9	5¼	36⅛	3	38½ x 38½	41⅝ x 41⅝
INDUSTRIAL WITH INTAKE GUARD (See Figure 5)									
10D963	12"	1/2	16"	4½"	3"	12¼"	5	14½ x 14½"	17¼ x 17¼"
10D964	16	1/2	20	7	3¼	16½	3	18½ x 18½	21¼ x 21¼
10D965	18	1/2	22	7	3⅛	18½	3	20½ x 20½	23¼ x 23¼
10D966, 10D967	20	1/2	24	7	3¾	20½	3	22½ x 22½	25⅝ x 25⅝
10D968	20	5/8	24	7½	3¾	20½	3	22½ x 22½	25⅝ x 25⅝
10D969	24	1/2	28	7	7⅞	24½	3	26½ x 26½	29⅝ x 29⅝
10D970	24	1/2	28	7½	3⅞	24½	6	26½ x 26½	29⅝ x 29⅝

Performance

Model: 1-Phase 115/230V	Model: 3-Phase 208-230/460V	Prop. Dia.	HP	Fan RPM	Sones @ 0.000" SP @ 5Ft.	CFM Air Delivery @ Static Pressure Shown: 0.000"	0.125"	0.250"	0.375"	0.500"
QUIET-DESIGN										
10E039	—	12	1/4	1750	9.8	1311	1167	—	—	—
10E040	**10E041**	16	1/4	1750	14.8	2432	2212	1945	—	—
10E042	**10E043**	18	1/3	1750	19.4	2979	2810	2608	2374	—
10E044	**10E045**	20	1/2	1140	13.9	4509	4112	3590	2888	—
10E046	—	24	1/2	1140	17.9	5703	5293	4833	4287	—
10E047	**10E048**	24	3/4	1140	19.0	6236	5854	5390	4818	—
—	**10E049**	30	3/4	1140	24	8865	8358	7708	6970	—
COMMERCIAL										
10D971	—	12	1/4	1750	12.0	1590	1432	1220	1007	—
10D972	—	16	1/4	1725	16.6	2483	2335	2147	1913	—
10D973	**10D974**	18	1/3	1725	22	3194	3007	2805	2561	—
10D975	—	20	1/3	1140	14.6	3717	3319	2803	1959	—
10D976	**10D977**	20	1/2	1140	13.9	4509	4112	3590	2888	—
10D978	—	24	1/3	1140	16.5	4632	4196	3664	2835	—
10D979	**10D980**	24	1/2	1140	17.0	4686	4363	3953	3394	—
10D981	**10D982**	30	3/4	1140	27	9203	8505	7742	6879	—

Performance certified is for installation type A: Free inlet, Free outlet. Performance ratings do not include the effects of appurtenances (accessories). Speed (RPM) shown is nominal. Performance is based on actual speed of test. The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per AMCA Standard 301. Values shown are for installation type A: Free inlet hemispherical sone levels.

Dayton® Direct-Drive Exhaust Fans

Performance (Continued)

Model 1-Phase 115/230V	Model 3-Phase 208-230/460V	Prop. Dia.	HP	Fan RPM	Sones @ 0.000" SP @ 5Ft.	CFM Air Delivery @ Static Pressure Shown 0.000"	0.125"	0.250"	0.375"	0.500"
COMMERCIAL, WITH INTAKE GUARD († 115V, * Speed Controllable)										
10D952†*	**—**	8	1/30	1725	6.9	454	319	170	—	—
10D953†*	**—**	10	1/30	1600	8.8	730	624	381	—	—
10D954†*	**—**	12	1/30	1600	6.4	889	733	509	—	—
10D955†*	**—**	14	1/20	1550	13.5	1066	878	601	—	—
10D956†*	**—**	16	1/20	1550	12.0	1201	934	594	—	—
10D957†*	**—**	18	1/4	1140	11.1	2627	2290	1818	1022	—
10D960	**—**	18	1/3	1725	19.6	3126	2953	2746	2503	—
10D958†*	**—**	20	1/4	1140	12.2	3491	3060	2502	1394	—
10D961†	**—**	20	1/4	1140	12.2	3491	3060	2502	1394	—
10D959†*	**—**	24	1/4	1160	15.8	3533	3023	2403	1722	—
10D962	**—**	24	1/3	1140	16.3	4430	3974	3417	2499	—
INDUSTRIAL										
10D983	**10D984**	16	1/4	1750	14.1	2476	2288	2061	1769	1350
10D985	**10D986**	18	1/3	1750	18.5	3354	3097	2805	2468	2003
10D987	**10D988**	20	3/4	1750	23	4557	4254	3919	3542	3101
10D989	**—**	24	1/2	1140	23	5892	5471	4961	4315	3593
10D990	**10D991**	24	3/4	1725	31	6978	6499	5905	5184	4412
10D992	**10D993**	30	3/4	1140	25	9308	8461	7556	6428	4998
—	**10D994**	36	3/4	1140	33	12,363	10,425	8453	6207	2895
INDUSTRIAL, WITH INTAKE GUARD										
10D963	**—**	12	1/4	1750	11.2	1286	1192	1022	902	666
10D964	**—**	16	1/4	1725	15.6	2847	2591	2314	1951	1265
10D965	**—**	18	1/4	1725	14.5	2989	2751	2469	2108	1555
10D966	**—**	20	1/4	1750	18.6	3198	2847	2495	2091	1579
10D967	**—**	20	1/3	1750	19.6	3745	3449	3109	2716	2195
10D968	**—**	20	3/4	1750	22	4590	4240	3843	3381	2675
10D969	**—**	24	1/3	1750	30	3984	3400	2867	2296	1706
10D970	**—**	24	1/2	1140	17.0	5438	5049	4573	3922	3242

Performance certified is for installation type A: Free inlet, Free outlet. Performance ratings do not include the effects of appurtenances (accessories). Speed (RPM) shown is nominal. Performance is based on actual speed of test. The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per AMCA Standard 301. Values shown are for installation type A: Free inlet hemispherical sone levels.

Models 10D952 thru 10D994, 10E039 thru 10E049

Unpacking

1. Inspect for any damage that may have occurred during transit.
2. Shipping damage claim must be filed with carrier.
3. Check all bolts, screws, set-screws, etc. for looseness that may have occurred during transit. Retighten as required. Rotate propeller by hand to be sure it turns freely.

General Safety Information

⚠ DANGER ***Do not depend on any switch as the sole means of disconnecting power when installing or servicing the fan. Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury. Motor will restart without warning after thermal protector trips. Do not touch operating motor, it may be hot enough to cause injury.***

⚠ DANGER ***Do not place any body parts or objects in fan, motor openings or drives while motor is connected to power source.***

⚠ WARNING ***Do not use this equipment in explosive atmospheres!***

1. Read and follow all instructions and cautionary markings. Make sure electrical power source conforms to requirements of equipment and local codes.
2. Fans should be assembled, installed and serviced by a qualified technician. Have all electrical work performed by a qualified electrician.
3. Follow all local electrical and safety codes in the United States and Canada, as well as the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA) in the United States. Ground motor in accordance with NEC Article 250 (grounding). Follow the Canadian Electric Code (CEC) in Canada.

⚠ CAUTION ***To reduce the risk of injury to persons, observe the following:***

OSHA requires OSHA complying guards when fan is installed within 7 feet of floor or working level.

UL/cUL Standards require OSHA complying guards when fan is installed within 8 feet of floor or working level.

4. All moving parts should be guarded.
5. Do not kink power cable or allow it to come in contact with sharp objects, oil, grease, hot surfaces or chemicals. Replace damaged cords immediately.
6. Make certain that the power source conforms to the requirements for the equipment.
7. Motor must be securely and adequately grounded. This can be accomplished by wiring with a grounded, metal-clad race way system by using a separate ground wire connected to the bare metal of the motor frame, or other suitable means.

Installation

⚠ WARNING ***Installation, troubleshooting and parts replacement is to be performed only by qualified personnel.***

WALL MOUNTING

1. Move fan to the desired location and determine the method by which the fan is to be mounted as shown in Figures 6, 7, 8 and 9. Optional wall collar (Figure 7), wall collar and guard (Figure 8) or wall housing (Figure 9) provide a convenient means of mounting sidewall fans.

NOTE: Wall shutter must be motorized to open during fan operation in either direction.

2. Cut an appropriate sized hole in the wall using the Dimensions table.

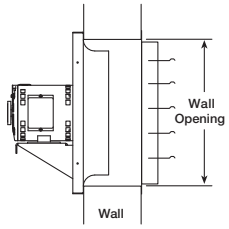


Figure 6 — Direct to Wall Installation

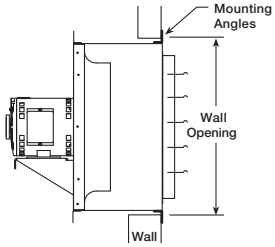


Figure 7 — Wall Collar Installation

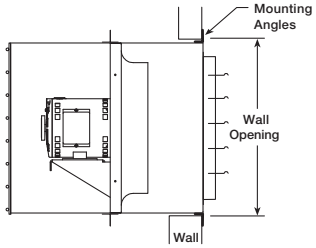


Figure 8 — Wall Collar & Guard Installation

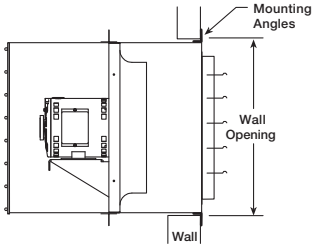


Figure 9 — Wall Housing Installation

Dayton® Direct-Drive Exhaust Fans

ENGLISH

Installation (Continued)

NOTE: Fans mounted to the wall require a different opening size than those mounted in collars or housings.

NOTE: Wall opening size and propeller-to-shutter distance are two important dimensions for fan installation.

3. The fan should be securely mounted within a rigid framework to prevent flexing or movement of the fan frame during operation. The fan frame should be equally supported on all sides within the framework and caution should be taken to avoid twisting of the fan frame during installation.

NOTE: Allowing the fan frame to flex or move during operation will create harmful vibrations which may damage the unit.

4. Fans should be mounted in opening with 1/4" clearance around perimeter. Framing should be secured to building structure utilizing corrosion resistant fasteners (by others). Fasteners should be used in all pre-punched mounting holes in the fan panel.
5. Install remaining components (shutter, intake guard, etc.).
6. Check all fasteners and set screws for tightness.
7. Rotation direction of the propeller should be checked by momentarily turning the unit on. Rotation should be in the same direction as the rotation decal affixed to the unit. For 3-phase installations, fan rotation can be reversed by interchanging any two of the three electrical leads. For single phase installations follow the wiring diagram located on the motor.

ELECTRICAL CONNECTION

NOTE: Refer to motor nameplate for wiring procedures.

1. Motor and fan must be securely grounded (bare metal) to a suitable electric ground, such as a grounded water pipe or ground wire system.

⚠ WARNING ***Comply with all local and national safety codes including the National Electrical Code (NEC) and National Fire Protection Act (NFPA).***

2. Wire motor for desired voltage per wiring diagram on motor.
3. Wire control switches at ground level.
4. Before activating fan, inspect to be sure that there are no obstructions or debris that would interfere with the propeller.

Operation

1. Before starting up or operating your new Dayton fan, check all fasteners for tightness. In particular, check set screws in propeller hub. While in the OFF position, or before connecting the fan to power, turn the fan propeller by hand to be sure it is not striking the orifice or any obstacle.
2. Start the fan up and shut it off immediately to check rotation of the propeller with directional arrow on the fan panel.
3. When the fan is started, observe the operation and check for any unusual noises.
4. Motor amperage should be checked to avoid overloading of the motor. With the system in full operation measure current input to the motor and compare with the nameplate rating to determine if the BHP is operating under safe load conditions.
5. Keep inlets and approaches to fan clean and free from obstruction.

Maintenance

⚠ WARNING ***Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.***

⚠ CAUTION ***Uneven cleaning of the propeller will produce an out of balance condition that will cause vibration in the fan.***

1. Depending on the usage and severity of the contaminated air, a regularly scheduled inspection for cleaning the fan propeller, housing and surrounding areas should be established.
2. Check for unusual noises when fan is running.
3. Periodically inspect and tighten set-screws.
4. Follow motor manufacturer's instructions for motor lubrication.
5. For disassembly refer to the parts illustration.
6. For critical applications, a spare motor should be available.

Models 10D952 thru 10D994, 10E039 thru 10E049

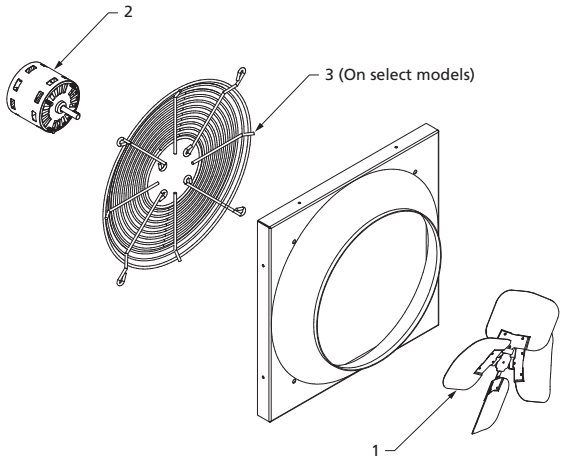


Figure 10 — Repair Parts Illustration for Quiet-Design and Commercial Fans

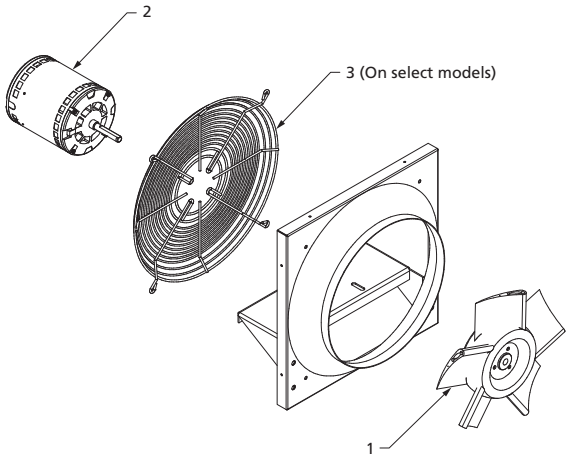


Figure 11 — Repair Parts Illustration for Industrial Fans

Repair Parts List for Direct-Drive Exhaust Fans

Reference Number	Description	Part Number For Models: 10D952	10D953	10D954	10D955	10D956	10D957	10D958	10D959	10D960	Qty.
1	Propeller	52J327	52J331	52J332	52J333	52J334	52J335	51D529	52J336	52J337	1
2	Motor	52J370	52J370	52J370	52J374	52J374	52J371	52J371	52J371	52J382	1
3	Guard	52J395	52J396	52J397	52J398	52J399	52J400	52J400	52J401	52J400	1

Reference Number	Description	Part Number For Models: 10D961	10D962	10D963	10D964	10D965	10D966	10D967	10D968	10D969	Qty.
1	Propeller	51D529	53A457	52J354	52J356	52J358	52J360	52J361	52J362	52J369	1
2	Motor	52J371	52J375	52J372	52J372	52J372	52J372	52J382	52J381	52J382	1
3	Guard	52J400	52J401	52J397	52J399	52J400	52J400	52J400	52J400	52J401	1

Reference Number	Description	Part Number For Models: 10D970	10D971	10D972	10D973	10D974	10D975	10D976	10D977	10D978	Qty.
1	Propeller	52J363	52J339	52J328	52J337	52J337	51D529	52J340	52J340	51N719	1
2	Motor	52J377	52J372	52J372	52J382	52J383	52J375	52J377	52J376	52J375	1
3	Guard	52J401	—	—	—	—	—	—	—	—	1

Reference Number	Description	Part Number For Models: 10D979	10D980	10D981	10D982	10D983	10D984	10D985	10D986	10D987	Qty.
1	Propeller	52J329	52J329	53H245	53H245	52J355	52J355	52J359	52J359	53A457	1
2	Motor	52J377	52J376	52J379	52J378	52J372	52J373	52J382	52J383	52J381	1

Reference Number	Description	Part Number For Models: 10D988	10D989	10D990	10D991	10D992	10D993	10D994	10E039	10E040	Qty.
1	Propeller	52J362	52J367	52J367	52J367	52J364	52J364	52J365	52J353	52J330	1
2	Motor	52J380	52J377	52J381	52J380	52J378	52J378	52J378	52J372	52J372	1

Reference Number	Description	Part Number For Models: 10E041	10E042	10E043	10E044	10E045	10E046	10E047	10E048	10E049	Qty.
1	Propeller	52J330	52J338	52J338	52J340	52J340	52J341	52J343	52J343	52J342	1
2	Motor	52J373	52J382	52J383	52J377	52J376	52J377	52J379	52J378	52J378	1

Dayton® Direct-Drive Exhaust Fans

ENGLISH

Troubleshooting Chart

Symptom	Possible Cause(s)	Corrective Action
Fan inoperative	1. Blown fuse or breaker	1. Replace or repair
	2. Defective motor	2. Replace or repair
	3. Incorrectly wired	3. Shut power OFF and check wiring for proper connections
	4. Electricity turned off	4. Contact local power company
Airflow - Insufficient	1. Damper (shutter) stuck shut	1. Inspect/repair damper
Airflow - Reversed air	3. Propeller rotation reversed	3. Reverse motor rotation, rewire motor
Airflow - Too much air	4. Insufficient static pressure	4. Check static pressure calculation
Excessive noise or vibration	1. Foreign material inside bearing	1. Replace bearing
	2. Loose propeller	2. Tighten set screws or taper bushing screws
	3. Crooked or damaged propeller	3. Replace propeller
	4. Fan not securely anchored	4. Secure properly
	5. Fan propeller out of balance	5. Replace propeller
Motor overloads or overheats	1. Shorted motor winding	1. Replace motor
	2. Incorrect propeller rotation	2. Check motor wiring
	3. Over/Under line voltage	3. Contact Power Company

LIMITED WARRANTY

DAYTON ONE-YEAR LIMITED WARRANTY. *DAYTON® DIRECT-DRIVE EXHAUST FANS, MODELS COVERED IN THIS MANUAL, ARE WARRANTED BY DAYTON ELECTRIC MFG. CO. (DAYTON) TO THE ORIGINAL USER AGAINST DEFECTS IN WORKMANSHIP OR MATERIALS UNDER NORMAL USE FOR ONE YEAR AFTER DATE OF PURCHASE. ANY PART WHICH IS DETERMINED TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP AND RETURNED TO AN AUTHORIZED SERVICE LOCATION, AS DAYTON DESIGNATES, SHIPPING COSTS PREPAID, WILL BE, AS THE EXCLUSIVE REMEDY, REPAIRED OR REPLACED AT DAYTON'S OPTION. FOR LIMITED WARRANTY CLAIM PROCEDURES, SEE "PROMPT DISPOSITION" BELOW. THIS LIMITED WARRANTY GIVES PURCHASERS SPECIFIC LEGAL RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION.*

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WARRANTY DISCLAIMER. *A DILIGENT EFFORT HAS BEEN MADE TO PROVIDE PRODUCT INFORMATION AND ILLUSTRATE THE PRODUCTS IN THIS LITERATURE ACCURATELY; HOWEVER, SUCH INFORMATION AND ILLUSTRATIONS ARE FOR THE SOLE PURPOSE OF IDENTIFICATION, AND DO NOT EXPRESS OR IMPLY A WARRANTY THAT THE PRODUCTS ARE MERCHANTABLE, OR FIT FOR A PARTICULAR PURPOSE, OR THAT THE PRODUCTS WILL NECESSARILY CONFORM TO THE ILLUSTRATIONS OR DESCRIPTIONS. EXCEPT AS PROVIDED BELOW, NO WARRANTY OR AFFIRMATION OF FACT, EXPRESSED OR IMPLIED, OTHER THAN AS STATED IN THE "LIMITED WARRANTY" ABOVE IS MADE OR AUTHORIZED BY DAYTON.*

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Product Suitability. *Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While attempts are made to assure that Dayton products comply with such codes, Dayton cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, review the product applications, and all applicable national and local codes and regulations, and be sure that the product, installation, and use will comply with them.*

Certain aspects of disclaimers are not applicable to consumer products; e.g., (a) some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you; (b) also, some jurisdictions do not allow a limitation on how long an implied warranty lasts, consequently the above limitation may not apply to you; and (c) by law, during the period of this Limited Warranty, any implied warranties of implied merchantability or fitness for a particular purpose applicable to consumer products purchased by consumers, may not be excluded or otherwise disclaimed.

Prompt Disposition. *A good faith effort will be made for prompt correction or other adjustment with respect to any product which proves to be defective within limited warranty. For any product believed to be defective within limited warranty, first write or call dealer from whom the product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to Dayton at address below, giving dealer's name, address, date, and number of dealer's invoice, and describing the nature of the defect. Title and risk of loss pass to buyer on delivery to common carrier. If product was damaged in transit to you, file claim with carrier.*

Manufactured for Dayton Electric Mfg. Co.

Dayton®

WHITE-RODGERS

TEMPERATURE CONTROL
SPDT Remote Bulb
INSTALLATION INSTRUCTIONS

Operator: Save these instructions for future use!

FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR OPERATING THIS CONTROL COULD CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

DESCRIPTION

This control is designed for use on equipment that requires a closed circuit for both rise and fall in temperature. The single pole, double throw switch action offers both open-on-rise terminals as well as close-on-rise terminals.

This control has capillary tubing between the temperature sensitive bulb and the switch mechanism, permitting the switch mechanism to be mounted at any convenient location while the temperature sensitive bulb is located in the fluid or medium being controlled.

PRECAUTIONS

THIS CONTROL MUST BE INSTALLED BY A QUALIFIED INSTALLER.

All wiring must conform to local and national electrical codes and ordinances.

This control is a precision instrument, and should be handled carefully. Rough handling or distorting components could cause the control to malfunction.

This control has been accurately calibrated at the factory. Any attempt to calibrate this control will void the White-Rodgers warranty.

⚠ WARNING

Do not use on circuits exceeding specified voltages. Higher voltages will damage control and could cause shock or fire hazard.

If in doubt about whether your wiring is millivolt, low or line voltage, have it inspected by a qualified heating and air conditioning contractor or a licensed electrician.

⚠ CAUTION

To prevent electrical shock and/or equipment damage, disconnect electric power to system at main fuse or circuit breaker box until installation is complete.

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

Following installation or replacement, follow appliance manufacturers' recommended installation/service instructions to insure proper operation.

INSTALLATION

The switch mechanism of this control may be mounted in any location, provided that the temperature and humidity of the air in which it is located do not cause a condensation on the switch parts.

The sensitive element, or "bulb", should be located in the **average temperature** of the controlled area.

Capillary tubing should be led over a path that protects it from damage from blows, cuts, etc., and should be installed without kinking or twisting. The tubing should be attached to some surface at frequent intervals along its length, and should not hang loosely. Excess tubing should be coiled and secured at a convenient protected location close to the switch mechanism.

The bulb should be handled with reasonable care, as a dent or sharp bend may change the calibration and cause the control to cycle at a temperature different from the dial setting.

EMERSON

WHITE-RODGERS DIVISION
EMERSON ELECTRIC CO.
9797 REAVIS RD., ST. LOUIS, MO. 63123-5398
(314) 577-1300, FAX (314) 577-1517
9999 HWY. 48, MARKHAM, ONT. L3P 3J3
(905) 475-4653, FAX (905) 475-4625

Printed in U.S.A.

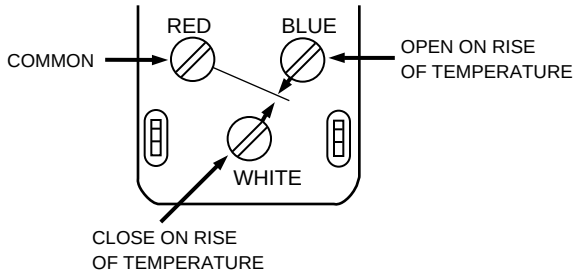
PART NO. 37-1637C
Replaces 37-1637B
9722

Wiring

All wiring must conform to local and national electrical codes and ordinances.

Connect in accordance with the wiring diagrams provided by the equipment manufacturer.

This control has a single-pole, double-throw, snap-action switch. The top left-hand terminal (red) is the common terminal. The top right-hand terminal (blue) has an open-on-rise switch action. The bottom center terminal (white) has close-on-rise switch action.

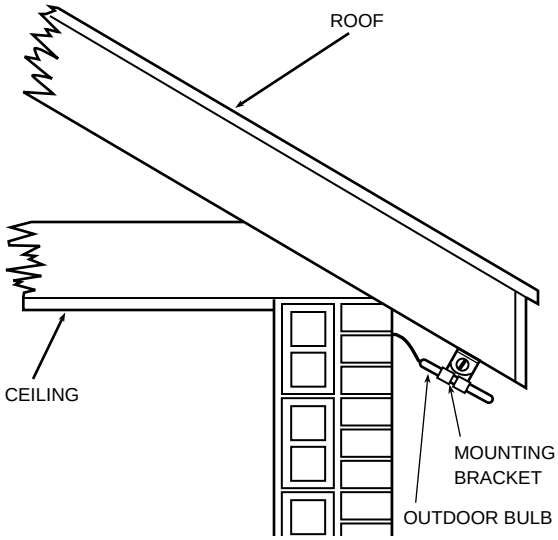


INSTALLATION AS AN OUTDOOR BULB

When used as a changeover control or outdoor thermostat, the bulb of this control should be located to measure the actual outdoor air temperature. A mounting bracket is provided for mounting the bulb.

The mounting bracket should be fastened to some convenient outside part of the building that is shielded from the direct rays of the sun, the direct fall of rain and snow, and sufficiently above ground to keep it out of snow and ice.

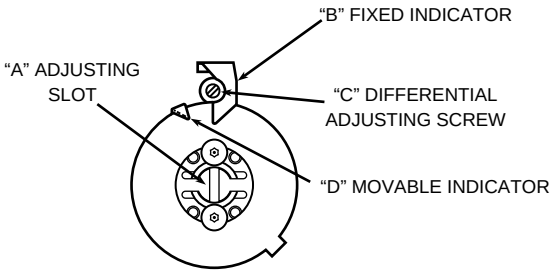
The underside of the eaves or overhang of a NORTH or NORTHEAST roof is a good location. It should be exposed to the circulation of air and wind.



SETTING THE DIAL

The fixed indicator (B) points to temperature at which the "R-B" contacts close and the "R-W" contacts open. Follow these instructions to set the dial.

1. Insert a screwdriver in the adjusting slot (A) and turn the dial until the fixed indicator (B) points to the lowest temperature of the cycle.
2. Turn the differential adjusting screw (C) until the moveable indicator (D) points to the highest temperature of the cycle.



SECTION 4 - PROCESS EQUIPMENT

REGENERATIVE BLOWER (240 SCFM @ 30"W.C. MANIFOLD INLET) - FPZ SCL K08-MS-10-3

MOISTURE SEPARATOR, TANK STYLE, 80 GALLONS - NES 80 GAL

VACUUM RELIEF VALVE, 2" FNPT, ADJUSTABLE - FPZ VRL6

INLINE FILTER, T-STYLE, 4" - SOLBERG CT-235P-400C

DILUTION FILTER SILENCER, 3" - SOLBERG FS-235P-300

FPZ BLOWER TECHNOLOGY

REGENERATIVE BLOWERS - VACUUM

SCL K07 K08 / K09 / K10 / K11 / K12

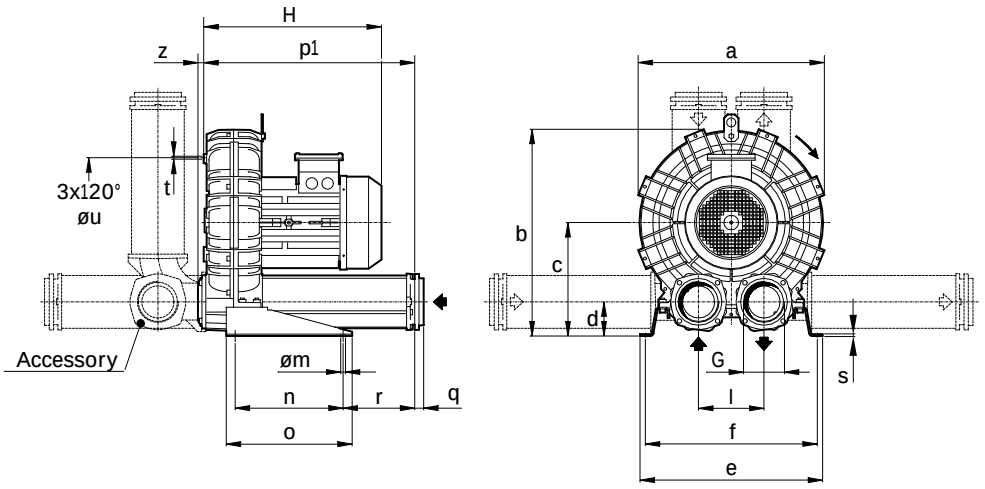
MS - SERIES

SN 1810-16 1/2

TECHNICAL CHARACTERISTICS
- Aluminium alloy constuction
- Smooth operation
- High efficiency impeller
- Maintenance free
- Mountable in any position
- Recognized TEFC - cURus motor

OPTIONS
- Special voltages (IEC 38)
- Surface treatments

ACCESSORIES
- Inlet and/or inline filters
- Additional inlet/outlet silencers
- Safety valves
- Flow converting device
- Optional connectors



Dimensions in inches.
Dimension for reference only.

Model	a	b	c	d	e	f	G	l	m	n	o	p1	q	r	s	t	u	z
K07-MS	16.69	18.84	10.59	3.23	18.43	17.24	3" NPT	6.10	0.51	11.81	13.78	20.16	0.98	5.39	0.20	M8	11.61	0.63
K08-MS	17.99	19.61	10.59	3.23	18.82	17.64	3" NPT	6.10	0.51	11.81	13.78	20.16	0.98	5.39	0.20	M8	12.2	0.63
K09-MS	19.37	22.09	12.40	3.78	20.00	18.82	4" NPT	7.17	0.51	11.81	13.78	23.07	0.98	7.83	0.20	M8	14.17	0.63
K10 -MS	20.31	22.56	12.40	3.78	20.00	18.82	4" NPT	7.17	0.51	11.81	13.78	23.07	0.98	7.83	0.20	M8	14.17	0.63
K11 -MS	21.34	23.74	13.07	3.58	21.26	20.00	4" NPT	7.87	0.51	11.81	13.78	23.46	0.98	8.03	0.20	M8	15.35	0.63
K12 -MS	21.57	23.82	13.07	3.58	21.26	20.00	4" NPT	7.87	0.51	11.81	13.78	23.58	0.98	8.03	0.20	M8	15.35	0.51

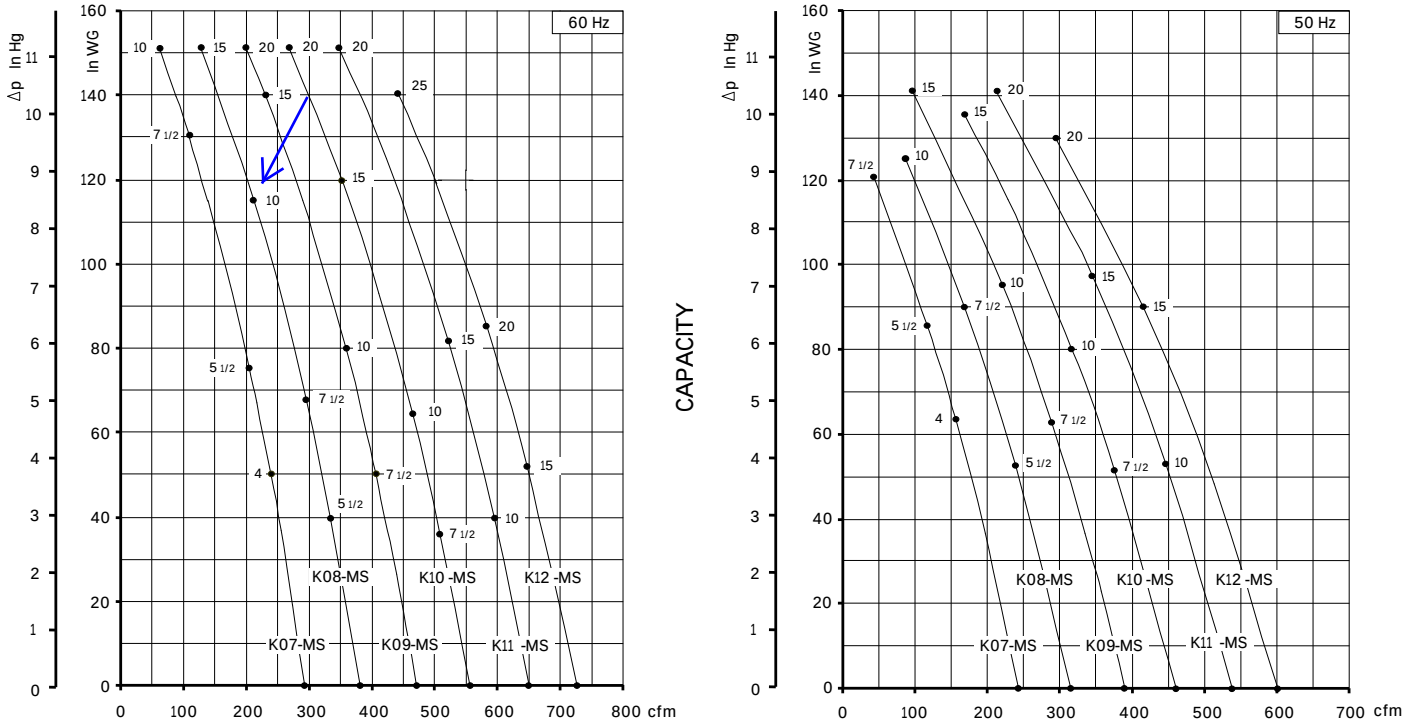
Model	Maximum flow cfm		Installed power Hp		Maximum differential pressure Dp (In Hg)		Noise level Lp dB (A) (1)		Overall dimensions H	Weight
	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	Inches	Lbs
K07-MS	294	243	4	4	3.7	4.6	77.7	75.7	15.45	103.00
			5 ½	5 ½	5.6	6.3	78.0	76.0	15.45	107.10
			7 ½	7 ½	9.6	8.9	78.3	76.3	18.37	145.70
			10	-	11.1	-	78.6	-	18.37	154.50
K08-MS	381	316	5 ½	5 ½	2.9	3.8	78.8	76.8	15.45	115.70
			7 ½	7 ½	5.0	6.6	79.1	77.1	18.37	154.30
			10	10	8.5	9.2	79.4	77.4	18.37	163.10
			15	-	11.1	-	79.7	-	19.15	184.00
K09-MS	471	390	7 ½	7 ½	3.7	4.6	79.3	77.3	18.84	166.50
			10	10	5.9	7.0	79.6	77.6	18.84	175.10
			15	15	10.3	10.4	80.1	78.1	19.63	196.20
			20	-	11.1	-	80.4	-	23.74	269.00
K10 -MS	556	460	7 ½	7 ½	2.7	3.8	79.4	77.4	18.84	170.90
			10	10	4.7	5.9	79.7	77.7	18.84	179.50
			15	15	8.8	9.9	80.2	78.2	19.63	200.60
			20	-	11.1	-	80.5	-	23.74	273.40
K11 -MS	650	539	10	10	2.9	3.9	82.0	80.0	19.04	194.90
			15	15	6.0	7.1	82.5	80.5	19.83	216.00
			20	20	11.1	10.4	83.0	81.0	23.94	288.80
K12 -MS	726	602	15	15	3.8	6.6	83.5	81.5	19.95	223.70
			20	20	6.3	9.6	84.3	82.3	24.06	296.50
			25	-	10.3	-	87.2	-	24.92	320.80

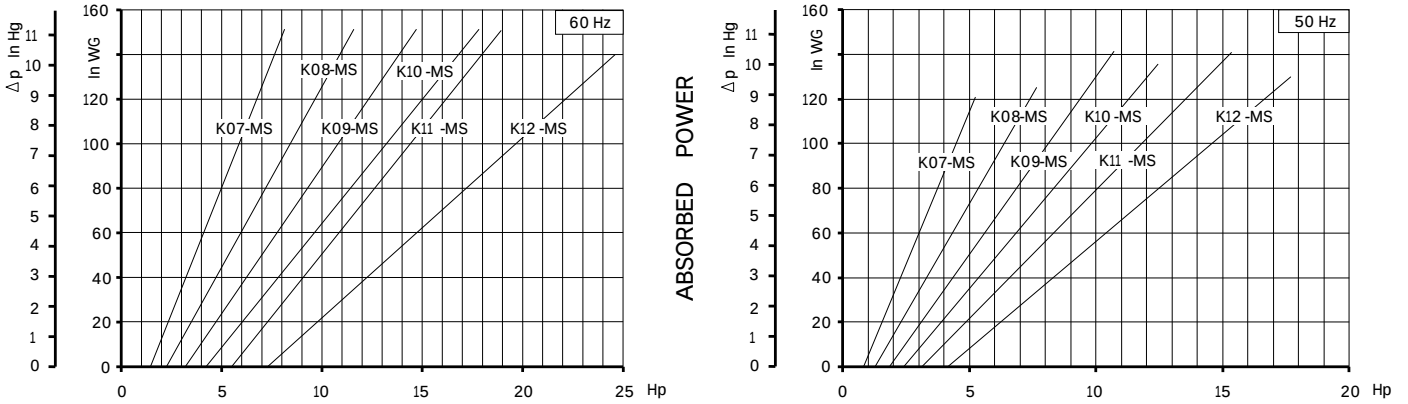
(1) Noise measured at 1 m distance with inlet and outlet ports piped, in accordance to ISO 3744.

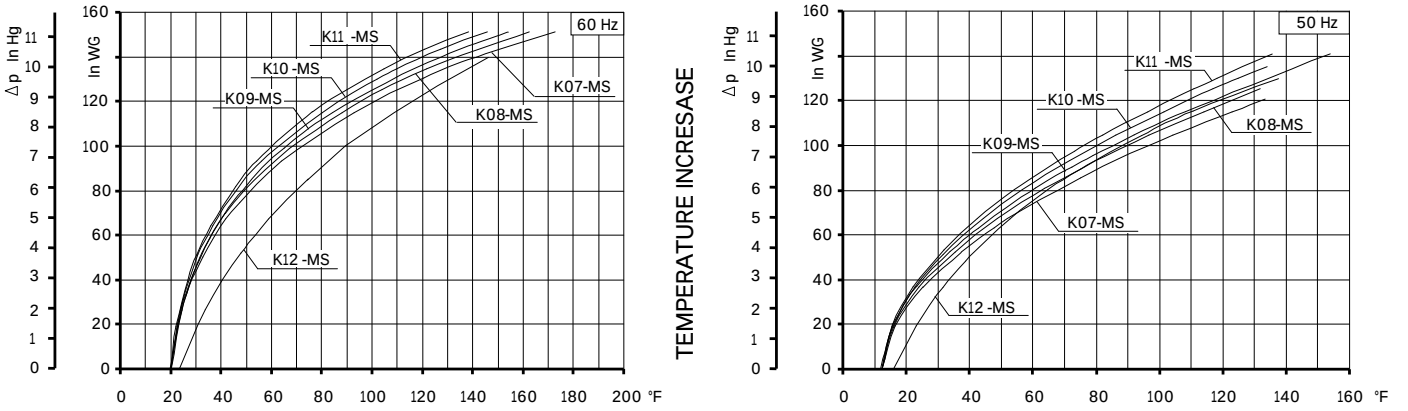
- For proper use, the blower should be equipped with inlet filter and safety valve; other accessories available on request.
- Ambient temperature from +5° to +104°F.
- Specifications subject to change without notice.

SCL K07 / K08 / K09 / K10 / K11 / K12 MS SERIES

SN 1810-16 2/2







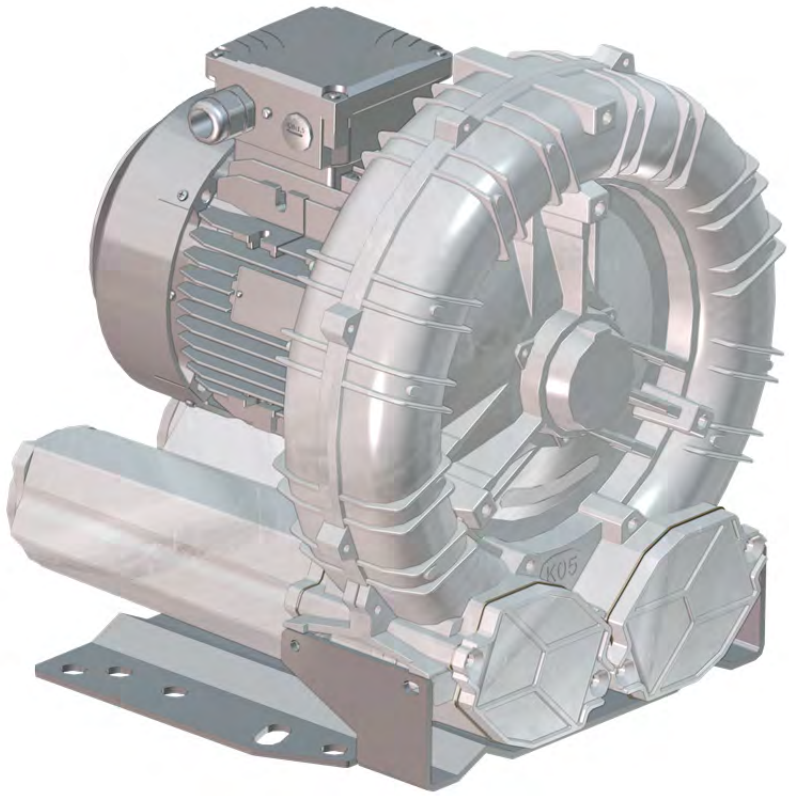
Curves refer to air at 68° F temperature, measured at inlet port and 29.92 In Hg atmospheric backpressure (abs).
Values for flow, power consumption and temperature rise: +/-10% tolerance.
Data subject to change without notice.

FPZ S.p.A.
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20863 Concorezzo (MB), ITALIA
Tel. +39 039 69 06 811
info@fpz.com www.fpz.com

COMPRESSORI-ASPIRATORI A CANALE LATERALE	**ISTRUZIONI**	**I**
LATERAL CHANNEL BLOWERS-EXHAUSTERS	**INSTRUCTIONS**	**GB**
COMPRESSEURS – ASPIRATEURS A CANAL LATERAL	**INSTRUCTIONS**	**F**
COMPRESORES – ASPIRADORES DE CANAL LATERAL	**INSTRUCCIONES**	**E**
SEITENKANALVERDICHTER-VAKUUMPUMPEN BAUREIHE	**BETRIEBSANLEITUNG**	**D**
COMPRESSORES - EXAUSTORES DE CANAL LATERAL	**INSTRUÇÕES**	**PB**

LEGGERE ATTENTAMENTE TUTTE LE ISTRUZIONI E CONSERVARLE	*I*
PLEASE READ CAREFULLY ALL INSTRUCTIONS AND KEEP THEM FOR FUTURE REFERENCE	*GB*
LIRE ATTENTIVEMENT TOUTES LES INSTRUCTIONS ET LES CONSERVER	*F*
SIRVASE LEER CUIDADOSAMENTE TODAS LAS INSTRUCCIONES Y CONSERVARLAS PARA FUTURA REFERENCIA	*E*
ALLE ANLEITUNGEN SIND SORGFÄLTIG ZU LESEN UND AUFZUBEWAHREN!	*D*
LEIS DILIGENTEMENTE TODAS ESTAS INSTRUÇÕES E CONSERVE-AS	*PB*

SCL K03 / K04 / K05 / K06 / K07 / K75 / K08 / K09 / K10 / K11 / K12 MS-MOR



COMPANY WITH QUALITY MANAGEMENT SYSTEM CERTIFIED BY DNV
= ISO 9001:2008 =

FPZ S.p.A.
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20863 Concorezzo (MB), ITALIA
Tel. +39 039 69 06 811
info@fpz.com www.fpz.com

FPZ
BLOWER TECHNOLOGY

DICHIARAZIONE DI CONFORMITÁ
DECLARATION OF CONFORMITY

Il Fabbricante
The manufacturer

FPZ S.p.A.
Via F.lli Cervi, 16

Dichiaria che la macchina
Declares that the machineries

SOFFIANTE A CANALE LATERALE
Lateral channel blowers-exhausters

Modello *Models*	**Serie** *series*	**Esecuzione** *Execution*	**Versione** *Version*
K03, K04, K05, K06, K07, K75, K08, K09, K10, K11, K12	MS	MOR	EU, USA, TMS, BPA
K07R, K08R, K09, K10, K11, K12	MD		

al quale questa dichiarazione si riferisce è conforme alla seguente Direttiva:
to which this declaration relates complies with the following Directives:

- Direttiva Macchine 2006/42/CE
- *Machinary directive 2006/42/EC*

E' conforme alle disposizioni pertinenti delle seguenti altre direttive:
It fulfils also the relevant provisions of the following Directives:

- Direttiva Compatibilità Elettromagnetica 2004/108/CE
- *Electromagnetic compatibility (EMC) directive EC 2004/108*
- Direttiva Bassa Tensione 2006/95/CE
- *Low voltage directive 2006/95/EC*

Inoltre dichiara che sono state applicate le seguenti norme armonizzate:
Also declares that the following Harmonised standards have been applied:

- UNI EN ISO 12100
- ISO/TR 14121 – 2

Nome ed indirizzo della persona autorizzata a costituire il Fascicolo Tecnico:
Name and address of the person authorised to compile the Technical File:

- Andrea Lazari Via F.lli Cervi 16 – 20863 Concorezzo (MB)

Concorezzo (MB), *data 01.08.2013*

Amministratore Delegato
Managing Director

Sergio Ferigo

Direttore Tecnico
Technical Manager

Andrea Lazari

COMPRESSIONE	DATI CARATTERISTICI	I
COMPRESSION	PERFORMANCE TABLE	GB
COMPRESSION	CARACTÉRISTIQUES TECHNIQUES	F
COMPRESIÓN	DATOS CARACTERÍSTICOS	E
KOMPRESSION	LEISTUNGDATEN	D
COMPRESSÃO	DADOS CARACTERÍSTICOS	PB

Mod	N 2900 rpm [kW]	N 3500 rpm [kW]	Q max 2900 rpm [m³/h]	Q max 3500 rpm [m³/h]	ΔP max 2900 rpm [hPa] (mbar)	ΔP max 3500 rpm [hPa] (mbar)	Leq[1] 2900 rpm (Lp) [dB(A)]	Leq[1] 3500 rpm (Lp) [dB(A)]	Peso[2] Weight[2] Poids[2] Gewicht [kg]	Ps max A [bar]
K03-MS	**0,37**	0,43	74	89	130	120	59,7	61,7	11	1,8
	0,55	0,63	74	89	180	200	60	62	12	1,8
K04-MS	**0,75**	0,9	137	166	140	120	62,6	64,6	15,8	1,8
	1,1	1,3	137	166	200	175	62,8	64,8	16,5	1,8
	1,5	1,75	137	166	250	250	63	65	19,5	1,8
K05-MS	**1,1**	1,3	219	265	130	100	68,2	70,2	22,5	2
	1,5	1,75	219	265	175	160	68,5	70,5	23,5	2
	2,2	2,55	219	265	270	260	68,8	70,8	26,5	2
	3	3,45	219	265	300	350	69,1	71,1	30,5	2
K06-MS	**2,2**	2,55	304	366	180	150	71	73	31,2	2
	3	3,45	304	366	250	220	71,3	73,3	32,5	2
	4	4,6	304	366	340	325	71,6	73,6	41	2
K07-MS	**2,2**	2,55	414	499	130	100	76,4	78,4	46,5	2,8
	3	3,45	414	499	200	175	76,7	78,7	47,5	2,8
	4	4,6	414	499	280	250	77	79	51	2,8
	5,5	6,3	414	499	400	375	77,3	79,3	61,5	2,8
K75-MS	**4**	4,6	477	576	150	100	77,4	79,4	51,5	2,8
	5,5	6,3	477	576	250	200	77,7	79,7	62	2,8
	7,5	8,7	477	576	325	300	78	80	67	2,8
K08-MS	**3**	3,45	536	647	125	100	77,4	79,4	49	2,8
	4	4,6	536	647	180	150	77,7	79,7	52,5	2,8
	5,5	6,3	536	647	275	250	78	80	63	2,8
	7,5	8,7	536	647	400	375	78,3	80,3	68	2,8
	9,2	10,6	536	647	450	450	78,6	80,6	77,5	2,8
K09-MS	**4**	4,6	663	800	130	85	78	80	62	2,8
	5,5	6,3	663	800	210	150	78,2	80,2	72,5	2,8
	7,5	8,7	663	800	290	250	78,5	80,5	77,5	2,8
	9,2	10,6	663	800	350	325	78,7	80,7	87	2,8
	11	12,7	663	800	450	400	79	81	87,5	2,8
K10-MS	**5,5**	6,3	782	944	160	115	78,1	80,1	75	2,8
	7,5	8,7	782	944	250	200	78,5	80,5	80	2,8
	9,2	10,6	782	944	300	270	79	81	89,5	2,8
	11	12,7	782	944	400	375	79,4	81,4	90	2,8
	15	17,4	782	944	500	500	79,6	81,6	95	2,8
K11-MS	**7,5**	8,7	915	1105	175	130	80	82	83,5	2,8
	9,2	10,6	915	1105	230	175	80,1	82,1	93	2,8
	11	12,7	915	1105	300	250	80,4	82,4	93,5	2,8
	15	17,4	915	1105	400	350	80,7	82,7	98,5	2,8
	18,5	21,5	915	1105	500	500	83,6	85,6	128,5	2,8
K12-MS	**9,2**	10,6	1022	1234	150	100	80,6	82,6	96,5	2,8
	11	12,7	1022	1234	200	150	80,9	82,9	97	2,8
	15	17,4	1022	1234	300	275	81,2	83,2	102	2,8
	18,5	21,5	1022	1234	425	375	84,1	86,1	132	2,8

[1] Rumorosità misurata alla distanza di 1 m con aspirazione e mandata canalizzate, secondo la Normativa ISO 3744
Noise measured at 1 m distance with inlet and outlet ports piped, in accordance to ISO 3744
Niveau de bruit mesuré a 1 m de distance, conduits d'aspiration et refoulement raccordés selon la norme ISO 3744
Rumorosidad medida a 1 m de distancia de los puertos de admisión y descarga, según la Normativa ISO 3744.
Schalldruckpegel, mit angeschlossener Schlauchleitung am Ein- und Auslass, im Abstand von 1 m gemäß ISO 3744 gemessen
Nível de rumor medido à distancia de 1 m. com aspiração e fluxo canalizados de acordo com a Normativa ISO 3744.

[2] Il valore indicato è riferito alla macchina con motore trifase per esecuzione MOR, senza il motore elettrico per esecuzioni GOR e GVR.
Value refers to the weight of the machine with 3 Phase motor if MOR range, without motor if GOR or GVR range.
Le valeur se refère à la turbine 3-phasé en execution MOR et GOR/GVR pour la turbine sans moteur.
El valor indicado se refiere al equipo con motor trifásico para la ejecución MOR. Sin el motor eléctrico para las ejecuciones GOR y GVR.
Die Angaben zum Gewicht beziehen sich bei der Baureihe MOR auf die Ausführung mit 3-phasigen Motoren und bei den Baureihen GOR und GVR auf die Verdichteraggregate ohne Motoren.
O valor refere-se à máquina com motor trifásico para a execução de MOR, sem o motor elétrico para execuções GOR e GVR.

N: Potenza installata
N: Installed motor power
N: Puissance installé
N: Potencia instalada
N: Installierte motorleistung
N: Capacidade instalada

Q: Portata
Q: Flow rate
Q: Débit
Q: Caudal
Q: Volumenstrom
Q: fluxo

ΔP: Pressione differenziale
ΔP: Differential pressure
ΔP: Pression différentielle
ΔP: Presión diferencial
ΔP: Druckdifferenz
ΔP: pressão difFerencia

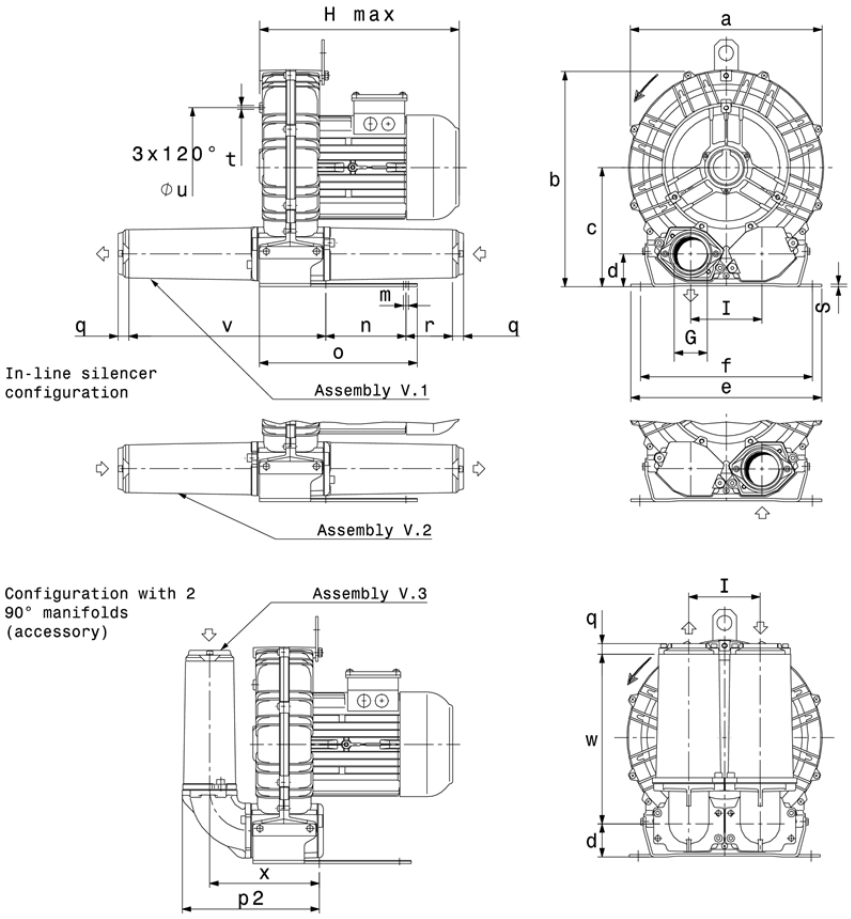
Leq: Rumorosità
Leq: Noise
Leq: Niveau sonore
Leq: Rumorosidad
Leq: Schalldruckpegel
Leq: Rumor

ASPIRAZIONE	**DATI CARATTERISTICI**	**I**
ASPIRATION	**PERFORMANCE TABLE**	**GB**
ASPIRATION	**CARACTÉRISTIQUES TECHNIQUES**	**F**
ASPIRACIÓN	**DATOS CARACTERÍSTICOS**	**E**
VAKUUMBETRIEB	**LEISTUNGDATEN**	**D**
ASPIRAÇÃO	**DADOS CARACTERÍSTICOS**	**PB**

Mod	N 2900 rpm [kW]	N 3500 rpm [kW]	Q max 2900 rpm [m³/h]	Q max 3500 rpm [m³/h]	ΔP max 2900 rpm [hPa] (mbar)	ΔP max 3500 rpm [hPa] (mbar)	Leq¹ 2900 rpm (Lp) [dB(A)]	Leq¹ 3500 rpm (Lp) [dB(A)]	Peso² Weight² Poids² Gewicht² [kg]	Ps max A [bar]
K03-MS	**0,37**	0,43	74	89	120	120	58,7	60,7	11	1,8
	0,55	0,63	74	89	160	200	59	61	12	1,8
K04-MS	**0,75**	0,9	137	166	140	120	61,6	63,6	15,8	1,8
	1,1	1,3	137	166	200	175	61,8	63,8	16,5	1,8
	1,5	1,75	137	166	225	250	62	64	19,5	1,8
K05-MS	**1,1**	1,3	219	265	130	100	67,2	69,2	22,5	2
	1,5	1,75	219	265	175	160	67,5	69,5	23,5	2
	2,2	2,55	219	265	240	260	67,8	69,8	26,5	2
	3	3,45	219	265	-	275	-	70,1	30,5	2
K06-MS	**2,2**	2,55	304	366	180	150	70	72	31,2	2
	3	3,45	304	366	250	220	70,3	72,3	32,5	2
	4	4,6	304	366	270	325	70,6	72,6	41	2
K07-MS	**2,2**	2,55	414	499	130	100	75,4	77,4	46,5	2,8
	3	3,45	414	499	200	175	75,7	77,7	47,5	2,8
	4	4,6	414	499	280	250	76	78	51	2,8
	5,5	6,3	414	499	325	375	76,3	78,3	61,5	2,8
K75-MS	**4**	4,6	477	576	150	100	76,4	78,4	51,5	2,8
	5,5	6,3	477	576	250	200	76,7	78,7	62	2,8
	7,5	8,7	477	576	-	300	-	79	67	2,8
K08-MS	**3**	3,45	536	647	125	100	76,5	78,5	49	2,8
	4	4,6	536	647	180	150	76,8	78,8	52,5	2,8
	5,5	6,3	536	647	275	250	77,1	79,1	63	2,8
	7,5	8,7	536	647	350	375	77,4	79,4	68	2,8
	9,2	10,6	536	647	-	-	-	-	77,5	2,8
K09-MS	**4**	4,6	663	800	130	85	77,1	79,1	62	2,8
	5,5	6,3	663	800	210	150	77,3	79,3	72,5	2,8
	7,5	8,7	663	800	290	250	77,6	79,6	77,5	2,8
	9,2	10,6	663	800	350	325	77,8	79,8	87	2,8
	11	12,7	663	800	-	375	-	80,1	87,5	2,8
K10-MS	**5,5**	6,3	782	944	160	115	77,4	79,4	75	2,8
	7,5	8,7	782	944	250	200	77,7	79,7	80	2,8
	9,2	10,6	782	944	300	270	78,2	80,2	89,5	2,8
	11	12,7	782	944	350	375	78,5	80,5	90	2,8
	15	17,4	782	944	-	-	-	-	95	2,8
K11-MS	**7,5**	8,7	915	1105	175	130	80	82	83,5	2,8
	9,2	10,6	915	1105	230	175	80,5	82,5	93	2,8
	11	12,7	915	1105	300	250	81	83	93,5	2,8
	15	17,4	915	1105	350	350	81,8	83,8	98,5	2,8
	18,5	21,5	915	1105	-	-	-	-	128,5	2,8
K12-MS	**9,2**	10,6	1022	1234	150	100	81	83	96,5	2,8
	11	12,7	1022	1234	200	150	81,5	83,5	97	2,8
	15	17,4	1022	1234	300	275	82,3	84,3	102	2,8
	18,5	21,5	1022	1234	325	350	85,2	87,2	132	2,8

INGOMBRI
DIMENSIONS
DIMENSIONS
DIMENSIONES
ABMESSUNGEN
DIMENSÕES EXTERIORES

(K03-MS/K04-MS/K05-MS/K06-MS)



Misure in mm, Dimensions in mm, Dimensions en mm, Medidas in mm, Abmessungen in mm, Dimensões em mm

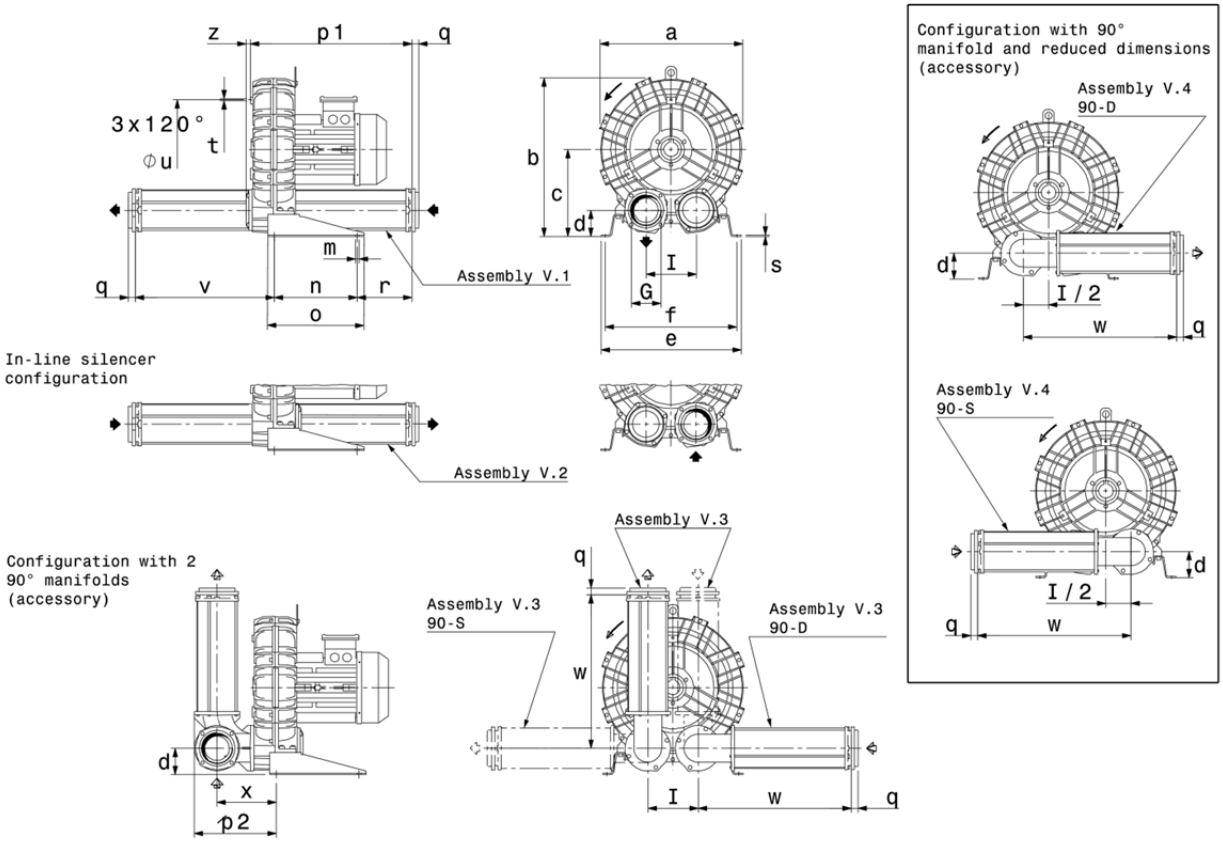
Mod	a	b	c	d	e	f	G	H
K03-MS	241	268	147	43	230	205	G 1" ¼	241
K04-MS	285	315	172	49	255	225	G 1" ½	310
K05-MS	327	365	200	54	320	260	G 2"	375
K06-MS	376	393	205	54	325	290	G 2"	400

Mod	i	m	n	o	p1	p2	q
K03-MS	86	10	83	142	205	140	18
K04-MS	102	12	95	171	222	160	18
K05-MS	120	15	115	265	320	230	18
K06-MS	125	15	140	272	334	244	18

Mod	r	s	t	u	v	w	x	z
K03-MS	75	4	M6	140	180	188	106	12
K04-MS	70	4	M6	175	195	188	120	18
K05-MS	98	4	M8	200	330	285	184	19
K06-MS	85	4	M8	240	332	285	198	19

INGOMBRI
DIMENSIONS
DIMENSIONS
DIMENSIONES
ABMESSUNGEN
DIMENSÕES EXTERIORES

(K07-MS/K75-MS/K08-MS/K09-MS/K10-MS/K11-MS/K12-MS)



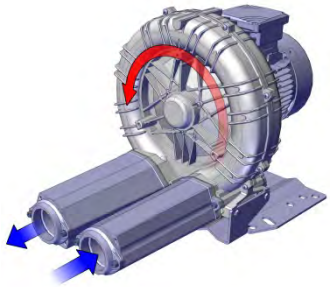
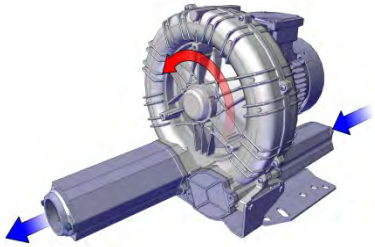
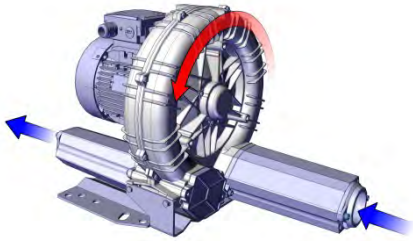
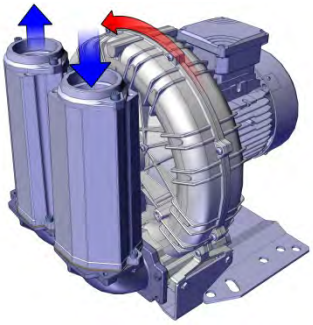
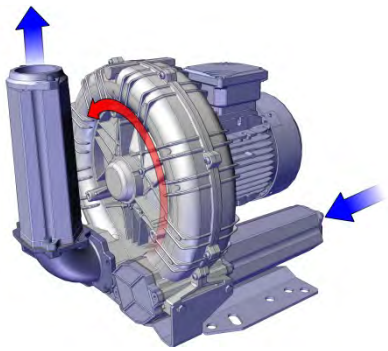
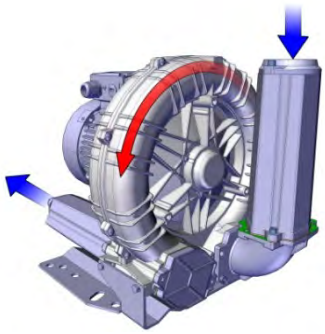
Misure in mm, Dimensions in mm, Dimensions en mm, Medidas in mm, Abmessungen in mm, Dimensões em mm

Mod	a	b	c	d	e	f	G	H
K07-MS	424	481	269	82	468	438	G 3”	445
K75-MS	424	481	269	82	468	438	G 3”	445
K08-MS	457	498	269	82	478	448	G 3”	480
K09-MS	492	561	315	96	508	478	G 4”	490
K10-MS	516	573	315	96	508	478	G 4”	490
K11-MS	542	603	332	91	540	508	G 4”	590
K12-MS	548	605	332	91	540	508	G 4”	593

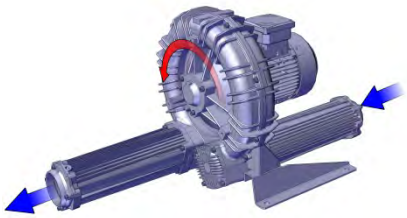
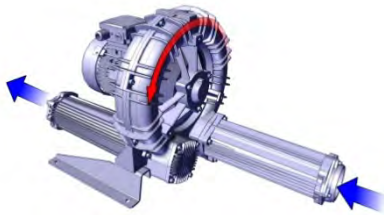
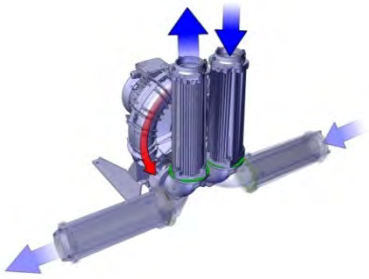
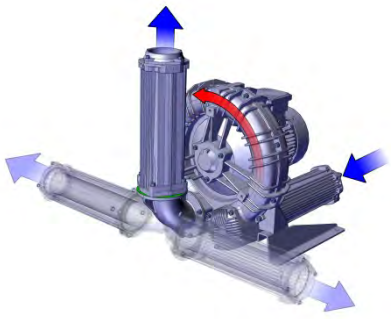
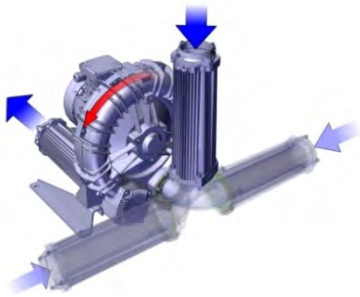
Mod	i	m	n	o	p1	p2	q
K07-MS	155	13	300	350	512	255	25
K75-MS	155	13	300	350	512	255	25
K08-MS	155	13	300	350	512	255	25
K09-MS	182	13	300	350	586	300	25
K10-MS	182	13	300	350	586	300	25
K11-MS	200	13	300	350	599	305	25
K12-MS	200	13	300	350	599	305	25

Mod	r	s	t	u	v	w	x	z
K07-MS	137	5	M8	295	443	481	183	16
K75-MS	137	5	M8	295	443	481	183	16
K08-MS	137	5	M8	310	443	481	183	16
K09-MS	199	5	M8	360	505	556	215	16
K10-MS	199	5	M8	360	505	556	215	16
K11-MS	204	5	M8	390	510	556	220	16
K12-MS	204	5	M8	390	510	556	220	13

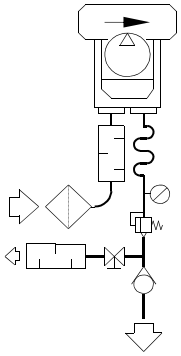
RIPOSIZIONAMENTO SILENZIATORE **(K03-MS/K04-MS/K05-MS/K06-MS)**
REPOSITIONING OF SILENCERS
REPOSITIONNEMENT DES SILENCIEUX
COLOCACIÓN DE LOS SILENCIADORES
EINBAU DER SCHALLDÄMPFER IN ANDERER POSITION
REPOSICIONAMENTO DOS SILENCIADORES

	 Ver. 0	
 Ver. 0-A	 Ver. 1	 Ver. 2
 Ver. 3 - 90°DS	 Ver. 4 - 90°D	 Ver. 4 - 90° S

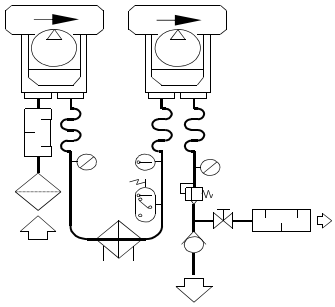
RIPOSIZIONAMENTO SILENZIATORE (K07-MS/K75-MS/K08-MS/K09-MS/K10-MS/K11-MS/K12-MS)
REPOSITIONING OF SILENCERS
REPOSITIONNEMENT DES SILENCIEUX
COLOCACIÓN DE LOS SILENCIADORES
EINBAU DER SCHALLDÄMPFER IN ANDERER POSITION
REPOSICIONAMENTO DOS SILENCIADORES

	 Ver.0	
 Ver. 0-A	 Ver. 1	 Ver. 2
 Ver. 3 - 90°DS	 Ver. 4 - 90°D	 Ver. 4 - 90° S

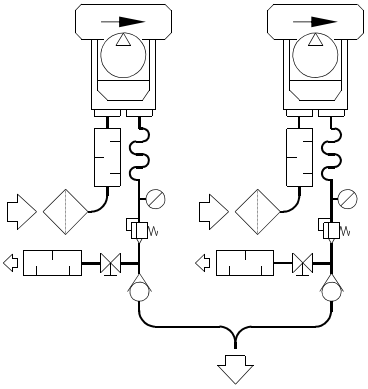
COMPRESSORE
PRESSURE SERVICE
SOUFFLANTE
COMPRESOR
VERDICHTER
COMPRESSOR



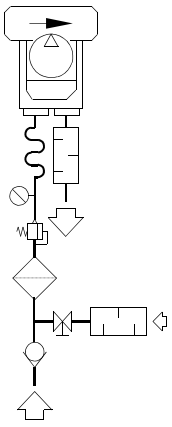
COMPRESSORE IN SERIE
SERIES PRESSURE SERVICE
SOUFFLANTE EN SÉRIE
COMPRESOR EN SERIE
SERIELL ARBEITENDER VERDICHTER
COMPRESSOR EM SÉRIE



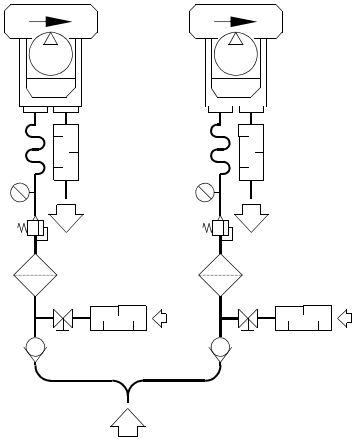
COMPRESSORE IN PARALLELO
PARALLEL PRESSURE SERVICE
SOUFFLANTE EN PARALLÉLE
COMPRESOR EN PARALELO
PARALLEL ARBEITENDER VERDICHTER
COMPRESSOR EM PARALELO



ASPIRATORE
VACUUM SERVICE
POMPE À VIDE
ASPIRADOR
VAKUUMPUMPE
ASPIRADOR



ASPIRATORE IN PARALLELO
PARALLEL VAACUM SERVICE
POMPE À VIDE EN PARALLÈLE
ASPIRADOR EN PARALELO
PARALLEL ARBEITENDER VAKUUMPUMPE
ASPIRADOR EM PARALELO



LEGENDA, KEY – ACCESSORIES, ZUBEHÖRLISTE, LÉGENDE ACCESSOIRES, TABLA DE ACCESORIOS, LEGENDA DOS ACESSÓRIOS

Item Item Composant Item Ítem Item		Denominazione Name Désignation Denominación Kennzeichnung Nome	Item Item Composant Item Ítem Item		Denominazione Name Désignation Denominación Kennzeichnung Nome
1		Filtro - Filtro in linea Filter - Inline filter Filtre - Filtre en ligne Filtro - Filtro en línea Filter – Leitungsfilter Filtro - Filtro da linha	7		Valvola di ritegno Check valve Clapet anti-retour Válvula de retención Rückschlagventil Válvula de retenção
(2)		Silenziatore Silencer Silencieux Silenciador Schalldämpfer Silenciador	8		Valvola Valve Vanne Válvula Ventil Válvula
3		Manicotto flessibile Flexible sleeve Manchon flexible Manguito flexible Flexibles Anschlussstück Luva flexível	(9)		Scambiatore Cooler Échangeur Intercambiador Wärmetauscher Permutador
4		Manometro – Vuotometro Pressure gauge - Vacuum gauge Manomètre – Vacuomètre Manómetro – Vacuómetro Manometer – Vakuummeter Manômetro – Manômetro de vácuo	(10)		Termometro Thermometer Thermomètre Termómetro Thermometer Termômetro
5		Pressostato – Vuotostato Pressure switch – Vacuum switch Pressostat – Vacuostat Presostato – Vacuóstato Druckschalter – Vakuumschalter Pressóstato – Interruptor de vácuo	(11)		Termostato Thermostat Thermostat Termostato Thermostat Termóstato
6		Valvola limitatrice Pressure relief valve Soupape de limitation Válvula limitadora Sicherheitsventil Válvula limitadora	(x) SE NECESSARIO (x) IF NECESSARY (x) SI NÉCESSAIRE (x) SI NECESARIO (x) SOFERN ERFORDERLICH (x) SE NECESSÁRIO		

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8 GENERAL INFORMATION

8.1 PURPOSE OF THE MANUAL

- The purpose of the manual is to provide the operator and maintenance personnel with "instructions for use" to prevent and minimise risks during the interaction of man and unit.
- The information was prepared by the manufacturer in the original language (ITALIAN) according to the principles of professional writing and in compliance with the applicable regulations.
- To facilitate its reading and understanding, the principles of communication best suited to the characteristics of the recipients have been adopted as far as possible.
- Keep the manual and enclosed documentation for the entire service life of the unit in a known and easy to access place so that it is always at hand for reference.
- To easily find specific information, see the table of contents.
- Any observations made by recipients can be an important contribution to improving the after-sales services provided by the manufacturer.
- Some information may not entirely match the actual configuration of the work unit delivered.
- Some parts of the text, or those of considerable importance, are indicated by symbols, whose meaning is described:

	These are generic or specific **DANGER** symbols and indicate hazards that can cause even serious **accidents to people** if the required precautions are not taken.
	This is the **PROHIBITED** symbol and indicates operations that must not be carried out because they can result in even serious **accidents to people**.
ATTENTION	The word ATTENTION is used to provide additional information and in particular to point out hazards that can cause **serious damage**.
NOTES FOR THE USER	NOTES are used to provide information allowing the user to make best use of the unit, with best performance, and for safety and respecting the environment.

8.2 UNIT AND MANUFACTURER'S IDENTIFICATION

The nameplate gives all the unit's identification details, which should always appear in all correspondence between the user and manufacturer (e.g. requests for assistance or for replacement parts as described in par. 1.3).
The nameplate is placed on the machine:



It is strictly forbidden to remove or tamper with the nameplate.



8.3 REQUEST FOR ASSISTANCE - AFTER-SALES SERVICE

All requests for After-Sales Service intervention must be sent to the following email address:

- customercare@fpz.com



Specifying:

- Type of unit;
- Serial no.;
- Defect found;
- Use the RMA form enclosed with this manual

8.4 REPLACEMENT PARTS

All requests regarding replacement parts must be sent to the following email address:

- customercare@fpz.com



Specifying:

- Type of unit;
- Serial no.;

- Code of part to be ordered;
- Required quantity;
- Means of shipment;

8.5 TESTING, WARRANTY AND LIABILITY

Testing and inspection

- The entire unit is sent to the customer prearranged for installation, after passing the tests and inspections required by the manufacturer, in conformity with the applicable laws.

Warranty

- Warranties are defined in the general terms and conditions of sale.

Liability

- **FPZ S.p.A.** cannot be held liable for operation faults or generic failures caused by improper use of the unit or operations carried out by persons not authorised by **FPZ S.p.A.**

9 SAFETY RULES

9.1 GENERAL NOTES ON SAFETY AND FOR THE USER



The instructions listed below must be read carefully and become a fundamental part of daily procedures in the use and maintenance of all the equipment, in order to prevent any kind of accident, injury or damage.

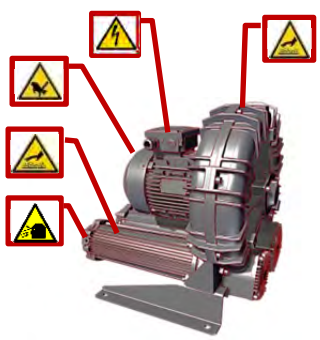
- Do not start the unit until its operation is clearly understood.
- If any doubts arise, despite having read this manual carefully and completely, contact **FPZ S.p.A.**
- Make sure all personnel involved in the use of the unit are informed regarding the safety requirements.
- Before starting the unit, the operator must check the efficiency of the safety devices and for any obvious defects in the unit. In case of any defects, immediately notify **FPZ S.p.A.**
- Check the proper operation of all the safety devices every day.
- The safety devices must never be removed or disabled.
- During maintenance or repair work it may be necessary to exclude some safety devices from the service. This operation must be carried out by authorised personnel.
- Never attempt rash solutions.
- All installation, commissioning and maintenance operations must be carried out exclusively by **qualified personnel**.
- Do not modify the electrical connections on the unit.
- Do not wear clothes, jewellery or accessories that can get caught in moving parts.
- Always keep the area around the unit free of obstructions.
- Use appropriate **PPE** such as boots, gloves, goggles and work clothes.
- Pay attention to all danger and caution signs placed on the unit.
- Always apply and enforce the safety rules; in case of any doubts, always consult this manual before acting.
- The unit must be used only and exclusively for its intended purpose and in accordance with that contractually established with **FPZ S.p.A.**

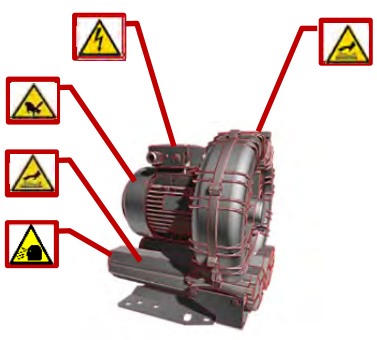


Non-compliance with the unit's intended use can cause serious accidents

The unit must only be started:

- In conformity with the purposes of use, transport and handling specified in "FORESEEN USE",
- respecting the values given in the "SPECIFICATIONS" and RATING DATA.







9.2 CONDITIONS OF INSTALLATION AND NORMAL OPERATION

Startup and operation must occur only under the following conditions:

- The unit must be completely assembled and intact, i.e. not damaged or tampered with.
- The silencer must be properly connected to the system piping.
- The machine must be securely fixed in place.
- The motor must be connected to a suitable control panel.
- If installed outdoors, protect the unit against the sun and weather.



Risk of injury due to shearing, crushing, entanglement!

During work on the unit there are risks of injury due to shearing, crushing or entanglement!
Therefore it must be carried out by technicians who handle and install the machine, taking the necessary safety measures and following the instructions given in this manual.



Danger due to escaping process fluids!

Danger due to overpressure with sudden release of process fluids (injury to the skin and eyes)!
Start the machine only if properly connected.



Danger due to electricity!

Improper behaviour can cause serious accidents!
Work on the electrical equipment must only be carried out by qualified and authorised electricians!
Before starting work on the unit or system, take the following precautions:

- disconnect the mains power;
- open the terminal box only after making sure the power is disconnected;
- take steps to prevent the power from being reconnected.



Danger of suction!

Danger due to negative pressure: sudden drawing in of hair and clothing! Start the machine only if properly connected.



Danger due to seizing of the impeller caused by performance values being exceeded

Use the blower, making sure the operating conditions comply with the values given in the SPECIFICATIONS.
Never operate the unit even temporarily with the inlet and/or outlet port closed.
Install a pressure-relief valve or equivalent circuit that can prevent excessive vacuum and/or overpressure and that enables compliance with the values given in the SPECIFICATIONS in this manual and the RATING DATA.
Turn the unit off immediately in case of any abnormal impeller noise! Then schedule maintenance.



Danger of burns caused by contact with hot surfaces of the unit!

In operation, in conformity with the values given in the "SPECIFICATIONS" and RATING DATA, the blowers / exhausters can reach high surface temperatures.
Use suitable PPE against the risk of burns. (Also see the section residual risks.)

9.3 FAULT CONDITION AND MAINTENANCE

Before starting routine maintenance on the unit, or for a fault, take the following safety measures:

- Disconnect the unit from the power supply via the main the switch.
- Place a sign: “DANGER! Maintenance work in progress." on the system control and the unit's control elements.
- **Allow the unit to cool**!
- Wait until the unit has completely stopped, i.e. that **the impeller is not rotating**, checking the electric motor fan.
- Ensure the absence of vacuum or overpressure in the unit and in the piping to be disconnected and that no fluid can escape from the unit and/or system!
- Follow the maintenance instructions in this manual.



Danger due to rotating impellers: cutting or shearing.

The rotating impeller can be accessed through the openings of the body and cover of the machine, once the manifolds or blind flanges are removed!
Never put hands or anything through these openings.



Danger due to electricity!

Improper behaviour can cause serious accidents!
Work on the electrical equipment must only be carried out by qualified and authorised electricians!
Before starting work on the unit or system, take the following precautions:

- disconnect the mains power;
- take steps to prevent the power from being reconnected;
- open the terminal box only after making sure the power is disconnected.

9.4 RESIDUAL RISKS

When designing the machines or systems on which the blower is to be installed, the following residual risks must be considered.



Danger due to hot surfaces!

In operation the unit may overheat, exposing the operator to contact with hot surfaces.
Do not touch the unit when in operation.
Before carrying out any operation after shutdown allow the unit to cool by waiting at least 20 minutes.



Danger due to rotating parts: electric motor cooling fan.

Although designed to reduce any danger, the machine has residual risks linked to the rotation of the fan.
Precautions to be taken:

- Do not wear loose fitting clothes
- Do not go near the machine with long and loose hair



Danger due to noise from the unit!

Some machines can produce high noise levels, even exceeding 80 dB(A).
The reference values are given in the specifications, which do not consider environmental reverberation.
Precautions to be taken:
Check the actual sound pressure of the machine in the place, and if necessary:

- Report the foreseen noise risk
- Arrange the use of PPE
- Insulate the place

10 FORESEEN USE

- FPZ side channel blowers / exhausters are designed to generate vacuum and overpressure and for conveying non-explosive, non-flammable, non-toxic and non-aggressive gases and air in continuous duty in a non-explosive environment.
- They consist of a toroidal chamber; between the body and cover there is an impeller with radial peripheral blades.
- FPZ side channel blowers / exhausters are designed and built for use in industrial plants and are equipped with three-phase or single-phase asynchronous bipolar electric motors in compliance with IEC 60034-1.

10.1 CONDITIONS OF USE



Non-compliance with the unit's intended use can cause serious accidents.

- This manual:
  MUST be read carefully and understood before carrying out any operations on the unit;
  MUST be strictly complied with;
  MUST always be at hand in the place where the unit is used.
- Installation must only be carried out by qualified personnel.

ATTENTION!	If installation is outdoors, protect the unit from the sun.

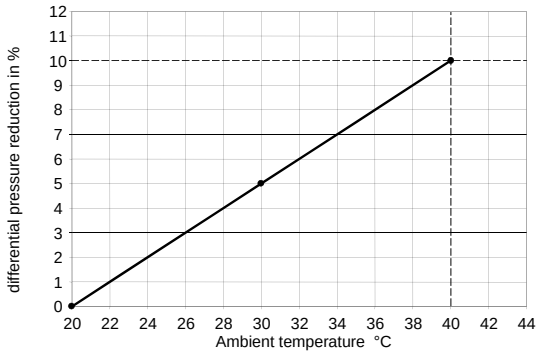
If installation is outdoors, protect the unit from the sun.
The maximum permissible pressure differentials given in the "SPECIFICATIONS" must never be exceeded. They are valid only under the following conditions;

- as a blower:
  gas intake temperature 20°C (+68°F) and atmospheric pressure 1013 mbar (abs.) (29.92 In Hg) measured at the inlet port
- as an exhauster:
  gas intake temperature 20°C (+68°F) measured at the inlet port and atmospheric backpressure 1013 mbar (abs.) (29.92 In Hg).

The ambient **temperature**, and the conveyed gas intake temperature, is permissible inside the range -15°C (+5°F) ÷ +40°C (+104°F) with the following provisions;

- for ambient temperature +30°C (+86°F) **reduce** the maximum pressure differentials given in the "SPECIFICATIONS" by 5%;
- for ambient temperature +40°C (+104°F) **reduce** the maximum pressure differentials given in the "SPECIFICATIONS" by 10%.

The graph to be used to reduce the maximum pressure differentials in case of ambient temperature between +21°C and +40°C (+70°F and +104°F) is given below



The unit should not be installed at more than 1000m a.s.l.; if higher, contact the FPZ after-sales service.

Danger due to limited visibility in the place where the unit is installed!

Make sure to always have the installed unit under control when carrying out any operation in the installation area.
The control elements must be placed so that the installed unit can be seen.
Danger of serious injury!

ATTENTION!	If the flow rate has to be reduced, use a bypass valve instead of throttling the suction or delivery.

- In case of suction in the place, and if on the system, protect the intake pipe using a suitable **filter** with maximum filtration of 100µm and check compliance with the maximum pressure/vacuum data given in the SPECIFICATIONS (max ΔP) :
- for use as a **blower** deduct the pressure loss (P_a) from the maximum compression indicated (max ΔP), i.e. $P_{working} \approx$ max ΔP - P_a (for $T_{ambient}$=20°C and $P_{ambient}$=1013 mbar)
- for use as an **exhauster** make sure the maximum vacuum at the inlet port is not exceeded.

10.2 SPECIAL VERSIONS

FPZ side channel blowers/exhausters can be manufactured in special or custom versions; the instructions given in this manual still apply to some of them.
The special versions manufactured, and for which that given above applies, are:

- **BPA version**
  Machines built to work in harsh environments and/or for conveying aggressive fluids, where aggressive means the presence of elements that can affect standard machine operation, such as humidity; as specified in point 2, conveying flammable, explosive or toxic gases, or installation in potentially explosive places, is not permitted.
- **TMS version**
  Machines that ensure mechanical seal between the parts that convey air or fluids, minimising leakage.
- **Special electric motors**
  On request, blowers/exhausters can be manufactured with motors having one or more of the following characteristics:
  - Special voltages
  - Higher levels of protection against solid bodies and/or liquids (standard IP55)
  - Higher insulation classes (standard Class F)
  - Protection devices such as thermal switches, heaters, PTC, PT100
- **IE2 motor**
  The side channel blowers/exhausters can be manufactured using class IE2 motors.
  Compared to the standard version, the performance and dimensions may vary; this information is given more precisely in the specific Data Sheets of the IE2 version.

Further customisation must be requested and agreed when ordering, subject to a feasibility appraisal by the Technical Department.

ATTENTION!	For maintenance of special version machines, contact FPZ.

10.3 PROHIBITIONS



THE FOLLOWING IS STRICTLY PROHIBITED:

- Using the unit in installations for unforeseen use.
- The suction and conveying of aggressive, corrosive and/or harmful fluids.
- Using the unit in conditions different from the values given in the "SPECIFICATIONS" and RATING DATA.
- Using the unit without having installed the suction filter.
- Operation with inlet and/or outlet port closed.
- Making conversions or changes to the unit, maintenance or repair work on own initiative or not envisaged in the manual. Maintenance work can be carried out only in compliance with that described in this user manual, exclusively by qualified personnel.

IT IS COMPULSORY TO:
- Check and comply with the intended use of the machine.
- Check and comply with the conditions of use specified in this manual.
- Comply with the installation conditions specified in this manual.
- Carry out the preliminary checks as specified in the section "STARTUP".
- Carry out maintenance as specified in section 7.

10.4 REASONABLY FORESEEABLE IMPROPER USE



Non-compliance with the unit's intended use can cause serious accidents.

Failure to comply with the prohibitions/obligations can result in technical faults, damage to the system or accidents.
Danger of serious injury!

- Listed below are some examples of improper use identified by risk analysis and practical experience, according to the conditions they can create.

IMPROPER USE	CONSEQUENCES	RISKS
IMPROPER USE LINKED TO NORMAL OPERATION		
Failure to comply with the distance for the motor air intake	Motor overheating and possible damage to the blower	RISK FOR THE MACHINE
Presence of operators and possible contact with the machine	Operator coming into contact with hot parts of the machine	RISK FOR THE OPERATOR
Use of loose clothing or untied long hair	Possible catching or suction in the machine or in the motor fan	RISK FOR THE OPERATOR
IMPROPER USE LINKED TO METHODS OF USE		
Failure to comply with the operating conditions (par. 2.2): - Ambient temperature outside the limits or incorrect - Altitude above 1000 m - Failure to consider system and filter pressure losses	Machine performance different from the data given, possible motor faults and seizing of the impeller	RISK FOR THE MACHINE
Failure to install the filter (for use with suction in the place)	Particles entering the blower with seizing of the impeller	RISK FOR THE MACHINE
Operation outside curve (P/Q) (Pressure /Flow rate)	Machine performance different from the data given, possible motor faults and seizing of the impeller	RISK FOR THE MACHINE, SYSTEMS AND OPERATORS
Rigid connection between the machine and system	Abnormal vibrations for the machine and/or system with possible seizing of the impeller.	RISK FOR THE MACHINE, SYSTEMS AND OPERATORS

Use of the unit with current values not corresponding to nominal	Possible overheating of the machine and motor when powered by an inverter.	RISK FOR THE MACHINE
IMPROPER USE LINKED TO MAINTENANCE WORK		
Failure to clean the filter	Seizing of the impeller	RISK FOR THE MACHINE
Failure to eliminate of layers of surface dust	Machine overheating	RISK FOR THE MACHINE, SYSTEMS AND OPERATORS
FAULT CONDITIONS / EMERGENCY CONDITIONS		
Not stopping the machine when making an abnormal noise.	Damage with possible seizing of the impeller, machine overheating and possible motor damage.	RISK FOR THE MACHINE, SYSTEMS AND OPERATORS

11 STORAGE AND TRANSPORT



Danger due to suspended loads.

The tipping over or falling of heavy loads can cause crushing and injury Place the packages in a stable way.
Do not place loads on the packages.

- Store the machine in a dry place, if possible keeping it in its packaging.
- Do not remove the protection from the openings.



Danger due to lifting of heavy loads!

The falling of heavy loads can cause crushing and injury or even death!
Before carrying out handling operations (lifting, moving, carrying, storage) check the weight, or mass (m), of the unit given in the "SPECIFICATIONS" and decide the most suitable method in order to ensure maximum safety.
Therefore, all the risk prevention measures must be met, including any local and/or particular regulations on safe handling:

- by suitably qualified and adequately instructed personnel;
- using appropriate means;
- organising the work so that it is done with minimum risk and in safe and healthy conditions;
- with a safe and stable support surface;
- with the use of suitable work clothes and personal protection equipment (gloves and goggles, safety shoes and helmet);
- on a work area with sufficient space, flat floors, without obstacles;
- avoiding knocking, jerking and jolting.

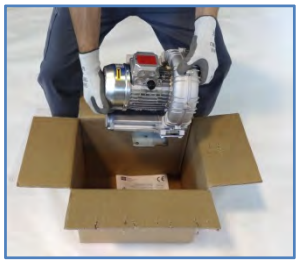
Units weighting more than 25 kg have lugs for handling.

Different packaging is used, depending on the size and weight; once the package is brought near the installation area, open it, take out the documents and then remove the machine as illustrated below.

m<25 kg







ATTENTION!

Lifting the unit in any way other than that indicated is strictly prohibited. Use the special lugs on the body of the blower, motor or base

m>25 kg









m>25 kg





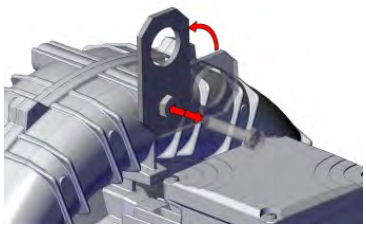

m>25 kg







- In some cases the lifting eye is turned 90°.
- Before lifting the machine, proceed as follows:
- Undo the screw
- Put the lifting eye back in the correct position
- Tighten the screw



12 INSTALLATION

12.1 INSTALLATION CONDITIONS

- Make sure the conditions of use as described in section 3 are complied with, then proceed with installation of the machine as specified below.

Danger due to limited visibility in the place where the unit is installed!

Make sure to always keep an eye on the installed unit when carrying out any operation in the installation area.
The control elements must be placed so that the installed unit can be seen.

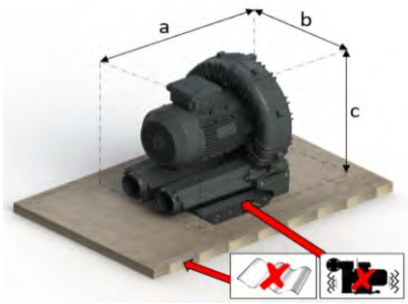
Danger due to vibration!

Regularly check the fixing of the unit to the support structure.
Excessive vibration of the unit can seriously damage the machine.

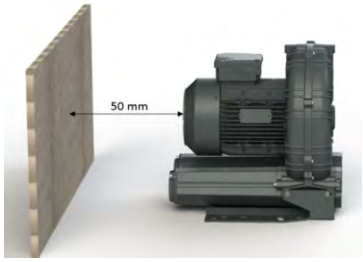
NOTE FOR THE USER

Vibration dampers are supplied with machines from K07 to K12.
On request, vibration dampers are also available on the other machines.

- The unit's support surface must be flat, sturdy, stable and as level as possible.
- The unit must be installed on a structure that does not transmit vibrations. Do not install the unit on structures that can transmit or amplify the noise.
- Installation of the unit must always be done using vibration dampers.
- Installation of the unit must ensure that motor ventilation is not impeded by obstacles placed in the immediate vicinity. Therefore, the motor air intake must remain free, ensuring a distance of at least 50mm between the motor fan cover and any structure.



- Connect the pipes using flexible sleeves, without resting the weight of the pipes on the unit, with the exception of a possible filter in case of suction in the place.
- Determine the dimensions a, b, c to allow adequate space for installation of the unit with its accessories (Dimensions available in the first section).



ATTENTION!	When installed outdoors, protect the unit against the sun and weather.

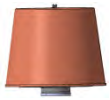
To avoid overloads caused by pressure fluctuations, install a bypass pressure-relief valve on the suction pipe in case of operation as an exhauster, and on the delivery when operating as a blower.



If the flow rate has to be reduced, use a bypass valve instead of throttling the suction or delivery.



Protect the suction pipe with a suitable filter with degree of filtration less than or equal to 100 µm. Foreign bodies are: dust, sand, gravel, dirt in the pipes, cutting burrs and shavings, welding slag and spatter, metal burrs and sealant residuals produced when connecting the pipes. Replace the filters regularly!



Size the pipes and choose accessories that minimise pressure losses; therefore:

- do not fit pipes narrower than the ports of the machine.
- when installing several machines in parallel, suitably size the manifold and the main line.
- use large-radius curves and not elbows.
- do not install valves with a smaller flow than nominal and check valves with shutter opposed by spring (the check valve with lowest pressure loss is the lightened non-return valve).
- when used for oxygenation, choose diffusers with low flow resistance (low pressure loss).



Danger due to foreign bodies and dirt entering the unit!

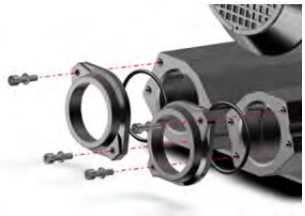
The ingress of even tiny foreign bodies causes serious damage to the unit with probable breakage of the impeller blades and the danger of debris being thrown out!

See INSTALLATION DIAGRAMS in the first section.

12.2 HORIZONTAL INSTALLATION

- Units supplied with standard set-up are ready to be installed in the horizontal position by means of the feet.
- The feet have holes for fixing; use all the holes and choose the appropriate type of screw.
- Remove the protection on the ports before checking the rotation direction and before final connection.
- To connect the unit to the piping, remove the flanges from the silencer housings to make the appropriate connections using flexible sleeves, thereby avoiding rigid connections which can cause stress and harmful vibrations.
- Refit the flanges on the silencer housings complete with gaskets and tighten.





Check the motor rotation direction (see par. 5.2 ROTATION DIRECTION)

12.3 INSTRUCTIONS FOR REPOSITIONING SILENCER HOUSINGS

- The SCL K MOR series has been designed for maximum flexibility in positioning the silencer housings in order to allow different installation configurations.
- The blower is normally supplied with silencers positioned as shown in figure **A**.
- If this arrangement has to be changed, establish the required arrangement of the silencer housings.

See the diagram provided in the first section of this manual

- Remove and refit the housings and blind flanges according to the following diagram to obtain the desired configuration

Removing the blind flange (B)

- Place the unit horizontal, resting the feet on a flat and stable surface.
- Undo the screws and remove the blind flange and gasket

Removing the silencer housing (C)

- Undo the screws.
- Remove the silencer housing with gasket.

Removing the flange (D)

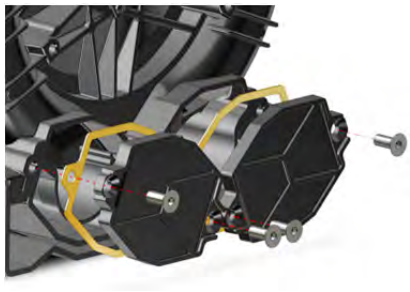
- Undo the screws.
- Remove the flange and gasket.
- Reassemble by proceeding in reverse order, remembering the gaskets.



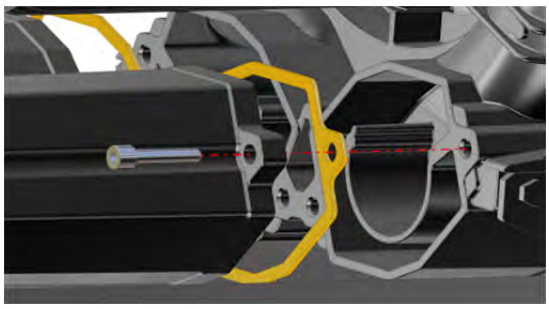
A



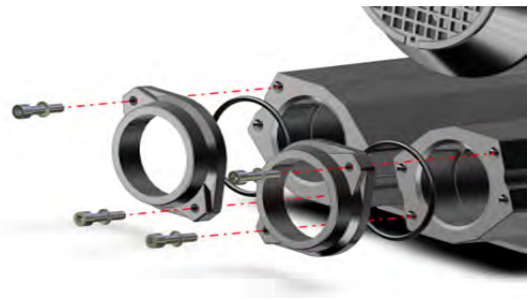
A



B



C



D



Danger due to rotating parts: impeller!

The danger of shearing due to the rotating impeller can exist even when the machine off, if it is started manually.
Therefore use suitable work clothes and personal protection equipment.

12.3.1 CK TYPE 90° MANIFOLD (accessory) USE

- For different connection configurations, use the CK type 90° manifold installed only on the cover openings.
- See the possible configurations as previously illustrated.



Fitting the CK type 90° manifold

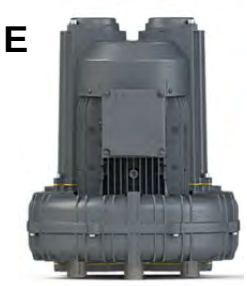
- Remove the silencer as previously described.
- Insert the gaskets between the cover and manifold.
- Tighten the respective screws
- Assemble the silencer by proceeding in reverse order.

See par. 5.1 for INSTALLATION CONDITIONS

12.4 VERTICAL INSTALLATION ON THE COVER

The units can be installed with the working axis vertical, as follows:

- Using vibration dampers fitted directly on the cover (E)
- Using a special foot for vertical fixing, available as an accessory (F).





Non-compliance with the unit's intended use can cause serious injury.

Regularly check the fixing of the unit to the support structure.
Excessive vibration of the unit can seriously damage the machine.

NOTE FOR THE USER	A special foot is available as an accessory for fixing the unit vertically on the cover. The foot has holes for fixing; use all the holes and choose the appropriate type of screw.

NOTE FOR THE USER	Vibration dampers are supplied with machines from K07 to K12. On request, vibration dampers are also available on the other machines.

ATTENTION!	Avoid the possibility of water stagnation, especially in case of installation of the unit with vertical axis.

ATTENTION!	Check the motor rotation direction. (see par. 5.2 ROTATION DIRECTION)

12.5 ELECTRIC MOTOR

Make sure to comply with all the safety measures and instructions given in the electric motor instruction manual.

Danger due to electricity!

- Improper behaviour can cause serious injury.
- Work on the electrical equipment (installation, maintenance) must only be carried out by qualified and authorised electricians!
- Before starting work on the unit or system, take the following precautions:
  - make sure the machine is NOT powered;
  - take steps to prevent the power from being reconnected;
  - open the terminal box only after making sure the power is disconnected!
- The terminal box must not contain:
  - foreign bodies;
  - impurities;
  - moisture.

Close the terminal box with the lid and seal the openings of the cable glands to prevent dust, water and moisture from entering.
Check the seals regularly.

- If a faulty unit is touched there is risk of electric shock!

Install the motor circuit breaker.
Have an electrician regularly check the electrical equipment.

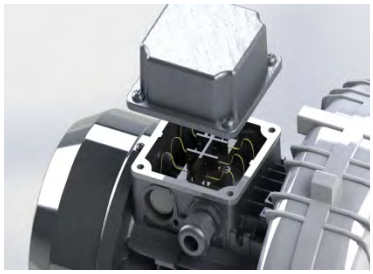
ATTENTION!

In case of various motor starts in the space of an hour, there are limitations which can seriously damage the unit if ignored.
Regarding this, refer to the electric motor instruction manual.

12.5.1 CONNECTION

ATTENTION!

Incorrect connection of the motor can seriously damage the unit.
The power supply of the motor and any auxiliary equipment must use wires of suitable thickness in order to avoid abnormal overheating and high voltage drops.



- Make sure the supply voltage and frequency match the rating data.
- Connect the earth wire of the motor to the terminal marked with the following symbol ⏚ always before connecting to the mains and check the leakage capacity. The earth wire is identified by its colour (yellow/green).
- Connect to the mains by referring to the diagram in the terminal box.
- Use the openings in the cable glands to run the power cables inside the terminal box.
- Once the terminal board connections are done, tighten the cable gland to secure the cables.
- The electrical connection terminals must be tightened to prevent high contact resistances and consequent overheating.
- Ensure the insulation gaps and distances between the different wires as required by the standards.
- All screws used for closing the terminal board must be tightened down. Damaged screws must be immediately replaced with screws of equivalent or better quality.

The connection must ensure:

- lasting safety over time.
- The ends of the wires must not protrude.
- The fuses only protect against short circuits and not the motor.
- Fuse ratings must take account of peak currents, especially in case of direct starting.
- The protection with motor circuit breaker (thermal or amperometric) is essential against the risks of overload, in the absence of a mains phase, excessive voltage fluctuation or stuck rotor.
- Adjust the motor circuit breaker to the rated current as the maximum value.

12.5.2 INVERTER POWERED ELECTRIC MOTOR

ATTENTION!

When powered by an inverter, the unit's nominal pressure or vacuum characteristics cannot be maintained.
For the performance of an inverter powered unit, contact the FPZ after-sales service.

The power supply via inverter is always the responsibility of the installer, who must ensure compliance with the standards and:

- checking and any measures necessary to comply with the limits of immunity and emission laid down by the standards;
- checking the suitability of the system and the inverter for operation with standard motors, i.e. class F, or the need for specific motors for these types of operation.

12.5.3 ROTATION DIRECTION

SCL K blowers - exhausters must be used with the rotation direction indicated by the arrow on the electric motor fan cover.



- To check the rotation direction, switch the motor on briefly and observe the fan.
- To change the rotation direction, invert the power cable connections, leaving the earth connection unchanged.

Refer to the connection diagram located in the terminal box

ATTENTION!

The position of the motor does not always allow the rotation direction to be checked, therefore it is advisable to do this check before installation of the system.

13 STARTUP

Non-compliance with the unit's intended use can cause serious accidents.

The unit must only be started:

- after carefully reading, understanding and complying with this user manual ("SAFETY RULES" and "INSTALLATION");
- in conformity with its intended use as prescribed in "FORESEEN USE";
- respecting the values given in the "SPECIFICATIONS".

13.1 PRELIMINARY CHECKS

Before starting the machine for use, carry out the following preliminary checks:

- If the unit has not been started up for some time, check its condition and, if necessary, remove any dust from the external surfaces;
- Deactivate/open any pipe closing devices (shut-off valves, solenoid valves, etc.) before starting the unit.
- **Never start and operate the unit with the inlet and/or outlet port closed!**
- Make sure the ambient and conveyed gas suction temperatures come within the values: -15°C (+5°F)÷ +40°C (+104°F);
- Check correct operation of the pressure-relief valve (not supplied).

13.2 OPERATION

The unit can be started for use after carrying out the preliminary checks.

- Start the unit by switching on the power to the electric motor.
- Check the operating pressure or vacuum and also compliance with the values given in the “SPECIFICATIONS”. Pressure losses in the pipes are often underestimated but are decisive factors for the operating differential pressure.
- Measure the motor absorption and check compliance with the rated value.

13.3 STOPPING

- The unit must be stopped by switching off the power supply to the motor.
- In case of shutdown, make sure to operate the unit with the inlet open for about 20 minutes.
  This operation allows the removal any condensate in the suction chamber.

14 MAINTENANCE

In order to prevent faults and damage it is important to periodically check the units in operation, therefore it is advisable to adopt a maintenance plan in line with this Manual, providing for:

- Periodical checks
- Periodical maintenance and troubleshooting

14.1 PERIODICAL CHECKS

The units in operation should undergo periodical inspections by qualified personnel, in order to prevent failures that can directly or indirectly cause damage.

A) With the unit in operation periodically check the following parameters:

- Delivery temperature
- Operating pressure and/or vacuum
- Electric motor current absorption
- Vibration
- State of the filter and corresponding pressure loss



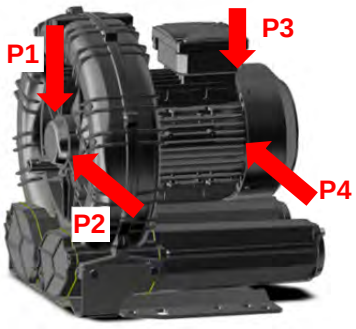
Danger of burns caused by contact with hot surfaces of the unit!!

When in operation the blowers / exhausters can reach high surface temperatures.
Before carrying out any operation after shutdown wait at least 20 minutes for the unit to cool.

Measurement of vibrations

The measurements for determining the vibration velocity [mm/s] must be done with an electronic vibration meter, at the following places:

- **Points P1** and **P2 (front bearing):** place the vibration meter near the front bearing, adopting the highest value.
- **Points P3** and **P4 (rear bearing):** place the vibration meter on the electric motor casing near the bearing housing (not on the fan cover), adopting the highest value.



Legend: Classification of machines: *Class I* = SCL with electric motor of power ≤ 15kW *Class II* = SCL with electric motor of power > 15kW Appraisal zones: *Zone A* = SCL with vibration (a) inside this zone they are considered acceptable for a long-term duty. *Zone B* = SCL vibration (a) inside this zone they are considered unsuitable for a continuous long-term duty. The machine can be operated in these conditions for a limited period, as long as there is the opportunity for a suitable corrective action.	Effective vibration velocity value [mm/s]	*Class I* (≤ 15kW)		Effective vibration velocity value [mm/s]	*Class II* (>15kW)
	a<1.8	***A***		a<2.8	***A***
	1.8<a<4.5	***B***		2.8<a<7.1	***B***



Danger due to seizing of the impeller caused by excessive vibration!

Vibration values higher than Zone B (table of effective vibration velocity value) are considered NOT permissible and can cause damage to the machine and therefore serious injury to operators.

- **In case of noise and/or abnormal vibration indicating the possibility of seizing of the impeller, move away and turn the unit off immediately!**

Variations in normal working conditions (increases in power absorption, abnormal noise, vibration, excessive overheating of the service fluid) are indications of a unit malfunction.
Also, compare the measured values with those given in the "SPECIFICATIONS.

B) With the unit stopped and cooled, periodically carry out the following checks:

- Dust: check and remove deposits from the external surfaces of the unit.
- Suction filter (if fitted): every 10-15 days, check and clean or replace the filter cartridge. The dirty cartridge will create strong suction resistance and consequently a higher pressure differential, power absorption and operating temperature.



Danger due to high temperatures!

To limit the formation of surface layers of dust that can affect the natural heat exchange between the unit and the environment, ensure regular cleaning and removal with suitable equipment.
The suction and/or delivery pipes must not be dirty or clogged! Wear suitable PPE.

14.2 PERIODICAL MAINTENANCE AND TROUBLESHOOTING

Refer to the following section, "OPERATION PROBLEMS", to identify possible critical situations and types of failures.

- In case of periodical maintenance for cleaning and replacement of some components, as well as in case of failure, it is necessary to disconnect and remove the machine from the system.



Danger due to electricity.

Before carrying out any operation, make sure the machine is NOT powered.



Risk of injury due to shearing, crushing, entanglement.

During work on the unit there are risks of injury due to shearing, crushing or entanglement!
Therefore it must be carried out by qualified personnel who handle and install the machine, taking the necessary safety measures and following the instructions given in this manual.



Danger due to residual negative pressure or overpressure.

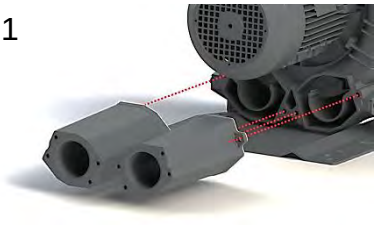
For residual overpressure: possible release of process fluids with risk of injury to the skin and eyes;
For negative pressure: possible drawing in of hair and clothing.
Disassemble the machine only after closing and draining the system connected to it.

14.3 REPLACING THE SOUND ABSORBING MATERIAL

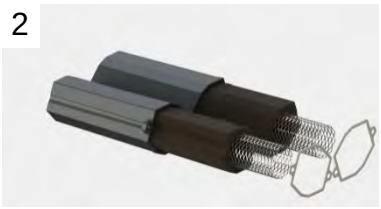
When replacing the sound absorbing material in the silencers, proceed as follows:

- Undo the screws (1)
- Disconnect the silencer housings (1)
- Remove the sound absorbing material from the silencer housings (2)
- Recover the support mesh (2)
- Replace the sound absorbing material and assemble by proceeding in reverse order.

1



2

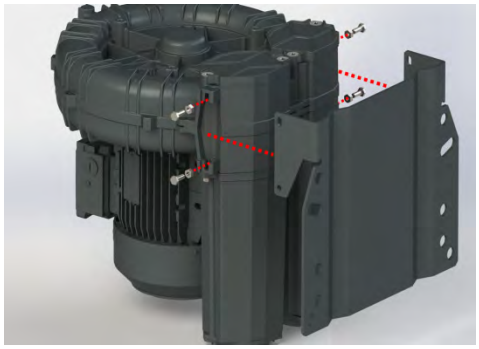


14.4 INTERNAL CLEANING

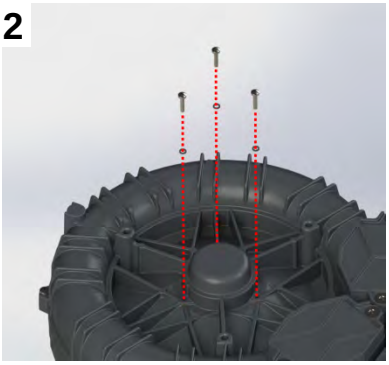
To clean the inside, proceed as follows:

- Place the unit upright, resting the fan cover on a flat and stable surface (1)
- Undo the screws (1)
- Remove the foot (1)
- Undo the cover screws (2)
- Remove the cover (3)
- Undo the screw and remove the washer (4)
- Remove the bearing and bearing cover (5)
- Remove the impeller (6)
- Clean and assemble by proceeding in reverse order
- Seal with System RS01 Arexons or Loctite 5970

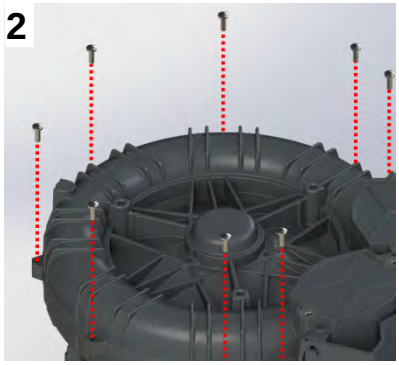
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2



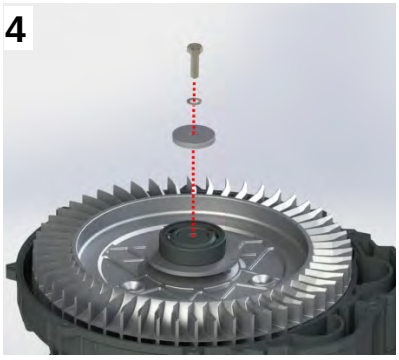
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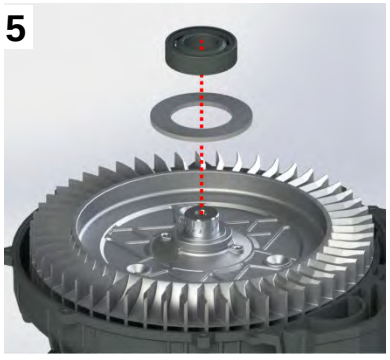
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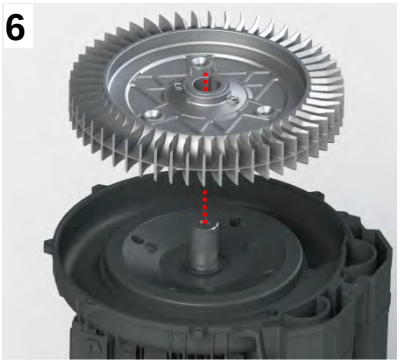
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5



6



14.5 LIFE OF BEARINGS

- In normal operating conditions (values given in the SPECIFICATIONS) the machine's bearings must be replaced by FPZ personnel after 20000 hours or 3 years, whichever comes first.

ATTENTION	The unit's bearings must only be replaced: if all the instructions, parts list, and the section/exploded view of the respective unit are available.

14.6 OPERATION PROBLEMS

Problem	Seriousness[6]	Cause	Cure
The unit does not start	F	Incorrect electrical wiring.	Have the electrical connection checked by the Technician, referring to the diagram in the terminal box.
	F	Unsuitable supply voltage.	Make sure the supply voltage, measured at the motor terminals, matches the rated voltage +/-10%.
	G	The impeller is stuck.	Have the unit repaired by FPZ After-Sales Service.
Insufficient or no air flow	G	The suction filter is clogged.	Have the cartridge cleaned or replaced by the Technician.
	G	Wrong frequency (for inverter powered units).	Correct the frequency.
	G	Profile of impeller blades modified (due to deposits on the profile).	Have the impeller checked by FPZ After-Sales Service
Insufficient or no differential pressure	F	Wrong rotation direction.	Have the rotation direction reversed by the Technician, switching around the two power supply wires.
	G	Leak in the system	Find the leak and seal it.
Current absorption higher than the permissible value	F	Incorrect electrical wiring.	Have the electrical connection checked by the Technician, referring to the diagram in the terminal box.
	F	Supply voltage drop.	Have the supply voltage at the terminals restored within the permissible values by the Technician.
	G	The suction filter is clogged.	Have the cartridge cleaned or replaced by the Technician.
	G	The unit has accumulated deposits inside.	Have the unit cleaned inside by FPZ After-Sales Service.
	G	The unit is operating at a pressure and/or vacuum higher than the permissible value.	Operate on the system and/or control valve to decrease the pressure differentials.
High delivery air temperature	G	The unit is operating at a pressure/vacuum higher than the permissible value.	Operate on the system and/or control valve to decrease the pressure differentials.
	G	The suction filter is clogged.	Have the cartridge cleaned or replaced by the Technician.
	G	The unit has accumulated deposits inside.	Have the unit cleaned inside by FPZ After-Sales Service.
	G	Suction and/or delivery pipes obstructed.	Have the obstructions removed by the Technician.
	G	Intake air temperature above 40°C (+104°F).	Use heat exchangers to reduce the intake air temperature.
Abnormal noise	F	The sound absorbing material is damaged.	Have the sound absorbing material replaced by the Technician.
	G	The impeller rubs against the casing: - The unit is operating at a pressure/vacuum higher than the permissible value.	Operate on the system to decrease the pressure differentials.
	G	- Reduction of assembly play due to internal deposits (dust, dirt on pipes, process residues, etc.).	Have the unit cleaned inside by FPZ After-Sales Service.
	G	Worn bearing.	Have the bearing replaced by FPZ After-Sales Service.
	F	Unit installation position unsuitable.	Have the units installed on structures that cannot transmit or amplify the noise (tanks, metal plates, etc.) by the Technician.
Abnormal vibration	G	The impeller is damaged.	Have the impeller replaced by FPZ After-Sales Service.
	G	The impeller has accumulated deposits.	Have the unit cleaned inside by FPZ After-Sales Service.
	G	Unit fixed without vibration dampers.	Have the unit secured with vibration dampers by the Technician.
	F	Rigid connection to the system	Have flexible sleeves installed between the unit and the pipes by the Technician.
	G	Faulty bearing on blower side or motor side.	Have the bearing replaced by FPZ After-Sales Service.
Leaks	G	Faulty gaskets on the silencer.	Have the gaskets checked and, if necessary, replaced by FPZ After-Sales Service.
	G	Faulty gaskets on the cover.	Have the gaskets checked and, if necessary, replaced by FPZ After-Sales Service.

[6] Divided as follows: F for functional fault and G for serious fault

RMA – REPAIR REQUEST FORM and DECLARATION OF DECONTAMINATION

Fill out and return to: E-mail customercare@fpz.com

MACHINE / PRODUCT DATA

Type of machine / Model		Serial no.		purchase document no.	
Cause	☐ Repair Warranty		☐ Repair	☐ Periodical maintenance	
Description of defect	☐ Blocked		☐ Noisy	☐ Motor failure	
	☐ Other:				

DECLARATION OF DECONTAMINATION

- For the safety of our employees and compliance with the legal requirements during handling of substances hazardous to health and the environment, this declaration must be filled out completely and sent for each machine / product.
- Without said declaration filled out completely, repair cannot be carried out.
- The declaration must be sent with the shipping documents.

1. The machine / the product

☐ has NOT come into contact with hazardous substances. In case of repair / disposal, there is no risk to people and the environment. Go to point 3.

☐ has come into contact with hazardous substances. Go to point 2.

2. Information on contamination

Type of system on which the machine is installed:

_____

And it has come into contact with the following substances subject to the requirement of labelling or dangerous to health / environment:

Trademark	Chemical name	Hazardous substance class	Characteristics (e.g. toxic, flammable, corrosive)

☐ The machine / product has been washed and cleaned on the outside. Specify the decontamination method used:

_____

3. Legally binding declaration

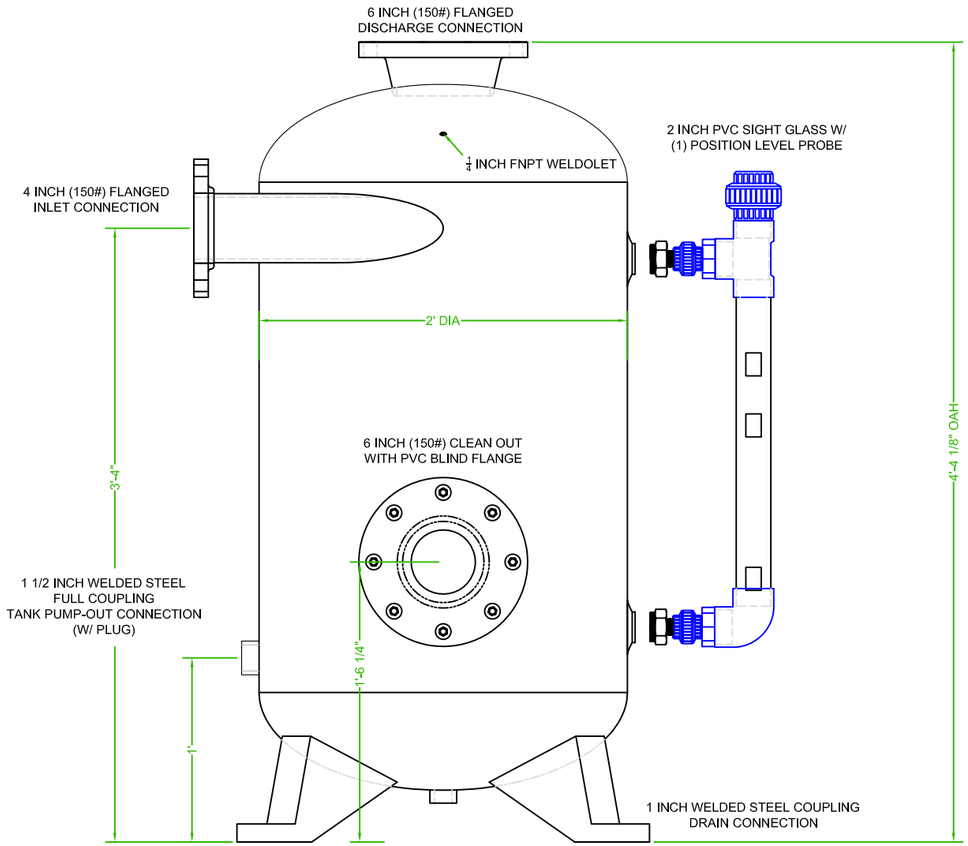
The undersigned hereby declares that the details given on this form are true and complete.

APPLICANT'S DETAILS

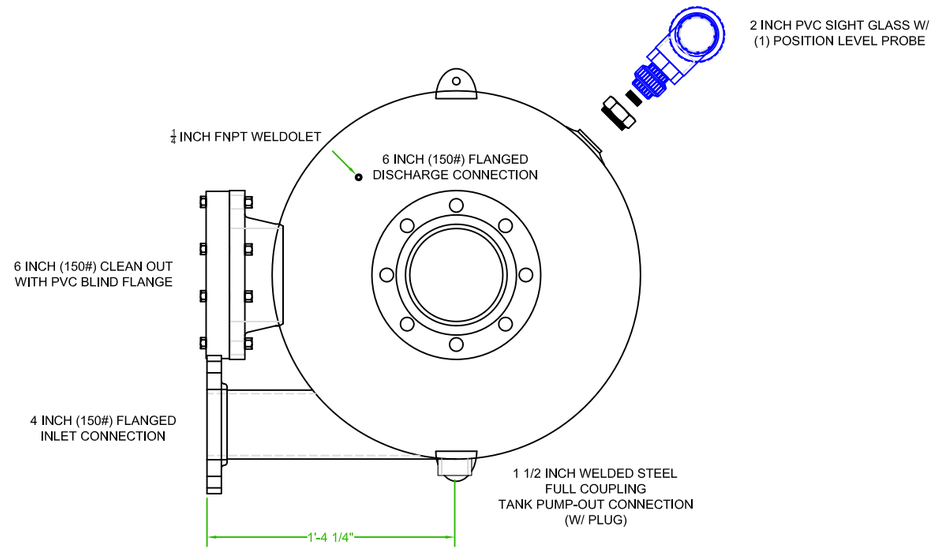
Company name:		Date	
Street:		Postal Code	
City:		Province	
Contact person:			
E-mail / tel. no.			

COMPLETION BY FPZ CUSTOMER CARE

RMA no.	
NOTES	



(D-2) SEPARATOR TANK
ELEVATIONAL VIEW



(D-2) SEPARATOR TANK
PLAN VIEW

NOTES:
1. TANK CONSTRUCTION - CARBON STEEL, 200 PSI RATED VESSEL
2. EXTERIOR MECHANICALLY PRE-PARED, PRIMED AND PAINTED WITH INDUSTRIAL ENAMEL PAINT (RUSTOLEUM SERIES 7400 OR EQUAL)
3. ESTIMATED CONDENSATE LEVEL:
LSHH-211 - 49 GALLONS

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	10-08-15	JAD

CONFIDENTIALITY NOTICE:
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DRWN BY	JAD
DATE	07-28-15
CHK BY	---
DATE	---
APPR BY	---
DATE	---

NES™
NATIONAL ENVIRONMENTAL SYSTEMS
84 DUNHAM STREET / ATTLEBORO, MA 02703
508-226-1100 (Phone) / 508-226-1180 (Fax)
WWW.NES-INC.BIZ

TITLE
80 GALLON MOISTURE SEPARATOR (D-2)

AECOM
FORMER OZONE INDUSTRIES SITE - QUEENS, NY

JOB NO.
15-152 (SSDS)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	M-3	1 OF 1	A

MOISTURE SEPARATOR

GENERAL THEORY

The moisture separator removes liquids from the process stream in soil venting applications to help protect the blower from corrosion and mineral deposits caused by water.

DESIGN INFORMATION

NES moisture separators operate on the principles of cyclonic section aided by velocity reduction. The moisture separator inlet pipe is set tangential to the tank wall, a stringer pipe extends down past the separator inlet is placed in the center of the tank. The moisture laden air stream is forced into a cyclonic rotation. The centrifugal force produced throws the water droplets to the outer wall of the separator where they fall and collect at the bottom. Additional efficiency is produced when the velocity is reduced to values between 1500 fpm and 6000 fpm. For a separator of this type, moisture separation efficiency is typically 95% or greater for moisture droplets greater than 10 micron.

CONSTRUCTION

NES moisture separators are constructed of carbon steel with bronze drain valves, removable lid with EPDM gasket, mechanical ball and float assembly standard for drum style separators. Sight glass, emergency high-level switch and pump out switches are optional. Tank style separators are standard with carbon steel construction, bronze drain valves, flanged clean-out port, sight glass and emergency high level switch. Pump-out switches and mist eliminator are optional. All separators are primed and coated with a rust inhibitor to prevent corrosion.

National Environmental Systems
Phone 508-226-1100 Fax 508-226)-1180 84 Dunham Street Attleboro, MA 02703
www.nes-inc.biz



Tank Style Moisture Separator

* 120 gallon total capacity
* Carbon Steel construction, exterior primed & painted
* 4" MNPT Tangential Inlet - Vapor
* Demister
* 4" FNPT Outlet - Vapor
* 2" Clear PVC Sight Glass
* Clean-out Man-way
* 1" Ball drain valve
* 2" MPT Pump Out - Liquid
* (3) Position High Level Switch

National Environmental Systems
Phone 508-226-1100 Fax 508-226)-1180 84 Dunham Street Attleboro, MA 02703
www.nes-inc.biz

FPZ, Inc
150 N. Progress Drive
Saukville, WI, 53080 - **U.S.A.**
Tel. (262) 268-0180
Fax (262) 268-0415
E-mail usa@fpz.com

ACCESSORIES

Safety Valves

SS1006

The following table is a guide to select the appropriate safety valve. The selections in the table are based on blowers operating at **60 Hz -** for 50 hz applications refer to the safety valve data sheets. To select the appropriate safety valve, determine the blower model, horsepower, and whether it is to be used for vacuum or pressure service. If it is desirable to have the valve activate at lower pressures than the maximum rated pressure or vacuum of the blower, a different safety valve might be required (refer to safety valve data sheets). In some cases, two valves are required. ***FPZ valves are supplied uncalibrated.*** All safety valves included detailed instructions on how to calibrate and install the valve.

Single Stage Blowers

Model	HP	Safety Valve Vacuum	Safety Valve Pressure
K03-MS	3/4	**VRL6**	**VRL6**
K04-MS	ALL	**VRL6**	**VRL6**
K05-MS	ALL	**VRL6**	**VRL6**
K06-MS	3	**VRL6**	**VRL8**
K06-MS	4	**VRL6**	**VRL6**
K06-MS	5 1/2	**VRL6**	**VRL6**
K06-MS	6 1/5	**VRL6**	**VRL6**
K07-MS	4	**VRL8**	**VRL8**
K07-MS	5 1/2	**VRL6**	**VRL8**
K07-MS	7 1/2	**VRL6**	**VRL6**
K07-MS	10	**VRL6**	**VRL6**
K08-MS	5.5	**VRL8**	**VRL9**
K08-MS	7 1/2	**VRL8**	**VRL8**
K08-MS	10	**VRL6**	**VRL8**
K08-MS	15	**VRL6**	**VRL6**
K09-MS	7 1/2	**VRL9**	**VRL9**
K09-MS	10	**VRL8**	**VRL8**
K09-MS	15	**VRL6**	**VRL8**
K09-MS	20	**VRL6**	**VRL6**
K10-MS	7 1/2	**VRL9**	**VRL9**
K10-MS	10	**VRL9**	**VRL9**
K10-MS	15	**VRL8**	**VRL8**
K10-MS	20	**VRL6**	**VRL8**
K10-MS	25	**-**	**VRL6**
K11-MS	10	**VRL9**	**VRL9**
K11-MS	15	**VRL9**	**VRL9**
K11-MS	20	**VRL8**	**VRL8**
K11-MS	25	**VRL6**	**VRL8**
K12-MS	15	**VRL9**	**VRL9**
K12-MS	20	**VRL9**	**VRL9**
K12-MS	25	**VRL8**	**VRL8**
K03-TS	ALL	**VRL6**	**VRL6**
K04-TS	ALL	**VRL6**	**VRL6**
K05-TS	ALL	**VRL8**	**VRL8**
K06-TS	5 1/2	**VRL9**	**VRL9**
K06-TS	7 1/2	**VRL8**	**VRL8**
K06-TS	10	**VRL6**	**VRL8**
K07-TS	7 1/2	**VRL9**	**VRL9**
K07-TS	10	**VRL9**	**VRL9**
K07-TS	15	**VRL8**	**VRL8**
K08-TS	7 1/2	N.A	N.A.
K08-TS	10	**VRL9**	**(2) VRL9**
K08-TS	15	**VRL9**	**VRL9**
K09-TS	15	**(2) VRL9**	**(2) VRL9**
K09-TS	20	**VRL9**	**VRL9**
K09-TS	25	**VRL8**	**VRL9**
K10-TS	15	**(2) VRL9**	**(2) VRL9**
K10-TS	20	**(2) VRL9**	**(2) VRL9**
K10-TS	25	**VRL9**	**VRL9**
K11-TS	25	**(2) VRL9**	**(2) VRL9**
K11-TS	30	**(2) VRL9**	**(2) VRL9**
K12-TS	30	**(3) VRL9**	**(3) VRL9**
115SH	30	**(2) VRL9**	**(2) VRL9**
115SH	40	**VRL9**	**VRL9**
115SH	50	**VRL9**	**VRL9**

Two Stage Blowers

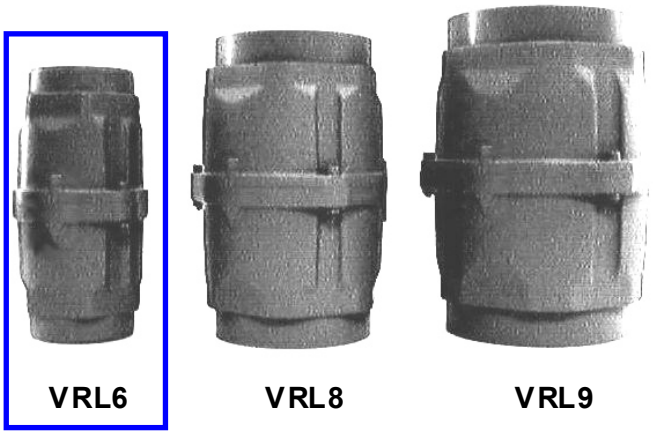
Model	HP	Safety Valve Vacuum	Safety Valve Pressure
15DH	ALL	**VRL6**	**VRL6**
20DH	ALL	**VRL6**	**VRL6**
30DH	ALL	**VRL6**	**VRL6**
40DH	ALL	**VRL6**	**VRL6**
K07-MD	3	**VRL6**	**VRL6**
K07-MD	4	**VRL6**	**VRL6**
K07-MD	5 1/2	**VRL6**	**VRL6**
K07-MD	7 1/2	**VRL6**	**VRL6-HP**
K08-MD	5 1/2	**VRL6**	**VRL6**
K08-MD	7 1/2	**VRL6**	**VRL6**
K08-MD	10	**VRL6**	**VRL6**
K08-MD	15	**-**	**VRL6-HP**
K09-MD	5 1/2	**VRL8**	**VRL8**
K09-MD	7 1/2	**VRL6**	**VRL6**
K09-MD	10	**VRL6**	**VRL6**
K09-MD	15	**-**	**VRL6-HP**
K10-MD	7 1/2	**VRL8**	**VRL8**
K10-MD	10	**VRL6**	**VRL6**
K10-MD	15	**VRL6**	**VRL6**
K10-MD	20	**-**	**VRL6-HP**
K11-MD	10	**VRL8**	**VRL8**
K11-MD	15	**VRL6**	**VRL8**
K11-MD	20	**VRL6**	**VRL6-HP**
K11-MD	25	**-**	**VRL6-HP**
K12-MD	15	**VRL8**	**VRL8**
K12-MD	20	**VRL6**	**VRL6**
K12-MD	25	**-**	**VRL6-HP**
K04-TD	2	**VRL6**	**VRL6**
K04-TD	3	**VRL6**	**VRL6**
K05-TD	3	**VRL6**	**VRL6**
K05-TD	4	**VRL6**	**VRL6**
K05-TD	5 1/2	**VRL6**	**VRL6**
K06-TD	5 1/2	**VRL6**	**VRL8**
K06-TD	7 1/2	**VRL6**	**VRL6**
K06-TD	10	**VRL6**	**VRL6**
K07-TD	7 1/2	**VRL8**	**VRL8**
K07-TD	10	**VRL6**	**VRL6**
K07-TD	15	**VRL6**	**VRL6**
K08-TD	7 1/2	**VRL8**	**VRL8**
K08-TD	10	**VRL8**	**VRL8**
K08-TD	15	**VRL6**	**VRL6**
K09-TD	15	**VRL8**	**VRL8**
K09-TD	20	**VRL6**	**VRL8**
K09-TD	25	**VRL6**	**VRL6**
K10-TD	15	**VRL9**	**VRL9**
K10-TD	20	**VRL8**	**VRL8**
K10-TD	25	**VRL6**	**VRL8**
K11-TD	20	**VRL9**	**VRL9**
K11-TD	25	**VRL8**	**VRL8**
K12-TD	25	**VRL8**	**VRL8**
K12-TD	30	**VRL9**	**VRL9**
115DH	25	**VRL8**	**VRL8**
115DH	30	**VRL6**	**VRL8**
115DH	40	**VRL6**	**VRL6**

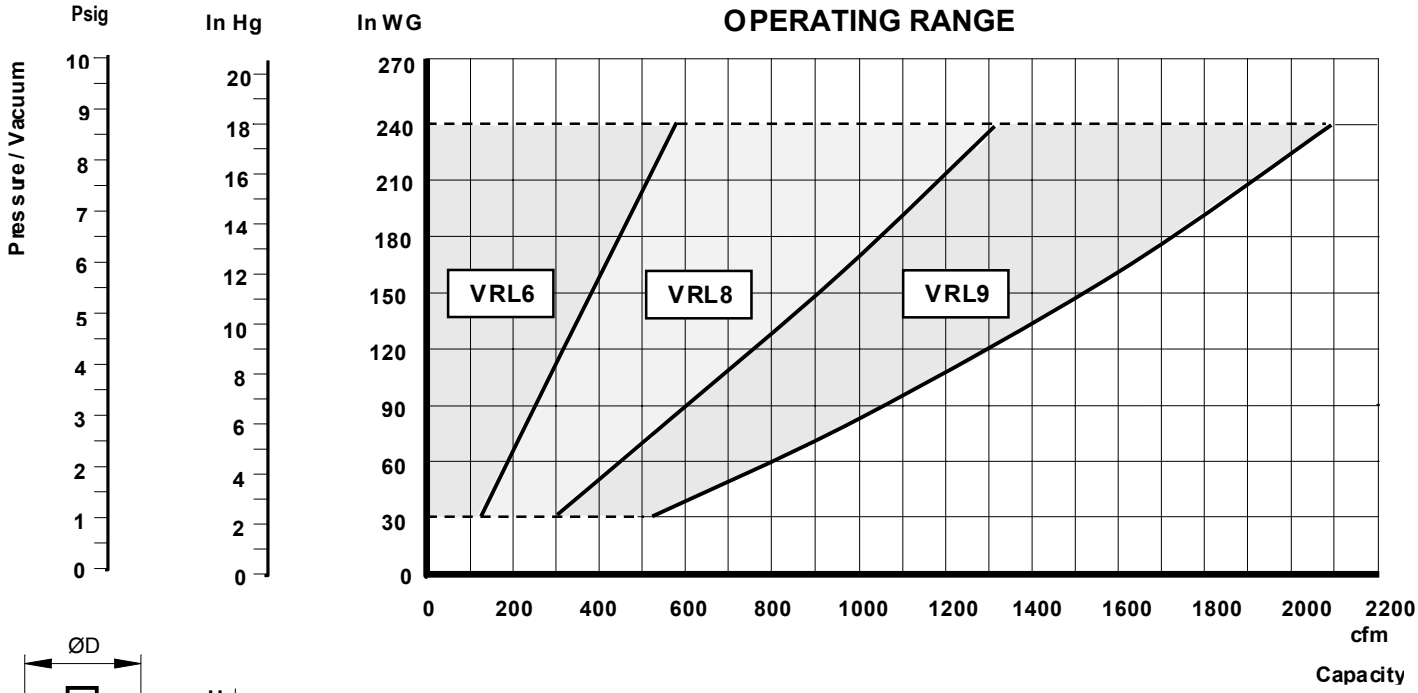
Valve selections are based on 60 Hz operation and refer to air having a density equal to 0.075 lbs / cu. Ft and inlet temperature of 68 deg F. Data is subject to change without notice.

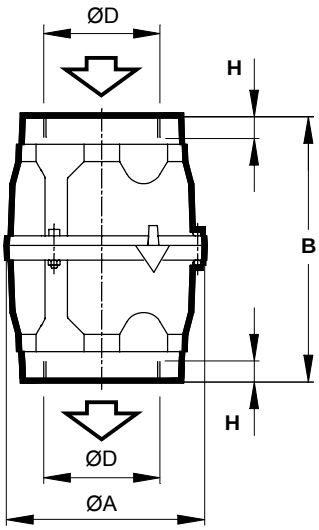
FPZ, Inc
150 N. Progress Drive
Saukville, WI, 53080 - **U.S.A.**
Tel. (262) 268-0180
Fax (262) 268-0415
E-mail usa@fpz.com

Safety Valves

The VRL valves are designed to protect blowers and / or motors from over pressurization or excess vacuum. When there is over pressurization, the valve opens and discharges to the outside. When there is excess in vacuum, the valve opens and takes flow from outside.
The valve have been designed for low pressure / low vacuum, with minimal difference between the initial value at which the valve begins to open and its fully-opened position. The valves are supplied with 2 different springs to maximize its efficiency.
These compact valves, made of aluminum alloy, are both easy to install and calibrate. The valves are designed to operate in a wide range of capacities. The VRL can be plumbed to divert excess primary flow through a secondary external outlet when working in pressure conditions or to pipe-in a secondary flow when working in vacuum.
Maximum efficiency is achieved by keeping operating values (flow versus pressure or vacuum) within the operating range (shaded area on graph). Capacity refers to air having a density equal to 0.075 lbs./cu.ft .







OVERALL DIMENSIONS

TYPE	ND	D	A	B	H	WEIGHT (Lbs)
VRL6	2”	2” NPT	3.94	6.57	0.47	2.1
VRL8	3”	3” NPT	5.31	7.48	0.59	4.2
VRL9	4”	4” NPT	6.30	8.11	0.71	5.7

- Dimensions in inches.
- Specifications subject to change without prior notice.

® **FPZ S.p.A.**
Via F.lli Cervi 16
20863 Concorezzo - (MB) - **ITALIA**
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www.fpz.com

I – GB – F – D – E **SN 1701-7**

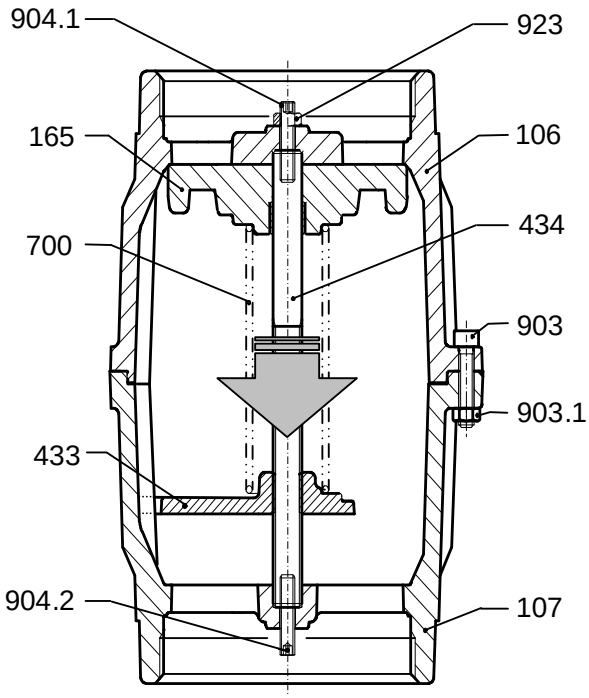
VALVOLA DI SICUREZZA VRL
SAFETY VALVE VRL
SOUPAPE DE SECURITE VRL
SICHERHEITSVENTIL VRL
VALVULA DE SEGURIDAD VRL

ISTRUZIONI D'USO
USE INSTRUCTIONS
INSTRUCTIONS D'UTILISATION
ANWENDUNGSHINWEISE
INSTRUCCIONES PARA EL USO

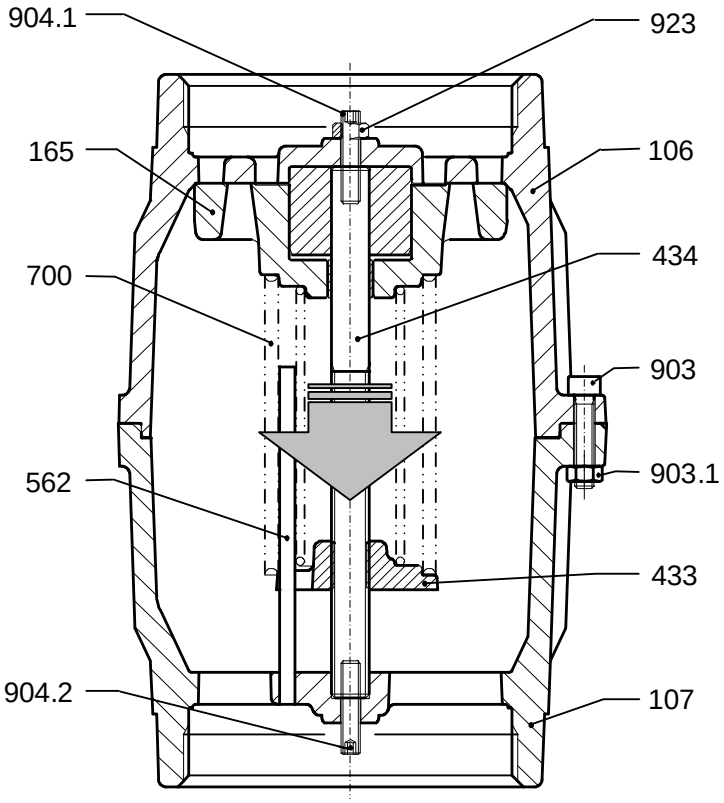
ATTENZIONE! LA VALVOLA E' FORNITA NON TARATA
CAUTION! THE VALVE IS SUPPLIED NOT CALIBRATED
ATTENTION ! LA SOUPAPE EST FOURNIE NON TAREE
ACHTUNG ! DAS VENTIL IST WERKSEITIG NICHT GEEICHT
ATENCION ! LA VALVULA NO ESTA GRADUADA



LEGGERE ATTENTAMENTE TUTTE LE ISTRUZIONI E CONSERVARLE
PLEASE READ CAREFULLY ALL INSTRUCTIONS AND KEEP THEM FOR FUTURE REFERENCE
LIRE ATTENTIVEMENT TOUTES LES INSTRUCTIONS ET LES CONSERVER
ALLE ANLEITUNGEN SIND SORGFÄLTIG ZU LESEN UND AUFZUBEWAHREN!
LEER ATENTAMENTE LAS INSTRUCCIONES Y CONSERVARLAS



VRL6
Fig. 1a



VRL8 - VRL9
Fig. 1b

ITEM	Denominazione - *Description* - Désignation - *Description* - Descripciòn
106	Corpo - *Housing* - Corps supérieur - *Gehäuse* - Cuerpo
107	Coperchio - *Cover* - Couvercle - *Abdeckung* - Cubierta
165	Otturatore - *Shutter* - Obturateur - *Verschluss* - Obturador
433	Piattello guida molla - *Spring guide disc* - Guide ressort - *Federführungsscheibe* - Disco guìa muelle
434	Asta - *Shutter guide* - Tige - *Schließführung* - Vastago
562	Spina cilindrica - Dowel pin -Goupille cylindrique - *Führungsstift* - Pin
700	Molla - *Spring* - Ressort - *Feder* - Muelle
903	Vite - *Screw* - Vis - *Schraube* - Tornillo
903.1	Dado - *Nut* - Ecrou - *Schraubenmutter* - Tuerca
904.1	Grano superiore - *Upper grub screw* - Tige de réglage supérieure – *Obere Einstellschraube* - Espàrrago superior
904.2	Grano inferiore - *Lower grub screw* - Tige de réglage inférieure - *Untere Einstellschraube* - Espàrrago inferior
923	Dado di fermo - *Nut* - Ecrou de blocage -*Schraubenmutter* - Contratuerca

I CONDIZIONI D'UTILIZZO

- **LE VALVOLE VRL SONO ADATTE AL CONVOGLIAMENTO DI ARIA E GAS NON ESPLOSIVI, NON INFIAMMABILI, NON AGGRESSIVI, IN ATMOSFERA NON ESPLOSIVA. LA TEMPERATURA DEL FLUIDO CONVOGLIATO È AMMESSA NEL CAMPO DI -15 A +160 °C.**
- **VALVOLE PROGETTATE E FABBRICATE PER LA LIMITAZIONE NEL CAMPO DELLE BASSE PRESSIONI / DEPRESSIONI, PER UN UTILIZZO SPECIFICO SU SOFFIANTI, ASPIRATORI E COMPRESSORI A BASSE PRESSIONI;**
- **NON SOPPORTANO PRESSIONI INTERNE ELEVATE, COMUNQUE NON SUPERIORI A 2.8 bar A;**
- **SONO SOGGETTE A PICCOLE PERDITE DEL FLUIDO CONVOGLIATO;**
- **CORPI SOLIDI ANCHE DI PICCOLE DIMENSIONI E SPORCIZIA POSSONO PROVOCARE GRAVI DANNI, VANNO QUINDI SEPARATI DAL FLUSSO MEDIANTE ADEGUATI FILTRI IN ASPIRAZIONE.**

GB *CONDITIONS OF USE*

- ***THE VRL VALVES ARE DESIGNED FOR THE HANDLING OF AIR OR NON-EXPLOSIVE, NON-HAZARDOUS AND NON-FLAMMABLE GASES IN NON-EXPLOSIVE ENVIRONMENTS. THE GAS INLET TEMPERATURE MUST BE IN THE RANGE OF -15 TO +160 °C.***
- ***RELIEF VALVES ARE DESIGNED AND MANUFACTURED TO LIMIT THE OPERATING PRESSURE IN LOW PRESSURE/VACUUM APPLICATIONS. THEY ARE FOR USE SPECIFICALLY ON LOW PRESSURE BLOWERS AND VACUUM PUMPS ONLY;***
- ***THE VALVE CANNOT WITHSTAND HIGH INTERNAL PRESSURE, DESIGN MAXIMUM OF 2.8 bar A;***
- ***THERE IS SMALL LOSS OF THE AIR/GAS BEING HANDLED;***
- ***SOLID PARTICULES, HOWEVER SMALL, INCLUDING DIRT CAN CAUSE SERIOUS DAMAGE; THEREFORE IT IS ESSENTIAL THAT SUCH SUBSTANCES SHOULD BE REMOVED FROM THE GAS BY SUITABLE FILTERS UPSTREAM OF THE INLET.***

F CONDITIONS D'UTILISATION

- **LES SOUPAPES VRL SONT ADAPTÉS À L'ACHEMINEMENT D'AIR ET DE GAZ NON EXPLOSIFS, ININFLAMMABLES, NON AGRESSIFS, DANS UNE ATMOSPHÈRE NON EXPLOSIVE. LA TEMPÉRATURE DU FLUIDE ACHEMINÉ EST ADMISE DANS UN ÉVENTAIL DE -15 À +160 °C.**
- **CES SOUPAPES ONT ETÉ DÉVELOPPÉES ET CONSTRUITES AFIN DE LIMITER LES VALEURS MAXIMALES VIDE/PRESSION ET LEUR UTILISATION EST SPÉCIFIQUEMENT RESERVÉE AUX ASPIRATEURS ET COMPRESSEURS BASSES PRESSION;**
- **NE SUPPORTENT PAS DES PRESSIONS INTERNES ÉLEVÉES, C'EST-À-DIRE DES PRESSIONS SUPÉRIEURES À 2.8 bar A;**
- **SONT SUJETTES À DE PETITES PERTES DU FLUIDE ACHEMINÉ;**
- **DES CORPS SOLIDES MÊME DE PETITES DIMENSIONS ET LÉGÈREMENT SALES PEUVENT PROVOQUER DE GRAVES DOMMAGES, ILS SONT PAR CONSÉQUENT SÉPARÉS DU FLUX PAR DES FILTRES ADÉQUANTS EN ASPIRATION.**

D *EINSATZBEDINGUNGEN*

- ***DIE VENTILE DER SERIE VRL SIND FÜR DEN DAUERBETRIEB IN NICHT-EXPLOSIVER UMGEBUNG ZUM ANSAUGEN UND VERDICHTEN VON LUFT ODER NICHT-EXPLOSIVEN, NICHT-BRENNBAREN UND NICHT-AGGRESSIVEN GASEN GEEIGNET. DIE ZULÄSSIGE ANSAUGTEMPERATUREN LIEGT ZWISCHEN -15 BIS +160 °C.***
- ***DIE SPEZIELL FÜR DEN NIEDERDRUCK- BZW. NIEDERVAKUUMBEREICH ENTWICKELTEN VENTILE SIND FÜR DIE SPEZIFISCHE ANWENDUNG IN VAKUUMPUMPEN UND KOMPRESSOREN GEEIGNET;***
- ***DIE GEHÄUSE WIDERSTEHEN KEINEN HOHEN INNENDRÜCKEN. UNTER KEINEN UMSTÄNDEN DARF DER MAX. BETRIEBSDRUCK VON 2.8 bar A ÜBERSCHRITTEN WERDEN;***
- ***DIE VENTILE SIND NICHT VOLLSTÄNDIG GASDICHT;***
- ***FREMDKÖRPER, AUCH GERINGER GRÖßE, UND VERUNREINIGUNGER KÖNNEN SCHWERE SCHÄDEN VERURSACHEN. SIE MÜSSEN DAHER AUS DEM FÖRDERMEDIUM MIT GEEIGNETEN ANSAUGFILTERN ENTFERNT WERDEN.***

E CONDICONES DE USO

- **LAS VALVULAS VRL SON ADAPTAS PARA EL MOVIMIENO DE AIRE O GASES NO EXPLOSIVOS, NO PELIGROSOS Y NO INFLAMABLES Y PARA SERVICIO EN AMBIENTES NO EXPLOSIVOS. LA TEMPERATURA DE ENTRADA DEL GAS DEBE ESTAR ENTRE LOS –15 Y +160 °C.**
- **VALVULAS PROYECTADAS Y FABRICADAS PARA LA LIMITACION EN EL SECTOR DE LAS BAJAS PRESIONES / VACIOS, PARA UN UTILIZO SOBRE ASPIRADORES, COMPRESORES A BAJAS PRESIONES.**
- **LA VALVULA NO PUEDE CONTENER PRESIONES INTERNAS ALTAS, NO MAYORES QUE 2.8 bar A;**
- **HAY UNA PECHEÑA PERDIDA DE FLUIDO MANEJADO;**
- **LAS PARTICULAS SOLIDAS, AUNQUE PEQUEÑAS, INCLUIDO EL POLVO, PUEDEN CAUSAR SERIOS DAÑOS. POR LO TANTO ES ESENCIAL QUE DICHAS SUSTANCIAS SEAN ELIMINADAS DEL GAS MEDIANTE FILTROS APROPIADOS ANTES DE LA ENTRADA.**

DIAGRAMMA DI SELEZIONE - *SELECTION DIAGRAM*
SCHÉMA DE SÉLECTION – AUSWAHLDIAGRAMM
DIAGRAMA DE SELECCION

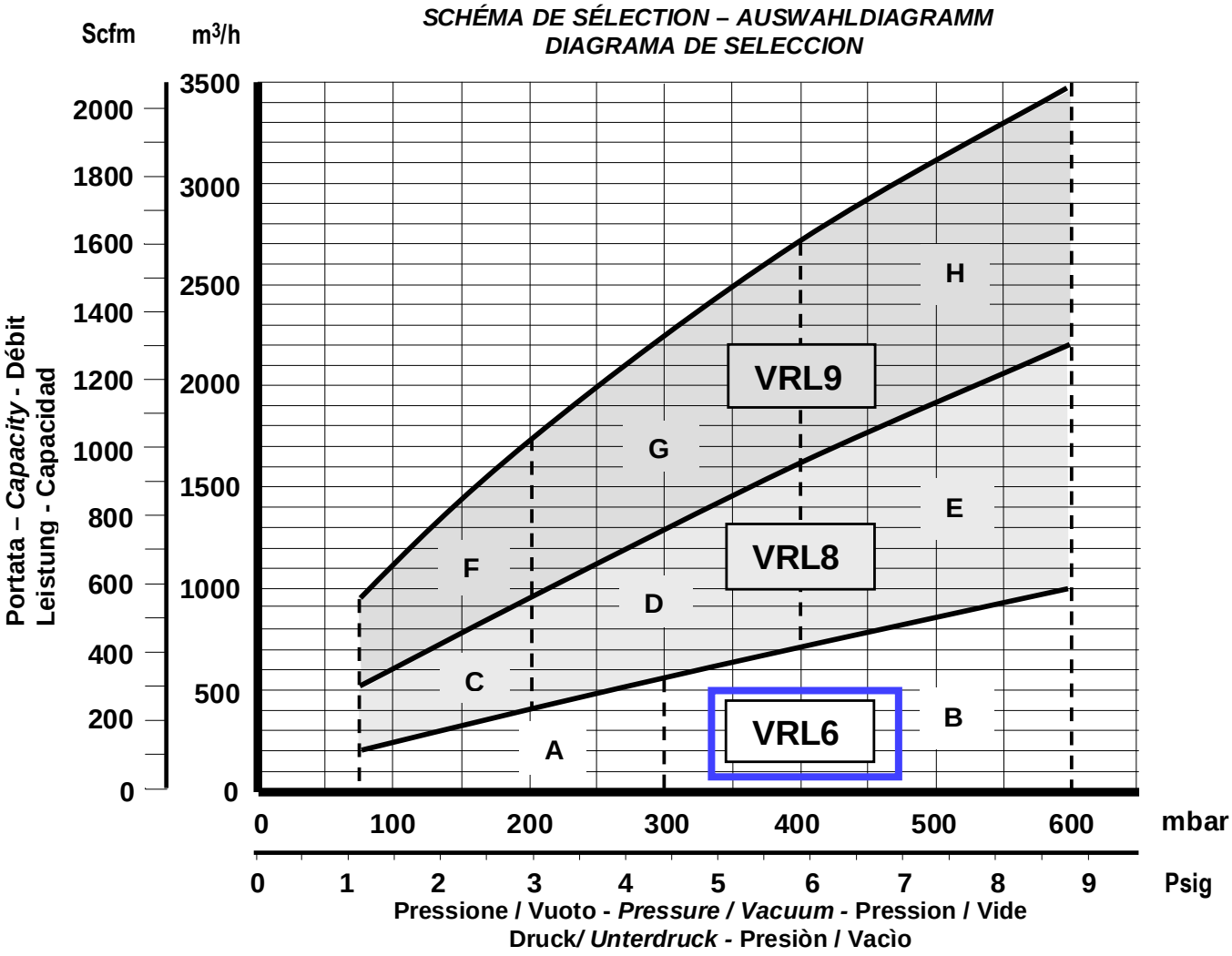


TABELLA DI SELEZIONE MOLLA - *SPRING SELECTION CHART* - TABLEAU DE SÉLECTION RESSORT
***UEBERSICHTSTABELLE FEDERN* - TABLA DE SELECCION MUELLE**

RANGE	MOLLA *SPRING* RESSORT *FEDER* MUELLE N°	Pressione / Vuoto *Pressure / Vacuum* Pression / Vide *Druck / Underdruck* Presiòn / Vacìo MIN [mbar]	MIN [psig]	Pressione / Vuoto *Pressure / Vacuum* Pression / Vide *Druck / Underdruck* Presiòn / Vacìo MAX [mbar]	MAX [psig]	Colore di identificazione *Colour of identification* Couleur d' identification *Farbidentifizierung* Color de identificaciòn
VRL6						
A	I	75	1.102	300	4.408	-
B	II	300	4.408	600	8,820	VERDE - *GREEN* - VERT - *GRÜN* - VERDE
VRL8						
C	I	75	1.102	200	2.940	-
D	II	200	2.940	400	5.880	VERDE – *GREEN* VERT - *GRÜN* - VERDE
E	I + II	400	5.880	600	8,820	-
VRL9						
F	I	75	1.102	200	2.940	VERDE - *GREEN* - VERT - *GRÜN* - VERDE
G	II	200	2.940	400	5.880	-
H	I + II	400	5.880	600	8,820	-

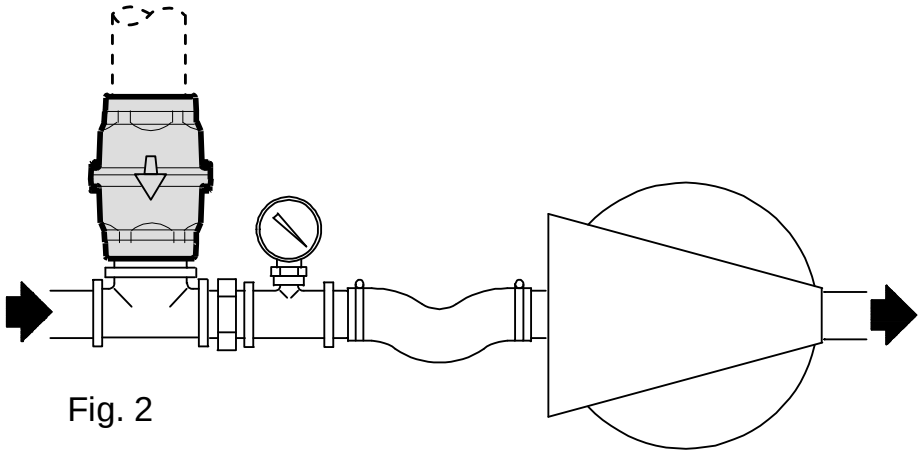


Fig. 2

SCHEMA DI INSTALLAZIONE – VALVOLA LIMITATRICE DI VUOTO
INSTALLATION SKETCH – VACUUM RELIEF VALVE
INSTALLATIONSSCHEMA – VAKUUMVENTIL
SCHÉMA DE INSTALLATION – SOUPAPE CASSE VIDE
ESQUEMA DE INSTALATIÒN – VALVULA LIMITADORA DE VACIO

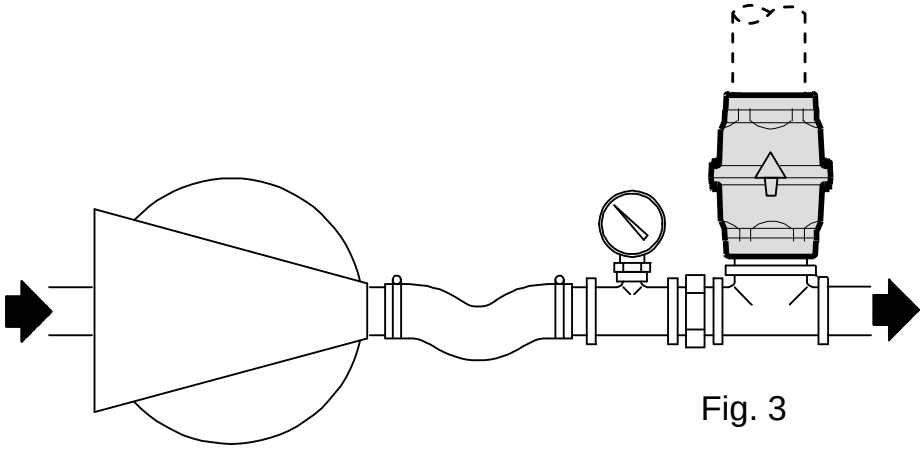


Fig. 3

SCHEMA DI INSTALLAZIONE – VALVOLA LIMITATRICE DI PRESSIONE
INSTALLATION SKETCH – PRESSURE RELIEF VALVE
INSTALLATIONSSCHEMA – DRUCKVENTIL
SCHÉMA DE INSTALLATION – SOUPAPE DE SÉCURITÉ
ESQUEMA DE INSTALATIÒN – VALVULA LIMITADORA DE PRESION

1. CHOICE OF SPRING

The valve is supplied with 2 different springs; each spring is to be used within a specific pressure-vacuum operating range. For the VRL8 and VRL9 there is the possibility to use both springs working in parallel.
Referring to the SELECTION DIAGRAM, check that the valve is correctly sized and depending where the operating point (area A, B,…H) is located, choose one or two springs according to SPRING SELECTION CHART.
The valve is supplied with spring # I installed. If spring needs to be replaced or a supplementary spring is needed to be added (for VRL8 / VRL9), proceed to point # 2 otherwise, adjust valve as per point #3.

2. INSTRUCTIONS FOR SPRING REPLACEMENT (OR MOUNTING ADITIONAL SPRING FOR VRL8 / VRL9)

- Remove the two plastic caps on valve.
- **Ensure stop-nut 923 is locked on the upper housing 106.**
- Unscrew screw 903 from nut 903.1.
- Remove cover 107 from housing 106.
- Unscrew spring guide disc 433 taking it out from shutter guide 434.
- Remove spring 700 (only in case of replacement).
- Install the appropriate spring into shutter 165.
- Compress spring and screw spring guide disc 433 on shutter guide 434 for at least 20 full thread terms.
- Check that both ends of the spring are properly positioned within their seats.
- Install the cover 107 on the housing 106 inserting:
  - for VRL6: the sliding guide on the slot in spring guide disc 433.
  - for VRL8 and VRL9: dowel pin 562 on the slot in spring guide disc 433.
- Tighten screw 903 on nut 903.1.

3. VALVE SETTING

A) Setting-up at allowed vacuum level

- Remove the two plastic caps on valve, if any.
- Position valve on the suction by-pass and connect a vacuum gage as close as possible to the exhauster inlet (Fig. 2).
- Unscrew nut 923.
- Relieve spring tension by backing off upper grub screw 904.1 with the fit key.
- Turn on exhauster. Induce highest attainable vacuum by throttling air intake upstream relief valve (normally reducing throttle to fully-closed).
- Adjust upper grub screw 904.1 until maximum allowable vacuum level is reached.
- Tighten nut 923 keeping blocked upper grub screw 904.1.
- Open suction line.

Double-check vacuum gauge to ensure no additional losses are induced by pipes or filters installed upstream relief valve.

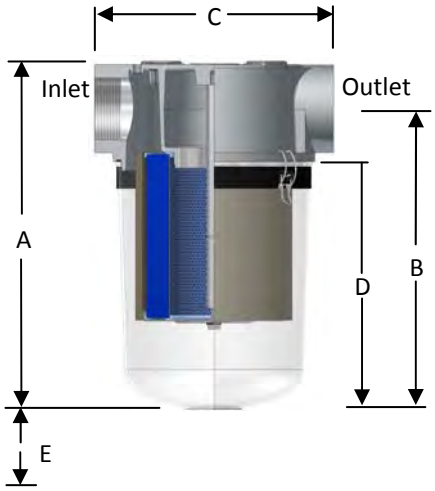
B) Setting-up at allowed pressure level

- Remove the two plastic caps on valve, if any.
- Remove nut 923 from upper grub screw 904.1 and place it on to the lower grub screw 904.2. Do not tighten.
- Position valve on the discharge by-pass and connect a pressure gage as close as possible to the blower outlet (Fig. 3).
- Relieve spring tension by backing on lower grub screw 904.2 with the fit key.
- Turn on blower. Induce highest attainable pressure by throttling air discharge downstream of the valve (normally reducing throttle to fully-closed).
- Unscrew lower grub screw 904.2 until maximum allowable pressure level is reached.
- Tighten nut 923 keeping blocked lower grub screw 904.2.
- Open discharge line.

Double-check pressure gauge to ensure no additional losses are induced by pipes or filters installed downstream the valve

”T” Style Vacuum Filters
ST/CT Series 1” – 6” FPT





General Features

- Compact design for space restrictions; min. service area
- Inlet above element for extended element life & maintenance intervals
- Cast, corrosion resistant aluminum top with machined connections: - Integrated baffle design
  - 4 M12 taps for mounting brackets: 2” to 6”
- ”T” style design minimizes piping requirements
- 1/4” differential gauge ports: 2” to 6”

ST Series Specifications

- See-through bucket made from polycarbonate material
- Bucket has a high tensile strength for dimensional stability
- Temp ratings: - Complete assembly max: 220°F (104°C)
  - See-through bucket only max: 257°F (125°C)
- Increased holding capacity

Technical Specifications

- Vacuum Rating: Gas tight seal
- Temp (continuous): min -15°F (-26°C) max 220°F (104°C)
- Filter change out differential: 15-20” H2O over initial Δ P
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron

Options

- Swing bolts for heavy duty environments
- 1” to 1-1/2” housings have dimples for optional gauge ports & mounting bracket taps
- Epoxy coated housings
- Drain ports
- Spool piece extender on select models
- ISO flange connections: NW25, NW40 (select models)

FPT Inlet & Outlet	Assembly SCFM Rating	Assembly Part Number		Dimensions - inches				Suggested Service HT.	Approx. Weight	Replacement Element Part No.		Element SCFM Rating
		Polyester	Paper	A	B	C	D	E	lbs.	Polyester	Paper	
1"	40	ST-897-100C	ST-896-100C	13 3/8	11 15/16	7	10 3/8	9	11	897	896	115
1-1/4"	60	ST-897-125C	ST-896-125C	13 3/8	11 15/16	7	10 3/8	9	11	897	896	115
1-1/2"	80	ST-897-150C	ST-896-150C	13 3/8	11 15/16	7	10 3/8	9	10	897	896	115
2"	175	ST-851/1-200C	ST-850/1-200C	16 1/4	14 1/4	9	12 1/2	9	15	851/1	850/1	290
2-1/2"	210	ST-851/1-250C	ST-850/1-250C	16 1/4	14 1/4	9	12 1/2	9	14	851/1	850/1	290
3"	300	ST-235P-300C	ST-234P-300C	19 3/4	17	13 1/2	14	9	29	235P	234P	570
4"	520	ST-235P-400C	ST-234P-400C	19 3/4	17	13 1/2	14	9	25	235P	234P	570

Dimension tolerance ± 1/4”

CT Series Specifications

- Carbon steel black enamel drop down bucket
- Swing bolts standard on 6” housings

FPT Inlet & Outlet	Assembly SCFM Rating	Assembly Part Number		Dimensions - inches				Suggested Service HT.	Approx. Weight	Replacement Element Part No.		Element SCFM Rating
		Polyester	Paper	A	B	C	D	E	lbs.	Polyester	Paper	
1"	40	CT-897-100C	CT-896-100C	13 3/8	11 13/16	7	10 3/8	9	12	897	896	115
1-1/4"	60	CT-897-125C	CT-896-125C	13 3/8	11 13/16	7	10 3/8	9	12	897	896	115
1-1/2"	80	CT-897-150C	CT-896-150C	13 3/8	11 13/16	7	10 3/8	9	11	897	896	115
2"	175	CT-851-200C	CT-850-200C	13	10 7/8	9	9	9	16	851	850	290
2-1/2"	210	CT-851-250C	CT-850-250C	13	10 7/8	9	9	9	15	851	850	290
3"	300	CT-235P-300C	CT-234P-300C	18 5/8	16 1/8	13 1/2	13	9	30	235P	234P	570
4"	520	CT-235P-400C	CT-234P-400C	18 5/8	16 1/8	13 1/2	13	9	26	235P	234P	570
6"	1100	CT-275P-600C	CT-274P-600C	18 1/4	14 1/2	19	9 7/8	10	45	275P	274P	1100

See Vacuum Filter Technical Data section for sizing guidelines.

Note CT 2” & 2-1/2” models: Element seals on the base of the housing.

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.

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Inlet Vacuum Filters
Maintenance Manual

www.solbergmfg.com

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Rev: MMVF-910

Note: Please read the maintenance instructions given by the OEM for the machinery first. The OEM's manual should be adhered to in order to protect the equipment. Solberg Manufacturing, Inc has made every effort to make sure that these instructions are accurate but is not responsible for any typos, slight variations or for human errors that may occur.

Maintenance Manual

SOLBERG Inlet Vacuum Filters

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**For Further Information Please Call: 630-773-1363*

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Section A

INTRODUCTION

The purpose of this manual is instruction on the proper assembly and care of Solberg inlet vacuum filters.

WARNING

This manual must be read and thoroughly understood before using and caring for this air filter. Failure to comply could result in explosion, product/system contamination or personal injury.

This manual should be used as a supplement to the user's understanding of the proper care needed to maintain a safe and dependable air filter. It is the responsibility of the user to interpret and explain all instructions to persons who do not read or understand English BEFORE they are allowed to maintain and use this filter.

This manual should be readily available to all operators responsible for operation and maintenance of the vacuum inlet filters.

We thank you for selecting products from Solberg Manufacturing, Inc. We are confident that our superior filter designs will exceed your application requirements.

Section B

GENERAL INFORMATION

1. Identification of Solberg Vacuum Inlet Filters.

All Solberg inlet vacuum air filters should have an identification label/nameplate that gives the following information:

Assembly Model #
Replacement Element #

(The exception is OEM supplied units. In this case please enter the OEM part numbers below.)

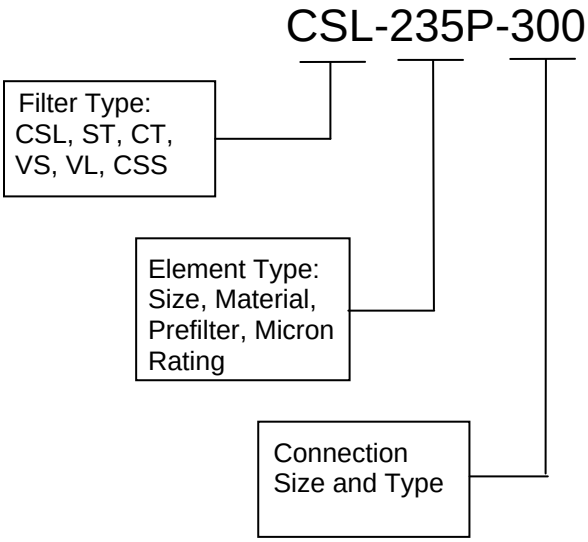
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Ph: 630.773.1363 Fax: 630.773.0727 Email: sales@solbergmfg.com Web: www.solbergmfg.com

Fill in the actual nameplate data from your new Solberg inlet filter(s):

No.	Filter Model Number	Replacement Element
1		
2		
3		
4		
5		

Table 1

The model number designates the filter type, the original element configuration and housing connection size. For example, the following part number identifies the filter as being a 'CSL' design filter with a 235 element with prefilter and 3" MPT connection size:



2. Filtration Rules of Thumb

General: For peak output performance from a compressor, blower, vacuum pump, engine, or any other machine that consumes air, one must have clean, unrestricted air. Proper filtration can help stabilize the working environment within rotating equipment even when the external conditions may be quite severe. A critical component in creating the right working conditions is filter sizing. With the properly sized filter, equipment will run smoothly over its entire expected operating life.

A major factor in filtration and filter sizing is air velocity through the filter media. Generally, the slower the velocity of air through a media the higher the filter efficiency and, conversely, the lower the pressure drop. Therefore, the primary

goal in filter sizing is to optimize the velocity of air through the media (sometimes called face velocity).

Rule of Thumb #1: Always begin with the filter cartridge requirements when sizing a filter. Once the appropriate element has been selected then move on to the housing requirements.

Rule of Thumb #2: Always ask or specify a filter based on a micron rating **with** filtration efficiencies. As an example, stating a requirement for a 1-micron filter is misleading because no efficiency rating has been specified. A 1-micron filter at 95-% efficiency may be less efficient than a 5-micron filter at 99% efficiency. For proper air system performance in light and industrial duty environments, a filter with a minimum of 99% filtration efficiency at 5 microns is required.

Rule of Thumb #3: Size your filter correctly by understanding the impact air velocity through a media has on efficiency and pressure drop. Maintain the suggested Air-to-Media ratios listed below based on the external environment listings and Filtration efficiency needs.

Filtration Efficiency Requirements (99+% efficiency)	**Environmental Conditions**	**Air to Media Ratio**	
Industrial Grade 2-micron **Paper**	Industrial Duty (clean, office/warehouse-like)	30 CFM/ft^2	$(51m^3/h)/cm^2$
	Severe Duty (workshop, factory-like)	15 CFM/ft^2	$(25.5m^3/h)/cm^2$
	Extreme Duty (Foundry, Construction-like)	10 CFM/ft^2	$(17m^3/h)/cm^2$
Industrial Grade 5-micron **Polyester**	Industrial Duty (clean, office/warehouse-like)	50 CFM/ft^2	$(85m^3/h)/cm^2$
	Severe Duty (workshop, factory-like)	40 CFM/ft^2	$(68m^3/h)/cm^2$
	Extreme Duty (Foundry, Construction-like)	25 CFM/ft^2	$(42.5m^3/h)/cm^2$
Industrial Grade 1-micron **Polyester**	Severe Duty (Foundry, Construction-like)	10 CFM/ft^2	$(17m^3/h)/cm^2$
Industrial Grade 0.3-micron **HEPA** Glass @ 99.97% efficiency	Industrial Duty (clean office/warehouse-like)	10 CFM/ft^2	$(17m^3/h)/cm^2$
	Severe Duty (workshop, factory-like)	7 CFM/ft^2	$(12m^3/h)/cm^2$
	Extreme Duty (Foundry, Construction-like)	5 CFM/ft^2	$(8.5m^3/h)/cm^2$

Table 2

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Rule of Thumb #4: Pressure drop is also caused by the dirt holding capacity of the element. As the element fills up with dirt, the pressure drop increases. It is important to document the pressure drop across a given filter when it is new and then clean or replace it when the pressure drop increases by 10” to 15” / 250-380mm H_2O from the original reading.

Rule of Thumb #5: The inlet connection greatly influences the overall pressure drop of the filter system. To minimize the restriction contributed by an inlet filter, a velocity of 6,000 ft/min (10200m^3/h) or less is suggested through the outlet pipe. The table below lists the suggested flows based on pipe size:

Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Airflow	
1/4"	6 CFM	10m^3/h	1 ¼"	60 CFM	102m^3/h	6"	1,100 CFM	1870m^3/h
3/8"	8 CFM	14m^3/h	1 ½"	80 CFM	136m^3/h	8"	1,800 CFM	3060m^3/h
1/2"	10 CFM	17m^3/h	2"	135 CFM	230m^3/h	10"	3,300 CFM	5610m^3/h
3/4"	20 CFM	34m^3/h	2 ½"	195 CFM	332m^3/h	12"	4,700 CFM	7990m^3/h
1"	35 CFM	60m^3/h	3"	300 CFM	510m^3/h	14"	6,000 CFM	10200m^3/h
			4"	520 CFM	884m^3/h			
			5"	800 CFM	1360m^3/h			

Table 3 **Note: This information is for general use only. A qualified engineer must properly design each system.*

3. Element Specifications

Temperature Range: -15° to 220°F / -26° to 105°C
Filter Change-Out Differential: 10” to 15” / 250-380mm H_2O Over Initial Delta P

Media	Micron Rating
Standard Paper	99+% @ 2 micron
Standard Polyester	99+% @ 5 micron
“S” Series Wire Mesh	Epoxy Coated Wire Mesh
“Z” Series Polyester	99+% @ 1 micron
“HE” Series HEPA	99.97% @ 0.3 microns
“U” Series Polyester	99+% @ 25 micron
“W” Series Polyester	99+% @ 100 micron
“S2” Series	Stainless Steel Wire Mesh
“AC” & “ACP” Series	N/A
“Y” Series Polypropylene	99+% @ 5 micron

Table 4

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Temperature Range: -15° to 385°F / -26° to 196°C
Filter Change-Out Differential: 10” to 15” / 250-380mm H_2O Over Initial Delta P

Media	Micron Rating
“MX” & “MXD” Series – Nomex Cloth	99+% @ 5 micron

Table 5

4. **Element Cleaning - Inlet Filtration**

Solberg elements should be cleaned or replaced, once the pressure drop reaches 15 to 20-inches water column (380 - 500mm WC) above the initial pressure drop of the installation.

The decision to clean the element rather than replace it is left to the discretion of the operator. Any damage which results from by-pass or additional pressure drop created by element cleaning is the sole responsibility of the operator.

WARNING

The overall performance of a filter element is altered once cleaned.

The initial pressure drop after cleaning will be greater than the original, clean pressure drop of the element.

After each subsequent cleaning, the initial pressure drop will continue to increase.

Under all circumstances, the initial pressure drop of the element needs to be maintained at less than 20-inches water column (500mm WC).

Cleaned elements that exceed 20-inches water column (500mm WC) at start-up should be replaced with new elements.

With many types of equipment, the maximum pressure drop allowed will be dictated by the ability of the equipment to perform to its rated capacity. Under all

circumstances, the operator should avoid exceeding the manufacturer's recommended maximum pressure drop for their specific equipment.

A. ***Polyester Element***: The polyester element may be washed in warm soapy water, vacuumed, gently blown out or replaced. The element should be dry before reinstallation. The element should be replaced after a maximum of three cleanings.
B. ***Paper Element***: The paper element may be lightly blown with low pressure air. It is disposable and in most cases should be replaced with a new element.
C. ***Polyurethane Prefilter***: The prefilter may be washed as a sponge or replaced to give the element a longer service life.
D. ***Epoxy Coated Wire Mesh and Stainless Steel Wire Mesh Elements***: Cleaning instructions similar to polyester, except mild solvents may be used.
E. ***Activated Carbon Element***: Not cleanable
F. ***Polypropylene Element***: Cleaning instructions similar to polyester
G. ***Nomex Cloth Element***: Cleaning instructions similar to polyester

If you are not confident that the integrity of the element was maintained during cleaning, it is recommended that a new element be installed. Also, spare parts such as gaskets, wing nuts and washers can be supplied upon request.

Section C

PROCEDURES

1. Installation.

A. Maximum inlet gas stream temperature for most Solberg inlet vacuum filter products is 220°F / 105°C. Temperatures in excess of this could cause damage to elements, media and elastomers.

B. Direction of flow is typically from the outside of the element to the inside of the element. Most products have arrows indicating direction of flow on inlet and outlet ports.

C. Ensure that pipe/flange connections are adequately sealed so the potential for leaks is reduced to a minimum.

2. Disconnecting canister top from canister base.

A. ST/CT/Small CSL: Release wire-form clips or loosen wing nut on "claw" bolts.

B. Large CSL: Loosen wing nut or hex head on T-bolts.

C. CSS: Twist upper housing to release.

D. VS/VL: Remove V-clamp by loosening Hex Nut or T-bolt and releasing.

E. Lift off canister top.

3. Removing element for service/maintenance.

A. Remove retaining hex head/wing-nut and washer carefully, and then remove element. Some elements will have a top plate that should also be removed.

B. Clean sealing surfaces of housing, top & base plates, and element endcaps so that they are free of dirt or any other particulate.

WARNING

Failure to comply with these instructions may result in system or pump contamination.

4. Securing Element.

A. Place new or cleaned element evenly on base plate. Be sure element seats properly on base and there is no dirt or particulate present on sealing surfaces.

B. Place top plate (if necessary) on element by centering on tap bolt.

C. Secure washer and wing nut to end cap (or top plate) and tap bolt. Element must be tightly secured. Note: DO NOT over tighten!

WARNING

Defective installation may cause system or pump contamination. Use only genuine Solberg replacement parts.

5. Securing canister top to canister base.

A. Make sure all surfaces are free from dust and other particulate.

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B. Hemisphere o-ring must rest evenly along canister/casting base o-ring groove.

C. ST/CT/Small CSL: Hold canister housing against o-ring or sealing ring on main filter head. Re-fasten wire-form clips or “claw” bolts.

D. Large CSL: Replace housing top plate. Feed T-bolts into corresponding slots and tighten evenly around perimeter. Note: Do NOT over tighten!

E. VS/VL: Secure V-clamp by disconnecting hex nut or T-bolt portion and placing V-clamp along the diameter of canister o-ring groove. Fasten T-bolt and secure tightly. V-CLAMP LEGS MUST REST UNIFORMLY ALONG ENTIRE O-RING GROOVE.

F. CSS: Reassemble top housing to bottom housing by aligning tabs and turning into place.

Section D

MAINTENANCE RECOMMENDATIONS

1. Pressure drop readings are recommended to have an effective air filter. Always document initial pressure drop during start-up when element is clean. Replacement cartridge is needed when system experiences 10” to 15” / 250-380mm H_2O higher pressure drop above the initial reading. Refer to page 4 for instructions.

2. Always check replacement cartridge gaskets to insure they are adhered uniformly along the end caps during handling. If not, contact Solberg Manufacturing, Inc. immediately. Do not modify or change from Solberg specified parts!

3. Always check inlets/outlets, element base and its components when replacing element to insure cleanliness. Wipe clean if necessary.

4. Operate only when a proper seal exists.

5. VS/VL: Never operate without absolute assurance that V-clamp is secured correctly along entire diameter of canisters. Check along V-clamp for wear. Replace if any distortion occurs due to handling and usage.

SPARE PARTS

Contact your Solberg Representative for spare part model numbers.

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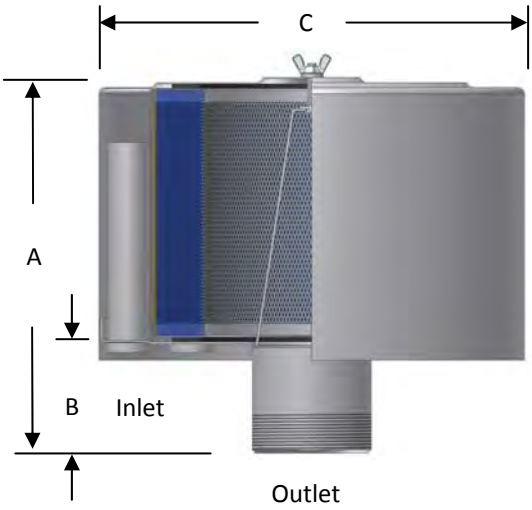
Compact Filter Silencers
FS Series 1/2” - 6” MPT, Flange





Features

- Fully drawn weatherhood - no welds to rust or vibrate apart
- Tubular silencing design - tubes are positioned to maximize attenuation and air flow while minimizing pressure drop
- Durable carbon steel construction with baked enamel finish & powder coated weatherhood



Technical Specifications

- Temp (continuous): min -15°F (-26°C) max 220°F (104°C)
- Filter change out differential: 15-20” H2O over initial Δ P
- Pressure drop graphs available upon request
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron

Options

- 1/8” tap holes available for 3” and larger connections
- Pressure drop indicator (See page 3-11)
- Various media for different environments
- Stainless steel construction
- Epoxy coated finish
- Special connections
- Side Access Silencer Filters (LQB Series) for space restricted enclosures (select models)

Tidbit: Charlie Solberg Sr. “Senior” designed our first filter silencer in 1966. The FS-15 size filter was created for small air compressors.

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Outlet Connections

MPT Outlet	Assembly SCFM Rating	Assembly Part Number Polyester	Assembly Part Number Paper	Dimensions - inches A	B	C	No. of Silencing Tubes	Approx. Wt. lbs	Replacement Element Part No. Polyester	Replacement Element Part No. Paper	Element SCFM Rating
1/2"	10	FS-15-050	FS-14-050	4	1 1/2	6	1	2	15	14	35
3/4"	25	FS-15-075	FS-14-075	4	1 1/2	6	2	2	15	14	35
1"	35	FS-15-100	FS-14-100	4	1 1/2	6	3	2	15	14	35
1"	55	FS-19P-100	FS-18P-100	6 5/8	1 5/8	6	3	3	19P	18P	100
1 1/4"	70	FS-19P-125	FS-18P-125	6 5/8	1 5/8	6	5	3	19P	18P	100
1 1/2"	85	FS-19P-150	FS-18P-150	6 5/8	1 5/8	6	5	4	19P	18P	100
2"	135	FS-31P-200	FS-30P-200	7 1/4	2 1/4	10	5	8	31P	30P	195
2"	135	FS-231P-200	FS-230P-200	12 1/4	2 1/4	10	5	14	231P	230P	300
2 1/2"	195	FS-31P-250	FS-30P-250	7 1/2	2 1/2	10	5	8	31P	31P	195
2 1/2"	195	FS-231P-250	FS-230P-250	12 1/2	2 1/2	10	9	15	231P	230P	300
3"	300	FS-231P-300	FS-230P-300	13	3	10	9	15	231P	230P	300
3"	300	FS-235P-300	FS-234P-300	13	3	16	9	29	235P	234P	570
3"	300	FS-275P-300	FS-274P-300	13	3	16	9	33	275P	274P	1100
4"	520	FS-235P-400	FS-234P-400	14	4	16	9	30	235P	234P	570
4"	520	FS-275P-400	FS-274P-400	14	4	16	9	34	275P	274P	1100
5"	800	FS-245P-500	FS-244P-500	14	4	16	14	33	245P	244P	880
5"	800	FS-275P-500	FS-274P-500	14	4	16	14	36	275P	274P	1100
6"	1100	FS-275P-600	FS-274P-600	15	5	16	18	38	275P	274P	1100

See Filter Silencer Technical Data section for sizing guidelines.

Dimension tolerance ± 1/4”

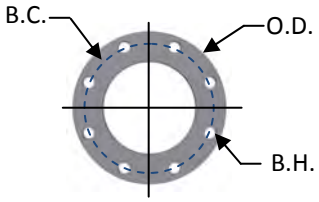
Flange Outlet Connections

Flange Outlet	Assembly SCFM Rating	Assembly Part Number Polyester	Assembly Part Number Paper	Dimensions - inches A	B	C	No. of Silencing Tubes	Approx. Wt. lbs	Replacement Element Part No. Polyester	Replacement Element Part No. Paper	Element SCFM Rating
4"	520	FS-235P-400F	FS-234P-400F	14	4	16	9	33	235P	234P	570
4"	520	FS-275P-400F	FS-274P-400F	14	4	16	9	39	275P	274P	1100
5"	800	FS-245P-500F	FS-244P-500F	14	4	16	14	38	245P	244P	880
5"	800	FS-275P-500F	FS-274P-500F	14	4	16	14	41	275P	274P	1100
6"	1100	FS-275P-600F	FS-274P-600F	15	5	16	18	42	275P	274P	1100

See Filter Silencer Technical Data section for sizing guidelines.

Dimension tolerance ± 1/4”

125/150# Pattern Flg	Dimensions - inches O.D.	B.C.	B.H.	No. of Holes	Flange Thickness
4"	9	7 1/2	0.75	8	0.38
5"	10	8 1/2	0.88	8	0.38
6"	11	9 1/2	0.88	8	0.38



O.D.: Outside Dimension
B.C.: Bolt Circle
B.H.: Bolt Hole

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.

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Filter Silencers and Inlet Filters Maintenance Manual

www.solbergmfg.com

Note: Please read the maintenance instructions given by the OEM for the machinery first. The OEM's manual should be adhered to in order to protect the equipment. Solberg Manufacturing, Inc has made every effort to make sure that these instructions are accurate but is not responsible for any typos, slight variations or for human errors that may occur.

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Maintenance Manual

Solberg Air Inlet Filters and Filter Silencers

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Section D

Maintenance Recommendations

1. General ..... pg. 11
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**For Further Information Please Call: 630-773-1363*

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Section A

INTRODUCTION

The purpose of this manual is instruction on the proper assembly and care of Solberg inlet air filters.

WARNING

This manual must be read and thoroughly understood before using and caring for this air filter. Failure to comply could result in explosion, product/system contamination or personal injury.

This manual should be used as a supplement to the user's understanding of the proper care needed to maintain a safe and dependable air filter. It is the responsibility of the user to interpret and explain all instructions to persons who do not read or understand English BEFORE they are allowed to maintain and use this filter.

This manual should be readily available to all operators responsible for operation and maintenance of the inlet air filters.

We thank you for selecting products from Solberg Manufacturing, Inc. We are confident that our superior filter designs will meet your application requirements.

Section B

GENERAL INFORMATION

1. Identification of Solberg Inlet Air Filters.

All Solberg inlet air filters should have an identification label/nameplate that gives the following information:

Assembly Model #
Replacement Element #

(The exception is OEM supplied units. In this case, please enter the OEM part numbers below.)
Fill in the actual nameplate data from your new Solberg inlet filter(s):

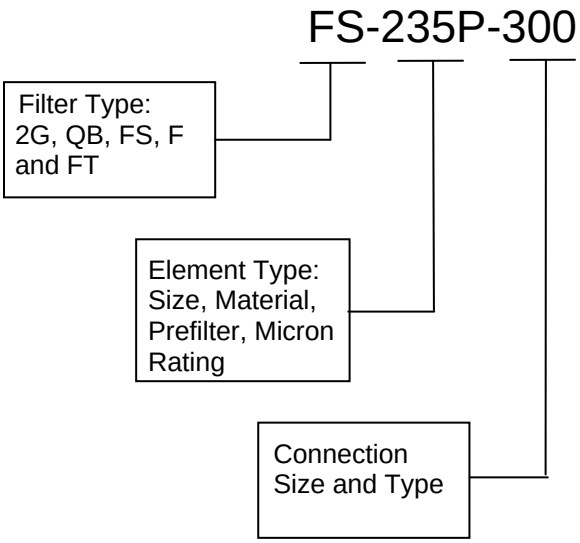
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No.	Filter Model Number	Replacement Element	Initial Delta P Readings
1			
2			
3			
4			
5			

Table 1

The model number designates the filter type, the original element configuration and housing connection size. For example, the following part number identifies the filter as being a 'FS' design filter with a 235 element with prefilter and 3" MPT connection size:



2. Filtration Rules of Thumb

General: For peak output performance from a compressor, blower, vacuum pump, engine, or any other machine that consumes air, one must have clean, unrestricted air. Proper filtration can help stabilize the working environment within rotating equipment even when the external conditions may be quite severe. A critical component in creating the right working conditions is filter sizing. With the properly sized filter, equipment will run smoothly over its entire expected operating life.

A major factor in filtration and filter sizing is air velocity through the filter media. Generally, the slower the velocity of air through a media the higher the filter efficiency and, conversely, the lower the pressure drop. Therefore, the primary

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goal in filter sizing is to optimize the velocity of air through the media (sometimes called face velocity).

Rule of Thumb #1: Always begin with the filter cartridge requirements when sizing a filter. Once the appropriate element has been selected then move on to the housing requirements.

Rule of Thumb #2: Always ask or specify a filter based on a micron rating ***with filtration efficiencies***. As an example, stating a requirement for a 1-micron filter is misleading because no efficiency rating has been specified. A 1-micron filter at 95% efficiency may be less efficient than a 5-micron filter at 99% efficiency. For proper air system performance in light and industrial duty environments, a filter with a minimum of 99% filtration efficiency at 5 microns is required.

Rule of Thumb #3: Size your filter correctly by understanding the impact air velocity through a media has on efficiency and pressure drop. Maintain the suggested Air-to-Media ratios listed below based on the external environment listings and Filtration efficiency needs.

Filtration Efficiency Requirements (99%+ efficiency)	**Environmental Conditions**	**Air to Media Ratio**	
Industrial Grade 2-micron **Paper**	Industrial Duty (clean, office/warehouse-like)	30 CFM/ft^2	(51m^3/h)/cm^2
	Severe Duty (workshop, factory-like)	15 CFM/ft^2	(25.5m^3/h)/cm^2
	Extreme Duty (Foundry, Construction-like)	10 CFM/ft^2	(17m^3/h)/cm^2
Industrial Grade 5-micron **Polyester**	Industrial Duty (clean, office/warehouse-like)	50 CFM/ft^2	(85m^3/h)/cm^2
	Severe Duty (workshop, factory-like)	40 CFM/ft^2	(68m^3/h)/cm^2
	Extreme Duty (Foundry, Construction-like)	25 CFM/ft^2	(42.5m^3/h)/cm^2
Industrial Grade 1-micron **Polyester**	Severe Duty (Foundry, Construction-like)	10 CFM/ft^2	(17m^3/h)/cm^2
Industrial Grade 0.3-micron **HEPA** Glass @ 99.97% Efficiency	Industrial Duty (Pre-filtered Applications)	10 CFM/ft^2	(17m^3/h)/cm^2
	Severe Duty (workshop, factory-like)	7 CFM/ft^2	(12m^3/h)/cm^2
	Extreme Duty (Foundry, Construction-like)	5 CFM/ft^2	(8.5m^3/h)/cm^2

Table 2

Rule of Thumb #4: Pressure drop is also caused by the dirt holding capacity of the element. As the element fills up with dirt, the pressure drop increases. It is

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important to document the pressure drop across a given filter when it is new and then clean or replace it when the pressure drop increases by 10” to 15” / 250-280mm H_2O over the original reading.

Rule of Thumb #5: The inlet connection greatly influences the overall pressure drop of the filter system. To minimize the restriction contributed by an inlet filter, a velocity of 6,000 ft/min (10200m^3/h) or less is suggested through the outlet pipe. The table below lists the suggested flows based on pipe size:

Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Airflow	
1/4"	6 CFM	10m^3/h	1 ¼"	60 CFM	102m^3/h	6"	1,100 CFM	1870m^3/h
3/8"	8 CFM	14m^3/h	1 ½"	80 CFM	136m^3/h	8"	1,800 CFM	3060m^3/h
1/2"	10 CFM	17m^3/h	2"	135 CFM	230m^3/h	10"	3,300 CFM	5610m^3/h
3/4"	20 CFM	34m^3/h	2 ½"	195 CFM	332m^3/h	12"	4,700 CFM	7990m^3/h
1"	35 CFM	60m^3/h	3"	300 CFM	510m^3/h	14"	6,000 CFM	10200m^3/h
			4"	520 CFM	884m^3/h			
			5"	800 CFM	1360m^3/h			

Table 3 **Note: This information is for general use only. A qualified engineer must properly design each system.*

3. Element Specifications

Temperature Range: -15° to 220°F / -26° to 105°C
Filter Change-Out Differential: 10” to 15” / 250-380mm H_2O Over Initial Delta P

Media	Micron Rating
Standard Paper	99+% @ 2 micron
Standard Polyester	99+% @ 5 micron
“S” Series Wire Mesh	Epoxy Coated Wire Mesh
“Z” Series Polyester	99+% @ 1 micron
“HE” Series HEPA	99.97% @ 0.3 microns
“U” Series Polyester	99+% @ 25 micron
“W” Series Polyester	99+% @ 100 micron
“S2” Series	Stainless Steel Wire Mesh
“AC” & “ACP” Series	N/A
“Y” Series Polypropylene	99+% @ 5 micron

Table 4

Temperature Range: -15° to 385°F / -26° to 196°C
Filter Change-Out Differential**:** 10” to 15”/ 250-380mm H_2O Over Initial Delta P

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Media	Micron Rating
“MX” & “MXD” Series – Nomex Cloth	99+% @ 5 micron

Table 5

4. **Element Cleaning - Inlet Filtration**

Solberg elements should be cleaned or replaced, once the pressure drop reaches 15 to 20-inches water column (380 - 500mm WC) above the initial pressure drop of the installation.

The decision to clean the element rather than replace it is left to the discretion of the operator. Any damage which results from by-pass or additional pressure drop created by element cleaning is the sole responsibility of the operator.

WARNING

The overall performance of a filter element is altered once cleaned.

The initial pressure drop after cleaning will be greater than the original, clean pressure drop of the element.

After each subsequent cleaning, the initial pressure drop will continue to increase.

Under all circumstances, the initial pressure drop of the element needs to be maintained at less than 20-inches water column (500mm WC).

Cleaned elements that exceed 20-inches water column (500mm WC) at start-up should be replaced with new elements.

With many types of equipment, the maximum pressure drop allowed will be dictated by the ability of the equipment to perform to its rated capacity. Under all circumstances, the operator should avoid exceeding the manufacturer’s recommended maximum pressure drop for their specific equipment.

A. ***Polyester Element***: The polyester element may be washed in warm soapy water, vacuumed, gently blown out or replaced. The element

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should be dry before reinstallation. The element should be replaced after a maximum of three cleanings.

B. ***Paper Element***: The paper element may be lightly blown with low pressure air. It is disposable and in most cases should be replaced with a new element.
C. ***Polyurethane Prefilter***: The prefilter may be washed as a sponge or replaced to give the element a longer service life.
D. ***Epoxy Coated Wire Mesh and Stainless Steel Wire Mesh Elements***: Cleaning instructions similar to polyester, except mild solvents may be used.
E. ***Activated Carbon Element***: Not cleanable
F. ***Polypropylene Element***: Cleaning instructions similar to polyester
G. ***Nomex Cloth Element***: Cleaning instructions similar to polyester

If you are not confident that the integrity of the element was maintained during cleaning, it is recommended that a new element be installed. Also, spare parts such as gaskets, wing nuts and washers can be supplied upon request.

Section C

PROCEDURES

1. Installation.

A. Maximum operating temperature for most Solberg inlet air filter products is 220°F / 105°C. Temperatures in excess of this could cause damage to elements, media and elastomers. High temperature products are available.

B. Direction of flow is typically from the outside of the element to the inside of the element. Most products have arrows indicating direction of flow on the inlet and outlet ports.

C. Ensure that pipe/flange connections are adequately sealed so the potential for leaks is reduced to a minimum.

2. Disconnecting canister top from canister base.

A. FS-04-06-10 *(or 05-07-11):* Twist top housing to open. Use care to support bottom housing while removing top housing. Fitting damage can occur if fitting is torqued in the wrong direction.

B. Small QB/FS/F/FT*:* Remove weather hood or top plate by loosening hex nut or wing nut and lifting off.

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C. Large 2Q/QB/FS/F/FT: Remove cover by loosening hex nut or wing nut and lifting off.

3. Removing element for service/maintenance.

A. Carefully remove retaining hex head/wing-nut and washer over top plate, and then remove element. Note: Model “04-06-10” elements should be free when housing tops are removed.

B. Clean sealing surfaces of housing, top plates and element endcaps so that they are free of dirt or any other particulate.

WARNING

Failure to comply with these instructions may result in system or equipment contamination.

4. Securing Element.

A. Place new or cleaned element evenly on base plate. Be sure element seats properly on base and there is no dirt or particulate present on sealing surfaces. With multiple element stacks place elements in line with base element and ensure elements seat properly.

B. Place top plate (if necessary) on element by centering on tap bolt.

C. Secure washer and wing nut to end cap (or top plate) and tap bolt. Element must be tightly secured. Note: Do NOT over tighten!

WARNING

Defective installation may cause system or pump contamination. Use only genuine Solberg replacement parts.

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5. **Securing canister top to canister base.**

   A. Make sure all surfaces are free from dust and other particulate.

   B. Small QB/FS/F/FT: Replace top plate and/or weather hood if necessary. Feed threaded rod into corresponding bolthole and tighten. Note: Do NOT over tighten!

   C. Large 2G/QB/FS/F/FT: Replace cover. Feed threaded rod into corresponding bolt hole(s) and tighten. Note: Do NOT over tighten!

   D. FS-04-06-10 (or 05-07-11): Reassemble top housing to bottom housing by aligning tabs and turning into place.

6. **Equipment Startup.**

   A. Be sure to read the instructions on installation or element replacement as listed above before starting equipment.

WARNING

If at any time the operator is unable to verify the integrity of the element or any housing feature, the factory or a regional representative should be contacted prior to start-up.

   B. Please check the listed steps prior to startup.

      1. Check element to make sure it is seated properly on element base or sealing surface.

WARNING

Failure to seat the element properly may result in contaminant by-pass resulting in damage to equipment.

      2. Check element top plate or cover to make sure it is seated properly on element.

      3. Check housing cover (if applicable) that it is installed correctly onto housing.

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4. Be sure all fasteners and hardware (if applicable) have been tightened.

WARNING

If the air flow is reversed through a Solberg filter unit, be sure to check the element and housing internals for damage. Failure to do so may result in damage to equipment.

Section D

MAINTENANCE RECOMMENDATIONS

1. Pressure drop readings are recommended to have an effective air filter. Always document initial pressure drop during start-up when element is clean. Replacement cartridge is needed when system experiences 10" to 15" / 250-380mm H^2O above drop above the initial reading. Refer to page 4 for initial values.

2. Always check replacement cartridge gaskets to insure they are adhered uniformly along the end caps during handling. If not, contact Solberg Manufacturing, Inc. immediately. Do not modify or change!

3. Always check inlets/outlets, element base and its components when replacing element to insure cleanliness. Wipe clean if necessary.

4. Operate only when a proper seal exists.

SPARE PARTS LIST:

Contact your Solberg Representative for spare part model numbers.

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SECTION 5 - PROCESS INSTRUMENTATION

MS HIGH LEVEL SWITCH, 1-FLOAT STYLE, SS FLOATS, 0.6 SG - FPI L500-1POS

MANIFOLD VACUUM GAUGES, (-)100-0" WC VAC. - DWYER LPG4-D7722N

INLET VACUUM GAUGES, (-)100-0" WC VAC. - DWYER LPG4-D7722N

INLET PRESSURE TRANSMITTER, 0-15 PSIA - DWYER 626-00-GH-P1-E3-S1

VACUUM SWITCH, 4 - 20 IWC - DWYER 1950-20-2F

INLET FLOWSENSOR PITOT TUBE, 4" - DWYER DS-300-4

PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP - DWYER 605-10

INLINE FILTER DIFFERENTIAL PRESSURE GAUGE, 0-10" WC DP - DWYER 2010

DISCHARGE FLOWSENSOR PITOT TUBE, 4" - DWYER DS-300-4

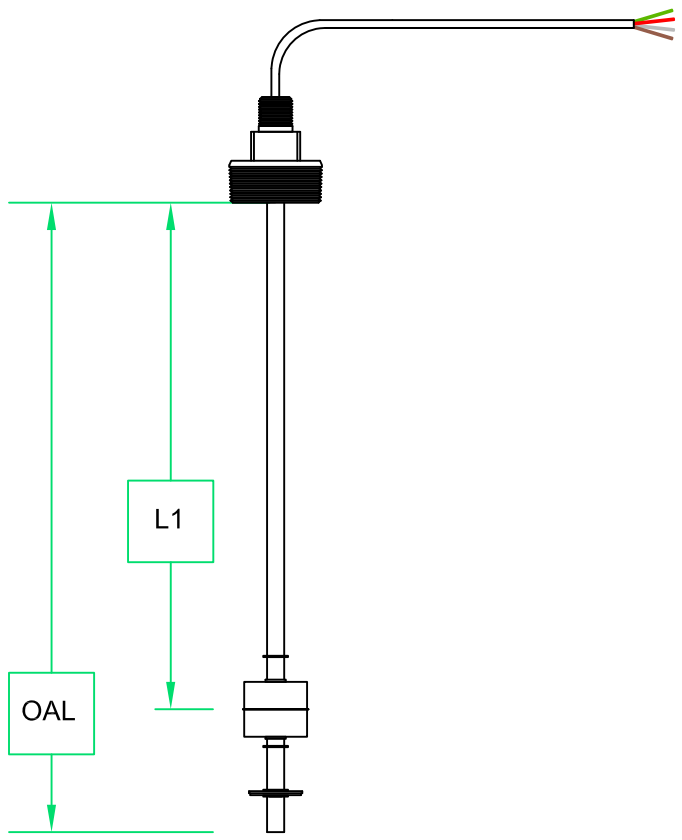
PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP - DWYER 605-10

TEMPERATURE INDICATORS, 0-250 DEGF - AV 1NFY4

DISCHARGE PRESSURE GAUGES, 0-100" WC PRESS. - DWYER LPG4-D8622N

DISCHARGE TEMPERATURE SWITCH, 0-225 DEGF ADJUSTABLE - UNITED ELECTRIC B54-103

L1	RED BLACK	NORMALLY CLOSED	HIGH-HIGH (1) COMMON



UL LISTED	
HOUSING	N/A
CONDUIT CONNECTION	$\frac{1}{2}$ NPT
FITTING AND STEM MATERIAL	STAINLESS STEEL
STEM DIAMETER	$\frac{1}{2}$ INCH
FITTING SIZE	2 INCH NPT
FLOAT STOP	SNAP RING
FLOAT MATERIAL	STAINLESS STEEL
SWITCH TYPE	SPST
SWITCH RATING	100 WATT
SPECIFIC GRAVITY	0.6
CENTERING DISC	STAINLESS STEEL

OAL - 14 INCHES
L1 - 12 INCHES
CABLE LENGTH - 120 INCHES
U.L. LISTED

GENERAL NOTES:

1. FOR TERMINAL BLOCK LOCATION SEE DRAWING (I-1)
2. FOR WIRING TERMINAL DESIGNATION SEE DRAWING (I-2)

REV	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	10-08-15	JAD

REVISIONS

CONFIDENTIALITY NOTICE:
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DRWN BY JAD — DATE 07-29-15
CHK BY — DATE
APPR BY — DATE

NATIONAL ENVIRONMENTAL SYSTEMS
84 DUNHAM STREET / ATTLEBORO, MA 02703
508-226-1100 (Phone) / 508-226-1180 (Fax)
WWW.NES-INC.BIZ

TITLE: 1 POSITION LEVEL SENSOR
LSHH-211

AECOM
FORMER OZONE INDUSTRIES SITE - QUEENS, NY

JOB NO. 15-152 (SSDS)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	M-4	1 OF 1	A

FPI SENSORS INTERNATIONAL

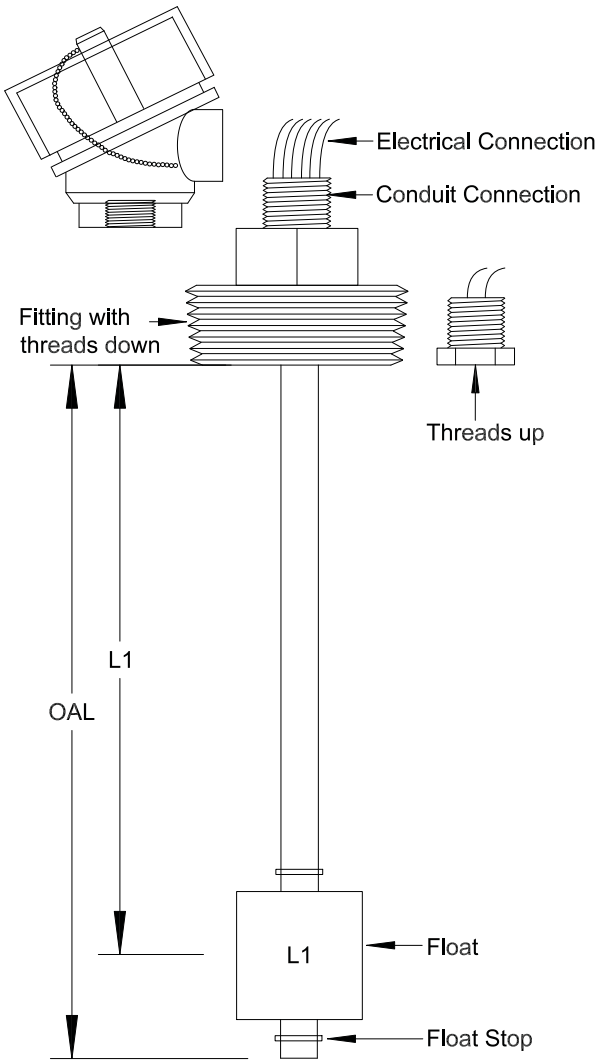
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HOUSING:
❑ Nema 4X Explosion Proof ☑ Watertight ❑ NA

ELECTRICAL CONNECTION:
❑ Wire ☑ Cable ❑ Connector (specify) _____

CONDUIT CONNECTION:
☑ ½" NPT ❑ Other _____ ❑ NA

FITTING AND STEM MATERIAL:
☑ SS ❑ Brass ❑ PVC ❑ Poly ❑ Teflon

FITTING SIZE (NPT):
❑ ¼" ❑ ½" ❑ ¾" ❑ 1" ❑ 1¼" ❑ 1½" ☑ 2"
❑ Flange _____ ❑ Other _____

THREAD ORIENTATION:
☑ Threads down *(threads from outside of the tank)*
❑ Threads up *(threads from inside of the tank)*

LEAD LENGTH: _____"

FLOAT STOPS:
❑ Retaining ring ☑ Set collar

FLOAT MATERIAL:
☑ SS ❑ Buna ❑ Poly ❑ Teflon ❑ PVC

SWITCH TYPE:
❑ SPST ☑ SPDT

SWITCH RATING:
❑ 10 watt (500ma) ☑ 50 watt (1 amp) ❑ 100 watt (3 amp)

ACTUATION:
L1 SEE DRAWING M3"

OPERATION:
❑ N.O. ☑ N.C.

SPECIFIC GRAVITY:
☑ .60sg ❑ .93sg

Minimum actuation is 1" Maximum actuation is 235"

OPTIONS:
❑ Shroud
❑ Field Adjustable Length
❑ Thermocouple _____
❑ Temp Switch ❑ N.O. or ❑ N.C. _____ °F set point
☑ Centering Disk
❑ Compression Union
❑ Thermistor _____

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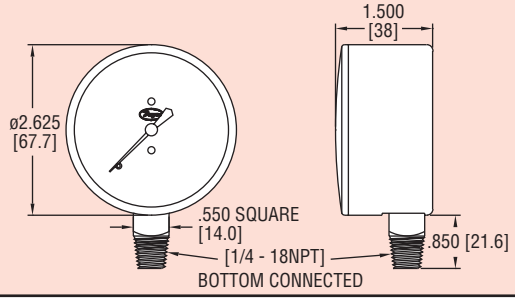
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Series LPG4

2.5″ Low Pressure Gage

1.5% Full-Scale Accuracy in a 2-1/2″ Gage





Our **Series LPG4** gages offer top of the line performance and accuracy for pressure and vacuum applications up to and including 160 in w.c. The LPG4 is constructed from a single beryllium-copper diaphragm affixed to a precision-machined brass plate. This innovative design, together with a high-precision, milled-teeth brass movement and nickel-silver pinion and bearing surface, provide the user with a top of the line low pressure instrument.

SPECIFICATIONS
Service: Compatible gases & liquids.
Wetted Materials: Brass and beryllium copper.
Housing: Drawn steel, black finish.
Lens: Polycarbonate (removable).
Accuracy: ±1.5% full-scale.

Pressure Limit: 100% of range scale.
Temperature Limits:
Process: -40 to 160°F (-40 to 70°C);
Ambient: -40 to 140°F (-40 to 60°C).
Size: 2.5″ (63 mm).
Process Connections: 1/4″ male NPT.
Enclosure Rating: NEMA 3 (IP54).
Weight: 7.3 oz (0.21 kg).

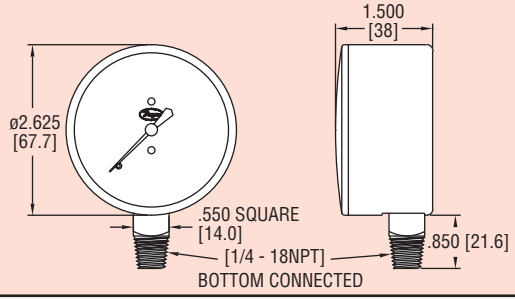
Model	Range	Model	Range
LPG4-D7122N	-10 to 0 in w.c. (-2.5 to 0 kPa)	LPG4-D8322N	0 to 40 in w.c. (0 to 10 kPa)
LPG4-D7222N	-15 to 0 in w.c. (-4 to 0 kPa)	LPG4-D8422N	0 to 60 in w.c. (0 to 15 kPa)
LPG4-D7322N	-25 to 0 in w.c. (-6 to 0 kPa)	LPG4-D8522N	0 to 80 in w.c. (0 to 20 kPa)
LPG4-D7422N	-40 to 0 in w.c. (-10 to 0 kPa)	LPG4-D8622N	0 to 100 in w.c. (0 to 25 kPa)
LPG4-D7522N	-60 to 0 in w.c. (-15 to 0 kPa)	LPG4-D8722N	0 to 160 in w.c. (0 to 40 kPa)
LPG4-D7622N	-80 to 0 in w.c. (-20 to 0 kPa)	LPG4-D8922N	-4 to 0 to 6 in w.c. (-1 to 0 to 1.5 kPa)
LPG4-D7722N	-100 to 0 in w.c. (-25 to 0 kPa)	LPG4-D9022N	-6 to 0 to 10 in w.c. (-1.5 to 0 to 2.5 kPa)
LPG4-D7822N	-160 to 0 in w.c. (-40 to 0 kPa)	LPG4-D9122N	-8 to 0 to 16 in w.c. (-2 to 0 to 4 kPa)
LPG4-D7922N	-235 to 0 in w.c. (-60 to 0 kPa)	LPG4-D9222N	-16 to 0 to 24 in w.c. (-4 to 0 to 6 kPa)
LPG4-D8022N	0 to 10 in w.c. (0 to 2.5 kPa)	LPG4-D9322N	-24 to 0 to 40 in w.c. (-6 to 0 to 10 kPa)
LPG4-D8122N	0 to 15 in w.c. (0 to 3.75 kPa)	LPG4-D9422N	-30 to 0 to 50 in w.c. (-7.5 to 0 to 14.5 kPa)
LPG4-D8222N	0 to 25 in w.c. (0 to 6 kPa)	LPG4-D9522N	-40 to 0 to 60 in w.c. (-10 to 0 to 0.15 kPa)

OPTION
For NIST traceable calibration certificate, use order code NISTCAL-PG1.

Series LPG4 2.5″ Low Pressure Gage

1.5% Full-Scale Accuracy in a 2-1/2″ Gage





Our **Series LPG4** gages offer top of the line performance and accuracy for pressure and vacuum applications up to and including 160 in w.c. The LPG4 is constructed from a single beryllium-copper diaphragm affixed to a precision-machined brass plate. This innovative design, together with a high-precision, milled-teeth brass movement and nickel-silver pinion and bearing surface, provide the user with a top of the line low pressure instrument.

SPECIFICATIONS
Service: Compatible gases & liquids.
Wetted Materials: Brass and beryllium copper.
Housing: Drawn steel, black finish.
Lens: Polycarbonate (removable).
Accuracy: ±1.5% full-scale.

Pressure Limit: 100% of range scale.
Temperature Limits:
Process: -40 to 160°F (-40 to 70°C);
Ambient: -40 to 140°F (-40 to 60°C).
Size: 2.5″ (63 mm).
Process Connections: 1/4″ male NPT.
Enclosure Rating: NEMA 3 (IP54).
Weight: 7.3 oz (0.21 kg).

Model	Range	Model	Range
LPG4-D7122N	-10 to 0 in w.c. (-2.5 to 0 kPa)	LPG4-D8322N	0 to 40 in w.c. (0 to 10 kPa)
LPG4-D7222N	-15 to 0 in w.c. (-4 to 0 kPa)	LPG4-D8422N	0 to 60 in w.c. (0 to 15 kPa)
LPG4-D7322N	-25 to 0 in w.c. (-6 to 0 kPa)	LPG4-D8522N	0 to 80 in w.c. (0 to 20 kPa)
LPG4-D7422N	-40 to 0 in w.c. (-10 to 0 kPa)	LPG4-D8622N	0 to 100 in w.c. (0 to 25 kPa)
LPG4-D7522N	-60 to 0 in w.c. (-15 to 0 kPa)	LPG4-D8722N	0 to 160 in w.c. (0 to 40 kPa)
LPG4-D7622N	-80 to 0 in w.c. (-20 to 0 kPa)	LPG4-D8922N	-4 to 0 to 6 in w.c. (-1 to 0 to 1.5 kPa)
LPG4-D7722N	-100 to 0 in w.c. (-25 to 0 kPa)	LPG4-D9022N	-6 to 0 to 10 in w.c. (-1.5 to 0 to 2.5 kPa)
LPG4-D7822N	-160 to 0 in w.c. (-40 to 0 kPa)	LPG4-D9122N	-8 to 0 to 16 in w.c. (-2 to 0 to 4 kPa)
LPG4-D7922N	-235 to 0 in w.c. (-60 to 0 kPa)	LPG4-D9222N	-16 to 0 to 24 in w.c. (-4 to 0 to 6 kPa)
LPG4-D8022N	0 to 10 in w.c. (0 to 2.5 kPa)	LPG4-D9322N	-24 to 0 to 40 in w.c. (-6 to 0 to 10 kPa)
LPG4-D8122N	0 to 15 in w.c. (0 to 3.75 kPa)	LPG4-D9422N	-30 to 0 to 50 in w.c. (-7.5 to 0 to 14.5 kPa)
LPG4-D8222N	0 to 25 in w.c. (0 to 6 kPa)	LPG4-D9522N	-40 to 0 to 60 in w.c. (-10 to 0 to 0.15 kPa)

OPTION
For NIST traceable calibration certificate, use order code NISTCAL-PG1.

Series 626 & 628

Industrial Pressure Transmitter

Complete Offering of Ranges, Connections and Outputs



General Purpose Housing (-GH)



General Purpose Housing (-GH) with DIN C



626 with LED Display (CH housing only)



Conduit Housing (-CH)

***Please see our website for dimensional drawings.**

The Series 626 Pressure Transmitters possess a highly precise 0.25% full scale accuracy piezo-resistive sensor contained in a compact, rugged, NEMA 4X (IP66) stainless steel general purpose housing or cast aluminum conduit housing.

The Series 628 Pressure Transmitters are ideal for OEMs with 1% full scale accuracy sensors. The transmitter is also available in the general purpose stainless steel housing and the cast aluminum conduit housing.
The corrosion resistant 316L stainless steel wetted parts allow the Series 626 and 628 transmitters to measure the pressure in a multitude of processes from hydraulic oils to chemicals. The Series 626 and 628 are available in absolute and pressure ranges with a variety of optional outputs, process connections and electrical terminations to allow you to select the right transmitter for your application.

APPLICATIONS

- Compressors
- Pumping systems
- Irrigation equipment
- Hydraulic
- Industrial process monitoring

FEATURES

- Metal conduit housing option
- Robust 316 SS oil filled sensor
- Compact design

SPECIFICATIONS

Service: Compatible gases and liquids.
Wetted Materials: Type 316L SS.
Accuracy:
626: 0.25% F.S.;
: 0.20% RSS;
628: 1.0% F.S.;
: 0.5% RSS;
626 Absolute Ranges: 0.5% F.S.;
: 0.30% RSS.
(Includes linearity, hysteresis, and repeatability.)
Temperature Limit: 0 to 200°F (-18 to 93°C).
Compensated Temperature Range: 0 to 175°F (-18 to 79°C).
Thermal Effect: ±0.02% FS/°F (includes zero and span).
Pressure Limits: See table.
Power Requirements: 10-30 VDC (for 4-20 mA, 0-5, 1-5, 1-6 VDC outputs); 13-30 VDC (for 0-10, 2-10 VDC outputs); 5 VDC ±0.5 VDC (for 0.5-4.5 VDC ratio-metric output).
Output Signal: 4-20 mA, 0-5 VDC,1-5 VDC, 0-10 VDC, or 0.5-4.5 VDC.
Response Time: 50 ms.
Loop Resistance: 0-1000 Ohms max. R max = 50 (Vps-10) Ohms (4-20 mA output), 5K Ohms (0-5, 1-5, 1-6, 0-10, 2-10, 0.5-4.5 VDC output).
Stability: 1.0% FS/year (Typ.).
Current Consumption: 38 mA maximum (for 4-20 mA output); 10 mA maximum (for 0-5, 1-5, 1-6, 0-10, 2-10, 0.5-4.5 VDC output); 140 mA maximum (for all 626/628/629-CH with optional LED).
Electrical Connections: Conduit Housing (-CH): terminal block, 1/2″ female NPT conduit; General Purpose Housing (-GH): cable DIN EN 175801-803-C.
Process Connection: 1/4″ male or female NPT and BSPT.
Enclosure Rating: NEMA 4X (IP66).
Mounting Orientation: Mount in any position.
Weight: 10 oz (283 g).
Agency Approvals: CE.

Pressure Limits

Range Number	Pressure Range	Maximum Pressure (psig)	Over Pressure (psig)	Range Number	Pressure Range (psig)	Maximum Pressure (psig)	Over Pressure (psig)
00	0-15 psia	30	45	12	0-200	400	1000
30	15-0 psia	30	45	13	0-300	600	1500
06	0-5 psig	10	50	14	0-500	1000	2500
07	0-15 psig	30	150	15	0-1000	2000	5000
08	0-30 psig	60	300	16	0-1500	3000	5000
09	0-50 psig	100	300	18	0-3000	6000	7500
10	0-100 psig	200	500	19	0-5000	7500	10000
11	0-150	300	750	26	0-8000	10000	12000

Ordering Chart

Accuracy								
	626							0.25% Full-Scale Accuracy
	628							1.0% Full-Scale Accuracy
Range		-00						0-15 psia
		-01						0-30 psia
		-02						0-50 psia
		-03						0-100 psia
		-04						0-200 psia
		-05						0-300 psia
		-06						0-5 psi
		-07						0-15 psi
		-08						0-30 psi
		-09						0-50 psi
		-10						0-100 psi
		-11						0-150 psi
		-12						0-200 psi
		-13						0-300 psi
		-14						0-500 psi
		-22						0-600 psi
		-15						0-1000 psi
		-16						0-1500 psi
		-18						0-3000 psi
		-19						0-5000 psi
		-26						0-8000 psi
		-67						0-0.5 bar
		-71						0-2.5 bar
		-75						0-10 bar
		-81						0-40 bar
Housing			-CH					Conduit Housing
			GH					General Purpose Housing
Process Connection				-P1				1/4″ male NPT
				-P2				1/4″ female NPT
				-P3				1/4″ male BSPT
				-P5				1/4″ female SAE with Refrigerant Valve Depressor ①
				-P9				1/2″ male NPT ①
Electrical Connection					-E1			Cable Gland with 3' of Prewired Cable
					-E3			Cable Gland with 9' of Prewired Cable
					-E4			DIN EN 175801-803-C ①
					-E5			1/2″ female NPT Conduit ②
					-E6			M-12 4 Pin Connector
Signal Output						-S1		4-20 mA
						-S2		1-5 VDC
						-S4		0-5 VDC
						-S5		0-10 VDC
						-S7		0.5-4.5 VDC ①
Options							-AT	Aluminum Tag
							-NIST	NIST Traceable Certificate
							-LED	Bright Red LED display ②③

① Available with -GH Housing only
② Available with -CH Housing only
③ LED option is not NEMA 4X (IP66)
④ Power Requirement: 5 VDC ±10%

Series 626 & 628 Pressure Transmitters

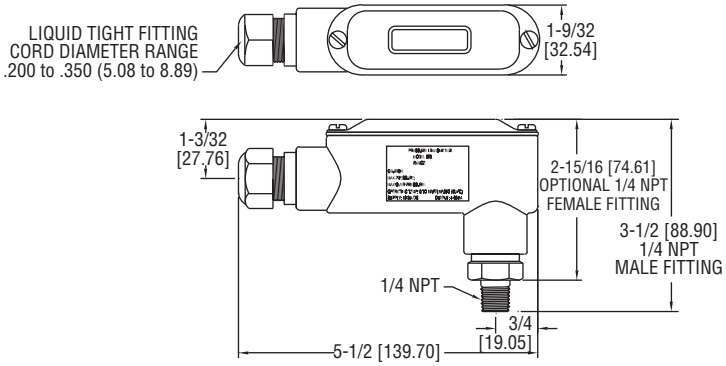
Specifications - Installation and Operating Instructions

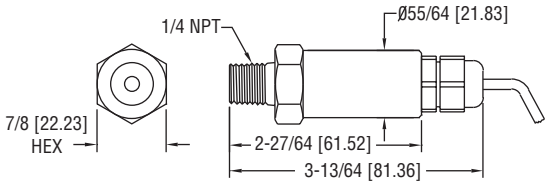


-CH Conduit Housing



-GH General Purpose Housing





The Series 626 and 628 Pressure Transmitters converts a single positive pressure into a standard 4-20 mA output signal. The Series 626 and 628 can be used to accurately measure compatible gases and liquids; Series 626 full scale accuracy is 0.25%; Series 628 full scale accuracy is 1.0% (see specifications). Designed for industrial environments with a NEMA 4X (IP66) housing, this transmitter resists most effects of shock and vibration.

CAUTION: Do not exceed specified supply voltage ratings. Permanent damage not covered by warranty will result. This device is not designed for 120 or 240 volt AC operation. Use only on 13 to 30 VDC.

Pressure Ranges		
Pressure Range	**Maximum Pressure**	**Over Pressure**
0-15 psia	30 psia	45 psia
15-0 psia	30 psia	45 psia
0-30 psia	60 psia	90 psia
0-50 psia	100 psia	150 psia
0-100 psia	200 psia	300 psia
0-200 psia	400 psia	600 psia
0-300 psia	600 psia	900 psia
0-5 psig	10 psig	50 psig
0-15 psig	30 psig	150 psig
0-30 psig	60 psig	300 psig
0-50 psig	100 psig	300 psig
0-100 psig	200 psig	500 psig
0-150 psig	300 psig	750 psig
0-200 psig	400 psig	1000 psig
0-300 psig	600 psig	1500 psig
0-500 psig	1000 psig	2500 psig
0-1000 psig	2000 psig	5000 psig
0-1500 psig	3000 psig	5000 psig
0-2000 psig	4000 psig	5000 psig
0-3000 psig	6000 psig	7500 psig
0-5000 psig	7500 psig	10000 psig
0-8000 psig	10000 psig	12000 psig

SPECIFICATIONS

Service: Compatible gases and liquids.
Wetted Materials: Type 316 SS.
Accuracy: 626: 0.25% FS, 0.20% RSS; 628: 1.0% FS, 0.5% RSS; 626 absolute ranges: 0.5% FS, 0.35% RSS. (Includes linearity, hysteresis, and repeatability).
Temperature Limit: 0 to 200°F (-18 to 93°C).
Compensation Temperature Range: 0 to 175° (-18 to 79°C).
Thermal Effect: 626: ±0.02% FS/°F. 628: ±0.04% FS/°F (includes zero and span).
Pressure Limits: See table.
Power Requirements: 10-30 VDC (for 4-20 mA, 0-5, 1-5, 1-6 VDC outpus); 13-30 VDC (for 0-10, 2-10 VDC outputs); 5 VDC ±0.5 VDC (for 0.5-4.5 VDC ratio-metric output).
Output Signal: 4-20 mA, 0-5 VDC,1-5 VDC, 0-10 VDC, or 0.5-4.5 VDC.
Response Time: 300 ms.
Loop Resistance: 0-1000 Ohms max. R max = 50 (Vps-10) Ohms (4-20 mA output), 5K Ohms (0-5, 1-5, 1-6, 0-10, 2-10, 0.5-4.5 VDC output).
Current Consumption: 38 mA maximum (for 4-20 mA output); 10 mA maximum (for 0-5, 1-5, 1-6, 0-10, 2-10, 0.5-4.5 VDC output); 140 mA maxumum (for all 626/628/629-CH with optional LED).
Electrical Connections: Conduit Housing (-CH): terminal block, 1/2″ female NPT conduit; General Purpose Housing (-GH): cable DIN EN 175801-803-C.
Process Connection: 1/4″ male or female NPT and BSPT.
Enclosure Rating: NEMA 4X (IP66).
Mounting Orientation: Mount in any position.
Weight: 10 oz (283 g).
Agency Approvals: CE.

INSTALLATION

1. Location: Select a location where the temperature of the transmitter will be between 0 and 175°F (-18 to 79°C). Distance from the receiver is limited only by total loop resistance. The tubing or piping supplying pressure to the unit can be practically any length required but long lengths will increase response time slightly.

2. Position: The transmitter is not position sensitive. However all standard models are originally calibrated with the unit in a position with the pressure connection downward. Although they can be used at other angles, for best accuracy it is recommended that units be installed in the position calibrated at the factory.

3. Pressure Connection: Use a small amount of plumber's tape or other suitable sealants to prevent leaks. Be sure the pressure passage inside the port is not blocked.

4. Electrical Connections

Wire Length -The maximum length of wire connecting the transmitter and receiver is a function of wire size and receiver resistance. Wiring should not contribute more than 10% of the receiver resistance to total loop resistance. For extremely long runs (over 1000 feet), choose receivers with higher resistance to minimize the size and cost of connecting leads. Where wiring length is under 100 feet, wire as small as 22 AWG can be used.

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CURRENT (4-20 mA) OUTPUT OPERATION

An external power supply delivering 10-30 VDC with minimum current capability of 40 mA DC (per transmitter) is required to power the control loop. See Fig. A for connection of the power supply, transmitter and receiver. The range of appropriate receiver load resistance (R_L) for the DC power supply voltage available is expressed by the formula:

$$R_L \text{ Max} = \frac{Vps - 10}{20 \text{ mA DC}}$$

Shielded cable is recommended for control loop wiring.

Current Output

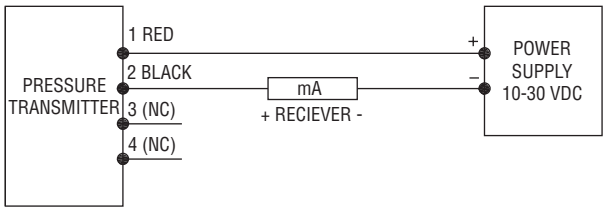
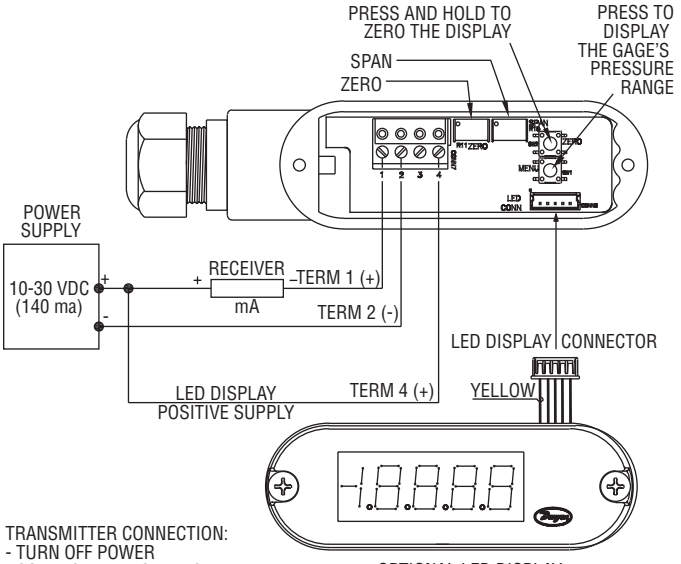


Fig. A: Current output connection

Conduit Housing with 4-20 mA Output (-CH) Electrical connections to the pressure transmitters are made to the terminal block located inside the housing. Remove the screws and lift off the cover. Wire as shown in Fig. A, B or C. Use Fig. A for current output connection. Use Fig. B for current output with optional LED display. Use Fig. C for current output with optional LED display using two power supplies.

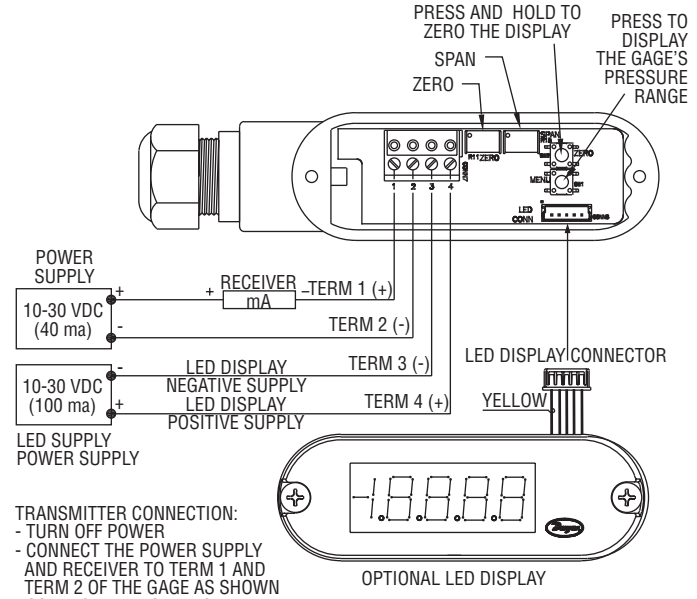
If ordering optional pre-wired cable, black wire is negative (-) and red wire is positive (+).



TRANSMITTER CONNECTION:
- TURN OFF POWER
- CONNECT THE POWER SUPPLY AND RECEIVER TO TERM 1 AND TERM 2 OF THE GAGE AS SHOWN
- CONNECT POWER SUPPLY (+) TO TERMINAL 4 (REQUIRED FOR THE OPTIONAL DISPLAY ONLY)
- INSTALL THE DISPLAY'S CONNECTOR
- TURN ON POWER

BE SURE TO TURN OFF POWER WHEN CONNECTING OR REMOVING THE DISPLAY'S CONNECTOR. FAILURE TO DO SO CAN RESULT IN THE GAGE DAMAGE.

Fig. B: Current output with optional LED display connection



TRANSMITTER CONNECTION:
- TURN OFF POWER
- CONNECT THE POWER SUPPLY AND RECEIVER TO TERM 1 AND TERM 2 OF THE GAGE AS SHOWN
- CONNECT LED POWER SUPPLY (-) TO TERMINAL 3
- CONNECT LED POWER SUPPLY (+) TO TERMINAL 4
- INSTALL THE DISPLAY'S CONNECTOR
- TURN ON POWER

BE SURE TO TURN OFF POWER WHEN CONNECTING OR REMOVING THE DISPLAY'S CONNECTOR. FAILURE TO DO SO CAN RESULT IN THE GAGE DAMAGE.

Fig. C: Current output with optional LED display using two power supplies

Hirschman DIN Connector with 4-20 mA When using cable version of -GH General Purpose Housing, black wire is negative (-) and red wire is positive (+). When using optional Hirschman DIN Plug, remove top-center screw and lift off the terminal block assembly. Wire to terminals shown below in Fig. D. For optional 4-pin M-12 connector, wire to pins as shown in Fig. E.

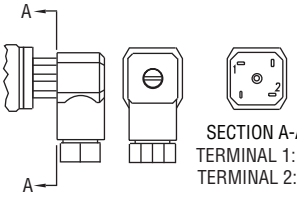


Fig. D

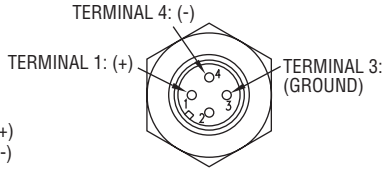


Fig. E

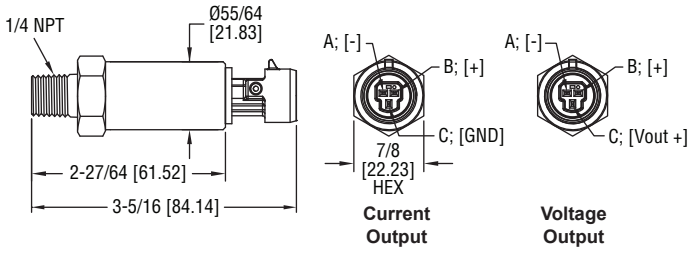


Fig. F: Packard Connection

VOLTAGE (0-5, 1-5, 0-10, 1-6 or 2-10 VDC) OUTPUT OPERATION
(Other outputs contact the factory) See Fig. G for connection of the power supply, transmitter and receiver.

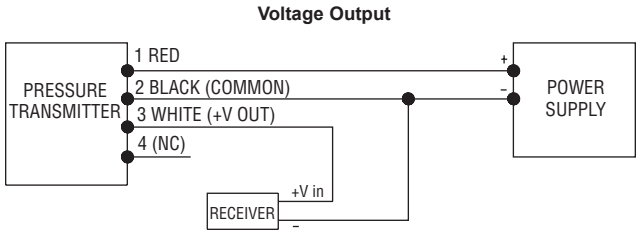


Fig. G: Voltage output connection

Conduit Housing (-CH) Electrical connections to the pressure transmitters are made to the terminal block located inside the housing. Remove the screws and lift off the cover. Wire as shown in Fig. G or Fig. H. Use Fig. G for voltage output connection. Use Fig. H for voltage output with optional LED display connection. If ordering optional pre-wired cable, black wire is negative (-), red wire is positive (+) and white wire is +Vout.

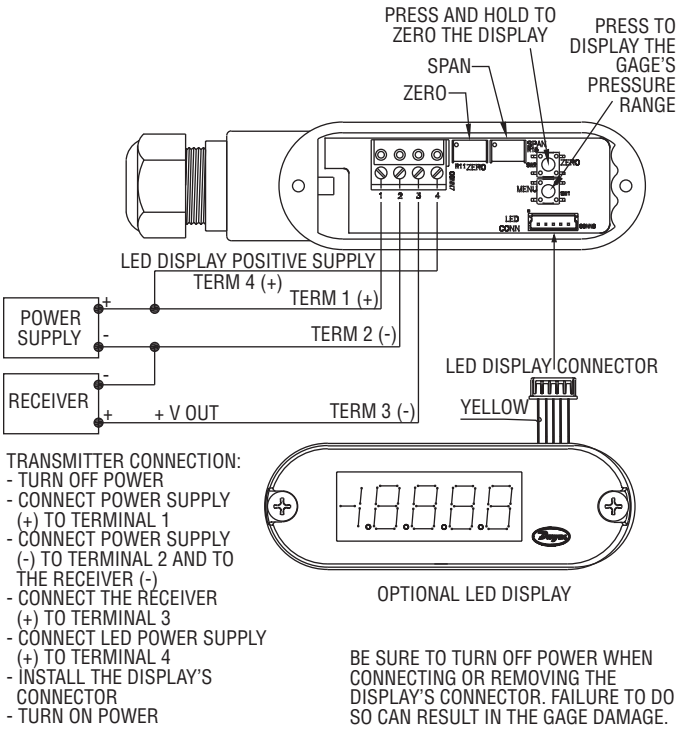


Fig. H: Voltage output with optional LED display connection

Hirschman DIN Connector with Voltage Output When using cable version of -GH General Purpose Housing, black wire is negative (-), red wire is positive (+) and white wire is output. When using optional Hirschman DIN Plug, remove top-center screw and lift off the terminal block assembly. Wire to terminals shown below in Fig. I. For optional 4-pin M-12 connector, wire to pins as shown in Fig. J. If utilizing optional A-164 cable for M-12 connection, brown wire corresponds to pin #1, white #2, blue #3, and black #4.

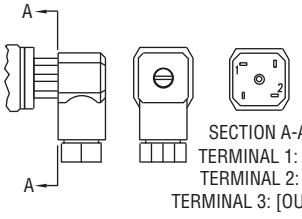


Fig. I

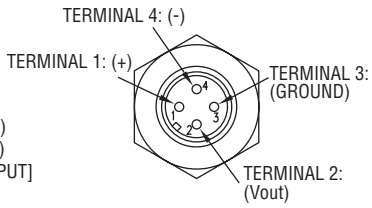


Fig. J

RATIOMETRIC (0.5-4.5 VDC) OUTPUT OPERATION
(Other outputs contact the factory) See Fig. K for connection of the power supply, transmitter and receiver.

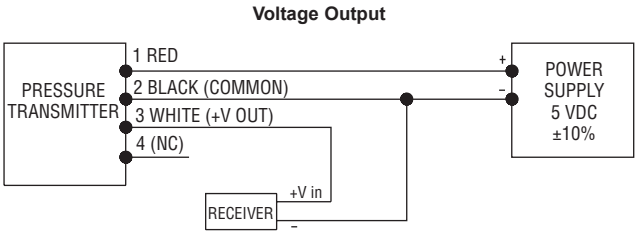


Fig. K: Voltage output connection

General Purpose Housing with Ratiometric Output When using cable version of -GH General Purpose Housing, black wire is negative (-), red wire is positive (+) and white wire is output. When using optional Hirschman DIN Plug, remove top-center screw and lift off the terminal block assembly. Wire to terminals shown below in Fig. L. For optional 4-pin M-12 connector, wire to pins as shown in Fig. M. If utilizing optional A-164 cable for M-12 connection, brown wire corresponds to pin #1, white #2, blue #3, and black #4.

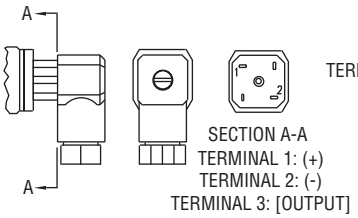


Fig. L

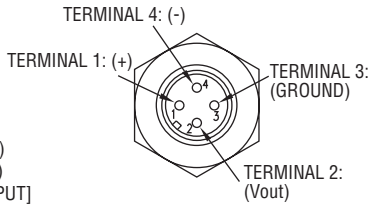


Fig. M

MAINTENANCE
After final installation of the pressure transmitter and its companion receiver, no routine maintenance is required. A periodic check of system calibration is suggested. The Series 626 and 628 transmitters are not field repairable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

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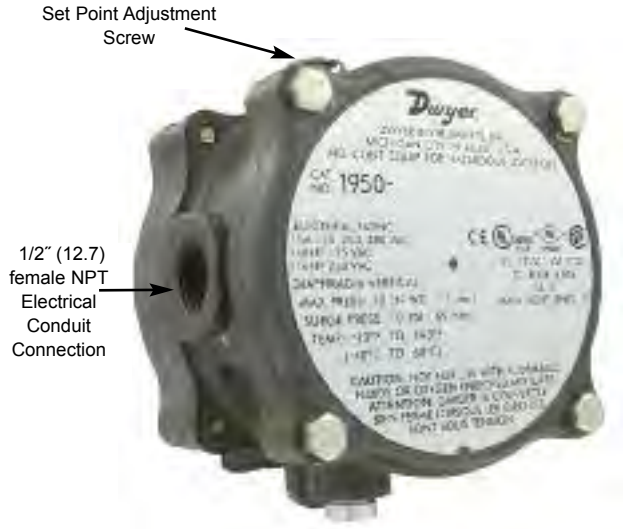
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Series 1950 Explosion-Proof Differential Pressure Switches

Specifications - Installation and Operating Instructions



Series 1950 Explosion-Proof Differential Pressure Switches combine the best features of the Series 1900 Pressure Switch with an integral explosion-proof and weather-proof housing. Each unit is UL & CSA listed; FM approved for use in Class I, Groups C & D; Class II, Groups E, F, & G; and Class III atmospheres (NEMA 7 & 9). They are totally rain-tight for outdoor installations. Twelve models allow set-points from .03 to 20 inches w.c. and from .5 to 50 psi (3.4 to 345 kPa).

Easy access to the SPDT switch for electrical hook-up is provided by removing the top plate of the three-part aluminum housing. Adjustment to the set point of the switch can be made without disassembling the housing. The unit is very compact, about half the weight and bulk of equivalent conventional explosion-proof switches.

CAUTION
For use only with air or compatible gases. Use of the Model 1950 switch with explosive media connected to the Low pressure port (including differential pressure applications in such media) is not recommended. Switch contact arcing can cause an explosion inside the switch housing which, while contained, may render the switch inoperative. If switch is being used to sense a single positive pressure relative to atmosphere, run a line from the low pressure port to a non-hazardous area free of combustible gases. This may increase response time on -0 and -00 models.

Note: The last number-letter combination in the model number identifies the switch's electrical rating (number) and diaphragm material (letter). The 2F combination is standard as described in the physical data above. In case of special models, a number 1 rating is the same as 2; a number 3 or 4 rating is 10A 125, 250, 480 VAC; 1/8 H.P. 125 VAC; 1/4 H.P. 250 VAC; a number 5 or 6 rating is 1A 125 VAC. Letter B indicates a Buna-N diaphragm; N = Neoprene; S = Silicone; and V = Viton®.

UL and CSA Listed, FM Approved For
CL. I GR. C, D - CL. II GR. E, F, G - CL. III

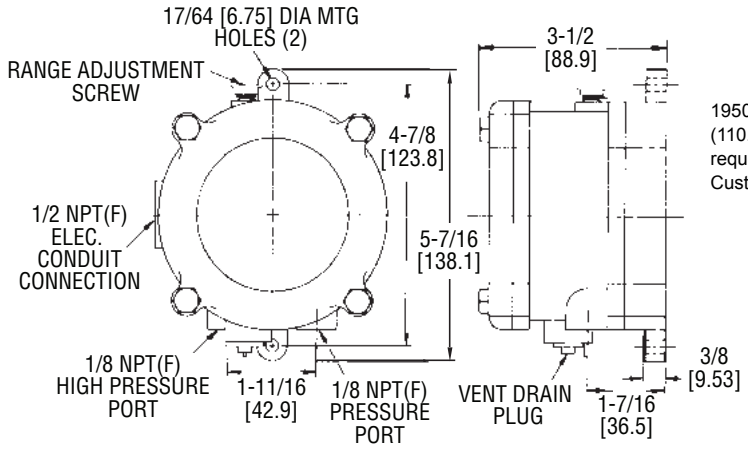
Series 1950 Switches
Operating ranges and deadbands

To order specify Model Number	Operating Range: Inches, W.C.	Approximate Dead Band	
		At Min. Set Point	At Max. Set Point
1950-02-2S	0.03 to 0.10	0.025	0.05
1950-00-2F	0.07 to 0.15	0.04	0.05
1950-0-2F	0.15 to 0.5	0.10	0.15
1950-1-2F	0.4 to 1.6	0.15	0.20
1950-5-2F	1.4 to 5.5	0.3	0.4
1950-10-2F	3.0 to 11.0	0.4	0.5
1950-20-2F	4.0 to 20.0	0.4	0.6
Model Number	Operating Range: PSI	Approximate Dead Band	
		Min. Set Point	Max. Set Point
1950P-2-2F	0.5 to 2.0	0.3 psi	0.3 psi
1950P-8-2F	1.5 to 8.0	1.0 psi	1.0 psi
1950P-15-2F	3.0 to 15.0	0.9 psi	0.9 psi
1950P-25-2F	4.0 to 25.0	0.7 psi	0.7 psi
1950P-50-2F	15.0 to 50	1.0 psi	1.5 psi

SPECIFICATIONS
Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Temperature Limits: -40 to 140°F (-40 to 60°C); 0 to 140°F (-17.8 to 60°C) for 1950P-8, 15, 25, and 50. -30 to 130°F (-34.4 to 54.4°C) for 1950-02.
Pressure Limits:
Continuous: 1950's - 45″ w.c. (0.11 bar);
1950P's - 35 psi (2.41 bar); 1950P-50 only - 70 psi (4.83 bar).
Surge: 1950's - 10 psi (0.69 bar), 1950P's - 50 psi (3.45 bar), 1950P-50 only - 90 psi (6.21 bar).
Enclosure Rating: IP54, NEMA 3, 7 and 9.
Switch Type: Single-pole double-throw (SPDT).
Electrical Rating: 15 A @, 125, 250, 480 VAC, 60 Hz. Resistive 1/8 HP @ 125 VAC, 1/4 HP @ 250 VAC, 60 Hz.
Electrical Connections: 3 screw type, common, normally open and normally closed.
Process Connections: 1/8″ female NPT.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Set Point Adjustment: Screw type on top of housing.
Weight: 3.25 lb (1.5 kg); 1950-02 model, 4.4 lb (2 kg).
Agency Approvals: CE, UL, CSA, FM.

RESPONSE TIME: Because of restrictive effect of flame arrestors, switch response time may be as much as 10-25 seconds where applied pressures are near set point.

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1950-02: 7-3/4″ (196.9) dia. x 4-11/32″ (110.3) depth. For complete dimensions request drawing 28-700175-00 from our Customer Service Department

1950 Switch Outline Dimensions

INSTALLATION

1. Select a location free from excess vibration and corrosive atmospheres where temperatures will be within the limits noted under Specifications on reverse. Switch may be installed outdoors or in areas where the hazard of explosion exists. See reverse for specific types of hazardous service.

2. Mount standard switches with the diaphragm in a vertical plane and with switch lettering and nameplate in an upright position. Some switches are position sensitive and may not reset properly unless they are mounted with the diaphragm vertical.

3. Connect switch to source of pressure, vacuum or differential pressure. Metal tubing with 1/4″ O.D. is recommended, but any tubing which will not restrict the air flow can be used. Connect to the two 1/8″ female NPT pressure ports as noted below:

A. Differential pressures - connect pipes or tubes from source of greater pressure to high pressure port marked HIGH PRESS, and from source of lower pressure to low pressure port marked LOW PRESS.

B. Pressure only (above atmospheric pressure) - connect tube from source of pressure to high pressure port. The low pressure port is left open to atmosphere.

C. Vacuum only (below atmospheric pressure) - connect tube from source of vacuum to low pressure port. The high pressure port is left open to atmosphere.

4. To make electrical connections, remove the three hex head screws from the cover and after loosening the fourth captive screw, swing the cover aside. Electrical connections to the standard single pole, double throw snap switch are provided by means of terminals marked “COM” (common), “NO” (norm open), “NC” (norm closed). The normally open contacts close and the normally closed contacts open when pressure increases beyond the set point. Switch loads for standard models should not exceed the maximum specified current rating of 15 amps resistive. Switch capabilities decrease with an increase in ambient temperature, load inductance, or cycling rate. Whenever an application involves one or more of these factors, the user may find it desirable to limit the switched current to 10 amps or less in the interest of prolonging switch life.

ADJUSTMENT: To Change the Set point

1. Remove the plastic cap and turn the slotted Adjust-ment Screw at the top of the housing clockwise to raise the set point pressure and counterclockwise to lower the set point. After calibration, replace the plastic cap and re-check the set point.

2. The recommended procedure for calibrating or checking calibration is to use a “T” assembly with three rubber tubing leads, all as short as possible and the entire assembly offering minimum flow restriction. Run one lead to the pressure switch, another to a manometer of known accuracy and appropriate range, and apply pressure through the third tube. Make final approach to the set point very slowly. Note that manometer and pressure switch will have different response times due to different internal volumes, lengths of tubing, fluid drainage, etc. Be certain the switch is checked in the position it will assume in use, i.e. with diaphragm in a vertical plane and switch lettering and Dwyer nameplate in an upright position.

3. For highly critical applications check the set point adjustment and if necessary, reset it as noted in step A.

MAINTENANCE

The moving parts of these switches need no maintenance or lubrication. The only adjustment is that of the set point. Care should be taken to keep the switch reasonably clean. Periodically the vent drain plug should be rotated, then returned to its original position. This will dislodge deposits which could accumulate in applications where there is excessive condensation within the switch. The Series 1950 Explosion-Proof Differential Pressure Switch is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

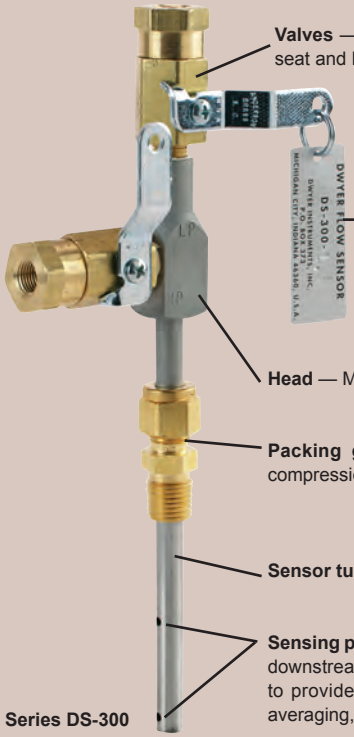
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Series DS

In-Line Flow Sensors

Use with the Dwyer® Differential Pressure Gages or Transmitters



Valves — Standard, brass with TFE seat and Buna-N O-ring

Nameplate — Stainless steel permanently attached with split ring. Includes complete size and model information.

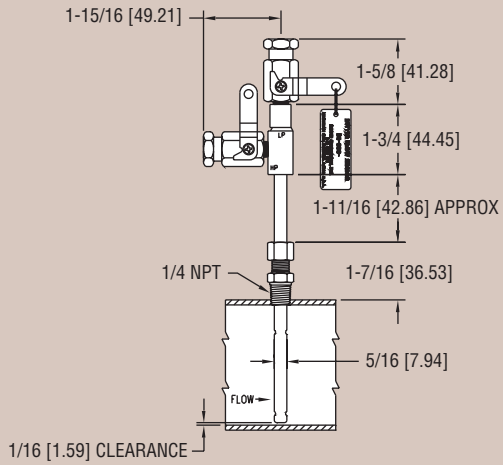
Head — Machined stainless steel.

Packing gland — Parker CPI brass compression fitting.

Sensor tube — 304 SS.

Sensing ports — Multiple upstream and downstream ports sized and positioned to provide effective accurate pressure averaging, even at lower velocities.

Series DS-300



In-Line Flow Sensors are averaging Pitot tubes that provide accurate and convenient flow rate sensing for schedule 40 pipe. When purchased with a Dwyer® Capsuhelic® differential pressure gage of appropriate range, the result is a flow indicating system delivered off the shelf at an economical price.

Pitot tubes have been used in flow measurement for years. Conventional pitot tubes sense velocity pressure at only one point in the flowing stream. Therefore, a series of measurements must be taken across the stream to obtain a meaningful average flow rate. The Dwyer® flow sensor eliminates the need for "traversing" the flowing stream because of its multiple sensing points and built-in averaging capability.

The Series DS-300 flow sensors are designed to be inserted in the pipeline through a compression fitting. They are furnished with instrument shut-off valves on both pressure connections. Valves are fitted with 1/8″ female NPT connections. Accessories include adapters with 1/4″ SAE 45° flared ends compatible with hoses supplied with the Model A-471 Portable Capsuhelic® gage kit. Standard valves are rated at 200 psig (13.7 bar) and 200°F (93.3°C). Where valves are not required, they can be omitted at reduced cost. Series DS-300 flow sensors are available for pipe sizes from 1″ to 10″.

DS-400 Averaging Flow Sensors are quality constructed from extra strong 3/4″ dia. stainless steel to resist increased forces encountered at higher flow rates with both air and water. This extra strength also allows them to be made in longer insertion lengths up to 24 inches (61 cm). All models include convenient and quick-acting quarter-turn ball valves to isolate the sensor for zeroing. Process connections to the valve assembly are 1/8″ female NPT. A pair of 1/8″ NPT X 1/4″ SAE 45° flared adapters are included, compatible with hoses used in the Model A-471 Portable Capsuhelic® Gage Kit. Supplied solid brass mounting adapter has a 3/4″ dia. compression fitting to lock in required insertion length and a 3/4″ male NPT thread for mounting in a Threaded Branch Connection.

Series DS-300

Model	Description
DS-300-1″	1″ pipe size
DS-300-1-1/4″	1-1/4″ pipe size
DS-300-1-1/2″	1-1/2″ pipe size
DS-300-2″	2″ pipe size
DS-300-2-1/2″	2-1/2″ pipe size
DS-300-3″	3″ pipe size
DS-300-4″	4″ pipe size
DS-300-6″	6″ pipe size
DS-300-8″	8″ pipe size
DS-300-10″	10″ pipe size

Series DS-400

Model	Description
DS-400-6″	6″ pipe size
DS-400-8″	8″ pipe size
DS-400-10″	10″ pipe size
DS-400-12″	12″ pipe size
DS-400-14″	14″ pipe size
DS-400-16″	16″ pipe size
DS-400-18″	18″ pipe size
DS-400-20″	20″ pipe size
DS-400-24″	24″ pipe size

OPTIONS & ACCESSORIES

DS-300 or DS-400 Less Valves. To order, add suffix **-LV**

A-160, Threaded Branch Connection, 3/8″ NPT, forged steel, 3000 psi

A-161, Brass Bushing, 1/4″ x 3/8″

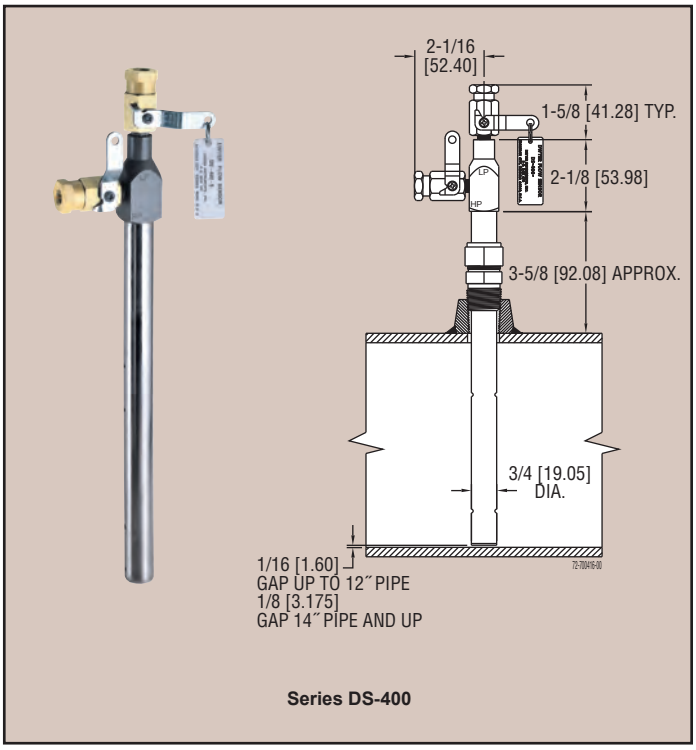
How To Order

Merely determine the pipe size into which the flow sensor will be mounted and designate the size as a suffix to Model DS-300. For example, a flow sensor to be mounted in a 2″ pipe would be a Model No. DS-300-2″.

For non-critical water and air flow monitoring applications, the chart below can be utilized for ordering a stock Capsuhelic® differential pressure gage for use with the DS-300 flow sensor. Simply locate the maximum flow rate for the media being measured under the appropriate pipe size and read the Capsuhelic® gage range in inches of water column to the left. The DS-300 sensor is supplied with installation and operating instructions, Bulletin F-50. It also includes complete flow conversion information for the three media conditions shown in the chart below. This information enables the user to create a complete differential pressure to flow rate conversion table for the sensor and differential pressure gage employed. Both the Dwyer® Capsuhelic® gage and flow sensor feature excellent repeatability so, once the desired flow rate is determined, deviation from that flow in quantitative measure can be easily determined. You may wish to order the adjustable signal flag option for the Capsuhelic® gage to provide an easily identified reference point for the proper flow.

Capsuhelic® gages with special ranges and/or direct reading scales in appropriate flow units are available on special order for more critical applications. Customer supplied data for the full scale flow (quantity and units) is required along with the differential pressure reading at that full flow figure. Prior to ordering a special Capsuhelic® differential pressure gage for flow read-out, we recommend you request Bulletin F-50 to obtain complete data on converting flow rates of various media to the sensor differential pressure output. With this bulletin and after making a few simple calculations, the exact range gage required can easily be determined.

Large 3/4 Inch Diameter for Extra Strength in Lengths to 24 Inches



Series DS-400

Gage Range (in w.c.)	Media @ 70°F	Full Range Flows by Pipe Size (Approximate)									
		1″	1-1/4″	1-1/2″	2″	2-1/2″	3″	4″	6″	8″	10″
2	Water (GPM)	4.8	8.3	11.5	20.5	30	49	86	205	350	560
	Air @ 14.7 PSIA (SCFM)	19.0	33.0	42.0	65.0	113	183	330	760	1340	2130
	Air @ 100 PSIG (SCFM)	50.0	90.5	120.0	210.0	325	510	920	2050	3600	6000
5	Water (GPM)	7.7	14.0	18.0	34.0	47	78	138	320	560	890
	Air @ 14.7 PSIA (SCFM)	30.0	51.0	66.0	118.0	178	289	510	1200	2150	3400
	Air @ 100 PSIG (SCFM)	83.0	142.0	190.0	340.0	610	820	1600	3300	5700	10000
10	Water (GPM)	11.0	19.0	25.5	45.5	67	110	195	450	800	1260
	Air @ 14.7 PSIA (SCFM)	41.0	72.0	93.0	163.0	250	410	725	1690	3040	4860
	Air @ 100 PSIG (SCFM)	120.0	205.0	275.0	470.0	740	1100	2000	4600	8100	15000
25	Water (GPM)	18.0	32.0	40.5	72.0	108	173	310	720	1250	2000
	Air @ 14.7 PSIA (SCFM)	63.0	112.0	155.0	255.0	390	640	1130	2630	4860	7700
	Air @ 100 PSIG (SCFM)	185.0	325.0	430.0	760.0	1200	1800	3300	7200	13000	22000
50	Water (GPM)	25.0	44.0	57.5	100.0	152	247	435	1000	1800	
	Air @ 14.7 PSIA (SCFM)	90.0	161.0	205.0	360.0	560	900	1600	3700	6400	
	Air @ 100 PSIG (SCFM)	260.0	460.0	620.0	1050.0	1700	2600	4600	10000	18500	
100	Water (GPM)	36.5	62.0	82.0	142.0	220	350	620	1500		
	Air @ 14.7 PSIA (SCFM)	135.0	230.0	300.0	505.0	800	1290	2290	5000		
	Air @ 100 PSIG (SCFM)	370.0	660.0	870.0	1500.0	2300	3600	6500	15000		

Model A-471 Portable Kit

For portable operation, the A-471 Capsuhelic® Portable Gage Kit is available complete with tough polypropylene carrying case, mounting bracket, 3-way manifold valve, two 10' high pressure hoses, and all necessary fittings.

See page 15 for complete information on the Capsuhelic® gage



Capsuhelic® Gage Shown Installed In A-471 Portable Kit

Series 631B Capsuhelic® Wet/Wet Differential Pressure Transmitter

Low pressure transmitter for use with DS-300/400 flow sensors. Use Series 631B Capsuhelic® Wet/Wet Differential Pressure Transmitter.

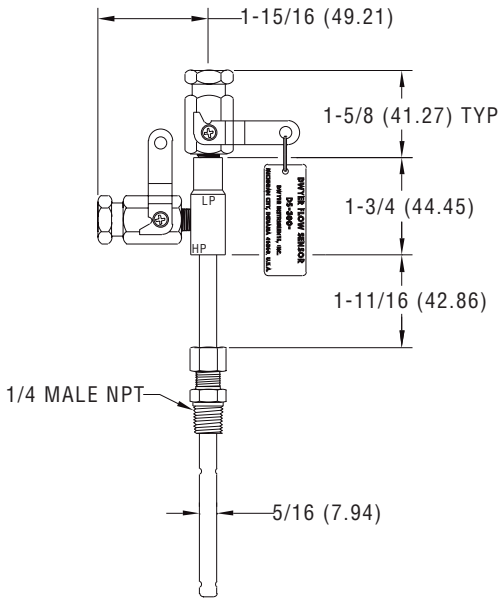
See page 65 for additional details.



Series DS-300 Flow Sensors

Installation and Operating Instructions Flow Calculations





Series DS-300 Flow Sensors are averaging pitot tubes that provide accurate, convenient flow rate sensing. When purchased with a Dwyer Capsuhelic® for liquid flow or Magnehelic® for air flow, differential pressure gage of appropriate range, the result is a flow-indicating system delivered off the shelf at an economical price. Series DS-300 Flow Sensors are designed to be inserted in the pipeline through a compression fitting and are furnished with instrument shut-off valves on both pressure connections. Valves are fitted with 1/8″ female NPT connections. Accessories include adapters with 1/4″ SAE 45° flared ends compatible with hoses supplied with the Model A-471 Portable Capsuhelic® kit. Standard valves are rated at 200°F (93.3°C). Where valves are not required, they can be omitted at reduced cost. Series DS-300 Flow Sensors are available for pipe sizes from 1″ to 10″.

INSPECTION

Inspect sensor upon receipt of shipment to be certain it is as ordered and not damaged. If damaged, contact carrier.

INSTALLATION

General - The sensing ports of the flow sensor must be correctly positioned for measurement accuracy. The instrument connections on the sensor indicate correct positioning. The side connection is for total or high pressure and should be pointed upstream. The top connection is for static or low pressure.

Location - The sensor should be installed in the flowing line with as much straight run of pipe upstream as possible. A rule of thumb is to allow 10 - 15 pipe diameters upstream and 5 downstream. The table below lists recommended up and down piping.

PRESSURE AND TEMPERATURE

Maximum: 200 psig (13.78 bar) at 200°F (93.3°C).

Upstream and Downstream Dimensions in Terms of Internal Diameter of Pipe*

Upstream Condition	Minimum Diameter of Straight Pipe		
	Upstream		Downstream
	In-Plane	Out of Plane	
One Elbow or Tee	7	9	5
Two 90° Bends in Same Plane	8	12	5
Two 90° Bends in Different Plane	18	24	5
Reducers or Expanders	8	8	5
All Valves**	24	24	5

* Values shown are recommended spacing, in terms of internal diameter for normal industrial metering requirements. For laboratory or high accuracy work, add 25% to values.

** Includes gate, globe, plug and other throttling valves that are only partially opened. If valve is to be fully open, use values for pipe size change. **CONTROL VALVES SHOULD BE LOCATED AFTER THE FLOW SENSOR.**

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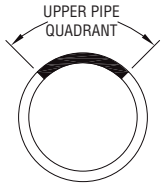
POSITION

Be certain there is sufficient clearance between the mounting position and other pipes, walls, structures, etc, so that the sensor can be inserted through the mounting unit once the mounting unit has been installed onto the pipe.

Flow sensors should be positioned to keep air out of the instrument connecting lines on liquid flows and condensate out of the lines on gas flows. The easiest way to assure this is to install the sensor into the pipe so that air will bleed into, or condensate will drain back to, the pipe.

For Air or Gas Flow

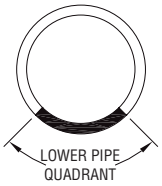
Install in upper quadrant of pipe



Condensate drains back to pipe

For Liquid or Steam Flow

Install in lower quadrant of pipe



Air bleeds back to pipe

INSTALLATION

1. When using an A-160 thred-o-let, weld it to the pipe wall. If replacing a DS-200 unit, an A-161 bushing (1/4˝ x 3/8˝) will be needed.

2. Drill through center of the thred-o-let into the pipe with a drill that is slightly larger than the flow sensor diameter.

3. Install the packing gland using proper pipe sealant. If the packing gland is disassembled, note that the tapered end of the ferrule goes into the fitting body.

4. Insert sensor until it bottoms against opposite wall of the pipe, then withdraw 1/16˝ to allow for thermal expansion.

5. Tighten packing gland nut finger tight. Then tighten nut with a wrench an additional 1-1/4 turns. Be sure to hold the sensor body with a second wrench to prevent the sensor from turning.

INSTRUMENT CONNECTION

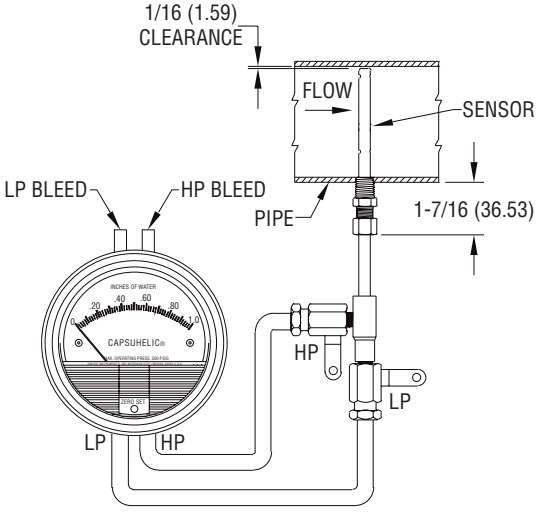
Connect the slide pressure tap to the high pressure port of the Magnehelic® (air only) or Capsuhelic® gage or transmitting instrument and the top connection to the low pressure port.

See the connection schematics below.

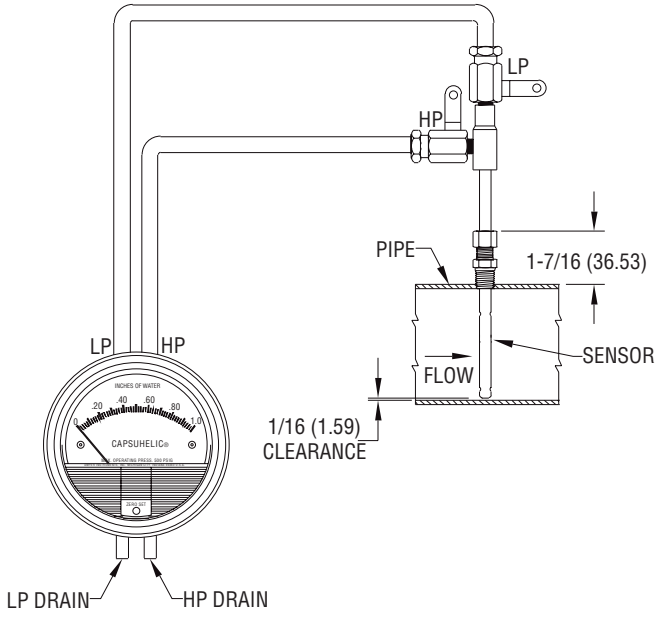
Bleed air from instrument piping on liquid flows. Drain any condensate from the instrument piping on air and gas flows.

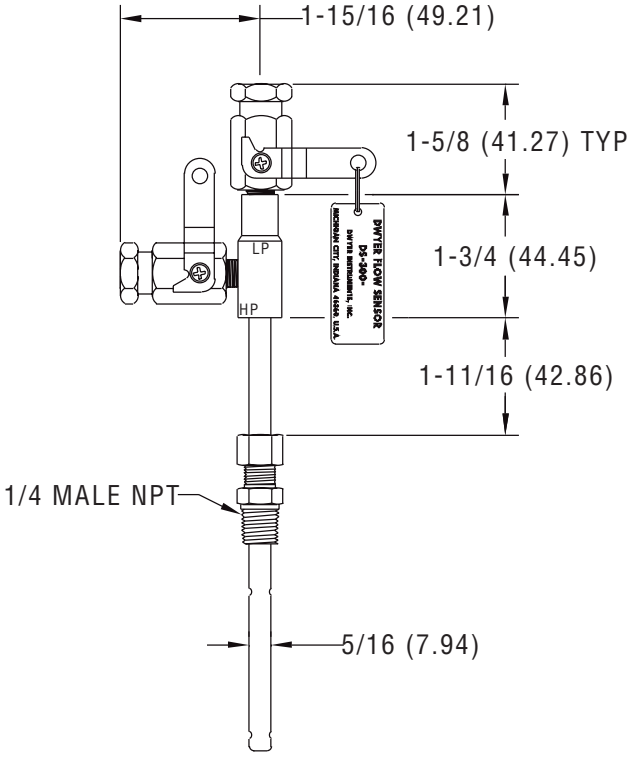
Open valves to instrument to place flow meter into service. For permanent installations, a 3-valve manifold is recommended to allow the gage to be zero checked without interrupting the flow. The Dwyer A-471 Portable Test Kit includes such a device.

Water Flow



Air or Gas Flow





Flow Calculations and Charts

The following information contains tables and equations for determining the differential pressure developed by the DS-300 Flow Sensor for various flow rates of water, steam, air or other gases in different pipe sizes.

This information can be used to prepare conversion charts to translate the differential pressure readings being sensed into the equivalent flow rate. When direct readout of flow is required, use this information to calculate the full flow differential pressure in order to specify the exact range of Dwyer Magnehelic® or Capsuhelic® gage required. Special ranges and calculations are available for these gages at minimal extra cost. See bulletins A-30 and F-41 for additional information on Magnehelic® and Capsuhelic® gages and DS-300 flow sensors.

For additional useful information on making flow calculations, the following service is recommended: Crane Valve Co. Technical Paper No. 410 “Flow of Fluids Through Valves, Fittings and Pipe.” It is available from Crane Valve Company, www.cranevalve.com.

Using the appropriate differential pressure equation from Page 4 of this bulletin,calculate the differential pressure generated by the sensor under normal operating conditions of the system. Check the chart below to determine if this value is within the recommended operating range for the sensor. Note that the data in this chart is limited to standard conditions of air at 60°F (15.6°C) and 14.7 psia static line pressure or water at 70°F (21.1°C). To determine recommended operating ranges of other gases, liquids an/or operating conditions, consult factory.

Note: the column on the right side of the chart which defines velocity ranges to avoid. Continuous operation within these ranges can result in damage to the flow sensor caused by excess vibration.

Pipe Size (Schedule 40)	Flow Coefficient “K”	Operating Ranges Air @ 60°F & 14.7 psia (D/P in. W.C.)	Operating Ranges Water @ 70°F (D/P in. W.C.)	Velocity Ranges Not Recommended (Feet per Second)
1	0.52	1.10 to 186	4.00 to 675	146 to 220
1-1/4	0.58	1.15 to 157	4.18 to 568	113 to 170
1-1/2	0.58	0.38 to 115	1.36 to 417	96 to 144
2	0.64	0.75 to 75	2.72 to 271	71 to 108
2-1/2	0.62	1.72 to 53	6.22 to 193	56 to 85
3	0.67	0.39 to 35	1.43 to 127	42 to 64
4	0.67	0.28 to 34	1.02 to 123	28 to 43
6	0.71	0.64 to 11	2.31 to 40	15 to 23
8	0.67	0.10 to 10	0.37 to 37	9.5 to 15
10	0.70	0.17 to 22	0.60 to 79	6.4 to 10

FLOW EQUATIONS

1. Any Liquid

$$Q\ (GPM) = 5.668 \times K \times D^2 \times \sqrt{\Delta P / S_f}$$

2. Steam or Any Gas

$$Q\ (lb/Hr) = 359.1 \times K \times D^2 \times \sqrt{p \times \Delta P}$$

3. Any Gas

$$Q\ (SCFM) = 128.8 \times K \times D^2 \times \sqrt{\frac{P \times \Delta P}{(T + 460) \times S_s}}$$

DIFFERENTIAL PRESSURE EQUATIONS

1. Any Liquid

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_f}{K^2 \times D^4 \times 32.14}$$

2. Steam or Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2}{K^2 \times D^4 \times p \times 128{,}900}$$

3. Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_s \times (T + 460)}{K^2 \times D^4 \times P \times 16{,}590}$$

Technical Notations

The following notations apply:

ΔP = Differential pressure expressed in inches of water column
Q = Flow expressed in GPM, SCFM, or PPH as shown in equation
K = Flow coefficient— See values tabulated on Pg. 3.
D = Inside diameter of line size expressed in inches.

For square or rectangular ducts, use: $D = \sqrt{\frac{4 \times \text{Height} \times \text{Width}}{\pi}}$

P = Static Line pressure (psia)
T = Temperature in degrees Fahrenheit (plus 460 = °Rankine)
p = Density of medium in pounds per square foot
S_f = Sp Gr at flowing conditions
S_s = Sp Gr at 60°F (15.6°C)

SCFM TO ACFM EQUATION

$$SCFM = ACFM \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

$$ACFM = SCFM \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520}\right)$$

$$\text{POUNDS PER CUBIC FOOT STD.} = \text{POUNDS PER CUBIC FOOT ACT.} \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520^*}\right)$$

$$\text{POUNDS PER CUBIC FOOT ACT.} = \text{POUNDS PER CUBIC FOOT STD.} \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

1 Cubic foot of air = 0.076 pounds per cubic foot at 60° F (15.6°C) and 14.7 psia.
* (520°= 460 + 60°) Std. Temp. Rankine

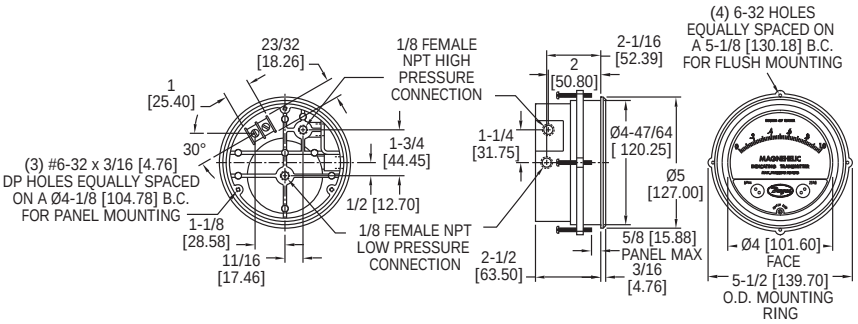
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Series 605 Magnehelic® Differential Pressure Indicating Transmitter

Specifications - Installation and Operating Instructions





The Series 605 Magnehelic® Indicating Transmitter simultaneously provides local indication on a large, easily read analog scale while also converting that pressure into a standard two-wire, 4-20 mA signal for ranges from 0-0.5 to 0-50″ w.c. Positive, negative or differential air and compatible gas pressure can be measured with accuracies as low as ±.5% of full scale. The basic mechanical components of the Series 605 Magnehelic® indicating transmitter are similar to those used in the popular, time-proven Magnehelic® differential pressure gage.

STANDARD ACCESSORIES

Mounting ring
Snap ring
(4) 6-32 x 1-1/4 screws (panel mtg.)
(3) 6-32 x 5/16 screws (surface mtg.)
(2) Tubing to 1/8″ NPT adapters
(2) 1/8″ NPT plugs
Adjustment key

SPECIFICATIONS

GAGE SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Accuracy: See chart.
Stability: ±1% F.S./yr.
Pressure Limits: See chart.
Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).
Process Connections: 1/8″ female NPT.
Size: 4″ (101.6 mm) dial face, 5″ (127 mm) O.D. x 2-11/16″ (68.3 mm).
Weight: 1 lb, 12.6 oz (811 g).
Agency Approvals: CE.

TRANSMITTER SPECIFICATIONS

Accuracy: See chart (includes linearity, hysteresis, repeatability).
Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).
Compensated Temperature Range: 32 to 120°F (0 to 48.9°C).
Thermal Effect: ±0.025% F.S./°F (0.045% F.S./°C).
Power Requirements: 10-35 VDC (2-wire).
Output Signal: 4 to 20 mA.
Zero and Span Adjustments: Protected potentiometers.
Loop Resistance: DC; 0-1250 ohms maximum.
Current Consumption: DC; 38 mA maximum.
Electrical Connections: Screw terminal block.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.

Model	Range in w.c.	Maximum Pressure	Electrical Accuracy +/-%	Mechanical Accuracy +/-%
605-00N	.05-0-.20	25 psi (1.7 bar)	2	4
605-11	.25-0-.25	25 psi (1.7 bar)	2	3
605-0	0-.50	25 psi (1.7 bar)	2	3
605-1	0-1.0	25 psi (1.7 bar)	2	2
605-2	0-2.0	2 psi (13.79 kPa)	0.5	2
605-3	0-3.0	2 psi (13.79 kPa)	0.5	2
605-6	0-6.0	2 psi (13.79 kPa)	0.5	2
605-10	0-10	2 psi (13.79 kPa)	0.5	2

Model	Range in w.c.	Maximum Pressure	Electrical Accuracy +/-%	Mechanical Accuracy +/-%
605-20	0-20.0	11 psi (75.8 kPa)	0.5	2
605-30	0-30	11 psi (75.8 kPa)	0.5	2
605-50	0-50	11 psi (75.8 kPa)	0.5	2
	Range in Pa			
605-60PA	0-60	25 psi (1.7 bar)	2	4
605-125PA	0-125	25 psi (1.7 bar)	2	3
605-250PA	0-250	25 psi (1.7 bar)	2	2
605-500PA	0-500	2 psi (13.79 kPa)	0.5	2

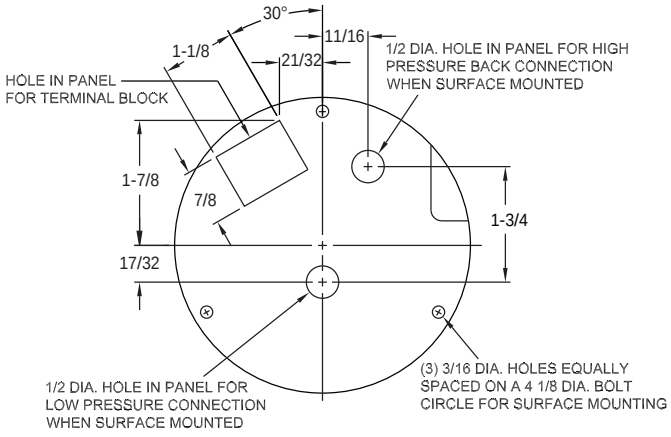
DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, IN 46361, U.S.A.
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INSTALLATION

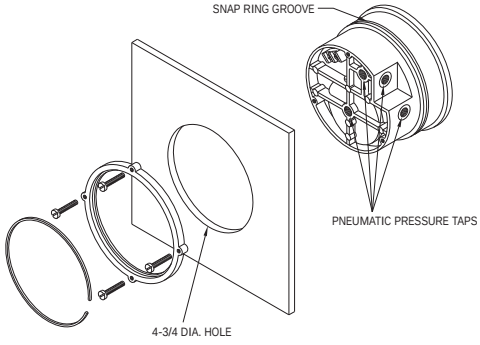
1. **LOCATION**: Select a location where the temperature of the unit will be between 20°F and 120°F. Distance from the receiver is limited only by total loop resistance. See “Electrical Connections”. The tubing feeding pressure to the instrument can be run practically any length required but long lengths will increase response time slightly. Avoid surfaces with excessive vibration.

2. **POSITION:** All standard models are calibrated with the diaphragm vertical and should be used in that position for maximum accuracy. If your application requires mounting in other than a vertical position, be sure to specify this when ordering.

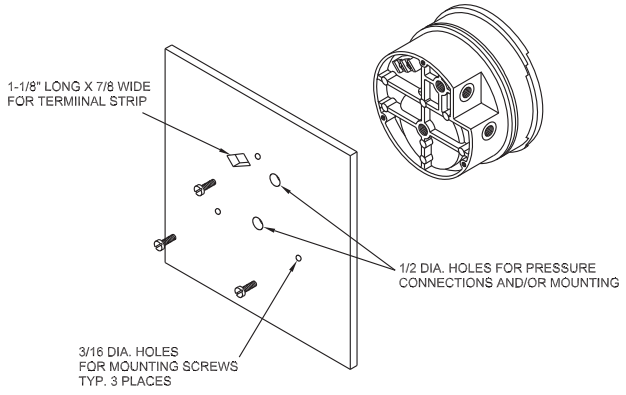
3. **PRESSURE CONNECTIONS:** For convenience, two sets of 1/8″ female NPT ports are available. Plug the unused set with pipe plugs provided. Attach tubing from positive pressure source to port marked “HI” or from negative (Vacuum) source to port marked “LOW”. In either case, opposite port must be vented to atmosphere. In dusty environments, we recommend use of an A-331 Filter Vent Plug to keep interior of instrument clean. For differential pressures the higher source is connected to the “HI” port and lower to the ”LOW” port.



4. **MOUNTING:** The Series 605 Transmitter may be either panel mounted or surface mounted.



A. PANEL MOUNTING: Cut a 4-3/4″ or 120mm dia. hole in panel and insert the complete unit from the front. Slip on the mounting ring and install the split snap ring in the groove on the bezel. Seat the mounting ring against the snap ring and thread the four screws through the tapped holes. Tighten screws against rear of panel.



B. SURFACE MOUNTING: Drill (3) 3/16″ dia. holes for mounting screws and cut (1) 7/8″ x 1-1/8″ hole for access to terminal strip as shown in hole location drawing. Insert screws from rear of panel and thread into tapped holes on back of transmitter case. If rear pressure connections are to be used, make 1/2″ dia. holes located as shown in hole location drawing in left column.

5. **ZEROING:** Once gage/transmitter is mounted in its final position, check to be sure pointer aligns with zero on scale, when no pressure is applied and both low and high pressure ports are vented to atmosphere. To adjust, turn small slotted screw at center-bottom of gage face. **Do not** move the larger black knobs labeled SPAN and ZERO. These are for use only if a calibration check shows the 4-20 mA output signal to need adjustment. See page 3 under heading OUTPUT RANGING.

ELECTRICAL CONNECTIONS

CAUTION: DO NOT EXCEED SPECIFIED SUPPLY VOLTAGE RATINGS. PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT. THIS UNIT IS NOT DESIGNED FOR AC VOLTAGE OPERATION.

Electrical connections to the Series 605 Transmitter are made to the two-screw terminal strip on the rear of the case. Polarity is indicated by + and – signs stamped on side. The schematic diagram of the Series 605 transmitter is illustrated in Figure B.

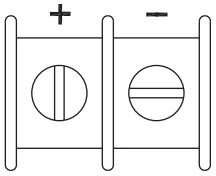


Figure A

An external power supply delivering 10.0 to 35 VDC with a minimum current capability of 40 milliamps must be used to power the control loop in which the Series 605 transmitter is connected. Refer to Fig. B for connection of the power supply, transmitter and receiver. The range of appropriate receiver load resistances (R_L) for the power supply voltage available is given by the formula and graph in Fig. C. Shielded two wire cable is recommended for control loop wiring and the negative side of the loop may be grounded if desired. Note also that the receiver may be connected in either the negative or positive side of the loop, whichever is most convenient. Should polarity of the transmitter or receiver be inadvertently reversed, the loop will not function properly but no damage will be done to the transmitter.

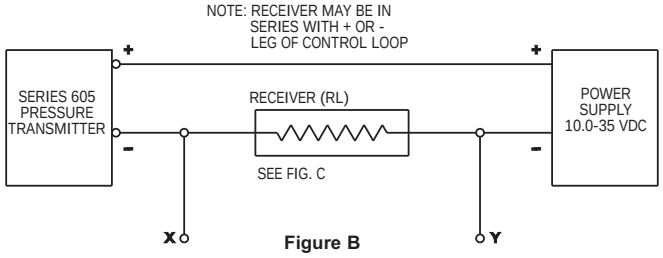


Figure B

The maximum length of connecting wire between the transmitter and the receiver is a function of wire size and receiver resistance. That portion of the total current loop resistance represented by the resistance of the connecting wires themselves should not exceed 10% of the receiver resistance. For extremely long runs (over 1,000 feet), it is desirable to select receivers with higher resistances in order to keep the size and cost of the connecting leads as low as possible. In installations where the connecting run is no more than 100 feet, connecting lead wire as small as No. 22 Ga. can be used.

The Series 605 transmitters can be used with receivers requiring 1-5 volt input rather than 4-20 mA. If the receiver requires a 1-5 volt input, insert a 250 ohm, 1/2 watt resistor in series with the current loop but in parallel with the receiver input. Referring to Figure B, R_L becomes the 250 ohm resistor and point X and Y are connected to the receiver input, point X being positive (+) and point Y negative (–) or ground. The resistor should be connected at the panel end of the transmitter current loop close to the receiver input to take advantage of the immunity of the current loop to electrical noise pickup. Most electronic component distributors stock a 249 r, 1/2 watt, ±1% tolerance metal film resistor which is adequate for this application.

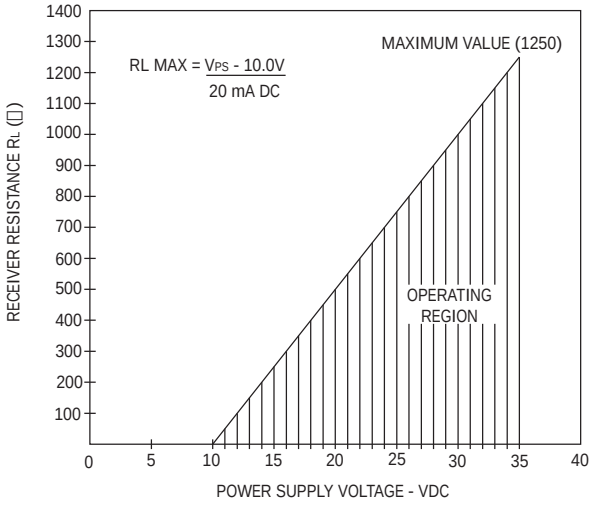


Figure C

OUTPUT RANGING

Each Series 605 Magnehelic® indicating transmitter is factory calibrated to produce 4 mA at zero scale reading and 20 mA at full scale reading. The following procedure should be used if the pressure versus output signal relationship needs to be checked.

1. With unit connected to the companion receiver per preceding instructions, insert an accurate milliammeter with a full scale reading of approximately 30 mA in series with the current loop.

2. Vent both pressure ports to atmosphere and, if necessary, adjust pointer zero screw to align pointer with zero on scale. A controllable pressure source capable of reaching the full scale range should be connected to either high pressure port. Plug the other high pressure port and vent one or both low pressure ports to atmosphere. The instrument must be ranged in the same position in which it will be used. Standard factory calibration and ranging is done with unit vertical.

3. Apply electrical power to the system and check for proper operation by slowly increasing pressure and observing whether the loop current increases above the 4 mA zero pressure reading.

4. A spanner type key is supplied to adjust span and zero. This helps to reduce unauthorized tampering. Apply pressure until pointer aligns with full scale reading and adjust the SPAN knob for a 20 mA reading.

5. Relieve all pressure, allow a few seconds for setting and adjust the ZERO knob for a 4 mA current loop reading.

6. The SPAN and ZERO controls are slightly interactive so steps 4 & 5 should be repeated a few times until readings of 4 and 20 mA are obtained consistently.

7. Remove the milliammeter from the current loop and proceed with final installation of the transmitter and receiver.

MULTIPLE UNITS WITH COMMON POWER SUPPLY

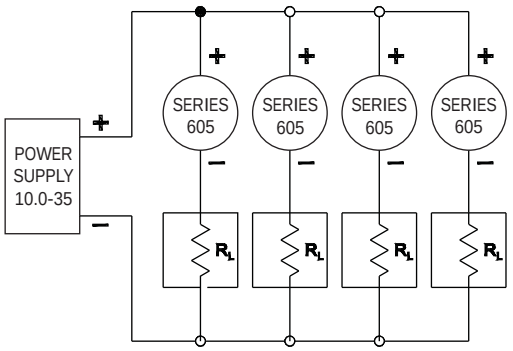


Figure D

Several Series 605 transmitters can be operated with a single power supply as depicted above in Figure D. Be careful to specify a supply with sufficient capacity. The minimum current requirement at a given voltage can be calculated by multiplying the number of units x 20 mA. In the example shown this would be 4 x 20 or 80 mA minimum.

MAINTENANCE

Upon final installation of the Series 605 Transmitter and the companion receiver, including the A-701 Digital Readout, no routine maintenance is required. A periodic check of system calibration is recommended. The Series 605 Differential Pressure Transmitter is not field repairable and should be returned, freight prepaid, to the factory if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization (RGA) number before shipping.

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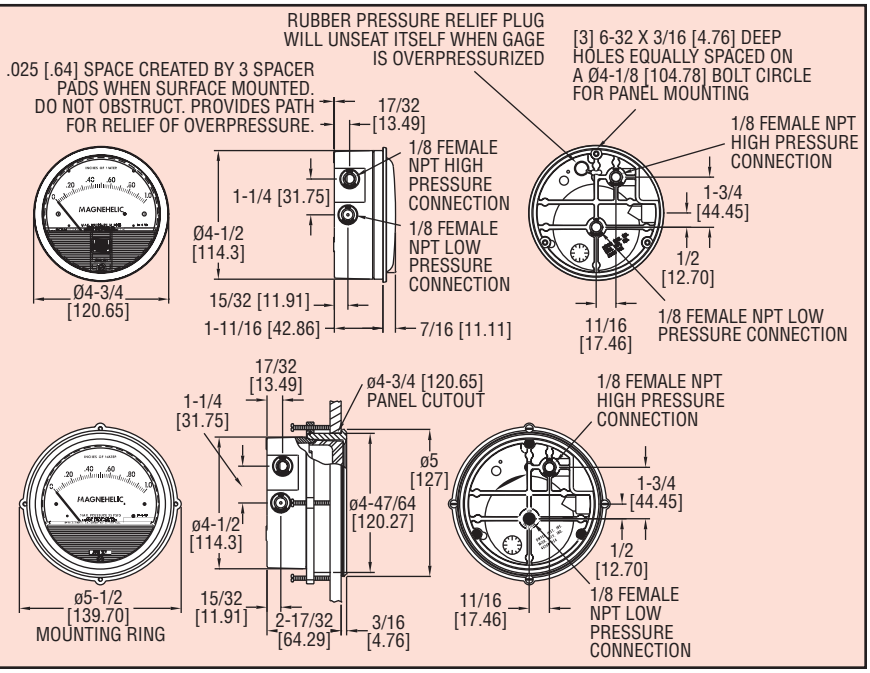
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Series 2000

Magnehelic® Differential Pressure Gages

Indicate Positive, Negative or Differential, Accurate within 2%





Scan here to watch product video

Select the Dwyer® Magnehelic® gage for high accuracy – guaranteed within 2% of full-scale – and for the wide choice of 81 models available to suit your needs precisely. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates low air or non-corrosive gas pressures – either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures. No manometer fluid to evaporate, freeze or cause toxic or leveling problems. It's inexpensive, too.

The Magnehelic® gage is the industry standard to measure fan and blower pressures, filter resistance, air velocity, furnace draft, pressure drop across orifice plates, liquid levels with bubbler systems and pressures in fluid amplifier or fluidic systems. It also checks gas-air ratio controls and automatic valves, and monitors blood and respiratory pressures in medical care equipment.

MOUNTING

A single case size is used for most models of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. Although calibrated for vertical position, many ranges above 1″ may be used at any angle by simply re-zeroing. However, for maximum accuracy, they must be calibrated in the same position in which they are used. These characteristics make Magnehelic® gages ideal for both stationary and portable applications. A 4-9/16″ hole is required for flush panel mounting. Complete mounting and connection fittings, plus instructions, are furnished with each instrument.❶

SPECIFICATIONS

Service: Air and non-combustible, compatible gases (natural gas option available). **Note:** May be used with hydrogen. Order a Buna-N diaphragm. Pressures must be less than 35 psi.
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.
Accuracy: ±2% of FS (±3% on - 0, -100 Pa, -125 Pa, 10MM and ±4% on - 00, -60 Pa, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: -20 in Hg to 15 psig† (-0.677 to 1.034 bar); MP option: 35 psig (2.41 bar); HP option: 80 psig (5.52 bar).
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only.❷
Temperature Limits: 20 to 140°F* (-6.67 to 60°C). -20°F (-28°C) with low temperature option.
Size: 4″ (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
Standard Accessories: Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adapter, and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for three adapters in MP & HP gage accessories.)
Agency Approval: RoHS. **Note:** -SP models not RoHS approved.

†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options.

ACCESSORIES



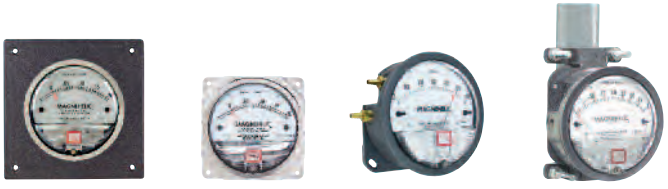
Model A-432 Portable Kit
Combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft (2.7 m) of 3/16″ ID rubber tubing, standhang bracket and terminal tube with holder.



Model A-605 Air Filter Gage Accessory Kit
Adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft (1.5 m) lengths of 1/4″ aluminum tubing two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves.

A-605B Air Filter Gage Accessory Kit, Air filter kit with two plastic open/close valves, two 4″ steel static tips, plastic tubing and mounting flange

A-605C Air Filter Gage Accessory Kit, Air filter kit with two plastic open/close valves, two plastic static tips, plastic tubing and mounting flange



Flush, Surface, Integrated Plate or Pipe Mounted

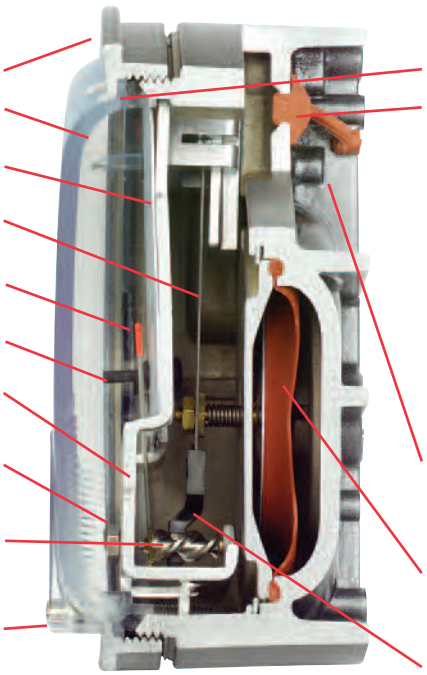


Enclosure Mounted

❶See page 7 (Magnehelic® Gage Mounting Accessories)
❷Over Protection Note: See page 5 (Series 2000)

Series 2000

Magnehelic® Gage Models & Ranges



Bezel provides flange for flush mounting in panel.

Clear plastic face is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

Precision litho-printed scale is accurate and easy to read.

Calibrated range spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

Red tipped pointer of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

Pointer stops of molded rubber prevent pointer over-travel without damage.

"Wishbone" assembly provides mounting for helix, helix bearings and pointer shaft.

Jeweled bearings are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

Helix is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.

Zero adjustment screw is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.

O-ring seal for cover assures pressure integrity of case.

OVERPRESSURE PROTECTION
Blowout plug is comprised of a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (1.7 bar). To provide a free path for pressure relief, there are four spacer pads which maintain 0.023″ clearance when gage is surface mounted. Do not obstruct the gap created by these pads.
The blowout plug is not used on models above 180″ of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.
The blowout plug should not be used as a system overpressure control. High supply pressures may still cause the gage to fail due to over pressurization, resulting in property damage or serious injury. Good engineering practices should be utilized to prevent your system from exceeding the ratings or any component.

Die cast aluminum case is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

Silicone rubber diaphragm with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

Samarium Cobalt magnet mounted at one end of range spring rotates helix without mechanical linkages.

Model	Range Inches of Water
2000-00N†••	.05-0-.2
2000-00†••	0-.25
2000-0†•	0-.50
2001	0-1.0
2002	0-2.0
2003	0-3.0
2004	0-4.0
2005	0-5.0
2006	0-6.0
2008	0-8.0
2010	0-10
2012	0-12
2015	0-15
2020	0-20
2025	0-25
2030	0-30
2040	0-40
2050	0-50
2060	0-60
2080	0-80
2100	0-100
2120	0-120
2150	0-150
2160	0-160
2180*	0-180
2250*	0-250
Zero Center Ranges	
2300-00†••	0.125-0-0.125
2300-0†•	.25-0-.25
2301	.5-0-.5
2302	1-0-1
2304	2-0-2
2310	5-0-5
2320	10-0-10
2330	15-0-15

Model	Range PSI
2201	0-1
2202	0-2
2203	0-3
2204	0-4
2205	0-5
2210*	0-10
2215*	0-15
2220*	0-20
2230**	0-30
Model	**Range, CM of Water**
2000-15CM	0-15
2000-20CM	0-20
2000-25CM	0-25
2000-50CM	0-50
2000-80CM	0-80
2000-100CM	0-100
2000-150CM	0-150
2000-200CM	0-200
2000-250CM	0-250
2000-300CM	0-300
Zero Center Ranges	
2300-4CM	2-0-2
2300-10CM	5-0-5
2300-30CM	15-0-15

†These ranges calibrated for vertical scale position.
• Accuracy +/-3%
• • Accuracy +/-4%
*MP option standard
**HP option standard

Model	Range MM of Water
2000-6MM†••	0-6
2000-10MM†•	0-10
2000-15MM	0-15
2000-25MM	0-25
2000-30MM	0-30
2000-50MM	0-50
2000-80MM	0-80
2000-100MM	0-100
2000-125MM	0-125
2000-150MM	0-150
2000-200MM	0-200
2000-250MM	0-250
2000-300MM	0-300
Zero Center Ranges	
2300-6MM†••	3-0-3
2300-10MM†•	5-0-5
2300-20MM†•	10-0-10
Model	**Range, Pa**
2000-60NPA†••	10-0-50
2000-60PA†••	0-60
2000-100PA†•	0-100
2000-125PA†•	0-125
2000-250PA	0-250
2000-300PA	0-300
2000-500PA	0-500
2000-750PA	0-750
2000-1000PA	0-1000
Zero Center Ranges	
Model	**Range, Pa**
2300-60PA†••	30-0-30
2300-100PA†•	50-0-50
2300-120PA	60-0-60
2300-200PA	100-0-100
2300-250PA	125-0-125
2300-300PA	150-0-150
2300-500PA	250-0-250
2300-1000PA	500-0-500

Model	Range, kPa
2000-0.5KPA	0-0.5
2000-1KPA	0-1
2000-1.5KPA	0-1.5
2000-2KPA	0-2
2000-2.5KPA	0-2.5
2000-3KPA	0-3
2000-4KPA	0-4
2000-5KPA	0-5
2000-8KPA	0-8
2000-10KPA	0-10
2000-15KPA	0-15
2000-20KPA	0-20
2000-25KPA	0-25
2000-30KPA	0-30
Zero Center Ranges	
2300-1KPA	.5-0-.5
2300-2KPA	1-0-1
2300-2.5KPA	1.25-0-1.25
2300-3KPA	1.5-0-1.5

Dual Scale Air Velocity Units
For use with pitot tube

Model	Range in W.C./ Velocity F.P.M.
2000-00AV†••	0-.25/ 300-2000
2000-0AV†•	0-.50/ 500-2800
2001AV	0-1.0/ 500-4000
2002AV	0-2.0/ 1000-5600
2005AV	0-5.0/ 2000-8800
2010AV	0-10/ 2000-12500

Dual Scale English/Metric Models

Model	Range, in w.c.	Range, Pa or kPa
2000-00D†••	0-.25	0-62 Pa
2000-0D†•	0-0.5	0-125 Pa
2001D	0-1.0	0-250 Pa
2002D	0-2.0	0-500 Pa
2003D	0-3.0	0-750 Pa
2004D	0-4.0	0-1.0 kPa
2005D	0-5.0	0-1.25 kPa
2006D	0-6.0	0-1.5 kPa
2008D	0-8.0	0-2.0 kPa
2010D	0-10	0-2.5 kPa
2015D	0-15	0-3.7 kPa
2020D	0-20	0-5 kPa
2025D	0-25	0-6.2 kPa
2050D	0-50	0-12.4 kPa
2060D	0-60	0-15 kPa

VELOCITY AND VOLUMETRIC FLOW UNITS
Scales are available on the Magnehelic® that read in velocity units (FPM, m/s) or volumetric flow units (SCFM, m^3/s, m^3/h). Stocked velocity units with dual range scales in inches w.c. and feet per minute are shown above. For other ranges contact the factory.
When ordering volumetric flow scales please specify the maximum flow rate and its corresponding pressure. Example: 0.5 in w.c. = 16,000 CFM.

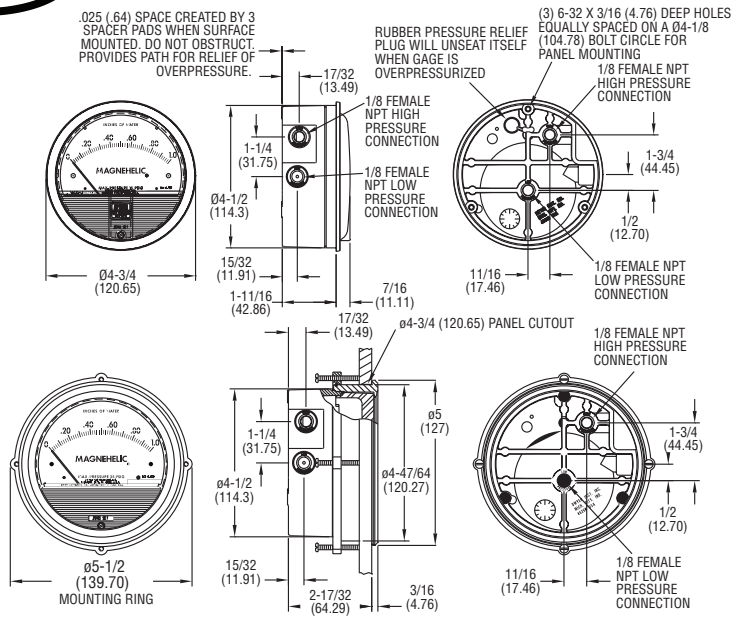
ACCESSORIES
A-321, Safety Relief Valve
A-448, 3-piece magnet kit for mounting Magnehelic® gage directly to magnetic surface
A-135, Rubber gasket for panel mounting
A-401, Plastic Carry Case



A-310A 3-Way Vent Valves
In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage.

Bulletin A-27

Magnehelic® Differential Pressure Gage



**The blowout plug is not used on models above 180 inches of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.*

STANDARD GAGE ACCESSORIES: Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adapters and three flush mounting adapters with screws.

MP AND HP GAGE ACCESSORIES: Mounting ring and snap ring retainer substituted for 3 adaptors, 1/4" compression fittings replace 1/8" pipe thread to rubber tubing adaptors.

OVERPRESSURE PROTECTION: Standard Magnehelic® Differential Pressure Gages are rated for a maximum pressure of 15 psig and should not be used where that limit could be exceeded. Models employ a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (excludes MP and HP models). To provide a free path for pressure relief, there are four spacer pads which maintain .023″ clearance when gage is surface mounted. Do not obstruct the gap created by these pads.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases. (Natural Gas option available.)
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. (MP model has polycarbonate cover).
Accuracy: ±2% of full scale (±3% on - 0, -100 Pa, -125 Pa, 10MM and ±4% on -00, - 00N, -60 Pa, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: -20″ Hg to 15 psig.† (-0.677 bar to 1.034 bar); MP option: 35 psig (2.41 bar), HP option: 80 psig (5.52 bar).
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only. The blowout plug is not used on models above 180 inches of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.
Temperature Limits: 20 to 140°F (-6.67 to 60°C). *Low temperature models available as special option.
Size: 4″ (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
Agency Approvals: RoHS.

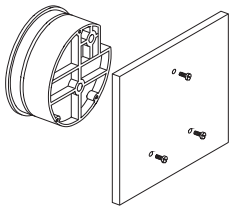
†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options.

Note: May be used with hydrogen when ordering Buna-N diaphragm. Pressure must be less than 35 psi.

INSTALLATION

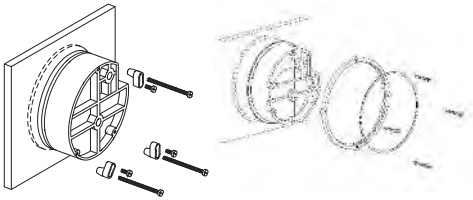
Select a location free from excessive vibration and where the ambient temperature will not exceed 140°F (60°C). Also, avoid direct sunlight which accelerates discoloration of the clear plastic cover. Sensing lines may be run any necessary distance. Long tubing lengths will not affect accuracy but will increase response time slightly. Do not restrict lines. If pulsating pressures or vibration cause excessive pointer oscillation, consult the factory for ways to provide additional damping.
All standard Magnehelic® Differential Pressure Gages are calibrated with the diaphragm vertical and should be used in that position for maximum accuracy. If gages are to be used in other than vertical position, this should be specified on the order. Many higher range gages will perform within tolerance in other positions with only rezeroing. Low range models of 0.5" w.c. plus 0.25" w.c. and metric equivalents must be used in the vertical position only.

SURFACE MOUNTING



Locate mounting holes, 120° apart on a 4-1/8" dia. circle. Use No. 6-32 machine screws of appropriate length.

FLUSH MOUNTING



Provide a 4-9/16" dia. (116 mm) opening in panel. Provide a 4-3/4" dia. (120 mm) opening for MP and HP models. Insert gage and secure in place with No. 6-32 machine screws of appropriate length, with adapters, firmly secured in place.

PIPE MOUNTING

To mount gage on 1-1/4" - 2" pipe, order optional A-610 pipe mounting kit.

TO ZERO GAGE AFTER INSTALLATION

Set the indicating pointer exactly on the zero mark, using the external zero adjust screw on the cover at the bottom. Note that the zero check or adjustment can only be made with the high and low pressure taps both open to atmosphere.

OPERATION

Positive Pressure: Connect tubing from source of pressure to either of the two high pressure ports. Plug the port not used. Vent one or both low pressure ports to atmosphere.
Negative Pressure: Connect tubing from source of vacuum or negative pressure to either of the two low pressure ports. Plug the port not used. Vent one or both high pressure ports to atmosphere.
Differential Pressure: Connect tubing from the greater of two pressure sources to either high pressure port and the lower to either low pressure port. Plug both unused ports.
When one side of the gage is vented in dirty, dusty atmosphere, we suggest an A-331 Filter Vent Plug be installed in the open port to keep inside of gage clean.

A. For portable use of temporary installation use 1/8" pipe thread to rubber tubing adapter and connect to source of pressure with flexible rubber or vinyl tubing.
B. For permanent installation, 1/4" O.D., or larger, copper or aluminum tubing is recommended.

MAINTENANCE

No lubrication or periodic servicing is required. Keep case exterior and cover clean. Occasionally disconnect pressure lines to vent both sides of gage to atmosphere and re-zero. Optional vent valves should be used in permanent installations. The Series 2000 is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

WARNING

Attempted field repair may void your warranty. Recalibration or repair by the user is not recommended.

TROUBLE SHOOTING TIPS

Gage won't indicate or is sluggish.

1. Duplicate pressure port not plugged.
2. Diaphragm ruptured due to overpressure.
3. Fittings or sensing lines blocked, pinched, or leaking.
4. Cover loose or "O"ring damaged, missing.
5. Pressure sensor, (static tips, Pitot tube, etc.) improperly located.
6. Ambient temperature too low. For operation below 20°F (-7°C), order gage with low temperature, (LT) option.

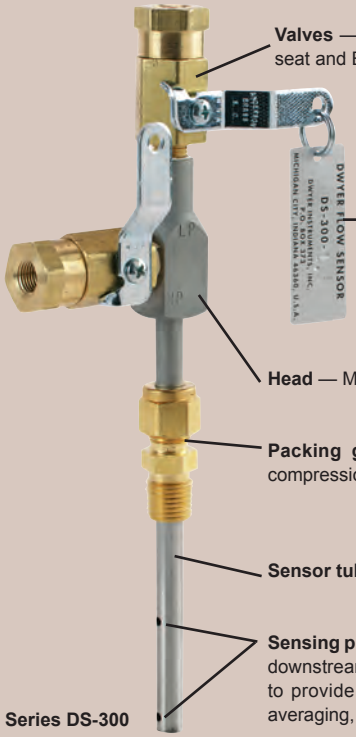
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Series DS

In-Line Flow Sensors

Use with the Dwyer® Differential Pressure Gages or Transmitters



Valves — Standard, brass with TFE seat and Buna-N O-ring

Nameplate — Stainless steel permanently attached with split ring. Includes complete size and model information.

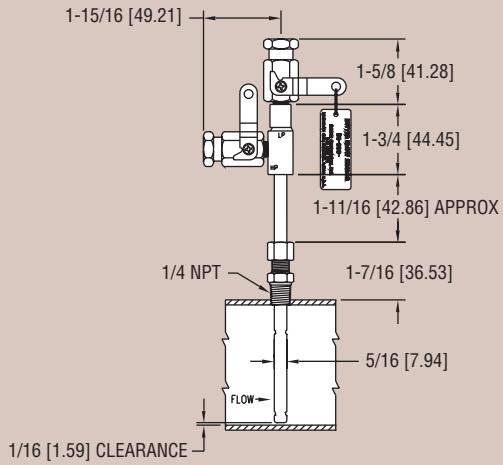
Head — Machined stainless steel.

Packing gland — Parker CPI brass compression fitting.

Sensor tube — 304 SS.

Sensing ports — Multiple upstream and downstream ports sized and positioned to provide effective accurate pressure averaging, even at lower velocities.

Series DS-300



In-Line Flow Sensors are averaging Pitot tubes that provide accurate and convenient flow rate sensing for schedule 40 pipe. When purchased with a Dwyer® Capsuhelic® differential pressure gage of appropriate range, the result is a flow indicating system delivered off the shelf at an economical price.

Pitot tubes have been used in flow measurement for years. Conventional pitot tubes sense velocity pressure at only one point in the flowing stream. Therefore, a series of measurements must be taken across the stream to obtain a meaningful average flow rate. The Dwyer® flow sensor eliminates the need for "traversing" the flowing stream because of its multiple sensing points and built-in averaging capability.

The Series DS-300 flow sensors are designed to be inserted in the pipeline through a compression fitting. They are furnished with instrument shut-off valves on both pressure connections. Valves are fitted with 1/8″ female NPT connections. Accessories include adapters with 1/4″ SAE 45° flared ends compatible with hoses supplied with the Model A-471 Portable Capsuhelic® gage kit. Standard valves are rated at 200 psig (13.7 bar) and 200°F (93.3°C). Where valves are not required, they can be omitted at reduced cost. Series DS-300 flow sensors are available for pipe sizes from 1″ to 10″.

DS-400 Averaging Flow Sensors are quality constructed from extra strong 3/4″ dia. stainless steel to resist increased forces encountered at higher flow rates with both air and water. This extra strength also allows them to be made in longer insertion lengths up to 24 inches (61 cm). All models include convenient and quick-acting quarter-turn ball valves to isolate the sensor for zeroing. Process connections to the valve assembly are 1/8″ female NPT. A pair of 1/8″ NPT X 1/4″ SAE 45° flared adapters are included, compatible with hoses used in the Model A-471 Portable Capsuhelic® Gage Kit. Supplied solid brass mounting adapter has a 3/4″ dia. compression fitting to lock in required insertion length and a 3/4″ male NPT thread for mounting in a Threaded Branch Connection.

Series DS-300

Model	Description
DS-300-1″	1″ pipe size
DS-300-1-1/4″	1-1/4″ pipe size
DS-300-1-1/2″	1-1/2″ pipe size
DS-300-2″	2″ pipe size
DS-300-2-1/2″	2-1/2″ pipe size
DS-300-3″	3″ pipe size
DS-300-4″	4″ pipe size
DS-300-6″	6″ pipe size
DS-300-8″	8″ pipe size
DS-300-10″	10″ pipe size

Series DS-400

Model	Description
DS-400-6″	6″ pipe size
DS-400-8″	8″ pipe size
DS-400-10″	10″ pipe size
DS-400-12″	12″ pipe size
DS-400-14″	14″ pipe size
DS-400-16″	16″ pipe size
DS-400-18″	18″ pipe size
DS-400-20″	20″ pipe size
DS-400-24″	24″ pipe size

OPTIONS & ACCESSORIES

DS-300 or DS-400 Less Valves. To order, add suffix **-LV**

A-160, Threaded Branch Connection, 3/8″ NPT, forged steel, 3000 psi

A-161, Brass Bushing, 1/4″ x 3/8″

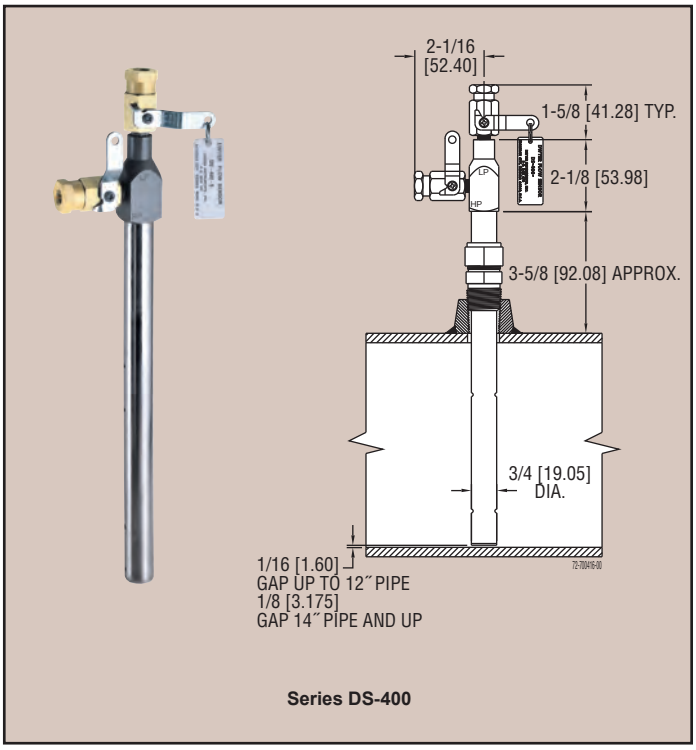
How To Order

Merely determine the pipe size into which the flow sensor will be mounted and designate the size as a suffix to Model DS-300. For example, a flow sensor to be mounted in a 2″ pipe would be a Model No. DS-300-2″.

For non-critical water and air flow monitoring applications, the chart below can be utilized for ordering a stock Capsuhelic® differential pressure gage for use with the DS-300 flow sensor. Simply locate the maximum flow rate for the media being measured under the appropriate pipe size and read the Capsuhelic® gage range in inches of water column to the left. The DS-300 sensor is supplied with installation and operating instructions, Bulletin F-50. It also includes complete flow conversion information for the three media conditions shown in the chart below. This information enables the user to create a complete differential pressure to flow rate conversion table for the sensor and differential pressure gage employed. Both the Dwyer® Capsuhelic® gage and flow sensor feature excellent repeatability so, once the desired flow rate is determined, deviation from that flow in quantitative measure can be easily determined. You may wish to order the adjustable signal flag option for the Capsuhelic® gage to provide an easily identified reference point for the proper flow.

Capsuhelic® gages with special ranges and/or direct reading scales in appropriate flow units are available on special order for more critical applications. Customer supplied data for the full scale flow (quantity and units) is required along with the differential pressure reading at that full flow figure. Prior to ordering a special Capsuhelic® differential pressure gage for flow read-out, we recommend you request Bulletin F-50 to obtain complete data on converting flow rates of various media to the sensor differential pressure output. With this bulletin and after making a few simple calculations, the exact range gage required can easily be determined.

Large 3/4 Inch Diameter for Extra Strength in Lengths to 24 Inches



Series DS-400

Gage Range (in w.c.)	Media @ 70°F	Full Range Flows by Pipe Size (Approximate)									
		1″	1-1/4″	1-1/2″	2″	2-1/2″	3″	4″	5″	8″	10″
2	Water (GPM)	4.8	8.3	11.5	20.5	30	49	86	205	350	560
	Air @ 14.7 PSIA (SCFM)	19.0	33.0	42.0	65.0	113	183	330	760	1340	2130
	Air @ 100 PSIG (SCFM)	50.0	90.5	120.0	210.0	325	510	920	2050	3600	6000
5	Water (GPM)	7.7	14.0	18.0	34.0	47	78	138	320	560	890
	Air @ 14.7 PSIA (SCFM)	30.0	51.0	66.0	118.0	178	289	510	1200	2150	3400
	Air @ 100 PSIG (SCFM)	83.0	142.0	190.0	340.0	610	820	1600	3300	5700	10000
10	Water (GPM)	11.0	19.0	25.5	45.5	67	110	195	450	800	1260
	Air @ 14.7 PSIA (SCFM)	41.0	72.0	93.0	163.0	250	410	725	1690	3040	4860
	Air @ 100 PSIG (SCFM)	120.0	205.0	275.0	470.0	740	1100	2000	4600	8100	15000
25	Water (GPM)	18.0	32.0	40.5	72.0	108	173	310	720	1250	2000
	Air @ 14.7 PSIA (SCFM)	63.0	112.0	155.0	255.0	390	640	1130	2630	4860	7700
	Air @ 100 PSIG (SCFM)	185.0	325.0	430.0	760.0	1200	1800	3300	7200	13000	22000
50	Water (GPM)	25.0	44.0	57.5	100.0	152	247	435	1000	1800	
	Air @ 14.7 PSIA (SCFM)	90.0	161.0	205.0	360.0	560	900	1600	3700	6400	
	Air @ 100 PSIG (SCFM)	260.0	460.0	620.0	1050.0	1700	2600	4600	10000	18500	
100	Water (GPM)	36.5	62.0	82.0	142.0	220	350	620	1500		
	Air @ 14.7 PSIA (SCFM)	135.0	230.0	300.0	505.0	800	1290	2290	5000		
	Air @ 100 PSIG (SCFM)	370.0	660.0	870.0	1500.0	2300	3600	6500	15000		

Model A-471 Portable Kit

For portable operation, the A-471 Capsuhelic® Portable Gage Kit is available complete with tough polypropylene carrying case, mounting bracket, 3-way manifold valve, two 10' high pressure hoses, and all necessary fittings.

See page 15 for complete information on the Capsuhelic® gage



Capsuhelic® Gage Shown Installed In A-471 Portable Kit

Series 631B Capsuhelic® Wet/Wet Differential Pressure Transmitter

Low pressure transmitter for use with DS-300/400 flow sensors. Use Series 631B Capsuhelic® Wet/Wet Differential Pressure Transmitter.

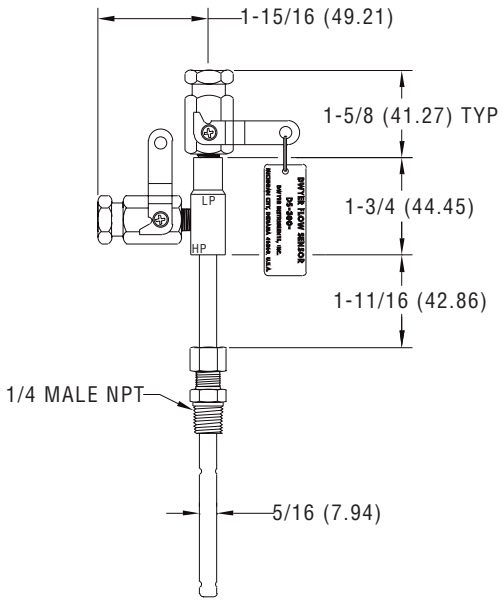
See page 65 for additional details.



Series DS-300 Flow Sensors

Installation and Operating Instructions Flow Calculations





Series DS-300 Flow Sensors are averaging pitot tubes that provide accurate, convenient flow rate sensing. When purchased with a Dwyer Capsuhelic® for liquid flow or Magnehelic® for air flow, differential pressure gage of appropriate range, the result is a flow-indicating system delivered off the shelf at an economical price. Series DS-300 Flow Sensors are designed to be inserted in the pipeline through a compression fitting and are furnished with instrument shut-off valves on both pressure connections. Valves are fitted with 1/8″ female NPT connections. Accessories include adapters with 1/4″ SAE 45° flared ends compatible with hoses supplied with the Model A-471 Portable Capsuhelic® kit. Standard valves are rated at 200°F (93.3°C). Where valves are not required, they can be omitted at reduced cost. Series DS-300 Flow Sensors are available for pipe sizes from 1″ to 10″.

INSPECTION

Inspect sensor upon receipt of shipment to be certain it is as ordered and not damaged. If damaged, contact carrier.

INSTALLATION

General - The sensing ports of the flow sensor must be correctly positioned for measurement accuracy. The instrument connections on the sensor indicate correct positioning. The side connection is for total or high pressure and should be pointed upstream. The top connection is for static or low pressure.

Location - The sensor should be installed in the flowing line with as much straight run of pipe upstream as possible. A rule of thumb is to allow 10 - 15 pipe diameters upstream and 5 downstream. The table below lists recommended up and down piping.

PRESSURE AND TEMPERATURE

Maximum: 200 psig (13.78 bar) at 200°F (93.3°C).

Upstream and Downstream Dimensions in Terms of Internal Diameter of Pipe*

Upstream Condition	Minimum Diameter of Straight Pipe		
	Upstream		Downstream
	In-Plane	Out of Plane	
One Elbow or Tee	7	9	5
Two 90° Bends in Same Plane	8	12	5
Two 90° Bends in Different Plane	18	24	5
Reducers or Expanders	8	8	5
All Valves**	24	24	5

* Values shown are recommended spacing, in terms of internal diameter for normal industrial metering requirements. For laboratory or high accuracy work, add 25% to values.

** Includes gate, globe, plug and other throttling valves that are only partially opened. If valve is to be fully open, use values for pipe size change. **CONTROL VALVES SHOULD BE LOCATED AFTER THE FLOW SENSOR.**

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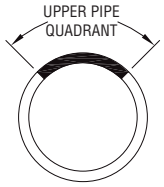
POSITION

Be certain there is sufficient clearance between the mounting position and other pipes, walls, structures, etc, so that the sensor can be inserted through the mounting unit once the mounting unit has been installed onto the pipe.

Flow sensors should be positioned to keep air out of the instrument connecting lines on liquid flows and condensate out of the lines on gas flows. The easiest way to assure this is to install the sensor into the pipe so that air will bleed into, or condensate will drain back to, the pipe.

For Air or Gas Flow

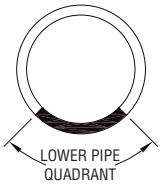
Install in upper quadrant of pipe



Condensate drains back to pipe

For Liquid or Steam Flow

Install in lower quadrant of pipe



Air bleeds back to pipe

INSTALLATION

1. When using an A-160 thred-o-let, weld it to the pipe wall. If replacing a DS-200 unit, an A-161 bushing (1/4˝ x 3/8˝) will be needed.

2. Drill through center of the thred-o-let into the pipe with a drill that is slightly larger than the flow sensor diameter.

3. Install the packing gland using proper pipe sealant. If the packing gland is disassembled, note that the tapered end of the ferrule goes into the fitting body.

4. Insert sensor until it bottoms against opposite wall of the pipe, then withdraw 1/16˝ to allow for thermal expansion.

5. Tighten packing gland nut finger tight. Then tighten nut with a wrench an additional 1-1/4 turns. Be sure to hold the sensor body with a second wrench to prevent the sensor from turning.

INSTRUMENT CONNECTION

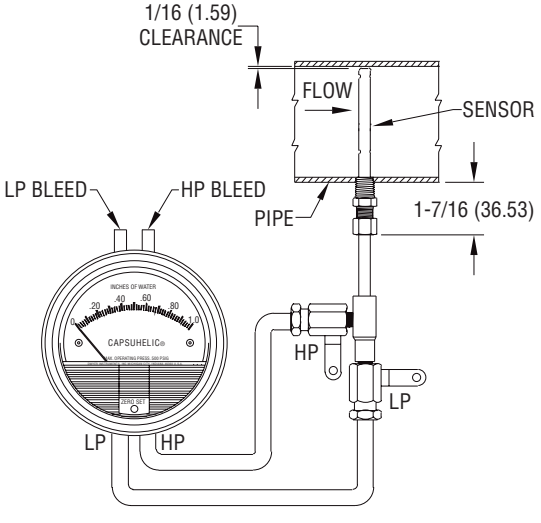
Connect the slide pressure tap to the high pressure port of the Magnehelic® (air only) or Capsuhelic® gage or transmitting instrument and the top connection to the low pressure port.

See the connection schematics below.

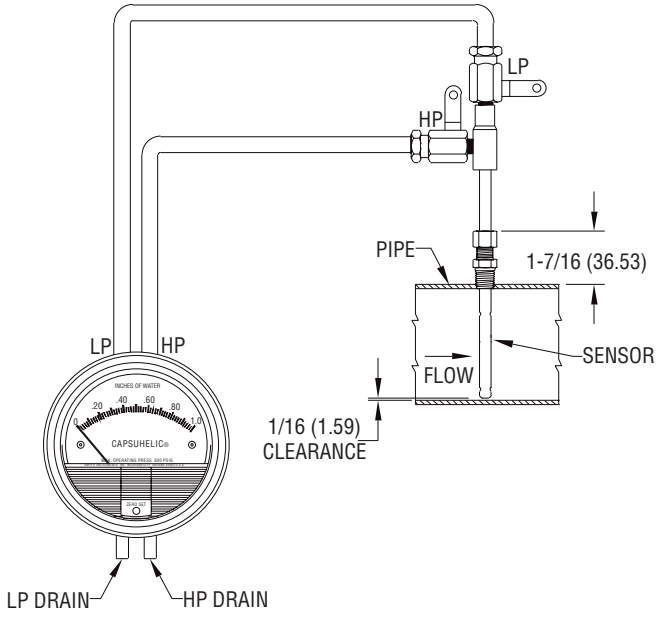
Bleed air from instrument piping on liquid flows. Drain any condensate from the instrument piping on air and gas flows.

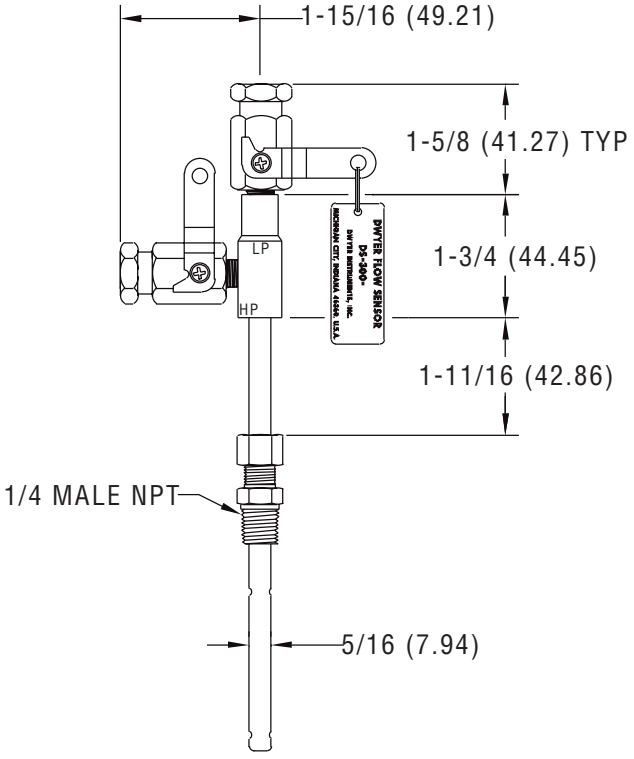
Open valves to instrument to place flow meter into service. For permanent installations, a 3-valve manifold is recommended to allow the gage to be zero checked without interrupting the flow. The Dwyer A-471 Portable Test Kit includes such a device.

Water Flow



Air or Gas Flow





Flow Calculations and Charts

The following information contains tables and equations for determining the differential pressure developed by the DS-300 Flow Sensor for various flow rates of water, steam, air or other gases in different pipe sizes.

This information can be used to prepare conversion charts to translate the differential pressure readings being sensed into the equivalent flow rate. When direct readout of flow is required, use this information to calculate the full flow differential pressure in order to specify the exact range of Dwyer Magnehelic® or Capsuhelic® gage required. Special ranges and calculations are available for these gages at minimal extra cost. See bulletins A-30 and F-41 for additional information on Magnehelic® and Capsuhelic® gages and DS-300 flow sensors.

For additional useful information on making flow calculations, the following service is recommended: Crane Valve Co. Technical Paper No. 410 "Flow of Fluids Through Valves, Fittings and Pipe." It is available from Crane Valve Company, www.cranevalve.com.

Using the appropriate differential pressure equation from Page 4 of this bulletin,calculate the differential pressure generated by the sensor under normal operating conditions of the system. Check the chart below to determine if this value is within the recommended operating range for the sensor. Note that the data in this chart is limited to standard conditions of air at 60°F (15.6°C) and 14.7 psia static line pressure or water at 70°F (21.1°C). To determine recommended operating ranges of other gases, liquids an/or operating conditions, consult factory.

Note: the column on the right side of the chart which defines velocity ranges to avoid. Continuous operation within these ranges can result in damage to the flow sensor caused by excess vibration.

Pipe Size (Schedule 40)	Flow Coefficient "K"	Operating Ranges Air @ 60°F & 14.7 psia (D/P in. W.C.)	Operating Ranges Water @ 70°F (D/P in. W.C.)	Velocity Ranges Not Recommended (Feet per Second)
1	0.52	1.10 to 186	4.00 to 675	146 to 220
1-1/4	0.58	1.15 to 157	4.18 to 568	113 to 170
1-1/2	0.58	0.38 to 115	1.36 to 417	96 to 144
2	0.64	0.75 to 75	2.72 to 271	71 to 108
2-1/2	0.62	1.72 to 53	6.22 to 193	56 to 85
3	0.67	0.39 to 35	1.43 to 127	42 to 64
4	0.67	0.28 to 34	1.02 to 123	28 to 43
6	0.71	0.64 to 11	2.31 to 40	15 to 23
8	0.67	0.10 to 10	0.37 to 37	9.5 to 15
10	0.70	0.17 to 22	0.60 to 79	6.4 to 10

FLOW EQUATIONS

1. Any Liquid

$$Q\ (GPM) = 5.668 \times K \times D^2 \times \sqrt{\Delta P / S_f}$$

2. Steam or Any Gas

$$Q\ (lb/Hr) = 359.1 \times K \times D^2 \times \sqrt{p \times \Delta P}$$

3. Any Gas

$$Q\ (SCFM) = 128.8 \times K \times D^2 \times \sqrt{\frac{P \times \Delta P}{(T + 460) \times S_s}}$$

DIFFERENTIAL PRESSURE EQUATIONS

1. Any Liquid

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_f}{K^2 \times D^4 \times 32.14}$$

2. Steam or Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2}{K^2 \times D^4 \times p \times 128{,}900}$$

3. Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_s \times (T + 460)}{K^2 \times D^4 \times P \times 16{,}590}$$

Technical Notations

The following notations apply:

ΔP = Differential pressure expressed in inches of water column
Q = Flow expressed in GPM, SCFM, or PPH as shown in equation
K = Flow coefficient— See values tabulated on Pg. 3.
D = Inside diameter of line size expressed in inches.

For square or rectangular ducts, use: $D = \sqrt{\frac{4 \times \text{Height} \times \text{Width}}{\pi}}$

P = Static Line pressure (psia)
T = Temperature in degrees Fahrenheit (plus 460 = °Rankine)
p = Density of medium in pounds per square foot
S_f = Sp Gr at flowing conditions
S_s = Sp Gr at 60°F (15.6°C)

SCFM TO ACFM EQUATION

$$SCFM = ACFM \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

$$ACFM = SCFM \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520}\right)$$

$$\text{POUNDS PER CUBIC FOOT STD.} = \text{POUNDS PER CUBIC FOOT ACT.} \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520^*}\right)$$

$$\text{POUNDS PER CUBIC FOOT ACT.} = \text{POUNDS PER CUBIC FOOT STD.} \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

1 Cubic foot of air = 0.076 pounds per cubic foot at 60° F (15.6°C) and 14.7 psia.
* (520°= 460 + 60°) Std. Temp. Rankine

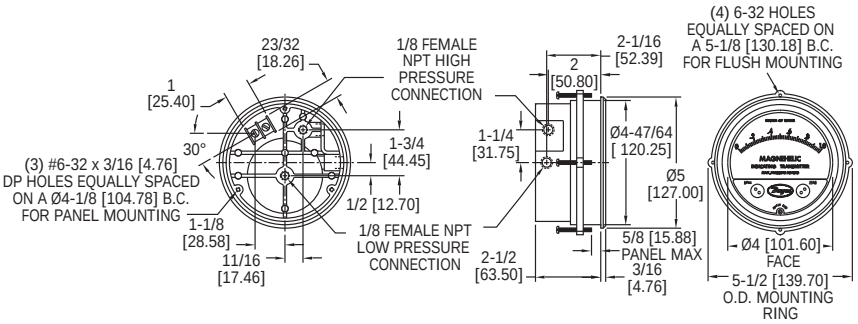
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Series 605 Magnehelic® Differential Pressure Indicating Transmitter

Specifications - Installation and Operating Instructions





The Series 605 Magnehelic® Indicating Transmitter simultaneously provides local indication on a large, easily read analog scale while also converting that pressure into a standard two-wire, 4-20 mA signal for ranges from 0-0.5 to 0-50″ w.c. Positive, negative or differential air and compatible gas pressure can be measured with accuracies as low as ±.5% of full scale. The basic mechanical components of the Series 605 Magnehelic® indicating transmitter are similar to those used in the popular, time-proven Magnehelic® differential pressure gage.

STANDARD ACCESSORIES

Mounting ring
Snap ring
(4) 6-32 x 1-1/4 screws (panel mtg.)
(3) 6-32 x 5/16 screws (surface mtg.)
(2) Tubing to 1/8″ NPT adapters
(2) 1/8″ NPT plugs
Adjustment key

SPECIFICATIONS

GAGE SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Accuracy: See chart.
Stability: ±1% F.S./yr.
Pressure Limits: See chart.
Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).
Process Connections: 1/8″ female NPT.
Size: 4″ (101.6 mm) dial face, 5″ (127 mm) O.D. x 2-11/16″ (68.3 mm).
Weight: 1 lb, 12.6 oz (811 g).
Agency Approvals: CE.

TRANSMITTER SPECIFICATIONS

Accuracy: See chart (includes linearity, hysteresis, repeatability).
Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).
Compensated Temperature Range: 32 to 120°F (0 to 48.9°C).
Thermal Effect: ±0.025% F.S./°F (0.045% F.S./°C).
Power Requirements: 10-35 VDC (2-wire).
Output Signal: 4 to 20 mA.
Zero and Span Adjustments: Protected potentiometers.
Loop Resistance: DC; 0-1250 ohms maximum.
Current Consumption: DC; 38 mA maximum.
Electrical Connections: Screw terminal block.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.

Model	Range in w.c.	Maximum Pressure	Electrical Accuracy +/-%	Mechanical Accuracy +/-%
605-00N	.05-0-.20	25 psi (1.7 bar)	2	4
605-11	.25-0-.25	25 psi (1.7 bar)	2	3
605-0	0-.50	25 psi (1.7 bar)	2	3
605-1	0-1.0	25 psi (1.7 bar)	2	2
605-2	0-2.0	2 psi (13.79 kPa)	0.5	2
605-3	0-3.0	2 psi (13.79 kPa)	0.5	2
605-6	0-6.0	2 psi (13.79 kPa)	0.5	2
605-10	0-10	2 psi (13.79 kPa)	0.5	2

Model	Range in w.c.	Maximum Pressure	Electrical Accuracy +/-%	Mechanical Accuracy +/-%
605-20	0-20.0	11 psi (75.8 kPa)	0.5	2
605-30	0-30	11 psi (75.8 kPa)	0.5	2
605-50	0-50	11 psi (75.8 kPa)	0.5	2
	Range in Pa			
605-60PA	0-60	25 psi (1.7 bar)	2	4
605-125PA	0-125	25 psi (1.7 bar)	2	3
605-250PA	0-250	25 psi (1.7 bar)	2	2
605-500PA	0-500	2 psi (13.79 kPa)	0.5	2

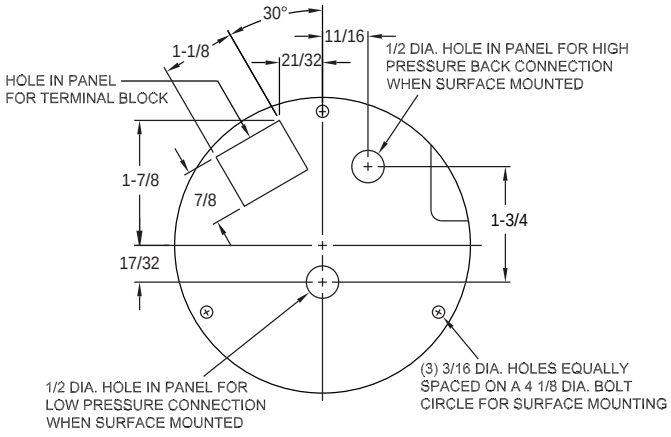
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INSTALLATION

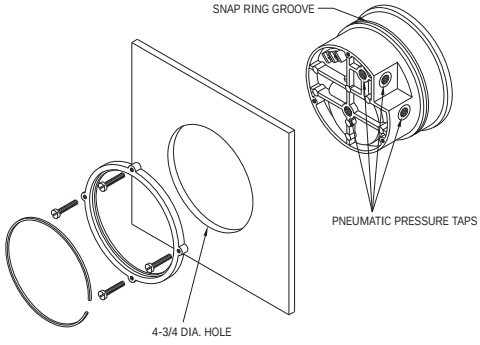
1. **LOCATION**: Select a location where the temperature of the unit will be between 20°F and 120°F. Distance from the receiver is limited only by total loop resistance. See “Electrical Connections”. The tubing feeding pressure to the instrument can be run practically any length required but long lengths will increase response time slightly. Avoid surfaces with excessive vibration.

2. **POSITION:** All standard models are calibrated with the diaphragm vertical and should be used in that position for maximum accuracy. If your application requires mounting in other than a vertical position, be sure to specify this when ordering.

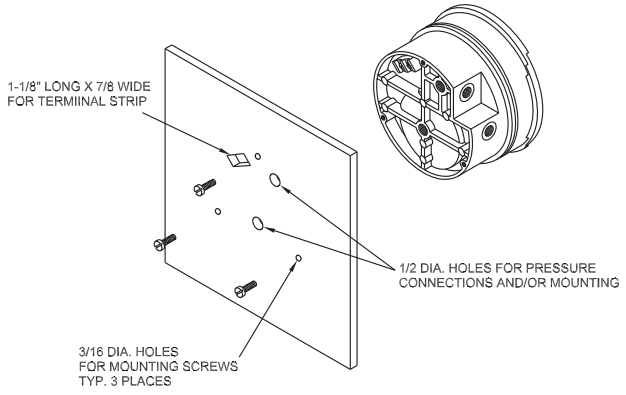
3. **PRESSURE CONNECTIONS:** For convenience, two sets of 1/8″ female NPT ports are available. Plug the unused set with pipe plugs provided. Attach tubing from positive pressure source to port marked “HI” or from negative (Vacuum) source to port marked “LOW”. In either case, opposite port must be vented to atmosphere. In dusty environments, we recommend use of an A-331 Filter Vent Plug to keep interior of instrument clean. For differential pressures the higher source is connected to the “HI” port and lower to the ”LOW” port.



4. **MOUNTING:** The Series 605 Transmitter may be either panel mounted or surface mounted.



A. PANEL MOUNTING: Cut a 4-3/4″ or 120mm dia. hole in panel and insert the complete unit from the front. Slip on the mounting ring and install the split snap ring in the groove on the bezel. Seat the mounting ring against the snap ring and thread the four screws through the tapped holes. Tighten screws against rear of panel.



B. SURFACE MOUNTING: Drill (3) 3/16″ dia. holes for mounting screws and cut (1) 7/8″ x 1-1/8″ hole for access to terminal strip as shown in hole location drawing. Insert screws from rear of panel and thread into tapped holes on back of transmitter case. If rear pressure connections are to be used, make 1/2″ dia. holes located as shown in hole location drawing in left column.

5. **ZEROING:** Once gage/transmitter is mounted in its final position, check to be sure pointer aligns with zero on scale, when no pressure is applied and both low and high pressure ports are vented to atmosphere. To adjust, turn small slotted screw at center-bottom of gage face. **Do not** move the larger black knobs labeled SPAN and ZERO. These are for use only if a calibration check shows the 4-20 mA output signal to need adjustment. See page 3 under heading OUTPUT RANGING.

ELECTRICAL CONNECTIONS

CAUTION: DO NOT EXCEED SPECIFIED SUPPLY VOLTAGE RATINGS. PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT. THIS UNIT IS NOT DESIGNED FOR AC VOLTAGE OPERATION.

Electrical connections to the Series 605 Transmitter are made to the two-screw terminal strip on the rear of the case. Polarity is indicated by + and – signs stamped on side. The schematic diagram of the Series 605 transmitter is illustrated in Figure B.

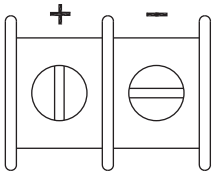


Figure A

An external power supply delivering 10.0 to 35 VDC with a minimum current capability of 40 milliamps must be used to power the control loop in which the Series 605 transmitter is connected. Refer to Fig. B for connection of the power supply, transmitter and receiver. The range of appropriate receiver load resistances (R_L) for the power supply voltage available is given by the formula and graph in Fig. C. Shielded two wire cable is recommended for control loop wiring and the negative side of the loop may be grounded if desired. Note also that the receiver may be connected in either the negative or positive side of the loop, whichever is most convenient. Should polarity of the transmitter or receiver be inadvertently reversed, the loop will not function properly but no damage will be done to the transmitter.

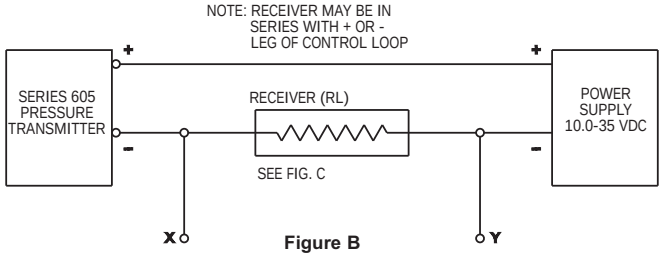


Figure B

The maximum length of connecting wire between the transmitter and the receiver is a function of wire size and receiver resistance. That portion of the total current loop resistance represented by the resistance of the connecting wires themselves should not exceed 10% of the receiver resistance. For extremely long runs (over 1,000 feet), it is desirable to select receivers with higher resistances in order to keep the size and cost of the connecting leads as low as possible. In installations where the connecting run is no more than 100 feet, connecting lead wire as small as No. 22 Ga. can be used.

The Series 605 transmitters can be used with receivers requiring 1-5 volt input rather than 4-20 mA. If the receiver requires a 1-5 volt input, insert a 250 ohm, 1/2 watt resistor in series with the current loop but in parallel with the receiver input. Referring to Figure B, R_L becomes the 250 ohm resistor and point X and Y are connected to the receiver input, point X being positive (+) and point Y negative (–) or ground. The resistor should be connected at the panel end of the transmitter current loop close to the receiver input to take advantage of the immunity of the current loop to electrical noise pickup. Most electronic component distributors stock a 249 r, 1/2 watt, ±1% tolerance metal film resistor which is adequate for this application.

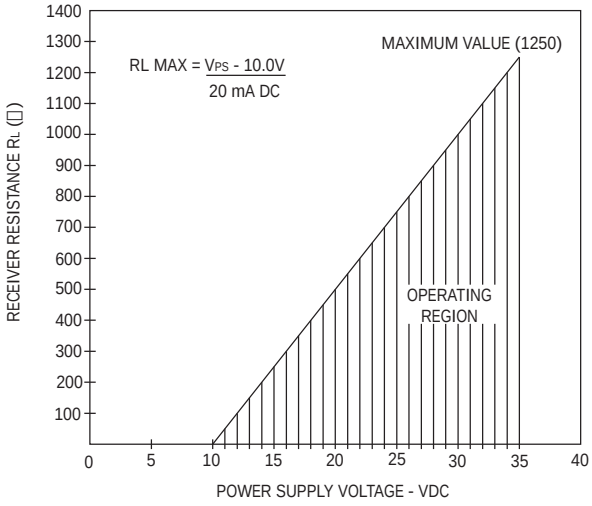


Figure C

OUTPUT RANGING

Each Series 605 Magnehelic® indicating transmitter is factory calibrated to produce 4 mA at zero scale reading and 20 mA at full scale reading. The following procedure should be used if the pressure versus output signal relationship needs to be checked.

1. With unit connected to the companion receiver per preceding instructions, insert an accurate milliammeter with a full scale reading of approximately 30 mA in series with the current loop.

2. Vent both pressure ports to atmosphere and, if necessary, adjust pointer zero screw to align pointer with zero on scale. A controllable pressure source capable of reaching the full scale range should be connected to either high pressure port. Plug the other high pressure port and vent one or both low pressure ports to atmosphere. The instrument must be ranged in the same position in which it will be used. Standard factory calibration and ranging is done with unit vertical.

3. Apply electrical power to the system and check for proper operation by slowly increasing pressure and observing whether the loop current increases above the 4 mA zero pressure reading.

4. A spanner type key is supplied to adjust span and zero. This helps to reduce unauthorized tampering. Apply pressure until pointer aligns with full scale reading and adjust the SPAN knob for a 20 mA reading.

5. Relieve all pressure, allow a few seconds for setting and adjust the ZERO knob for a 4 mA current loop reading.

6. The SPAN and ZERO controls are slightly interactive so steps 4 & 5 should be repeated a few times until readings of 4 and 20 mA are obtained consistently.

7. Remove the milliammeter from the current loop and proceed with final installation of the transmitter and receiver.

MULTIPLE UNITS WITH COMMON POWER SUPPLY

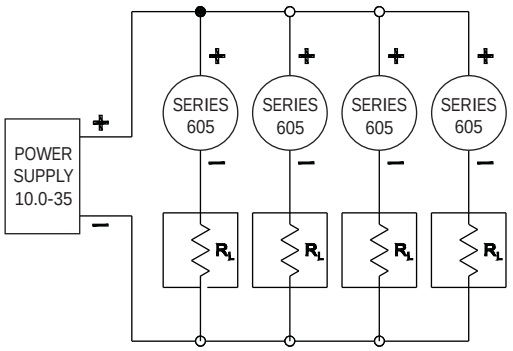


Figure D

Several Series 605 transmitters can be operated with a single power supply as depicted above in Figure D. Be careful to specify a supply with sufficient capacity. The minimum current requirement at a given voltage can be calculated by multiplying the number of units x 20 mA. In the example shown this would be 4 x 20 or 80 mA minimum.

MAINTENANCE

Upon final installation of the Series 605 Transmitter and the companion receiver, including the A-701 Digital Readout, no routine maintenance is required. A periodic check of system calibration is recommended. The Series 605 Differential Pressure Transmitter is not field repairable and should be returned, freight prepaid, to the factory if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization (RGA) number before shipping.

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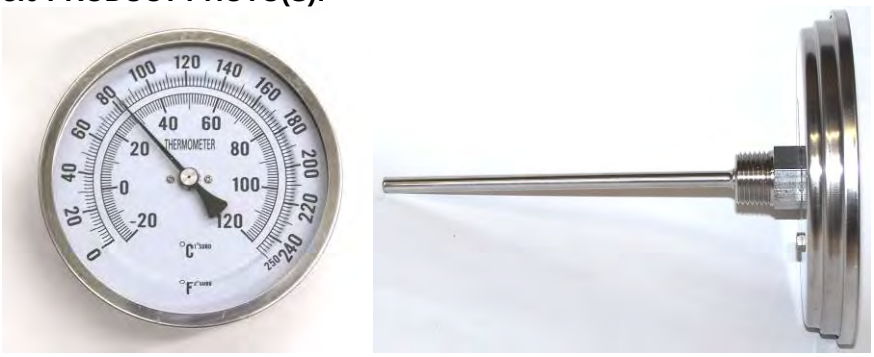
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GRAINGER® FOR THE ONES WHO GET IT DONE GRAINGER INTERNATIONAL, INC. GLOBAL SOURCING DIVISION	-- GGS TECHNICAL SPECIFICATION --			
	SPECIFICATION NUMBER: 1NFY4_TSRev1.doc	AUTHOR: Hoskinson	TITLE: ENG	REL. DATE: 5/25/07
	GGS MODEL NUMBER(s): 1NFY4	DESCRIPTION: Industrial thermometer	REVISION #: 1	REV. DATE: 8/10/07

1.0 BRAND:	No brand
2.0 PRODUCT DESCRIPTION:	Bimetal Industrial Thermometer

3.0 PRODUCT PHOTO(S):



4.0 PRODUCT REQUIREMENTS:

4.1 Features & Performance	Requirement
Temperature scale(s)	°F: 0 to 250 °C: -20 to 120
Connection location/type	Back; 1/2 inch NPT
Dial size (inches)	3
Stem length (inches)	2 1/2
Stem diameter (inches)	1/4 In
Rotated degrees	N/A
Angled degrees	N/A
Full scale accuracy	≤40°F: ±1.5% 41 to 200°F: ±1% ≥201°F: ±1.5%
Calibration	External Adjustment

4.2 Materials & Construction	Requirement
Case	Stainless Steel Hermetically Sealed to Prevent Icing/Fogging Inside
Stem	Stainless Steel
Coil dampening	Silicone for Superior Time Response and Vibration Dampening
Dial face	Glass

4.3 Finish / Color	Requirement
All Surface Finishes	a) Surface finishes must be uniform and continuous. The surface finish must not exhibit any visual defects such as blisters, rust, corrosion, scratches, peeling, bubbles, and/or cracking. b) All exposed surfaces must be free of burrs and sharp edges. c) All applied finishes must adhere to the surface and show no signs of delamination or peeling.
Finish	Stainless Steel

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This specification is based on the manufacturers design and is to be used as a Quality Control document.

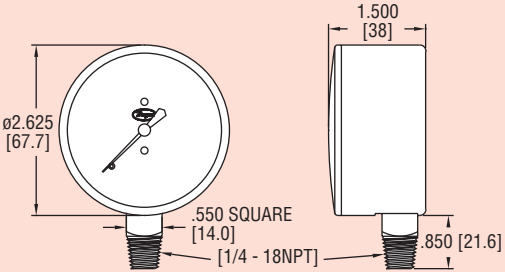
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Series LPG4

2.5″ Low Pressure Gage

1.5% Full-Scale Accuracy in a 2-1/2″ Gage





Our **Series LPG4** gages offer top of the line performance and accuracy for pressure and vacuum applications up to and including 160 in w.c. The LPG4 is constructed from a single beryllium-copper diaphragm affixed to a precision-machined brass plate. This innovative design, together with a high-precision, milled-teeth brass movement and nickel-silver pinion and bearing surface, provide the user with a top of the line low pressure instrument.

SPECIFICATIONS

Service: Compatible gases & liquids.
Wetted Materials: Brass and beryllium copper.
Housing: Drawn steel, black finish.
Lens: Polycarbonate (removable).
Accuracy: ±1.5% full-scale.
Pressure Limit: 100% of range scale.

Temperature Limits:
Process: -40 to 160°F (-40 to 70°C);
Ambient: -40 to 140°F (-40 to 60°C).
Size: 2.5″ (63 mm).
Process Connections: 1/4″ male NPT.
Enclosure Rating: NEMA 3 (IP54).
Weight: 7.3 oz (0.21 kg).

Model	Range
LPG4-D7122N	-10-0 in w.c. (-2.5-0 kPa)
LPG4-D7222N	-16-0 in w.c. (-4-0 kPa)
LPG4-D7322N	-25-0 in w.c. (-6-0 kPa)
LPG4-D7422N	-40-0 in w.c. (-10-0 kPa)
LPG4-D7522N	-60-0 in w.c. (-15-0 kPa)
LPG4-D7622N	-80-0 in w.c. (-20-0 kPa)
LPG4-D7722N	-100-0 in w.c. (-25-0 kPa)
LPG4-D7822N	-160-0 in w.c. (-40-0 kPa)
LPG4-D7922N	-235-0 in w.c. (-60-0 kPa)
LPG4-D8022N	0-10 in w.c. (0-2.5 kPa)
LPG4-D8122N	0-15 in w.c. (0-3.75 kPa)
LPG4-D8222N	0-25 in w.c. (0-6 kPa)

Model	Range
LPG4-D8322N	0-40 in w.c. (0-10 kPa)
LPG4-D8422N	0-60 in w.c. (0-15 kPa)
LPG4-D8522N	0-80 in w.c. (0-20 kPa)
LPG4-D8622N	0-100 in w.c. (0-25 kPa)
LPG4-D8722N	0-160 in w.c. (0-40 kPa)
LPG4-D8922N	-4-0-6 in w.c. (-1-0-1.5 kPa)
LPG4-D9022N	-6-0-10 in w.c. (-1.5-0-2.5 kPa)
LPG4-D9122N	-8-0-16 in w.c. (-2-0-4 kPa)
LPG4-D9222N	-16-0-24 in w.c. (-4-0-6 kPa)
LPG4-D9322N	-24-0-40 in w.c. (-6-0-10 kPa)
LPG4-D9422N	-30-0-50 in w.c. (-7.5-0-14.5 kPa)
LPG4-D9522N	-40-0-60 in w.c. (-10-0-0.15 kPa)

OPTION

For NIST traceable calibration certificate, use order code NISTCAL-PG1.



54 Series Temperature Switches

Types
B54, B54S, C54, C54S, C54A, C54AS, E54, E54S, F54, F54S

UNITED ELECTRIC CONTROLS

Installation and Maintenance Instructions

Please read all instructional literature carefully and thoroughly before starting. Refer to the final page for the listing of Recommended Practices, Liabilities and Warranties.

GENERAL

Type B54, B54S, C54, C54S, C54A, C54AS (Immersion Stem)
Temperature variations are sensed by a liquid filled sensor which expands or contracts against a bellows which actuates a snap-action switch at a predetermined set point.

Type E54, E54S, F54, F54S (Bulb & Capillary)
Temperature variations of a liquid filled sensing bulb are hydraulically transmitted to a diaphragm which actuates a snap-acting switch at a predetermined set point.

MAXIMUM TEMPERATURE* STATED IN LITERATURE AND ON NAMEPLATE MUST NEVER BE EXCEEDED, EVEN BY SURGES IN THE SYSTEM. OCCASIONAL OPERATION OF UNIT UP TO MAX. TEMPERATURE IS ACCEPTABLE (E.G., START-UP, TESTING). CONTINUOUS OPERATION SHOULD BE RESTRICTED TO THE DESIGNATED ADJUSTABLE RANGE.

*Maximum Temperature - the highest temperature to which a sensing element may be occasionally operated at, without adversely affecting set point calibration and repeatability.

THIS PRODUCT DOES NOT HAVE FIELD REPLACEABLE PARTS.

Please refer to product bulletin for product specifications. Product bulletins may be found at www.ueonline.com.

Part I - Installation

Tools Needed
Screwdriver
Adjustable wrench

MOUNTING

INSTALL UNIT WHERE SHOCK, VIBRATION AND TEMPERATURE FLUCTUATIONS ARE MINIMAL. DO NOT MOUNT UNIT IN AMBIENT TEMPERATURES EXCEEDING PUBLISHED LIMITS. 54 SERIES TEMPERATURE SWITCHES CAN BE MOUNTED IN ANY POSITION, PROVIDED THE ELECTRICAL CONDUIT IS NOT FACING UP. ORIENT UNIT SO THAT MOISTURE IS PREVENTED FROM ENTERING THE ENCLOSURE*.

Remove Cover (Enclosed version only). Cover is held on by one captive screw located on the front of the cover.

54 Series temperature switches can be mounted in any position by using either the Mounting Screw holes on the bracket or the NPT connector on the immersion stem (local mounted only). Optional union connectors or separable well kits are available for remote bulb types.

A 7/8" diameter hole has been provided in the bracket plate for mounting a standard conduit fitting.

FOR LOCAL MOUNTING, ALWAYS HOLD A WRENCH ON THE TEMPERATURE HOUSING HEX WHEN MOUNTING UNIT. DO NOT TIGHTEN BY TURNING ENCLOSURE. THIS WILL DAMAGE SENSOR AND WEAKEN SOLDERED OR WELDED JOINTS.

For remote mounting, fully immerse the bulb and 6" of capillary in the control zone. It is generally desirable to place the bulb close to the heating or cooling source in order to sense temperature fluctuations quickly. Be sure to locate the bulb so that it will not be exposed to temperatures beyond the instrument range limits.

WIRING

DISCONNECT ALL SUPPLY CIRCUITS BEFORE WIRING UNIT. ELECTRICAL RATINGS STATED IN LITERATURE AND ON NAMEPLATE MUST NOT BE EXCEEDED. OVERLOAD ON A SWITCH CAN CAUSE FAILURE ON THE FIRST CYCLE. WIRE UNITS ACCORDING TO NATIONAL AND LOCAL ELECTRICAL CODES. MAXIMUM RECOMMENDED WIRE SIZE IS #14 AWG.

Conduit Connection (Enclosed units only)

FOR ENCLOSED UNITS, CONNECT THE CONDUIT TO THE HOLE IN ACCORDANCE WITH NATIONAL AND LOCAL CODES. BRING WIRES UP TO THE TERMINALS FROM THE REAR. MAXIMUM RECOMMENDED WIRE SIZE - #14 AWG.

Part II - Adjustments

Tools Needed
1/4" Open-ended wrench
1/16" Allen wrench
(single switch calibrated units)

MAKE SURE THAT LIVE ELECTRICAL SUPPLIES TO THE TEMPERATURE SWITCH ARE DISCONNECTED BEFORE PERFORMING ANY DISASSEMBLY. THIS MAY REQUIRE DISCONNECTING MORE THAN ONE CIRCUIT.

Dual Switch Units (C54A, C54AS)

ON DUAL SWITCH UNITS, "LOW SET" SWITCH MUST ALWAYS BE SET EQUAL OR BELOW THE "HIGH SET" SWITCH.

* If applicable

High Set

Immerse the sensing portion of the unit in a calibrated temperature bath or other calibrated source at the desired "Hi Set" temperature. Allow 5 minutes for the thermal system to stabilize. Using a 1/4" open end wrench, slowly turn the main adjustment screw towards the right (counter-clockwise) until the "Hi Set" switch transfers. If switch does not transfer, turn the main adjustment screw towards the left (clockwise) until the switch transfers, and then towards the right until it transfers again. The "Hi Set" switch should now transfer on "temperature rise" at the bath temperature. If it is desired that the switch transfer on "temperature fall" at the bath temperature, turn the main adjustment screw towards the left until the switch transfers again.

Low Set

Lower the temperature of the calibrated bath (or use another bath) to the desired "Low Set" temperature, and allow 5 minutes for the thermal system to stabilize. Using a 1/4" open end wrench, slowly turn the low set adjustment screw towards the left until the switch transfers. If switch does not transfer, turn the low set adjustment screw towards the right until the switch transfers, and then towards the left until it transfers again. The "Low Set" switch is now set to actuate at the bath temperature on "temperature fall". If it is desired that the "Low Set" switch transfer on "temperature rise" at the bath temperature, turn the low set adjustment screw towards the right until the switch transfers.

Fine Adjustment

If it is necessary to "fine adjust" the "High Set" setting, raise the bath temperature to a value slightly higher than the "High Set" temperature. Note the temperature at which the switch transfers (on rise). Lower the bath temperature and note when switch transfers again (on fall). Turn the main adjustment screw towards the left to raise or towards the right to lower the settings.

If necessary, perform the same "fine adjustment" procedure outlined above for the "Low Set" switch.

Single Switch Units

Uncalibrated (C54, C54S, F54, F54S)

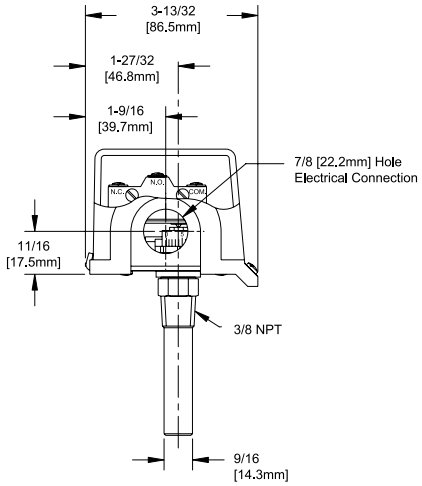
To adjust single switch units, follow "High Set" instructions. For "fine adjustment", follow Fine Adjustments above.

Calibrated (B54, B54S, E54, E54S)

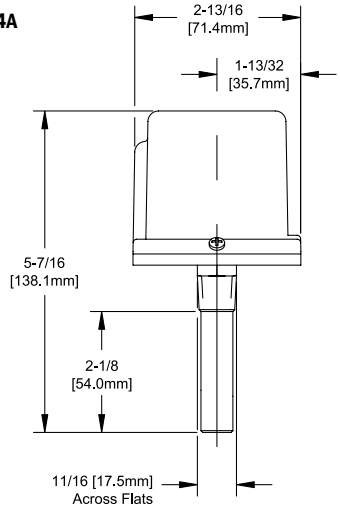
Turn the reference dial to desired set point by aligning setting on dial with dowel pin.

Dimensions

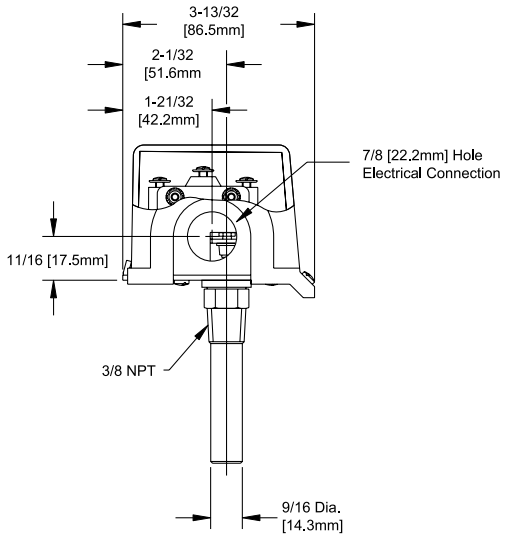
Types B54, C54



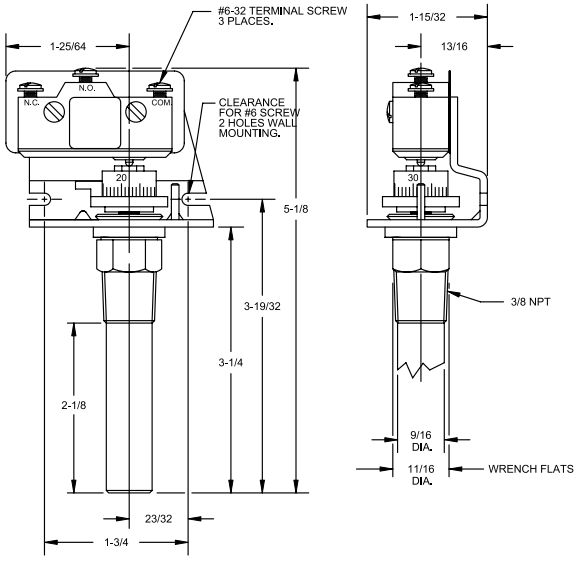
Types B54, C54, C54A



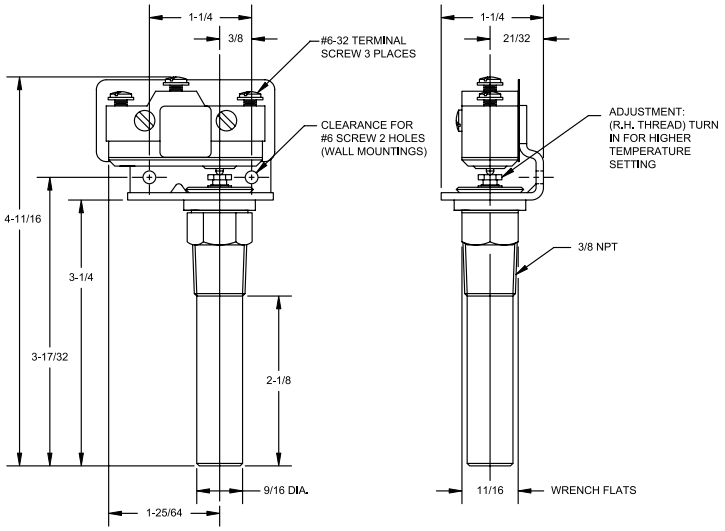
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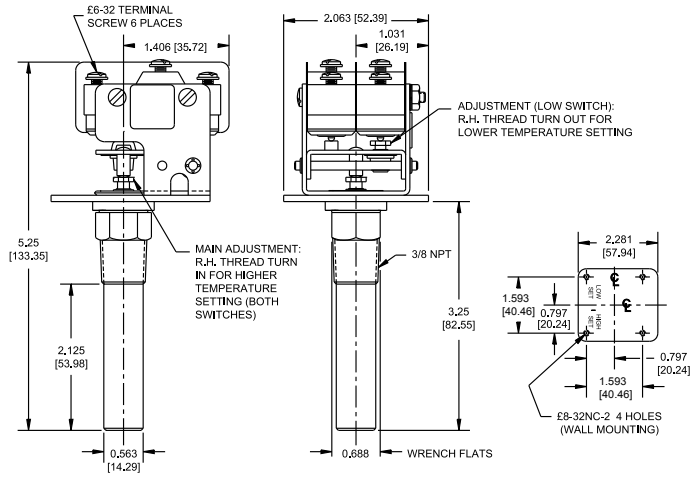
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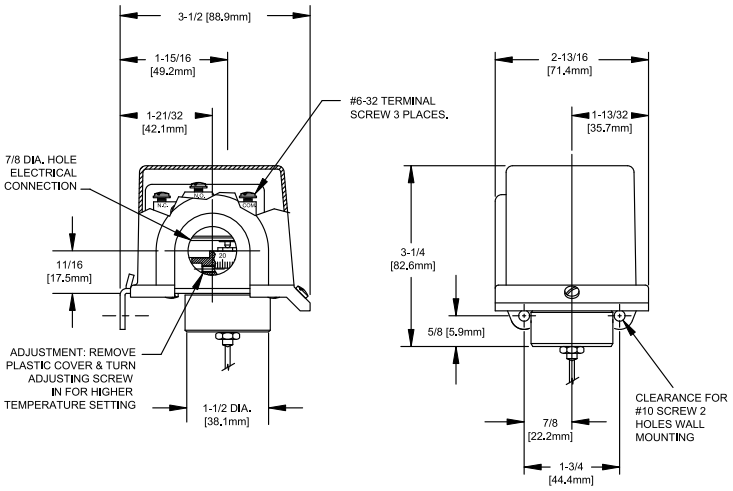
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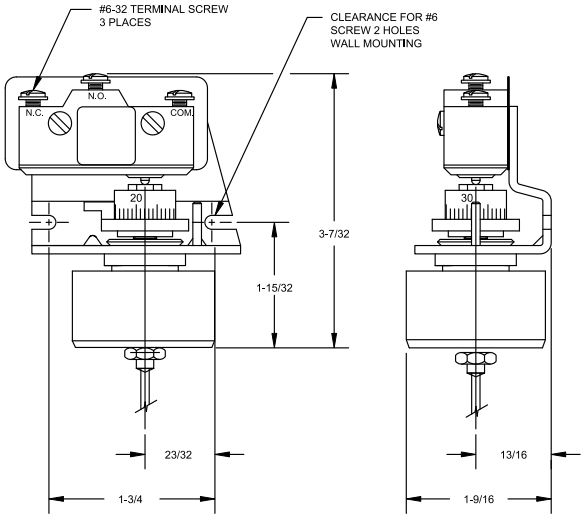
Type C54AS



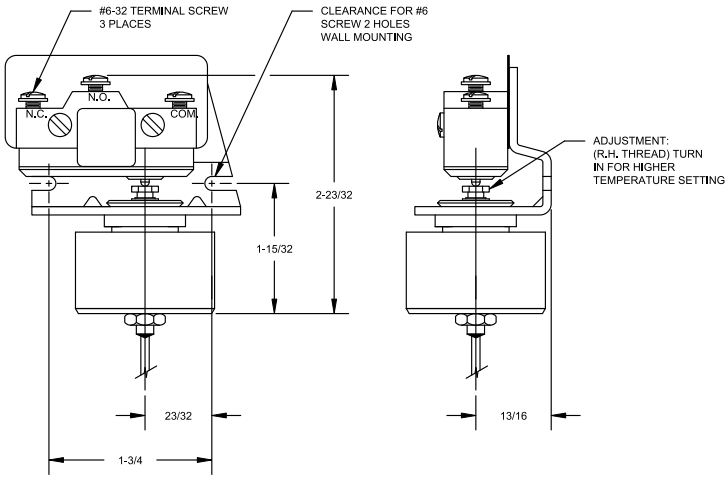
Types E54, F54



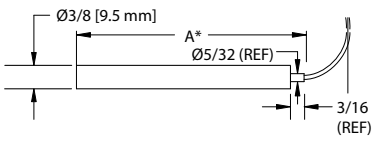
Type E54S



Type F54S



Remote Bulb



* USE DIMENSION "A" FOR SEPERABLE WELL INSTALLATIONS.

Bulb Size		
	Dimension "A"	
Models	Inches	mm
E54 & F54		
D20BC, D20BS, D22BC, D22BS	4.50	114.3
D21BC, D21BS	6.86	174.6
D23BC, D23BS	3.63	92.1
E54S & F54S		
D21BC, D21BS	6.86	174.6
D22BC, D22BS	4.50	114.3
D23BC, D23BS	3.63	92.1

RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF SELLER'S LIABILITY

Seller's liability to Buyer for any loss or claim, including liability incurred in connection with (i) breach of any warranty whatsoever, expressed or implied, (ii) a breach of contract, (iii) a negligent act or acts (or negligent failure to act) committed by Seller, or (iv) an act for which strict liability will be inputted to seller, is limited to the "limited warranty" of repair and/or replacement as so stated in our warranty of product. In no event shall the Seller be liable for any special, indirect, consequential or other damages of a like general nature, including, without limitation, loss of profits or production, or loss or expenses of any nature incurred by the buyer or any third party.

UE specifications subject to change without notice.

UNITED ELECTRIC CONTROLS

180 Dexter Avenue, P.O. Box 9143
Watertown, MA 02471-9143 USA
Telephone: 617 926-1000 Fax: 617 926-2568
http://www.ueonline.com

SECTION 6 - ELECTRICAL DRAWINGS & TABLE(S)

T-2, INTERLOCK TABLE

I-1, CONTROL PANEL LAYOUT DRAWING

T-3, CONTROL PANEL BOM

I-2, WIRING DIAGRAMS & TERMINAL DETAILS

E-1, LINE DIAGRAM

T-4, VFD SETTINGS TABLE

TABLE 2

INTERLOCK SCHEDULE
NES 15-152, REVISION A (OCTOBER 2015) BY: EMB CHK: EJ
SSDS SYSTEM
AECOM / FORMER OZONE INDUSTRIES SITE
QUEENS, NY

Interlock	Interlock ID	Interlock Description	B-2, SSDS Blower	OPERATOR INTERFACE	Adjustable Set Point (EOS)	Alarm Notification (Local Panel Display)	Manual Reset (Warning / Alarm)	Remote Alarm Notification	Alarm Log	Data Log (10 Minutes)	INSTRUMENT TYPE	NES FACTORY TEST SET POINT
		Emergency Stop	O			Y		Y	Y			
1		No alarms present	I									
2	LSHH-211	Moisture Separator (D-1) High-High Level Switch	O			Y	Y	Y	Y		D	
3	PT-207	SSDS (B-2) Inlet Vacuum								Y	A	
4	VSL-207	SSDS (B-2) Low Vacuum				Y	Y	Y	Y		D	2.2" wc(V)
5	DPT-210	SSDS (B-2) Inlet Flow								Y	A	
6	DPTL-210	SSDS (B-2) Low Flow			Y	Y	Y	Y	Y		L	1" wc
7	DPT-219	SSDS (B-2) Discharge Flow								Y	A	
8	TS-222	SSDS (B-2) High Discharge Temperature	O			Y	Y	Y	Y		D	120 F
9	VFD Fault	VFD Fault Alarm	O			Y		Y	Y		D	
10		Main Power Failure	O			Y		Y	Y		D	

Note:

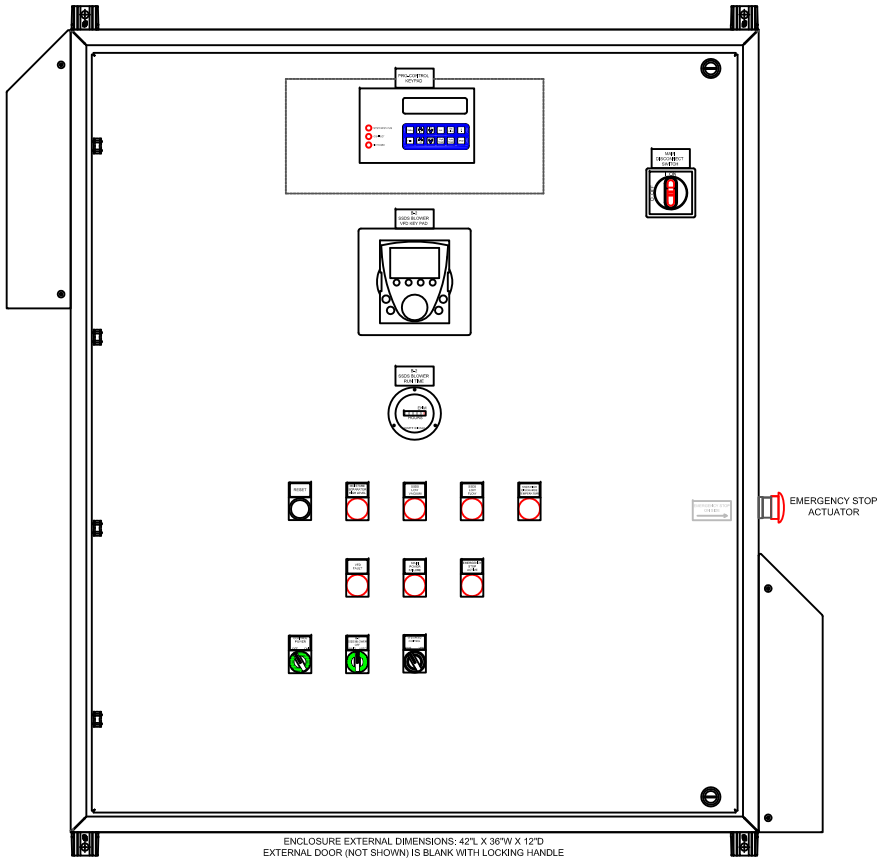
O - Off
I - On
I/O - On / Off Control
P- Proportional Control

Y - Yes

A - Analog
D - Digital
L - Internal Logic

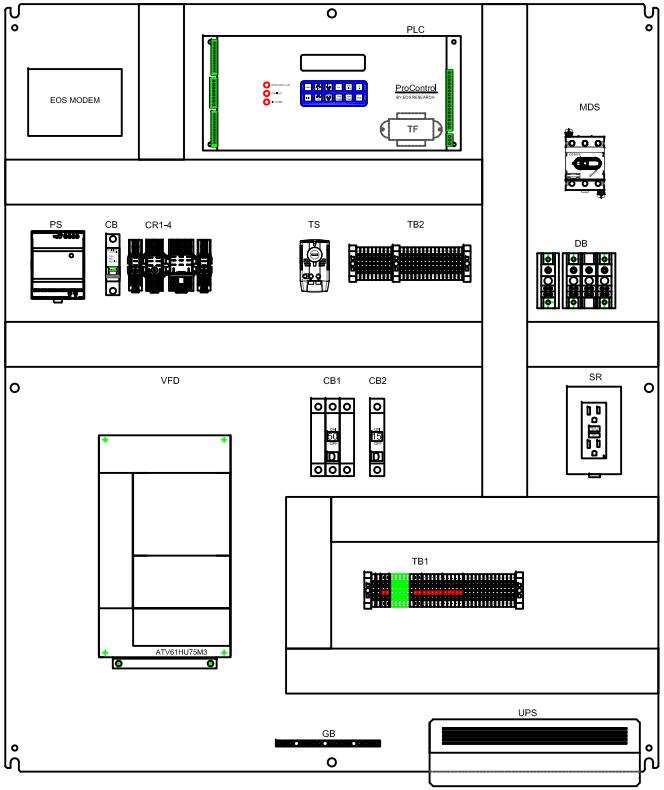
RapidTech LLC d/b/a National Environmental Systems
84 Dunham Street - Attleboro, MA 02703
Phone: (508)226-1100; Fax: (508)226-1180; Email: Info@nes-inc.biz

PANEL EXTERIOR



ENCLOSURE EXTERNAL DIMENSIONS: 42"L X 36"W X 12"D
EXTERNAL DOOR (NOT SHOWN) IS BLANK WITH LOCKING HANDLE

PANEL INTERIOR



LEGEND -

CB	- CIRCUIT BREAKER
CR	- CONTROL RELAY
DB	- DISTRIBUTION BLOCK(S)
GB	- GROUND BAR
MDS	- MAIN DISCONNECT SWITCH
PLC	- PROGRAMABLE LOGIC CONTROLLER
PS	- POWER SUPPLY
SR	- SERVICE RECETACLE
TB	- TERMINAL BLOCK
TF	- TRANSFORMER (FOR EOS)
TS	- TEMPERATURE SWITCH
UPS	- UNINTERRUPT. POWER SUPPLY
VFD	- VARIABLE FREQUENCY DRIVE

NOTES

1) REFER TO TABLE 3 FOR BILL OF MATERIALS.
2) LOCAL CONTROL PANEL HAS AN EMERGENCY STOP BUTTON INSTALLED ON ENCLOSURE
3) DEAD FRONT ENCLOSURE DOOR NOT SHOWN FOR DRAWING CLARITY
4) LOCAL CONTROL PANEL IS UL 508A LISTED.
5) EOS STOOD OF BACK PANEL FOR KEYPAD ACCESS THROUGH SWING PANEL.
6) OPERATOR DETAILS ON SHEET 2 OF 2
7) GROUND IN ACCORDANCE WITH N.E.C. ARTICLE 250.122 & LOCAL AUTHORITY HAVING JURISDICTION

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	10-08-15	EMB

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DATE	06-25-15
CHK BY	
DATE	
APPR BY	
DATE	

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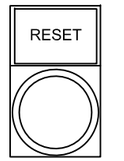
TITLE: CONTROL PANEL
INTERIOR / EXTERIOR LAYOUT DRAWING

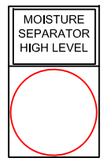
AECOM - SSD SYSTEM
FORMER OZONE INDUSTRIES SITE QUEENS, NY

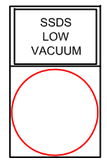
JOB NO. 15-152 (SSDS)

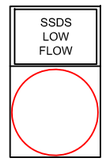
SCALE	SIZE	DWG NO.	SHEET	REV
NTS	C	I-1	1 OF 2	A

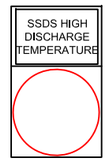
OPERATOR DETAILS





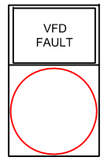


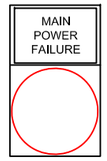


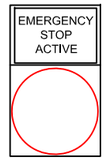


B-2
SSDS BLOWER
RUN TIME

PRO-CONTROL
KEYPAD





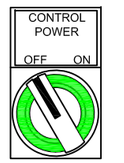


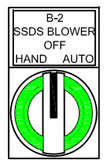
EMERGENCY STOP
ON SIDE

MAIN
DISCONNECT
SWITCH

EMERGENCY STOP
PUSH TO STOP
TWIST TO START

B-2
SSDS BLOWER
VFD KEY PAD







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REV	DESCRIPTION	DATE	APPROVED
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DATE	
APPR BY	
DATE	

TITLE: OPERATOR DETAILS

AECOM - SSD SYSTEM
FORMER OZONE INDUSTRIES SITE QUEENS, NY

JOB NO. 15-152 (SSDS)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	I-1	2 OF 2	A

TABLE 3
PANEL BILL OF MATERIALS

REVISION A OCTOBER 9, 2015

15-152 SSD SYSTEM - FORMER OZONE INDUSTRIES - OZONE PARK, NY

TAG	QUANTITY	ITEM	MODEL	MANUFACTURER
		SECTION 7 - CONTROL COMPONENTS		
ENCL	1	ENCLOSURE NEMA4 42 X 36 X 12 - MILD STEEL/GRAY W/ LOCKING HANDLE	EN4SD423612GY	HAMMOND
ENCL	1	BACK-PANEL 42 X 36 MILD STEEL/WHT	EP4236	HAMMOND
ENCL	1	SWING-PANEL 42 x 36 MILD STEEL/WHT	ESP4236	HAMMOND
VF	2	VENT FAN 6 IN RAIN HOOD NEMA 3R	RH40000GY	HAMMOND
ENCL	1	MOUNTING FEET SET OF 4 - ZINC PLATED	EZPMFHD	HAMMOND
VF	1	VENT FAN 210CFM 115VAC 6 IN	FAN150AC115	HAMMOND
VF	1	VENT FAN ADJ. 30-140F BI-METAL TEMP SWITCH N.O.	SKT011419NO	HAMMOND
VF	1	VENT FAN FINGER GUARD 6 IN	FAN150FG	HAMMOND
VF	2	VENT FAN 6 IN RAIN HOOD GRILL & SOLID COVER KIT	RHA40000G	HAMMOND
VF	1	VENT FAN POWER CORD 24 INCH	DNMFC	HAMMOND
MDS	1	NON-FUSED THROUGH DOOR DISCONNECT 3-PHASE 80 AMP	OT80F3	ABB
MDS	1	NON-FUSED THROUGH DOOR DISCONNECT SHAFT 13 IN	OXS6X330	ABB
MDS	1	NON-FUSED THROUGH DOOR DISCONNECT HANDLE NEMA3R	OHBS2AJ	ABB
PLC	1	PROCONTROL PLC 24DI,16AI,30DO,8A	A2	EOS
WM	1	PROCONTROL CELL MODEM W/ 80FT ANTENNA CABLE	CELL MODEM	EOS
UPS	1	UPS, 350VA, 200W, 120V, 1PH, 3 UPS & SURGE OUTLET 3 SURGE ONLY	BE350G	APC
VFD	1	VFD 10 HP 208/230V 33 A 3-PHASE NEMA1	ATV61HU75M3	SQUARE D
VFD	1	VFD KEYPAD REMOTE MOUNT KIT	VW3A1102	SQUARE D
VFD	1	RJ45-RJ45 CABLE FOR REMOTE LCD KYPD 3 Meters	VW3A1104R30	SQUARE D
HM	1	QUARTZ DRIVE ANALOG HOUR METER 2.8IN DIAMETER BEZEL 115VAC	T50B212	ENM
CR	2	RELAY 120V 1PDT W/LIGHT BLADE PARALLEL	RH1B-UL-AC120V	IDEC
CR	2	SOCKET DIN RAIL/SURFACE 5-BLADE FOR RH1B	SH1B-05	IDEC
CR	1	RELAY 120V 2PDT W/LIGHT BLADE PARALLEL	RH2B-UL-AC120V	IDEC
CR	1	SOCKET DIN RAIL/SURFACE 5-BLADE FOR RH2B	SH2B-05	IDEC
CR	1	RELAY 3PDT 120VAC W/INDICATOR LIGHT	RH3B-UL-AC120V	IDEC
CR	1	SOCKET DIN RAIL/SURFACE 11-BLADE FOR RH3B	SH3B-05	IDEC
PS	1	POWER SUPPLY 24VDC 2.5A	PSC-24-060	ADI
CB	1	CIRCUIT BREAKER 6A 1-POLE 120/240 VAC	MG24430	SQUARE D
CB	1	CIRCUIT BREAKER 50 AMPS 3-POLE 208/240 VAC	QOU350	SQUARE D
CB	1	CIRCUIT BREAKER 15 AMP 1-POLE 120/240VAC	QOU115	SQUARE D
RECP	1	DUPLEX GFCI RECEPTACLE 125 VAC 15 AMP 2-POLE NEMA 5-15R	1595-TRWRW	LEGRAND
RECP	1	1-GANG WEATHERPROOF RECEPT. BOX	IHD3- 1	RED DOT
ESTOP	1	MUSHROOM SWITCH NON-ILLUM RED TRIGGER ACTION - TURN TO RELEASE	ZB5AS844	SQUARE D
PB	1	PUSH BUTTON OPERATOR NON-ILLUM BLACK	ZB5AA2	SQUARE D
LT	7	PILOT LIGHT HEAD RED LED	ZB5AV043	SQUARE D
PB	4	CONTACT BLOCK 1-N.O. SCREW CLAMP	ZBE101	SQUARE D
PB	2	CONTACT BLOCK 1-N.C. SCREW CLAMP	ZBE102	SQUARE D
LT	6	RED LED W/LATCH MODULE 24 V	ZB5AVB4	SQUARE D
SW	1	MOUNTING BASE,120V RED PROTECTED LED	ZB5AVG4	SQUARE D
SW	1	2 POS SELECTOR SWITCH ILLUM. GREEN MAINTAINED	ZB5AK1233	SQUARE D
SW	1	2 POS SELECTOR SWITCH NON-ILLUM. BLACK MAINTAINED	ZB5AD2	SQUARE D
SW	1	3 POS SELECTOR SWITCH ILLUM. GREEN MOMENTARY	ZB5AK1733	SQUARE D
SW	2	MOUNTING BASE 120V GREEN PROTECTED LED	ZB5AVG3	SQUARE D
PB	3	MOUNTING COLLAR LATCH	ZB5AZ009	SQUARE D
TB	55	TERMINAL BLOCK SCREW CLAMP 20 AMP 600 V GRAY	NSYTRV22	SQUARE D
TB	9	TERMINAL BLOCK END BARRIERS GRAY	NSYTRAC22	SQUARE D
TB	4	TERMINAL BLOCK END ANCHORS	NSYTRAABV35	SQUARE D
TB	5	TERMINAL BLOCK GROUND SCREW CLAMP 20 AMP 600 V GREEN	NSYTRV22PE	SQUARE D
PB	11	LEGEND PLATE HOLDER	ZBZ33	SQUARE D
PB	11	LEGEND PLATE LARGE BLACK/RED	ZBY5101	SQUARE D
DB	1	POWER DISTRIBUTION BLOCK 175 AMP 3-POLE 600 VAC	9080-LBA362104	SQUARE D
DB	1	COVER DISTRIBUTION BLOCK 3-POLE	9080-LB23	SQUARE D
DB	1	DISTRIBUTION BLOCK 175 AMP 1-POLE 600 VAC	9080-LBA162104	SQUARE D
DB	1	COVER DISTRIBUTION BLOCK 1-POLE	9080-LB21	SQUARE D
GB	1	LOAD CENTER GROUND BAR 15 TERMINALS	PK15GTA	SQUARE D

EOS BOTTOM ROWS

PROCONTROL
TYPE A2
16DI,16AI,22DO

RS232 SERIAL JACK RJ45

TELEPHONE JACK RJ11

RESET — 1 — 31 — 1

EMERGENCY STOP ACTIVE — CR3C 12/8 — 32 — 2

M/S TANK HIGH LEVEL SWITCH — LSHH-211 — 3 — 33 — 3

DISCHARGE HIGH TEMPERATURE SWITCH — TSH-222 — 4 — 34 — 4

VFD RUN SIGNAL — CR2B 12/8 — 35 — 5

VFD FAULT SIGNAL — VFD R1C/R1B — 6 — 36 — 6

MAIN POWER FAILURE SIGNAL — CR4A 9/5 — 37 — 7

INLET VACUUM SWITCH — VSL-207 — 8 — 38 — 8

SPARE — 9 — 39 — 9

SPARE — 10 — 40 — 10

SPARE — 11 — 41 — 11

SPARE — 12 — 42 — 12

DISCRETE INPUTS

DISCRETE OUTPUTS (RELAY)

CM2

CM1

39 — 15 — R (X1/X2) — VFD FAULT

38 — 14 — R (X1/X2) — MAIN POWER FAILURE

37 — 13 — R (X1/X2) — SSDS HIGH DISCHARGE TEMPERATURE

36 — 12 — R (X1/X2) — SSDS LOW FLOW

35 — 11 — R (X1/X2) — SSDS LOW VACUUM

34 — 10 — R (X1/X2) — MOISTURE SEPARATOR HIGH SUMP LEVEL

33 — 9 — H/O/A — 9A — CR1 14/13 — B-2 SSDS BLOWER

CM1 — 23 — CR3A 9/5 — 28 (+A) — 29 (A-)

24VDC PWR SUPPLY (L / N)

EOS PWR SUPPLY (L / N)

GND

(10 VAC) INPUT POWER — AC — AC

CR2A 9/5 — 7 — HM / G (X1/X2) — B-2 SSDS BLOWER RUNNING

CR3B 10/2 — 6 — R (X1/X2) — EMERGENCY STOP ACTIVE

E-STOP ON PANEL — 5 — CR3 14/13 — EMERGENCY STOP RELAY

3 — G (X1/X2) — CONTROL POWER

OFF / ON — 2 — 4 — FAN — COOLING FAN

L2 — UPS (L / N) — N2

RECEPTACLE

1 — CR4 14/13 — POWER FAILURE RELAY

CB 6 AMP

120 VAC — L1 — N1

29

G
G
G
G
G
G
G
DP99

SIGNAL GROUNDS

INLET VACUUM TRANSMITTER — PT-207 — 17 — 47 — 17

INLET FLOW TRANSMITTER — DPT-210 — 18 — 48 — 18

DISCHARGE FLOW TRANSMITTER — DPT-219 — 19 — 49 — 19

VFD HERTZ — VFD COM/AO1 — 20 — 50 — 20

SPARE — 21 — 51 — 21

SPARE — 22 — 52 — 22

SPARE — 23 — 53 — 23

SPARE — 24 — 54 — 24

ANALOG INPUTS

28

+24V
+24V
+24V CELL
+9V

POWER SUPPLY (OUTPUT)

EOS MODEM POWER — EOS MODEM (- / +)

- A — 24 VDC — + A

SERIAL #: 9845

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REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	10-08-15	EMB

REVISIONS

DRWN BY	EMB	DATE	06-26-15
CHK BY		DATE	
APPR BY	--	DATE	--

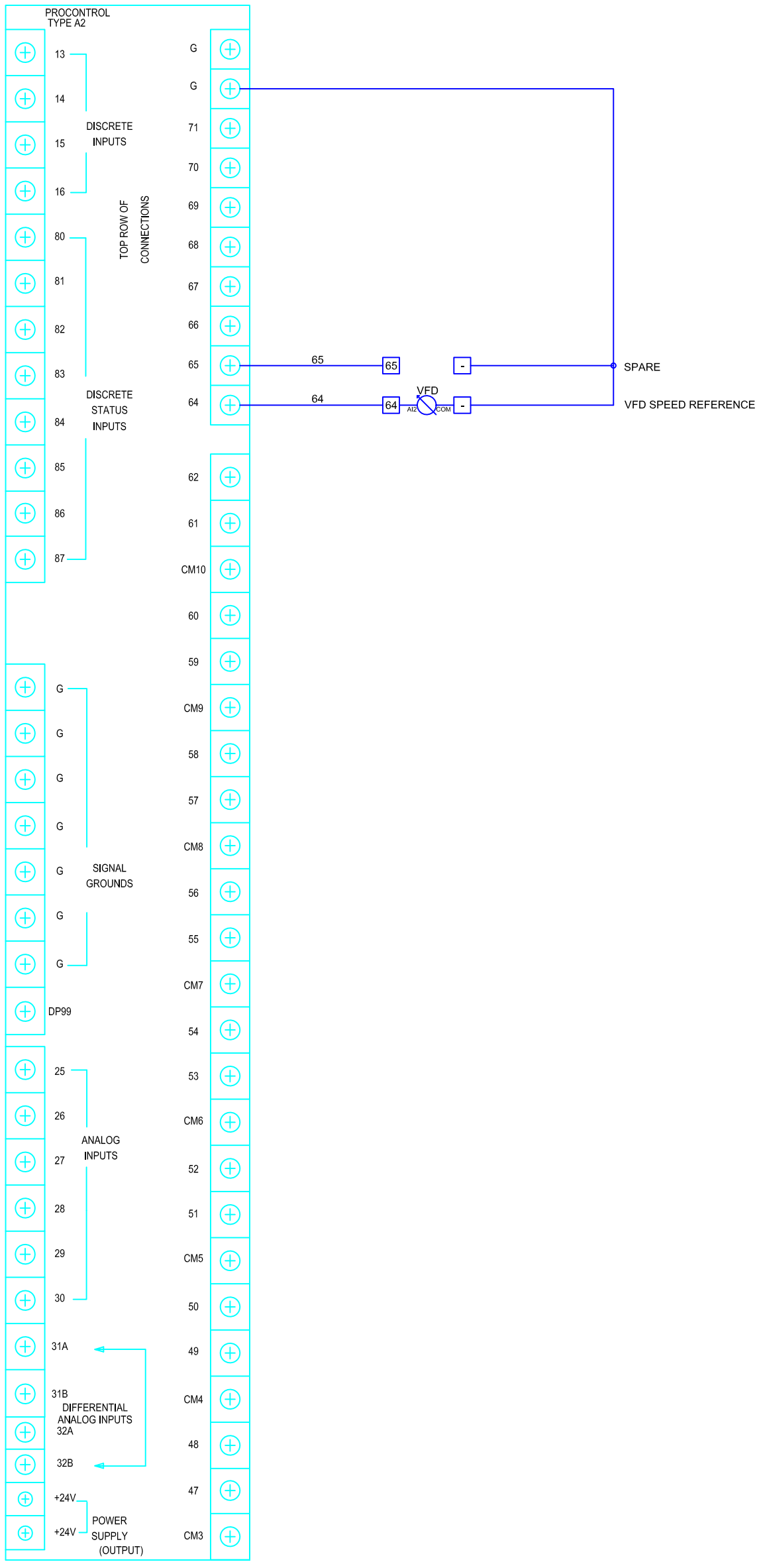
TITLE: PLC WIRING DIAGRAM

AECOM - SSD SYSTEM
FORMER OZONE INDUSTRIES SITE QUEENS, NY

JOB NO. 15-152 (SSDS)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	I-2	1 OF 3	A

EOS TOP ROW



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REV	DESCRIPTION	DATE	APPROVED
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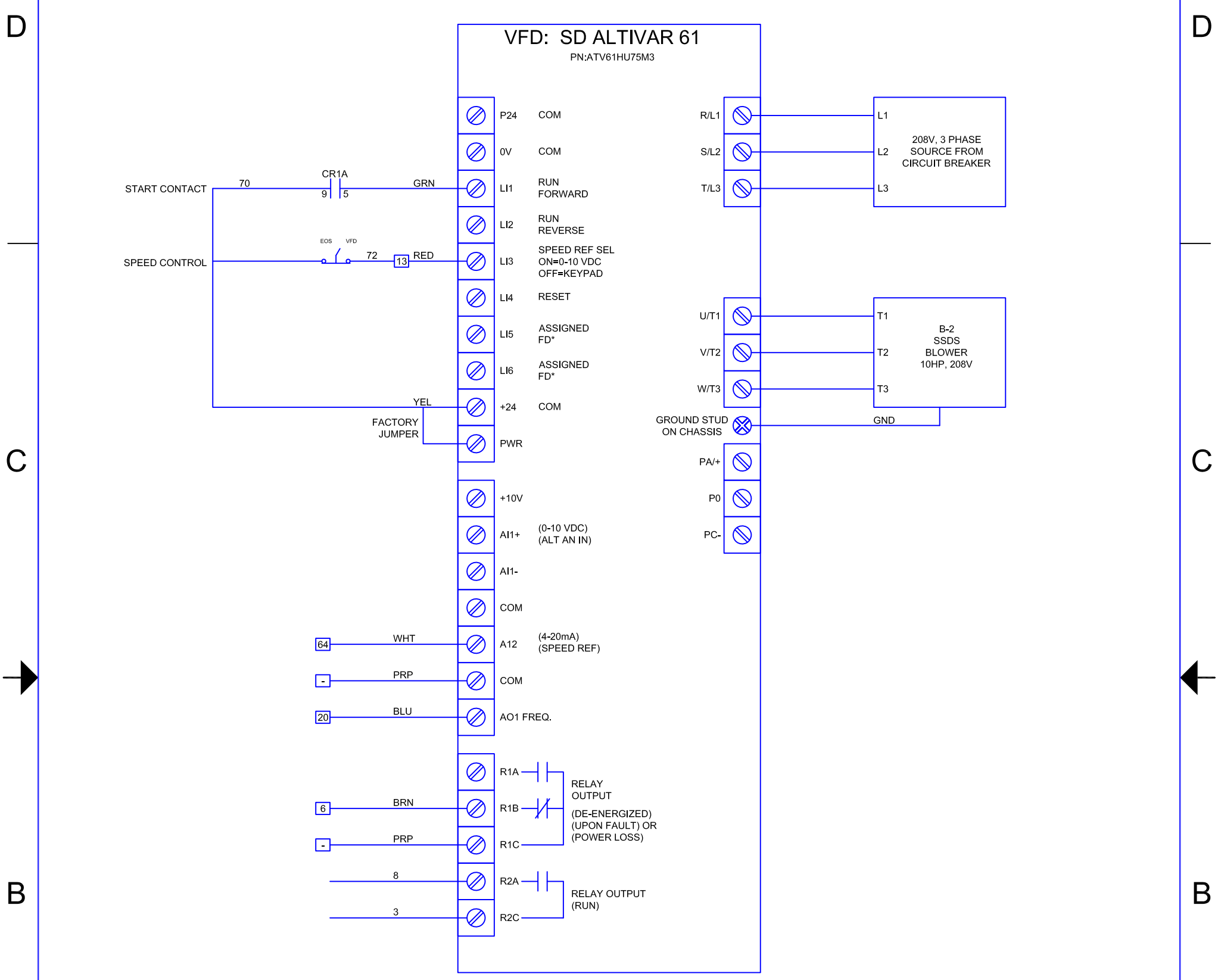
TITLE
PLC WIRING DIAGRAM

AECOM - SSD SYSTEM
FORMER OZONE INDUSTRIES SITE QUEENS, NY

JOB NO. 15-152 (SSDS)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	I-2	2 OF 3	A

VFD1 WIRING



REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	10-08-15	EMB

REVISIONS

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DRWN BY EMB DATE 06-26-15
CHK BY DATE
APPR BY DATE

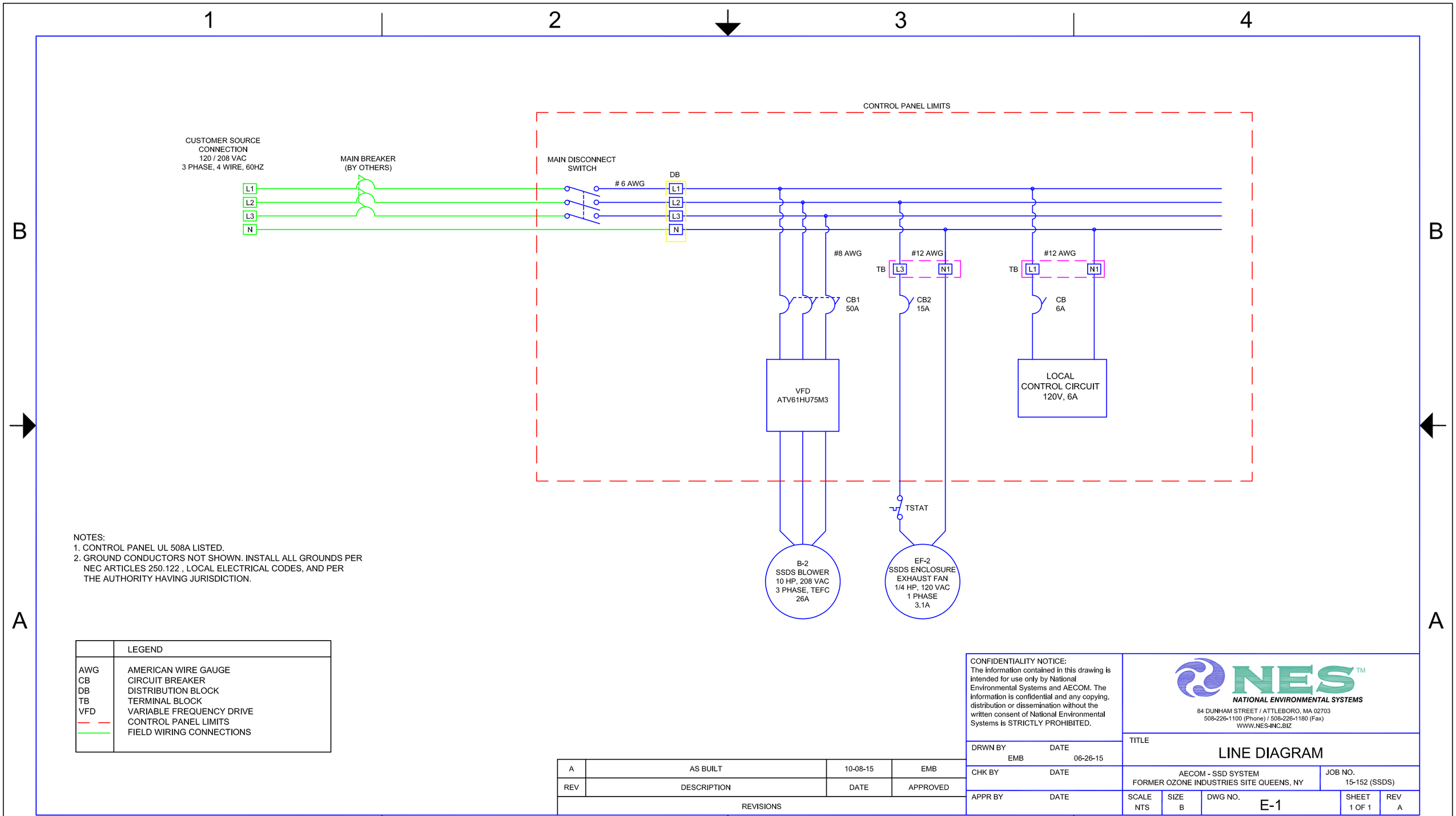
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TITLE
VFD WIRING DIAGRAM

AECOM - SSD SYSTEM
FORMER OZONE INDUSTRIES SITE QUEENS, NY

JOB NO. 15-152 (SSDS)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	I-2	3 OF 3	A



NOTES:
1. CONTROL PANEL UL 508A LISTED.
2. GROUND CONDUCTORS NOT SHOWN. INSTALL ALL GROUNDS PER NEC ARTICLES 250.122 , LOCAL ELECTRICAL CODES, AND PER THE AUTHORITY HAVING JURISDICTION.

	LEGEND
AWG	AMERICAN WIRE GAUGE
CB	CIRCUIT BREAKER
DB	DISTRIBUTION BLOCK
TB	TERMINAL BLOCK
VFD	VARIABLE FREQUENCY DRIVE
— —	CONTROL PANEL LIMITS
———	FIELD WIRING CONNECTIONS

REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	10-08-15	EMB

REVISIONS

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DRWN BY	EMB
DATE	06-26-15
CHK BY	
DATE	
APPR BY	
DATE	
TITLE	LINE DIAGRAM
	AECOM - SSD SYSTEM FORMER OZONE INDUSTRIES SITE QUEENS, NY
JOB NO.	15-152 (SSDS)
SCALE	NTS
SIZE	B
DWG NO.	E-1
SHEET	1 OF 1
REV	A

TABLE 5
ATV 61

VFD SETTINGS
NES 15-152, REVISION A - (October, 2015)
AECOM - Former Ozone Industries Site (SSDS)
Queens, NY

SETPOINTS LOADED BY NES - VIA VFD INTEGRAL KEYPAD

MAIN MENU	SUB-MENU	SUB-SUB-MENU	DESCRIPTION
2 ACCESS LEVEL			LEVEL OF ACCESS CONTROL
1 DRIVE MENU	1.1 SIMPLE START		STD. MOTOR CURRENT
1 DRIVE MENU	1.1 SIMPLE START		STD. MOTOR FREQUENCY
1 DRIVE MENU	1.1 SIMPLE START		NOMINAL MOTOR SPEED
1 DRIVE MENU	1.1 SIMPLE START		MAX. OUTPUT FREQUENCY
1 DRIVE MENU	1.5 INPUTS/OUTPUTS CFG	AI2 CONFIGURATION	AI2 MINIMUM VALUE
1 DRIVE MENU	1.5 INPUTS/OUTPUTS CFG	AI2 CONFIGURATION	AI2 MAXIMUM VALUE
1 DRIVE MENU	1.5 INPUTS/OUTPUTS CFG	AO1 CONFIGURATION	AO1 ASSIGNMENT
1 DRIVE MENU	1.5 INPUTS/OUTPUTS CFG	AO1 CONFIGURATION	AO1 MIN OUTPUT VALUE
1 DRIVE MENU	1.5 INPUTS/OUTPUTS CFG	AO1 CONFIGURATION	AO1 MAX OUTPUT VALUE
1 DRIVE MENU	1.6 COMMAND		CONFIGURATION REFERENCE 1
1 DRIVE MENU	1.6 COMMAND		CHANNEL MODE CONFIG.
1 DRIVE MENU	1.6 COMMAND		CONTROL CHANNEL 1 CONFIG.
1 DRIVE MENU	1.6 COMMAND		CONTROL CHANNEL 2 CONFIG.
1 DRIVE MENU	1.7 APPLICATION FUNCTION	STOP COFIGURATION	TYPE OF STOP

PLEASE NOTE: PARAMETERS NOT LISTED REMAIN AT FACTORY DEFAULT

RapidTech LLC dba National Environmental Systems
84 Dunham Street - Attleboro, MA 02703
(508) 226-1100 / info@nes-inc.biz

TABLE 5
ATV 61

SETTINGS
Expert
26 AMPS
60Hz NEMA
3480 RPM
60 Hz
4.2 mA
20 mA
MOTOR FREQ.
4 mA
20 Ma
HMI
SEPARATE
TERMINALS
HMI
FREEWHEEL

RapidTech LLC dba National Environmental Systems
84 Dunham Street - Attleboro, MA 02703
(508) 226-1100 / info@nes-inc.biz

SECTION 7 - CONTROL COMPONENTS

ENCLOSURE NEMA4 42 X 36 X 12 - MILD STEEL W/ LOCKING HANDLE - HAMMOND EN4SD423612GY

VENT FAN 210CFM 115VAC 6 IN - HAMMOND FAN150AC115

VENT FAN ADJ. 30-140F BI-METAL TEMP SWITCH N.O. - HAMMOND SKT011419NO

NON-FUSED THROUGH DOOR DISCONNECT 3-PHASE 80 AMP - ABB OT80F3

PROCONTROL PLC 24DI,16AI,30DO,8A - EOS A2

PROVIEW USER'S GUIDE - EOS

PROCONTROL CELL MODEM W/ 80FT ANTENNA CABLE - EOS CELL MODEM

UPS, 350VA, 200W, 120V, 1PH, 3 UPS & SURGE OUTLET 3 SURGE ONLY - APC BE350G

VFD 10 HP 208/230V 33 A 3-PHASE NEMA1 - SQUARE D ATV61HU75M3

QUARTZ DRIVE ANALOG HOUR METER 2.8IN DIAMETER BEZEL 115VAC - ENM T50B212

POWER SUPPLY 24VDC 2.5A - ADI PSC-24-060

MUSHROOM SWITCH RED TRIGGER ACTION - TURN TO RELEASE - SQUARE D ZB5AS844

HAMMOND MANUFACTURING

Quality Products. Service Excellence.

Type 4 Mild Steel Wallmount Enclosure *Eclipse Series*

Hinge Door with Quarter Turn/Handle







Panel Sold Separately

Application

- Designed to enclose electrical and/or electronic equipment and protect against harsh, industrial environments for wallmount applications.
- Impressive styling features like hidden hinges, attractive latching systems make the Eclipse a suitable addition to any high-tech equipment installation.
- A wide range of sizes and practical accessories make this product line a complete package.

Standards

- UL 508 Type 3R, 4, and 12
- CSA Type 3R, 4, and 12
- Complies with
  - NEMA Type 3R, 4, and 12
  - IEC 60529, IP66

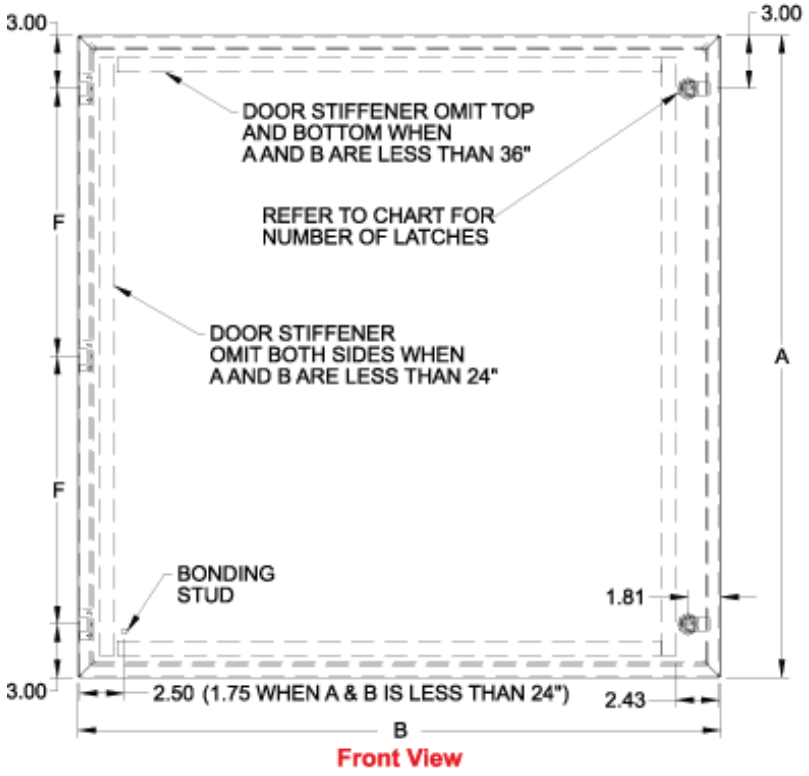
Construction

- Formed 14 or 16 gauge steel.
- Smooth, continuously welded seams ground smooth.
- Door stiffeners are provided where required for increased strength and rigidity - designed to also permit additional mounting options.
- Formed lip on enclosure to exclude flowing liquids and contaminants.
- Door latches feature the added safety of quarter turn slot requiring use of tool for opening.
- Doors may be easily removed for modifications and are interchangeable.
- Seamless poured-in place gasket.
- Collar studs provided for mounting inner panel.
- Includes hardware kit with panel mounting nuts and sealing washers for wall mounting holes.
- Bonding stud provided on door and grounding stud installed in enclosure.
- Hinges are constructed from 304 stainless steel.
- Hinge pins are stainless steel.
- Quarter turn latch and multi-point handle (key lockable) are zinc diecast with black epoxy finish.
- Door alignment guide provided on 36" wide enclosures.

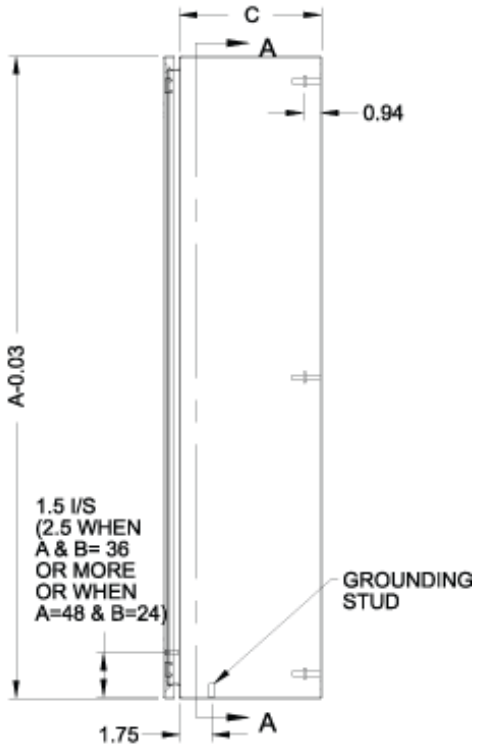
Finish

- Cover and enclosure are phosphatized and finished with a recoatable powder inside and out with choice of ANSI 61 smooth Gray (GY) or RAL7035 textured light gray (LG).

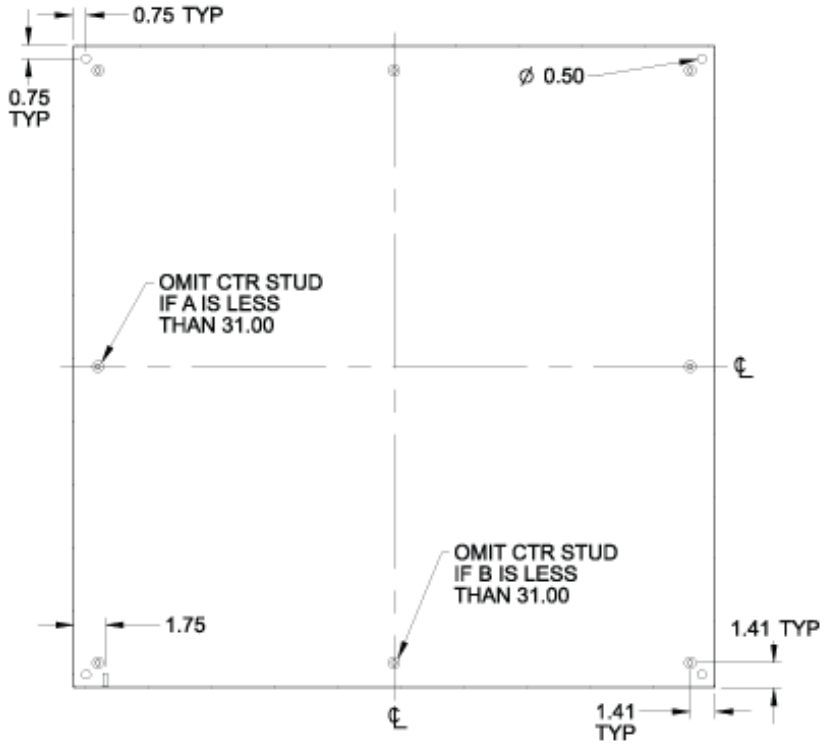
Accessories



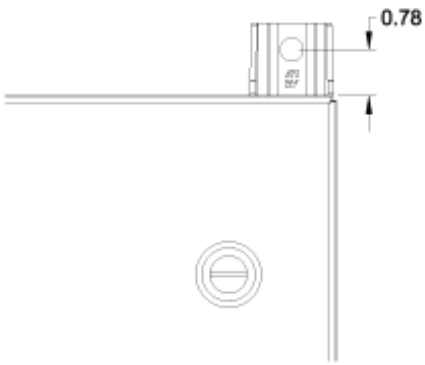
Front View



Side View



SECTION A-A



Mounting Foot Detail

Part No. (ANSI 61 Gray)	Part No. (RAL 7035 Light Gray)	Overall Dimensions A	B	C	Door/Body Gauge	Latches Qty	Type	Opt. Panel Part No.	Panel Size D	E	# Hinges	F	Ship Wt. (lbs)
EN4SD12126GY	**EN4SD12126LG**	12.00	12.00	6.00	16	1	Qtr Turn	**EP1212**	10.20	10.20	2	6.00	12
EN4SD12246GY	**EN4SD12246LG**	12.00	24.00	6.00	16	1	Qtr Turn	**EP1224**	10.20	22.20	2	18.00	24
EN4SD16126GY	**EN4SD16126LG**	16.00	12.00	6.00	16	1	Qtr Turn	**EP1612**	14.20	10.20	2	10.00	16
EN4SD16166GY	**EN4SD16166LG**	16.00	16.00	6.00	16	1	Qtr Turn	**EP1616**	14.20	14.20	2	10.00	19
EN4SD16206GY	**EN4SD16206LG**	16.00	20.00	6.00	16	1	Qtr Turn	**EP1620**	14.20	18.20	2	10.00	22
EN4SD20126GY	**EN4SD20126LG**	20.00	12.00	6.00	16	1	Qtr Turn	**EP2012**	18.20	10.20	2	14.00	20

Part No. (ANSI 61 Gray)	Part No. (RAL 7035 Light Gray)	Overall Dimensions A	B	C	Door/Body Gauge	Latches Qty	Type	Opt. Panel Part No.	Panel Size D	E	# Hinges	F	Ship Wt. (lbs)
EN4SD202410GY	**EN4SD202410LG**	20.00	24.00	10.00	16	1	Qtr. Turn	**EP2024**	18.20	22.20	2	14.00	36
EN4SD241210GY	**EN4SD241210LG**	24.00	12.00	10.00	16	1	Qtr Turn	**EP2412**	22.20	10.20	2	18.00	26
EN4SD241610GY	**EN4SD241610LG**	24.00	16.00	10.00	16	1	Qtr. Turn	**EP2416**	22.20	14.20	2	18.00	30
EN4SD242010GY	**EN4SD242010LG**	24.00	20.00	10.00	16	1	Qtr. Turn	**EP2420**	22.20	18.20	2	18.00	36
EN4SD242410GY	**EN4SD242410LG**	24.00	24.00	10.00	14	2	Qtr. Turn	**EP2424**	22.20	22.20	2	18.00	45
EN4SD243010GY	**EN4SD243010LG**	24.00	30.00	10.00	14	2	Qtr. Turn	**EP2430**	22.20	28.20	2	18.00	53
EN4SD302010GY	**EN4SD302010LG**	30.00	20.00	10.00	14	2	Qtr. Turn	**EP3020**	28.20	18.20	3	12.00	47
EN4SD302410GY	**EN4SD302410LG**	30.00	24.00	10.00	14	2	Qtr. Turn	**EP3024**	28.20	22.20	3	12.00	53
EN4SD303010GY	**EN4SD303010LG**	30.00	30.00	10.00	14	2	Qtr. Turn	**EP3030**	28.20	28.20	3	12.00	75
EN4SD362410GY	**EN4SD362410LG**	36.00	24.00	10.00	14	2	Qtr. Turn	**EP3624**	34.20	22.20	3	15.00	70
EN4SD363010GY	**EN4SD363010LG**	36.00	30.00	10.00	14	2	Qtr. Turn	**EP3630**	34.20	28.20	3	15.00	84
EN4SD363610GY	**EN4SD363610LG**	36.00	36.00	10.00	14	2	Qtr. Turn	**EP3636**	34.20	34.20	3	15.00	100
EN4SD423010GY	**EN4SD423010LG**	42.00	30.00	10.00	14	1	3-point	**EP4230**	40.20	28.20	4	12.00	107
EN4SD423610GY	**EN4SD423610LG**	42.00	36.00	10.00	14	1	3-point	**EP4236**	40.20	34.20	4	12.00	117
EN4SD482410GY	**EN4SD482410LG**	48.00	24.00	10.00	14	1	3-point	**EP4824**	46.20	22.20	4	14.00	95
EN4SD483010GY	**EN4SD483010LG**	48.00	30.00	10.00	14	1	3-point	**EP4830**	46.20	28.20	4	14.00	120
EN4SD483610GY	**EN4SD483610LG**	48.00	36.00	10.00	14	1	3-point	**EP4836**	46.20	34.20	4	14.00	125
EN4SD603610GY	**EN4SD603610LG**	60.00	36.00	10.00	14	1	3-point	**EP6036**	58.20	34.20	4	18.00	150
EN4SD201612GY	**EN4SD201612LG**	20.00	16.00	12.00	16	1	Qtr Turn	**EP2016**	18.20	14.20	2	14.00	32
EN4SD202012GY	**EN4SD202012LG**	20.00	20.00	12.00	16	1	Qtr Turn	**EP2020**	18.20	18.20	2	14.00	34
EN4SD242012GY	**EN4SD242012LG**	24.00	20.00	12.00	16	1	Qtr Turn	**EP2420**	22.20	18.20	2	18.00	38
EN4SD242412GY	**EN4SD242412LG**	24.00	24.00	12.00	14	2	Qtr Turn	**EP2424**	22.20	22.20	2	18.00	47
EN4SD302412GY	**EN4SD302412LG**	30.00	24.00	12.00	14	2	Qtr Turn	**EP3024**	28.20	22.20	3	12.00	57
EN4SD303012GY	**EN4SD303012LG**	30.00	30.00	12.00	14	2	Qtr Turn	**EP3030**	28.20	28.20	3	12.00	80
EN4SD362412GY	**EN4SD362412LG**	36.00	24.00	12.00	14	2	Qtr Turn	**EP3624**	34.20	22.20	3	15.00	62
EN4SD363012GY	**EN4SD363012LG**	36.00	30.00	12.00	14	2	Qtr Turn	**EP3630**	34.20	28.20	3	15.00	91
EN4SD363612GY	**EN4SD363612LG**	36.00	36.00	12.00	14	2	Qtr Turn	**EP3636**	34.20	34.20	3	15.00	104
EN4SD423012GY	**EN4SD423012LG**	42.00	30.00	12.00	14	1	3-point	**EP4230**	40.20	28.20	4	12.00	111
EN4SD423612GY	**EN4SD423612LG**	42.00	36.00	12.00	14	1	3-point	**EP4236**	40.20	34.20	4	12.00	121
EN4SD482412GY	**EN4SD482412LG**	48.00	24.00	12.00	14	1	3-point	**EP4824**	46.20	22.20	4	14.00	98
EN4SD483612GY	**EN4SD483612LG**	48.00	36.00	12.00	14	1	3-point	**EP4836**	46.20	34.20	4	14.00	148
EN4SD603612GY	**EN4SD603612LG**	60.00	36.00	12.00	14	1	3-point	**EP6036**	58.20	34.20	4	18.00	165
EN4SD723012GY	**EN4SD723012LG**	72.00	30.00	12.00	14	2	Qtr Turn, 5-point	**EP7230**	70.20	28.20	5	16.50	190
EN4SD723612GY	**EN4SD723612LG**	72.00	36.00	12.00	14	2	Qtr Turn, 5-point	**EP7236**	70.20	34.20	5	16.50	195
EN4SD242016GY	**EN4SD242016LG**	24.00	20.00	16.00	16	1	Qtr Turn	**EP2420**	22.20	18.20	2	18.00	52
EN4SD242416GY	**EN4SD242416LG**	24.00	24.00	16.00	14	2	Qtr Turn	**EP2424**	22.20	22.20	2	18.00	66
EN4SD302416GY	**EN4SD302416LG**	30.00	24.00	16.00	14	2	Qtr Turn	**EP3024**	28.20	22.20	3	12.00	85
EN4SD363016GY	**EN4SD363016LG**	36.00	30.00	16.00	14	2	Qtr Turn	**EP3630**	34.20	28.20	3	15.00	102
EN4SD423616GY	**EN4SD423616LG**	42.00	36.00	16.00	14	1	3-point	**EP4236**	40.20	34.20	4	12.00	140

HAMMOND MANUFACTURING

Quality Products. Service Excellence.

Tube Axial Fans *DNMF Series*









Features

- Choice of 4.70" (120mm), 3.15" (80mm), 5.91" (150mm) or 10" (254mm).
- Choice of either 115 or 230 VAC, 50/60 Hz.
- Impedance protected motor.
- Class-B insulated.
- Ball bearing construction, metal or plastic blades.
- Diecast aluminum body.
- DNMF100AC, FAN150AC and FAN10A fans have male plug terminations (requires fan cords).
- FAN80AC fans have 11" long lead wires.
- Fan is cooled by incoming air.
- Fan component is recognized to UL 507 and CSA certified.
- Includes mounting hardware.

Accessories

- Fan Cords

Part No. 115 VAC	Part No. 230 VAC	Overall Dimensions Height	Width	Depth	CFM	Wattage 50Hz	60Hz	Speed (RPM)	Noise (dB)	Use With Fan Guard Part No.	Use With Filter Grill Part No.
FAN80AC115	**FAN80AC230**	3.15	3.15	1.50	32	11	10	3100	34	FAN80FG	XPFA80*
DNMF100AC115	**DNMF100AC230**	4.70	4.70	1.50	105	24	22	3000	50	DNFG	XPFA120*
FAN150AC115	**FAN150AC230**	5.75 & 5.90	6.72	2.00 & 2.20	210 & 230	27 & 46	26 & 40	3100 & 3400	63 & 53	FAN150FG	n/a
FAN10A115	**FAN10A220**	10.00 dia.		3.50	550	30	35	1650	55	FAN10FG	XPFA254*

Data subject to change without notice

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Thermostats *SKT Series*



Features

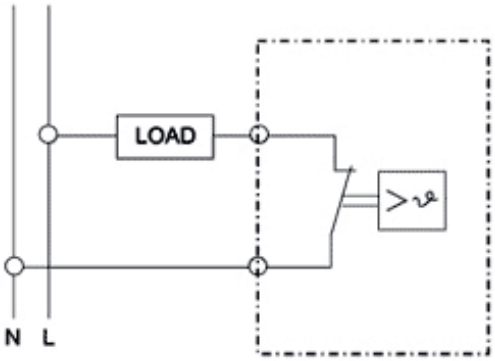
- Designed to provide air temperature control and monitoring in cabinets.
- Thermostat NC (Normally Closed) for the control of heaters and heater fans
- Thermostat NO (Normally Open) for the control of cooling units, or for switching signal transmitters in case of overheating.
- Available in Fahrenheit or Celsius.

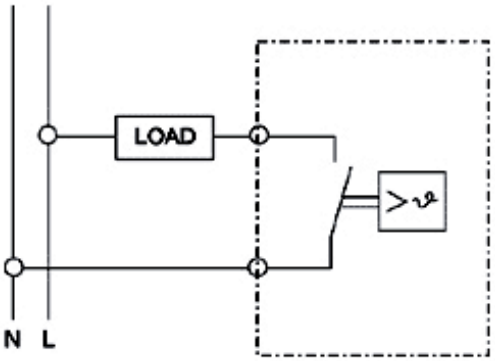
NC - Normally Closed (Red)

- Used in conjunction with heaters.
- Contact opens when rising temperatures reach the set point temperature, shutting heater off.

NO - Normally open (Blue)

- Used in conjunction with fans.
- Contact closes when rising temperatures reach the set point temperature, turning fan on.





Part No.	Scale	Contact Type	Dimensions Height x Width x Depth	Switching Capacity	Ship Wt. lbs
SKT011409NC	F°	Normally Closed	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1

Part No.	Scale	Contact Type	Dimensions Height x Width x Depth	Switching Capacity	Ship Wt. lbs
SKT011409NC-C	C°	Normally Closed	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1
SKT011419NO	F°	Normally Open	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1
SKT011419NO-C	C°	Normally Open	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1

Sensor Element:	Thermostatic bi-metal
Switching difference (hysteresis):	+ or - 4°F (+or- 3°K)
Adjustment Range:	30 - 140°F
Noise Suppression:	N (according to VDE 0875)
Connection:	2 pole terminal for AWG 14 (2.5 mm²)
Mounting:	Easily installed by clip mounting on 35 or 38mm DIN rail (included)
Housing:	Flame retardant plastic UL94VO
Color:	Gray (SB)
Protection:	IP20
Approval:	UL Recognized Component, cUL Recognized Component, CE

Data subject to change without notice

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OT80F3

General Information

Extended Product Type:	OT80F3
Product ID:	1SCA105798R1001
EAN:	6417019397016
Catalog Description:	OT80F3 switch-disconnector
Long Description:	Front operated switch-disconnector. Types OT 16...125 include protected terminal clamps, IP 20.

Categories

Products » Low Voltage Products and Systems » Switches » Disconnect Switches

Ordering

EAN:	6417019397016
Minimum Order Quantity:	10 piece
Customs Tariff Number:	85365080

Dimensions

Product Net Width:	53 mm
Product Net Height:	92 mm
Product Net Depth:	73 mm
Product Net Weight:	0.27 kg

Container Information

Package Level 1 Units:	1 piece
Package Level 1 Width:	84 mm
Package Level 1 Height:	64 mm
Package Level 1 Length:	103 mm
Package Level 1 Gross Weight:	0.27 kg
Package Level 1 EAN:	6417019397016

Environmental

RoHS Status:	Planned to follow EU Directive 2002/95/EC August 18, 2005 and amendment after 2009 Q3

Technical UL/CSA

Ampere Rating UL/CSA:	60 A
Horsepower Rating UL/CSA:	(acc. to UL 200 V) 20 Hp (acc. to UL 208 V) 20 Hp (acc. to UL 240 V) 20 Hp (acc. to UL 480 V) 40 Hp (acc. to UL 600 V) 40 Hp

Additional Information

Cable Cross-Section:	1.5…35 mm²
Conventional Free-air Thermal Current (I_{th}):	q = 40 °C 80 A
Conventional Thermal Current (I_{the}):	Fully Enclosed 80 A
Earthing Switch Type:	No Additional Type
Handle Type:	None
IIT Publishing Status:	Level 0 - Information enabled
Includes:	None
Mounting Type:	Modular
Number of Poles:	3
Operating Mechanism:	Mechanism on top of the switch
Operating Mode:	Front Operated
Order Multiple:	10 piece
Pollution Degree:	3
Position of Line Terminals:	Top In - Bottom Out
Power Loss:	per Pole 2.8 W
Product Main Type:	OT
Product Name:	Switch-disconnectors
Rated Impulse Withstand Voltage (U_{imp}):	8 kV
Rated Insulation Voltage (U_i):	750 V
Rated Operational Current AC-21A (I_e):	(500 V) 80 A (690 V) 80 A

	(380 ... 415 V) 80 A
Rated Operational Current AC-22A (I_e):	(380 ... 415 V) 80 A
Rated Operational Current AC-23A (I_e):	(380 ... 415 V) 75 A (500 V) 58 A (690 V) 20 A
Rated Operational Power AC-23A (P_e):	(220 ... 240 V) 22 kW (400 V) 37 kW (415 V) 37 kW (500 V) 37 kW (690 V) 18.5 kW
Rated Operational Voltage:	750 V
Rated Short-time Withstand Current (I_{cw}):	for 1 s 1 kiloampere rms
Special Functions:	No
Standards:	IEC
Terminal Type:	Screw Terminals

Certificates and Declarations (Document Number)

Declaration of Conformity - CE:	1SCC301167D0201
RoHS Information:	1SCC301183D0201

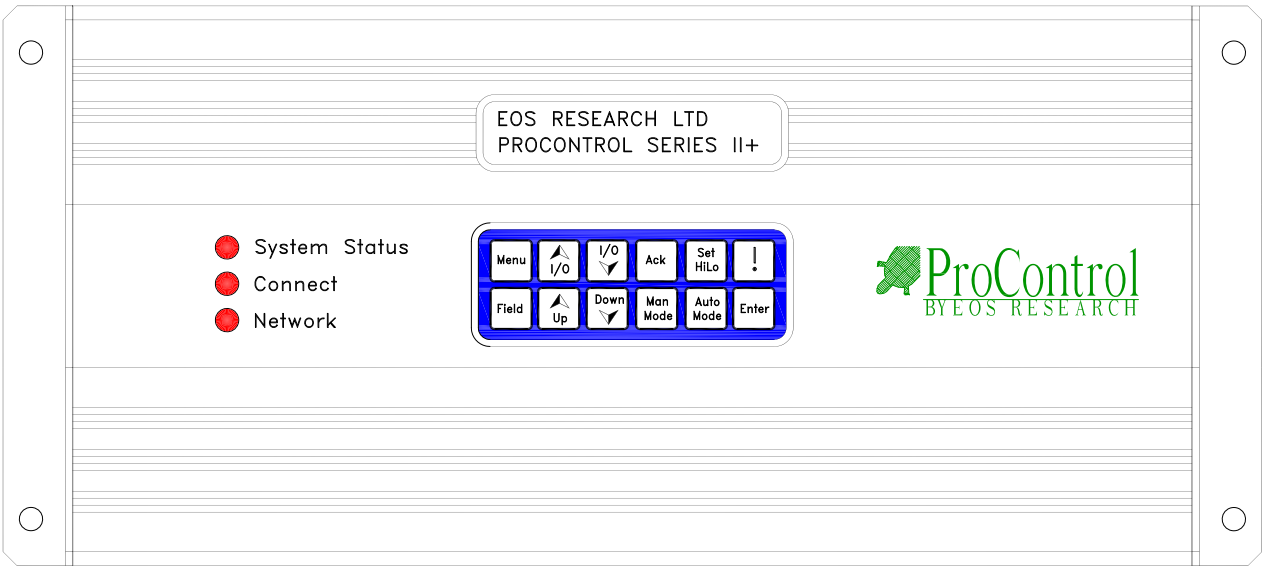
Classifications

E-nummer:	3170941
ETIM 5.0:	EC000216 - Switch disconnector
Object Classification Code:	Q



PROCONTROL series 2 plus

TYPE A
Product Specification



The next generation **Type A** ProControl features a capacity of up to 78 industrially-hardened inputs and outputs in a small and easy-to-use package. The **Series 2**^{plus} contains everything you need for the core of your control/monitoring system, including the ability to drive motor starters, solenoids and other devices directly from built-in relay outputs. The **Series 2**^{plus} includes expanded datalogging and reporting capability, a built-in power supply for your instruments and transducers, as well as pluggable connectors for all I/O. The **Type A** features higher I/O counts, large datalog memory, greater process control capacity, and a vacuum fluorescent display. Available with Ethernet, cellular data modem and analog phone modem communication options.

	Model A1	Model A2
INPUTS		
Discrete	Sixteen (16) protected discrete inputs. Support for 4 flowmeters or pulse accumulators with rates to 500Hz.	Twenty-Four (24) protected discrete inputs (eight of these are status inputs). Support for 4 flowmeters or pulse accumulators with rates to 500Hz.
Analog	Sixteen (16) 4-20ma inputs with built-in 24Vdc supply. Inputs are surge and short-circuit protected and may also be used as discrete inputs	Sixteen (16) 4-20ma inputs with built-in 24Vdc supply. Inputs are surge and short-circuit protected and may also be used as discrete inputs
OUTPUTS		
Discrete	Twenty-two (22) relay outputs - 14 rated @ 1A, remainder @ 0.5A, 120V	Thirty (30) relay outputs - 14 rated @ 1A, remainder @ 0.5A, 120V
Analog		Eight (8) 4-20ma outputs. PID loop control.

Specifications subject to change without notice.

	Model A1	Model A2
DATALOGGING		
Discrete	30,000 points standard. All logging occurs on change of state.	30,000 points standard. All logging occurs on change of state.
Analog	80,000 points standard (5000 per channel)	80,000 points standard (5000 per channel)
Event	10,000 points standard.	10,000 points standard.
Totalizer	50 points per channel	50 points per channel
COMMUNICATIONS		
Ethernet, cellular IP:	ProView™ Software, real-time monitoring from any broadband connection. Alarm and Status Emails, text messaging on alarm	
Analog phone modem:	ProView™ Software, real-time monitoring from any phone line. Alarm and Status fax reports, text/pager messages (email optional)	
ProControl Network:	Optional, can be linked via RS-485 for distributed control or higher I/O counts	
USER INTERFACE		
Display	VFD (Vacuum Fluorescent Display) 2 x 20 character display	
Keypad	2 x 6 membrane keypad.	
LEDs	LEDs: System Status, Communications Link, Networking	
PROCESS CONTROL		
System	Up to 64 regular system processes total with 16 startup and 16 shutdown processes, specified by easy-to-understand Boolean (IF...THEN) logic	
Alarms	Generate shutdowns, emails, FAX reports and/or text messages.	
Loops	PID loop control with user control of setpoint, proportional, integral and derivative gains and max change per calculation. Also open loop proportional algorithm.	
POWER		
System	10VAC, 50VA, external transformer provided	
I/O Supply	24 VDC, 15V and 9V available for powering sensors/instruments.	
ENVIRONMENTAL		
Dimensions	13.5" long x 6" wide x 3.5" high.	
Weight	7 lbs.	
Power Dissipation	30W max.	
Operating Temperature	-20C to +50C	
Humidity	95% R.H. non-condensing	

Crafted in the USA by people who know how to build something to last.

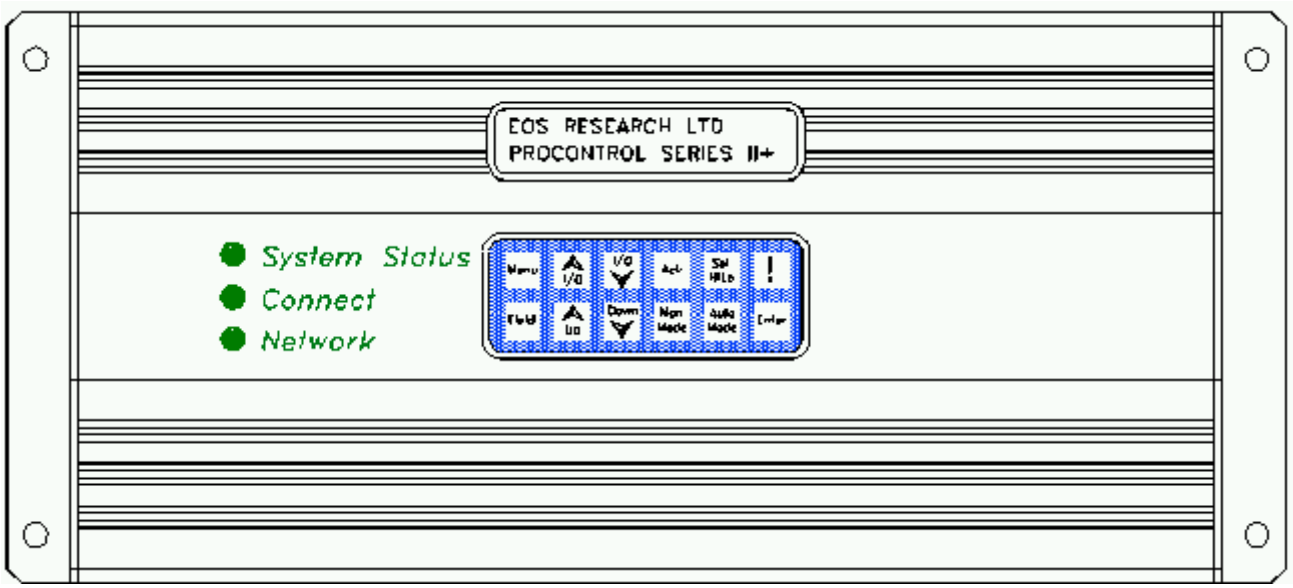
E O S
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PROCONTROL

SERIES 2*plus* USER MANUAL



Version 2.X

LIMITED WARRANTY

EOS Research Ltd. (EOS) warrants its products to be free from defects in materials and workmanship for a period of one year from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its sole option, any such defective products. This warranty includes parts and labor. This warranty does not apply to equipment which has been damaged by accident, negligence or misapplication or has been altered or modified in any way.

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This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

IMPORTANT SAFETY PRECAUTIONS

Any complex hardware or software may be difficult to document, explain or understand. It is important to consider the consequences or unexpected or abnormal behavior which may be caused by a defect or human failure to comprehend. In order to protect people and property from damage, a thorough safety analysis should always be performed. When the consequences of a failure are serious, it is essential to protect life and property against such a failure with redundant backup systems or safety devices. It is agreed between the purchaser and EOS Research Ltd. that protection against and the consequences of any such failure are entirely the purchaser's responsibility.

This device is not approved for use in life support or medical systems.

As installed, this product may be part of a system which is required to meet various electrical, fire, safety or other codes and regulations. Compliance with these codes is the purchaser's responsibility.

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APPENDIX A - Typical ProControl Wiring

Please see the ProView manual for operation of the remote access software which is supplied with the ProControl Series **2*plus***.

1.0 SYSTEM OVERVIEW

1.1 General

The *ProControl Series* **2**^{plus} is a small but powerful microprocessor based control/ telemonitoring system. By combining a control panel and remote monitor in one unit, the Series **2**^{plus} can act as a central supervisory and data management tool for any stand-alone operation. The *ProControl Series* **2**^{plus} can perform multiple tasks:

- **Stand-Alone Control:** The *ProControl Series* **2**^{plus} is a sophisticated programmable logic controller that will efficiently supervise and control your operation. It can interface with up to 70 electrical devices (float switches, pressure transducers, pH transmitters, flow meters, pumps, blowers, etc.), and execute numerous control functions simultaneously. Automatic shutdown routines can be programmed in to protect you operation during alarm conditions. It is extremely versatile in terms of the control algorithms it can execute.

- **Remote Control and Monitoring:** The *ProControl Series* **2**^{plus} gives you a window into your operation from any remote location, using the easy-to-use Windows-based software supplied with the system. You communicate with the ProControl over a modem link, which allows you to view all of your system's operating conditions, while also providing the same access to control functions that you would have if you were at the site (e.g., turning pumps on and off, adjusting alarm setpoints, etc.). No other telemonitoring device gives you the ProControl's level of remote control capability.

- **Reporting:** The *ProControl Series* **2**^{plus} will keep you informed. It will send you periodic fax status reports of your project operations on a schedule specified by you, and will alert you immediately either by fax or by numeric or alpha-numeric pager if an alarm condition warrants attention. No longer do you have to assume what's happening at your remote operation.....the ProControl will tell you exactly.

- **Datalogging:** The *ProControl Series* **2**^{plus} is your information manager. It is a powerful datalogger that automatically records all operating conditions in its battery-backed memory. You can access your logged data remotely at any time, and download it to your office computer for further processing. The datalogging capability is an invaluable tool for reporting purposes, troubleshooting, and trend graphing.

One or more of these features can be used in your installation; they are standard in every ProControl unit.

1.2 Key Concepts

The following are the building blocks of any Series **2*plus*** monitoring and control system.

Inputs and Outputs (I/O's)

No system can be effective in the real world without communication and one of the principal ways the ProControl communicates is by responding to information collected by sensors and by issuing "commands" to other electronic or electrical devices. Sensor information constitutes an *Input* while a "command" to another device constitutes an *Output*. The Series **2*plus*** works with all of the more important types of I/O devices in general use. Appendix A demonstrates how a variety of I/O devices are connected to the ProControl.

Digital Inputs

These inputs are designed to detect the closure of switch contacts such as those found on float switches or overpressure sensors. They can respond to any normally open or normally closed dry contact. The Series **2*plus*** provides its own wetting (supply) voltage of 5 volts DC for each digital input circuit. The Series **2*plus*** can respond to changes in state as fast as 4 Hz or 3 Hz (cycles per second) depending on the model purchased. Digital inputs are "debounced" for 125 or 150 milliseconds, respectively. This means that a switch or other input that changes state (becomes open or closed) must stay in that state for 125 or 150 milliseconds before the Series **2*plus*** will respond to the change.

Eight high-speed digital inputs can also be used for traditional digital (pulse-output) flow meters. These inputs can detect signal changes at up to a 200/500 Hz rate. All high-speed digital inputs are "debounced" for 1250/500 microseconds. The faster rate applies only to those systems containing the 18.432 MHz processor.

Analog Inputs

These inputs are compatible with sensors which send out a 4 - 20 milliamp (mA) signal. Most analog sensors are available with this type of signal, examples being pressure transducers, pH transmitters, and many flow meters. These inputs allow the operator to read the actual "value" of a parameter, such as pressure, instead of an on/off signal.

Digital Outputs

Digital outputs turn things like pumps, solenoid valves, and alarm lights on and off. The Series **2*plus*** digital outputs are relay outputs designed to switch small loads directly, such as motor starters, lamps, and solenoid valves.

Analog Outputs

Analog outputs are typically used in process control schemes where a controlled piece of equipment can accept a signal which is variable over a range. This output is expressed as a percentage (0 - 100%) and is used to control pump speeds, chemical dosing rates, etc., instead of conventional on/off operation. The equipment that the ProControl sends the analog output to must accept a 4 - 20 mA signal. Often, an analog output is used in conjunction with an analog input such as a pH transmitter to form a control scheme known as *feedback control*. In essence, the input and output will work together to maintain a user set input level. This concept is described further in the next section under *Analog Output Processes*.

Tagnames

Each input and output is given a descriptive *Tagname* by the user that uniquely identifies it to the system operator. For instance, a digital input could be called "TANKHI", an analog input could be called "AIRFLO" and a digital output could be called "PUMP_1". This tagname is used by the local LCD display, the FAX report and by the ProView software. The analog inputs are also given a *Units Tagname* which identifies the unit of measure associated with the input sensor. Each tagname can be up to six characters long and each units tagname can be up to three characters long ("PSI", for instance). The tagnames can include the uppercase letters A-Z, the numbers 0-9, a blank space, and the underscore (_) character.

1.3 Control Basics

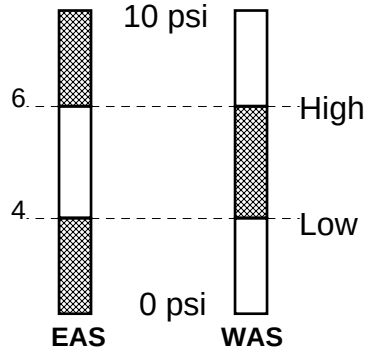
The status of all inputs or outputs can easily be monitored both locally and remotely. What gives the Series **2*plus*** its real power, however, is the ability to automatically initiate actions based on the status of the inputs and your pre-programmed instructions (this is often called *Process Control*). These actions can include switching certain outputs, faxing back a report, sending an alphanumeric or numeric page, shutting down the entire system or sounding the local alarm. Process control functions are programmed into your ProControl by EOS Research or one of our technology partners according to your specifications.

Active State

Central to the use of control on the Series **2*plus*** is the concept of *Active State*. Each input on the ProControl receives certain signals from a sensor which constitute "normal" operation and other signals which constitute an exception to normal operation.

A digital input can monitor only two states, ON or OFF (alternatively, CLOSED or OPEN). The *Active State* would be the state in which the controller would respond to the digital input, and perform certain actions or generate an alarm. For example, if a high level float switch in a tank is tripped (turned ON) by rising fluid level, we can say that its *Active State* correlates to a situation in which the fluid level is high. The active state of the float switch could cause the Series **2*plus*** to trigger an alarm, turn off a pump, or initiate some other action. The Series **2*plus*** can be set up so that either ON or OFF is the active state.

An analog input sensor can take on many states (or values) between the minimum and maximum of its measurement range. The ProControl operator, however, can set two threshold values which divide the total input span into two functional regions. These threshold values are more commonly called the *Low Alarm Limit* and the *High Alarm Limit*, although on the Series **2*plus*** these thresholds are somewhat more flexible in use than those names imply. An analog input which has transcended either its Low Alarm Limit or High Alarm Limit is said to be in its active state.



For instance, consider an analog input sensor which measures pressure from 0 to 10 PSI. The system operator could set the low limit to 4 PSI and the high limit to 6 PSI. In this case the *Active State* would usually be considered as the input state greater than 6 PSI or less than 4 PSI. This interpretation is called *Endpoint Active State* (EAS) on the Series **2*plus*** because the endpoints of the range are the areas which need to trigger action or generate alarms. The opposite interpretation is also possible and is called *Window Active State* (WAS). Any input values between 4 PSI and 6 PSI would trigger action or generate alarms.

Figure 1. Active State

If the ProControl has *Alarms Set*, when any input enters its active state, a local beeper will sound on the ProControl. The word *Alarm* here applies only to the sounding of a local beeper and is not associated with any process control. The active state condition is indicated on the LCD display and can be acknowledged by the operator. The beeper is silenced when it has been acknowledged or after 30 seconds have elapsed. The beeper only operates when the system is operating in Manual mode.

Startup Sequence

The *Startup Sequence* is a series of control algorithms or steps which run in succession and which are designed to place the system in its normal operating mode. It can be as simple as turning all the outputs on simultaneously, or as complex as a multi-stage delay with many conditions. Up to 8 or 16 individual startup steps can be declared depending on the model of the controller. The ProControl can be configured to automatically run this sequence when the unit is powered up.

Process Tasks

A *Process Task* is an ongoing control algorithm which runs continuously. Think of each process task as an IF-THEN statement, in which an action is initiated if a certain condition or combination of conditions exists. Some examples are:

- IF Tank Level Sensor 2 is on, THEN turn Pump 2 off
- IF Air Flow Rate < 10 cfm AND Reactor Temperature > 250^{o}, THEN open Bleed Valve 2

Up to 16 or 64 separate process tasks can be run simultaneously depending on the model of the controller. Process tasks can trigger FAX reports, pager alerts, and system shutdowns.

Shutdown Sequence

The *Shutdown Sequence* is a series of control steps which run in succession and which are designed to shut your system down in a manner which is best for the equipment or treatment processes involved. The shutdown sequence can be activated manually or automatically due to an alarm condition. Here is a typical shutdown sequence:

- Turn off Well Pumps 1 and 2
- Wait 5 minutes, then turn off Stripper Blower
- Open Bleed Valve 2
- When Oxidizer Temperature < 150^{o}, turn off SVE Blower

Automatic Operation

The use of the startup sequence, process tasks, and the shutdown sequence constitutes *Automatic Operation* of your system with the ProControl Series **2*plus*** (otherwise known as *Auto Mode*). The Series **2*plus*** will be placed into auto mode (automatically) when your system has been started up using the programmed startup sequence. If one condition of the programmed startup sequence is not met during the startup process, your system will be completely shut down by the ProControl as a safety measure. Once the startup sequence has been successfully completed, the ProControl begins running the process tasks continuously. **PROCESS TASKS WILL RUN ONLY WHEN IN AUTO MODE**. Please note that the audible beeper will not sound even if the ProControl has *Alarms Set* when it is in Auto Mode, since the process tasks will control these situations as the user has specified.

Manual Operation

You can override the Series **2**^{plus} programmed control functions by operating in *Manual Mode*. In manual mode, your process will respond only to operator input from the keypad of the ProControl, or to commands issued from the ProView software. **PLEASE NOTE THAT PROCESS TASKS AND THEIR ERROR-CHECKING MECHANISMS DO NOT RUN DURING MANUAL MODE!** Manual mode is useful when you wish to troubleshoot your system, but none of the system safeguards built into auto mode are available. You can place your operation into auto mode any time by issuing the command from the keypad.

Analog Output Processes

In some cases, you may want to use an analog output to control equipment that maintains an analog input at a certain constant level. For example, you may wish to automatically maintain a pH of 8.5 in a reaction tank by varying the dosing rate of a chemical feed pump. The pH you wish to maintain (8.5) is called the *SetPoint* of the analog output process. An analog input to the ProControl (in this case, a pH transmitter) is said to provide *feedback* to the unit, and combined with an analog output, constitute *feedback control*.

PID Loops

A reliable type of feedback control can be obtained through a *PID Loop*. PID stands for *Proportional-Integral-Derivative*, and is a commonly-used process control technique. We'll skip the details of the mathematics involved, but suffice it to say that a PID loop is the favored control technique for most analog output processes. With only a *Proportional* term applied in the equation, the analog output is controlled based on an error signal generated from the difference between the SetPoint and the actual analog input. The PID loop can also improve its performance as it continues to run if an *Integral* term is used and can respond to quick changes in the controlling analog input if a *Derivative* term is used. EOS Research will configure your PID loops for you and can provide further information if necessary.

Proportional Outputs

In some cases, it may be desirable to base an analog output signal on an analog input value. In this situation, no specific SetPoint is used because there is a direct relationship between the output and input values. For example, if you wanted to base the output of a metering pump on some flow rate, you might use a proportional output to relate the amount of chemical metered to the flow rate.

2.0 ON-SITE OPERATION

2.1 LCD Display

If your unit did not come with an LCD display, the following sections *do not* apply.

The 2 line x 20 character LCD display is used to display and control system operations. The display is divided into separate areas or fields, as outlined below.

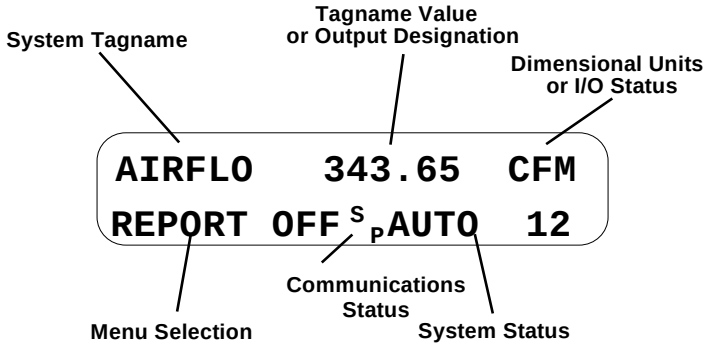


Figure 2. Display Fields

System Tagname This six-character field is used to identify the I/O point displayed. Descriptive names such as WELL1 or BLOWER are used.

Tagname Value For analog inputs, this field displays the value of the input, the high alarm limit, or the low alarm limit. For digital outputs, OUTPUT is displayed. For digital inputs, this field is unused. For analog outputs, this field displays the output percentage, the output level, or the associated input setpoint.

Dimensional Units or I/O Status For analog inputs, this three-character field displays the dimensional units associated with the input sensor, such as GPM or PSI. For digital inputs and outputs, this field displays either ON or OFF. For analog outputs, this field abbreviates percent with PCT. In the case of digital outputs, if the particular output displayed has been designated a lamp output (*see ProView manual*), and a lamp test is currently running, an asterisk (*) will appear before ON or OFF to indicate the lamp is illuminated despite the indicated output status (the output will return to this indicated status once the lamp test has been completed).

Menu Selection This field displays the current menu selection.

Communications Status This field displays one of five different descriptors which indicate any of several special functions of the ProControl. If no communications action is being taken, ">" will appear. Communications messages include: **SP** (Sending Page) - indicates that the unit is attempting to send either an alphanumeric or numeric page; **EF** (Encoding Fax) - indicates that the unit is presently encoding a facsimile report as a result of a request by either the operator or the unit itself; **SF** (Sending Fax) - indicates that the unit is attempting to send a fax report; and **DC** (Data Communications) - indicates that the unit is presently interfaced with ProView.

System Status This area displays the current system status: AUTO, MANUAL, START, or SHUTD and an associated process task number indicating the last successfully completed Auto process, current Startup process, or current Shutdown process.

2.2 Keypad

The Series **2**^{plus} keypad contains 12 buttons which are used along with the LCD Display to control the operations of the system.

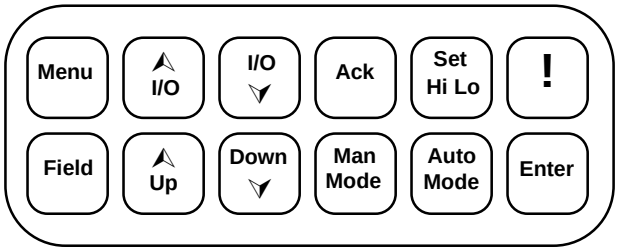


Figure 3. Series 2^{plus} Keypad

Menu — This key is used to scroll through a series of options which are displayed on the LCD screen, and which allow the user to configure various aspects of system behavior.

I/O / I/O — These keys are used to display information about particular I/O points on the LCD Screen. The keys allow the user to scroll through all of the system I/O points either forward or backward.

Ack — The Acknowledge key is used to silence the audible beeper or to acknowledge a memo sent from a remote ProView user.

Set Hi Lo — The Set Hi Lo key allows the user to change the high and low alarm limits for analog inputs or to toggle the display in the I/O Summary.

! — The Emergency Shutdown key is used to turn off all outputs and return the system to manual mode. The programmed shutdown sequence is <u>not</u> executed using this key.

Field — The Field key is used to select a character position to be edited. It is used in conjunction with any direct alphanumeric entry.

Up / Down — These keys are used to toggle system variables from one state to the next or to scroll through possible character entries when used in conjunction with the Field key.

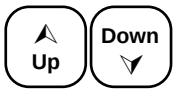
Man Mode — This key is used to place the system in manual mode.

Auto Mode — This key is used to place the system in auto mode.

Enter — The Enter key is used to initiate certain actions selected by other keys or to confirm alphanumeric editing done using other keys.

2.3 Password

When the system is first turned on the password screen is displayed and the user is prompted to enter the password to gain access to the system. "EOS" is the default password. The password on the Series **2**^{plus} was designed as a *low-level* security feature. It is not sufficient in and of itself to withstand a determined effort at system entry. The ProControl unit can be configured to bypass the password screen when the unit is powered up.




```
CUSTOMER ID TAGNAME
ENTER PASSWORD: BAA
```

Use the Up and Down keys to change the character displayed above the cursor.




```
CUSTOMER ID TAGNAME
ENTER PASSWORD: BAA
```

The Field key is used to move the cursor to the next character to be edited.




```
CUSTOMER ID TAGNAME
ENTER PASSWORD: EOS
```

The enter key submits the password for approval.

If the password was entered correctly, the following screen will be displayed for about a second before the operations screen is displayed:

```
Password Accepted
VER 2.XXX   : 1
```

ROM Version # — User Setup Version #

Otherwise, the following message will be displayed for a second and the user will be returned to the password menu:

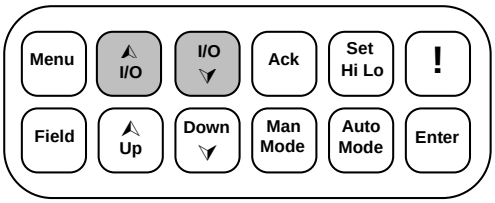
```
Incorrect Password
```

2.4 Operations Screen

After the password has been entered correctly, the operations screen is displayed. The operations screen allows the user to set system parameters and to review the status of all system inputs and outputs.

```
WELL1              OFF
ALARMS SET >MANUAL
```

2.5 I/O Keys



Pressing the I/O Up or I/O Down keys will scroll through the operational I/O points in the system. Data relevant to a particular I/O point will be displayed to right of the point's Tagname.

I/O

```
WELL2                ON
ALARMS SET >MANUAL
```

Forward scroll through I/O points

I/O

```
WELL3                OFF
ALARMS SET >MANUAL
```

Forward scroll through I/O points

I/O

```
WELL2                ON
ALARMS SET >MANUAL
```

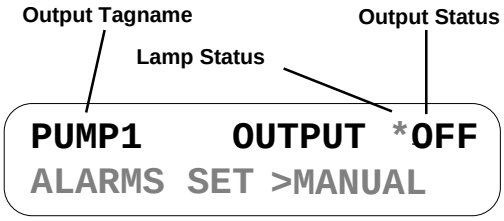
Backward scroll through I/O points

2.6 Digital Input Menu



A digital input displayed in the operations screen will be displayed as shown. When the input is in its Active State "ON" will be displayed in the Input Status area. Otherwise, "OFF" will be displayed.

2.7 Digital Output Menu



A digital output displayed in the operations screen will appear as shown. When the output has been turned on, "ON" will be displayed in the Output Status area. Otherwise, "OFF" will be displayed. The cursor is displayed under the first character in the status field to indicate that it can be changed. The Lamp Status character (*) will be shown for a lamp output if a *lamp test* is running regardless of the output's true state.

Up Down

```
PUMP1      OUTPUT  ON
ALARMS SET >MANUAL
```

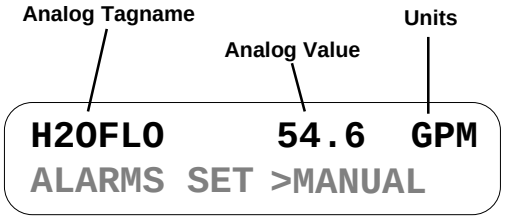
Pressing the Up or Down key will toggle the digital output state and turn the corresponding relay OFF or ON.

Field

```
PUMP1      OUTPUT  ON
ALARMS SET >MANUAL
```

Pressing the Field key will move the cursor to the Menu selection field.

2.8 Analog Input Menu



An analog input displayed in the operations screen will be displayed as shown to the left. The value of the analog input will be shown along with the dimensional units. In the case of a pulse accumulator (totalizer only), you will see only TOT where units is normally displayed.

Set Hi Lo

```
H2OFLO      20.0  GPM
LOW ALARM  >MANUAL
```

Use the Set Hi Lo key to set the low alarm limit.

Set Hi Lo

```
H2OFLO      80.0  GPM
HIGH ALARM >MANUAL
```

Press the Set Hi Lo key again to set the high alarm limit.

Set Hi Lo

```
H2OFLO    120817  GAL
TOTAL FLOW >MANUAL
```

Press the Set Hi Lo key again to see the total flow on a flow type input, and once more to return.

Up Down

```
H2OFLO      30.0  GPM
LOW ALARM  >MANUAL
```

The Up and Down keys are used to change the value of the current character, as denoted by the cursor.

Field

```
H2OFLO      30.0  GPM
LOW ALARM  >MANUAL
```

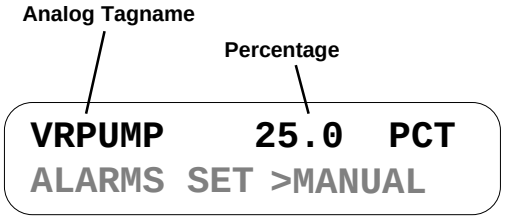
The Field key is used to move to the next character to be edited.

Enter

```
H2OFLO      30.0  GPM
LOW ALARM  >MANUAL
```

To save the low alarm limit changes, press the enter key.

2.9 Analog Output Menu



An analog output displayed in the operations screen will be displayed as shown to the left. The percentage of full scale output will be displayed as well.

Set Hi Lo



The Set Hi Lo key can be used to set the output percentage.

Set Hi Lo



Press the Set Hi Lo key again to declare the SetPoint of an associated analog input. The SetPoint is used only if a PID control loop is in use as an analog output process.

Pressing Set Hi Lo again returns to the original menu.

Up Down



The Up and Down keys are used to change the value of the current character, as denoted by the cursor.

Field



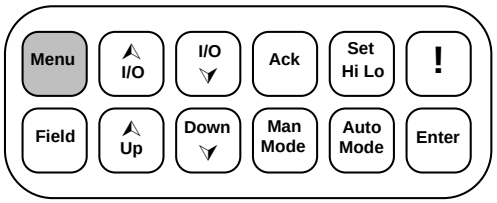
The Field key is used to move to the next character to be edited.

Enter



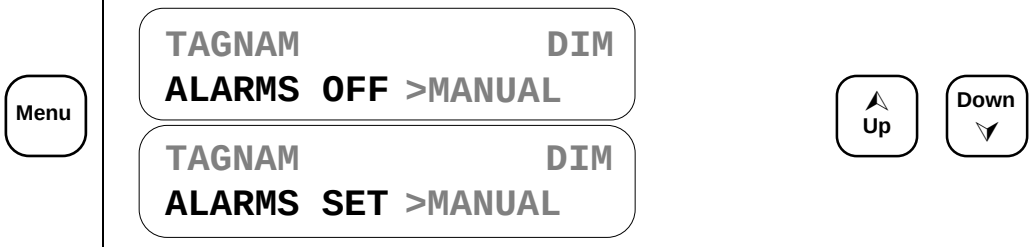
To save the output level changes, press the enter key.

2.10 Menu Key

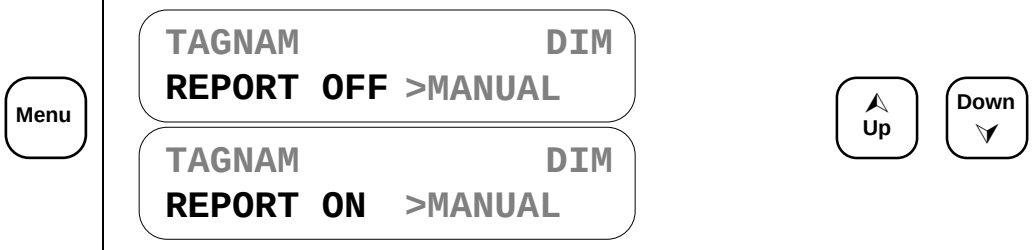


When pressed, the Menu key will scroll through a series of items which allow the user to configure various aspects of system behavior. A description of these items appear in a 10 character field at the bottom left of the display. Either the Up and Down keys or the Enter key is used to change the item.

ALARMS Use the Up and Down keys to enable or disable Alarms.



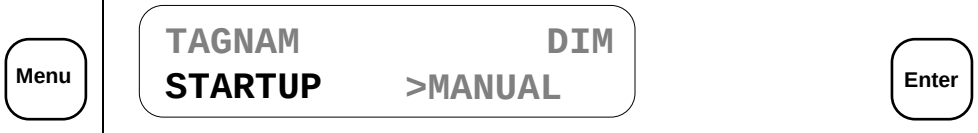
REPORT Use the Up and Down keys to enable or disable the unit's reporting capabilities (fax or page).



FAX NOW Use the Enter key to send a FAX report immediately.



STARTUP Use the Enter key to run the Startup Sequence.



SHUTDOWN Use the Enter key to run the Shutdown Sequence.



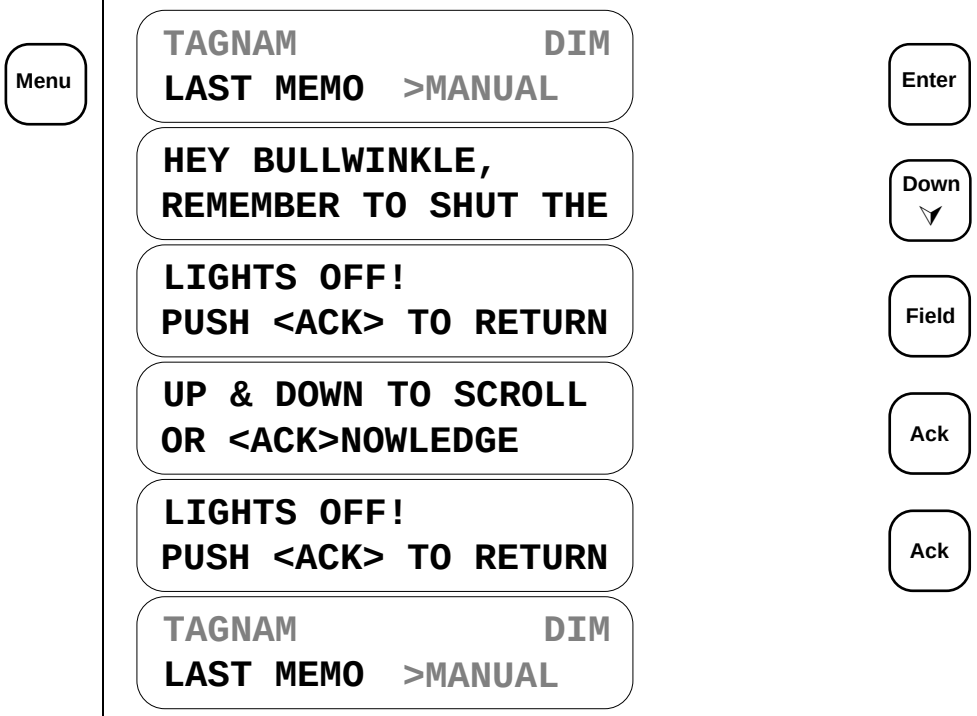
LAST SHUTDOWN This display item shows what input or output caused the last shutdown.



LOG OFF Use the Enter key to Log Off the system and return to the password menu.

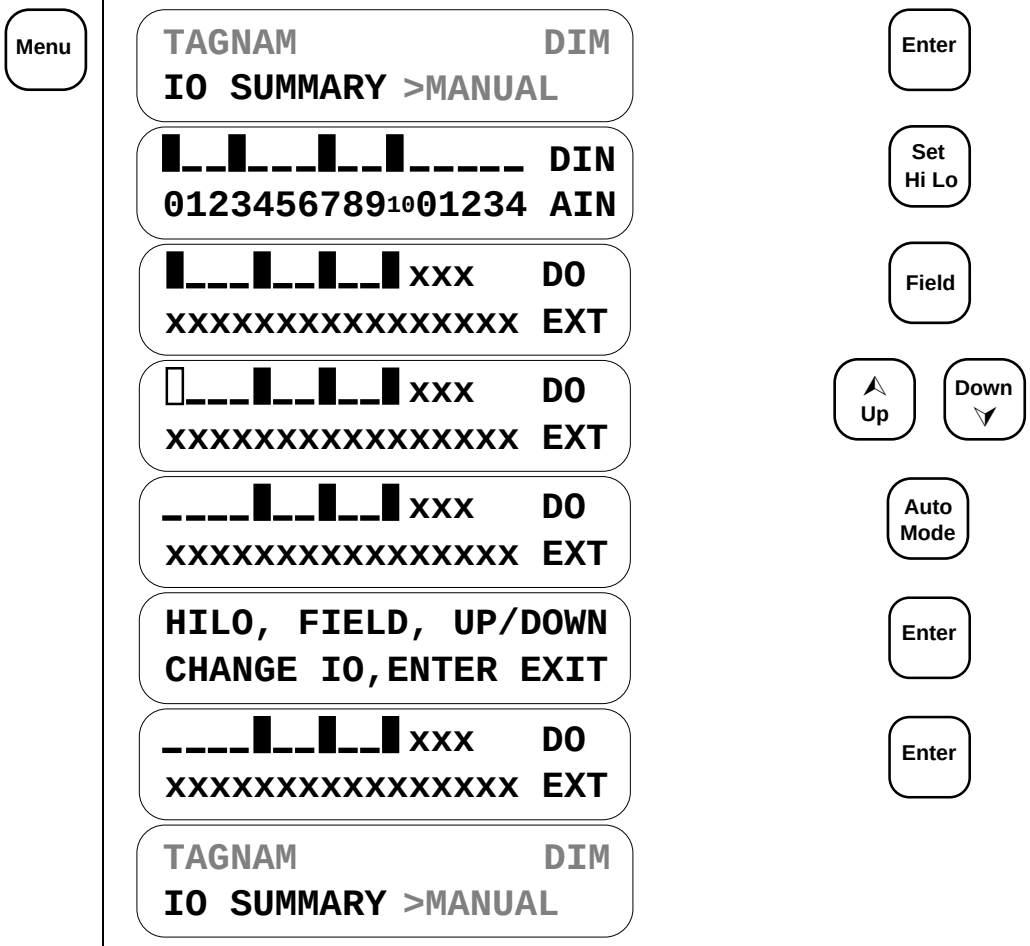


LAST MEMO Use the Enter key to see the last memo sent from the remote ProView user. Up and Down are used to scroll through the message, and Ack is used to return to the ProControl menus. If you hit any other key you will see an informative message telling you which keys are valid. The message will be displayed for 3 seconds if no keys are pressed, but can be acknowledged before the 3-second period by pressing either the Ack or Enter keys.

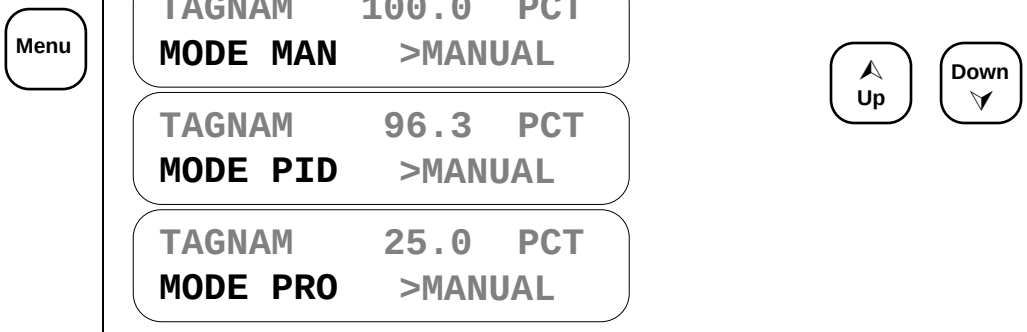


IO SUMMARY

Use the Enter key to enter the I/O summary. The analog input values 0-10 represent a percentage of full scale (i.e. 0 ≅ 4 mA, 5 ≅ 12 mA). Set HiLo is used to toggle between input/output summaries. An underscore represents an open input or an unswitched output. A block indicates a closed input or a switched output. An **x** or **X** is displayed when an output is not enabled and is unswitched or switched, respectively. An asterisk (*****) will be displayed if an output is declared as a lamp and a lamp test is currently being performed. The Field key can be used to move the blinking cursor through the outputs. The Up/Down keys can be used to toggle the state of the output whose position is covered by the blinking cursor. The Enter key will return the ProControl back to its standard menus. If you press any other keys you will see an informative message telling you which keys are valid. The message will be displayed for 3 seconds if no keys are pressed, but can be interrupted before the 3-second period by pressing the Enter key.

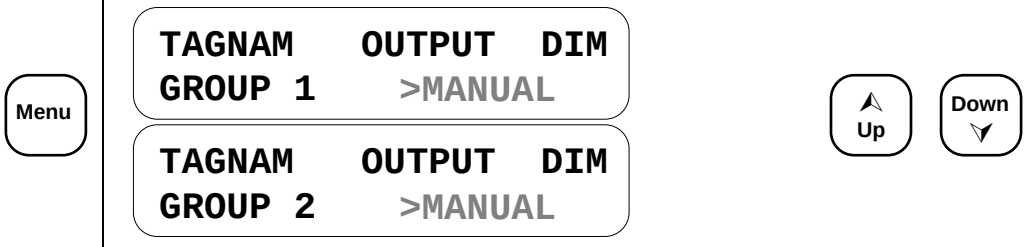


MODES Use the Up and Down keys to toggle an Analog Output from Manual control to PID control or Proportional control, depending on which analog output process is being used. This selection will only appear if an analog output tagname is displayed and the analog output is part of an analog output process.



GROUP The ProControl allows outputs to be assigned to different *Groups* to allow greater process control flexibility. In some cases, you may wish to be able to specify alternate process tasks for a given output. For instance, you can have the operation of a pump be controlled by a series of level switches in a tank, or alternately, the pump can be run on a timed cycle. By selecting the appropriate process Group, you can change the control strategy for that piece of equipment. EOS Research will configure the groups for you according to your specifications

Use the Up and Down keys to select a Group for the displayed output. This menu item is displayed only for outputs that have been configured by EOS to have alternate process Groups.



2.11 LED Indicators

Your ProControl unit has three status LEDs to the left of the keypad, which are used to indicate the following:

System Status: Normally ON when unit is powered.
One blink - The system has internally reset.
Two blinks - An internal error has occurred.

Connect: ON if user is remotely or locally connected.
ON if system is faxing or paging.
Slow blink - last fax or page failed, press ACK to clear.
Fast blink - local connect cable inadvertantly left plugged in, press ACK to clear.

Network: Rapid blinking indicates an active network connection.

3.0 REPORTING FEATURES

3.1 Fax Report

The ProControl unit will keep you informed of your system's operations with facsimile status reports. With the supplied ProView software you can configure the unit to send fax reports to up to two different numbers. You can also have these reports sent on a daily basis, at regular intervals during the day, or when triggered by specific process tasks. You can send one at any time by using the *Fax Now* option either from the menu on the ProControl's display, or through the ProView software.

The fax report you receive will contain several fields, each denoted by a shadow box. The number of fields will depend on the configuration of your system. For instance, you would not see a field indicating *Analog Outputs* if your system does not contain any of these.

The fields as you will see them are shown below. All information enclosed in brackets is variable and depends on your particular system configuration.

To:

```
<FAX RECIPIENT>
```

will indicate the intended fax recipient's name.

From:

```
THE <SYSTEM NAME>        SYSTEM IN <SITE LOCATION>   AT <TIME> ON <DATE>
SETUP VERSION X       :  ROM VERSION 2.x          :  MODEL B1
```

will indicate the name and location of your system, the date and time at which the fax report was initiated, your current ProView setup version, and the current on-board software version 2.X.




```
<MODE><PXX>  :   LAST SHUTDOWN AT <TIME> ON <DATE> BY <SHUTDOWN CAUSE>
                 FAX REPORT INITIATED BY <FAX CAUSE>
```

will indicate the current <MODE> of the controller and associated process. For example, if the controller is running the startup or shutdown sequence, you would see either START or SHUTD followed by the current algorithm. Similarly, in auto mode, you would see AUTO followed by the last successfully completed process task.

The LAST SHUTDOWN indicates when the system last initiated the shutdown sequence and what caused it to happen. For example, if the shutdown sequence were initiated by a key press, the cause you would see would be KEYPAD. Similarly, if the shutdown sequence were caused by a process task such as a high pressure sensor whose tagname was HIPRES, you would see HIPRES as the <SHUTDOWN CAUSE>. If multiple inputs or outputs caused the shutdown (i.e. a process task was dependent on more than one input being in the active state and/or multiple outputs being ON), the most recent one which changed will appear as the cause.

Similarly, the FAX REPORT INITIATED BY line will indicate the tagname of the I/O point which caused the fax to be sent, provided there was only one I/O point responsible. If multiple I/O points were responsible, the process itself will be indicated. Consider, for example, a process task where a shutdown was caused by HIPRES and BLOWER, and a fax was also generated. The <FAX CAUSE> would be PROCESS XX, where *XX* is the number from 1 - 64 of this process task. In the case where *Fax Now* was selected from the menu option on the LCD, the <FAX CAUSE> would be KEYPAD. The <FAX CAUSE> from a ProView generated *Fax Now* command would be REMOTE. This line will <u>not</u> appear on daily or interval scheduled fax reports.

Discrete Inputs:

```
<TAGNAME> is <STATE>   <TAGNAME> is <STATE> ...
```

will indicate the status of all of the digital inputs in four columns. Inputs which are in the active state will appear as ON and those which are in their normal state will appear as OFF.

Discrete Outputs:

```
<TAGNAME> is <STATE>   <TAGNAME> is <STATE> ...
```

will indicate the status of all of the digital outputs in four columns.

Analog Inputs:

```
<TAGNAME> is <VALUE> <DIM> LIMITS are L: <LO-LIM> <DIM> H: <HI-LIM> <DIM>
<TAGNAME> is <VALUE> <DIM> TOTAL FLOW is <FLOW>   <DIM>
<TAGNAME>                  TOTAL FLOW is <FLOW>   <DIM>
...
```

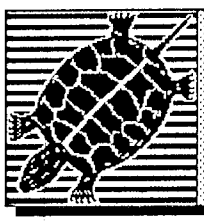
will indicate the current value, dimensional units, low alarm limit, and high alarm limit for all analog inputs which are not flow-type inputs. The precision of the values displayed can be selected through ProView. Any flow-type analog input which is responsible for maintaining a total flow will display that flow in place of the alarm limits. Any pulse-type digital input used for a digital flow meter will appear here since the information being obtained by that type of flow meter is analog in nature. In addition, pulse accumulators (volume totalizers) will appear here.

Analog Outputs:

```
<TAGNAME>   <PCT>  PCT  <MODE>      <TAGNAME>   <PCT>  PCT  <MODE>
...
```

will indicate the output percentage and mode of operation of all analog outputs. The precision is fixed to one decimal place and will range from 0.0 to 100.0, expressed as a percentage. The <MODE> of operation will be PID if the analog output is currently being used in a PID loop, or PRO if the analog output is currently being used in a Proportional scheme, otherwise it will be MAN indicating that the analog output is under manual control.

The next two pages contain examples of scheduled and alarm fax reports.



ProControl Series II+

EOS Research Ltd.

Fax Report

To:

BULLWINKLE J MOOSE

From:

THE NORTH WATER SUPPLY SYSTEM IN MAYBERRY USA @ 09:44:00 ON 12/10/1999
SETUP VERSION 1 : ROM VERSION 2.156 : MODEL B2

System Status:

AUTO P04 : NO PREVIOUS SHUTDOWN

Discrete Inputs:

WEL1LO is OFF	WEL2LO is OFF	TWR_HH is OFF	TNK_HH is OFF
RESET is OFF			

Discrete Outputs:

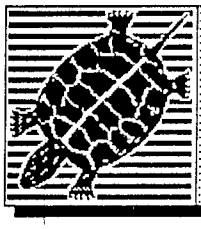
WLPMP1 is ON	WLPMP2 is ON	FINPMP is ON	CHLMET is ON
NAOMET is ON	PH_ALM is ON	CL_ALM is ON	TWRALM is OFF
WL1ALM is OFF	WL2ALM is OFF	TNKALM is OFF	

Analog Inputs:

TWRLVL is	59.2	FT	LIMITS are	L:	8.0	FT	H: 70.0	FT
TNKLVL is	0.00	FT	LIMITS are	L:	8.00	FT	H: 12.00	FT
FINFLO is	501.3	GPM	TOTAL FLOW is		14794	GAL		
FLOW_2 is	399.3	GPM	TOTAL FLOW is		12561	GAL		
FLOW_1 is	0.0	GPM	TOTAL FLOW is		0	GAL		
FIN_PH is	0.00	PH	LIMITS are	L:	6.00	PH	H: 8.00	PH
FIN_CL is	0.00	PPM	LIMITS are	L:	0.75	PPM	H: 2.00	PPM

Analog Outputs:

VSPMP1	86.8 PCT	PID	VSPMP2	100.0 PCT	PID
NAOHFD	100.0 PCT	PID	CHLRFD	20.0 PCT	PRO



ALARM Fax Report

EOS Research Ltd. — ProControl Series II+

To:

BULLWINKLE J MOOSE

From:

THE NORTH WATER SUPPLY SYSTEM IN MAYBERRY USA @ 09:34:12 ON 12/10/1999
SETUP VERSION 1 : ROM VERSION 2.156 : MODEL B2

System Status:

AUTO P04 : NO PREVIOUS SHUTDOWN
FAX REPORT INITIATED BY REMOTE

Discrete Inputs:

WEL1LO is OFF	WEL2LO is OFF	TWR_HH is OFF	TNK_HH is OFF
RESET is OFF			

Discrete Outputs:

WLPMP1 is ON	WLPMP2 is ON	FINPMP is ON	CHLMET is ON
NAOMET is ON	PH_ALM is ON	CL_ALM is ON	TWRALM is OFF
WL1ALM is OFF	WL2ALM is OFF	TNKALM is OFF	

Analog Inputs:

TWRLVL is 59.1	FT	LIMITS are	L: 8.0	FT	H: 70.0	FT
TNKLVL is 0.00	FT	LIMITS are	L: 8.00	FT	H: 12.00	FT
FINFLO is 203.5	GPM	TOTAL FLOW is	11348	GAL		
FLOW_2 is 399.6	GPM	TOTAL FLOW is	8671	GAL		
FLOW_1 is 0.0	GPM	TOTAL FLOW is	0	GAL		
FIN_PH is 0.00	PH	LIMITS are	L: 6.00	PH	H: 8.00	PH
FIN_CL is 0.00	PPM	LIMITS are	L: 0.75	PPM	H: 2.00	PPM

Analog Outputs:

VSPMP1	37.4 PCT	PID	VSPMP2	100.0 PCT	PID
NAOHFD	100.0 PCT	PID	CHLRFD	20.0 PCT	PRO

3.2 Page Alerts

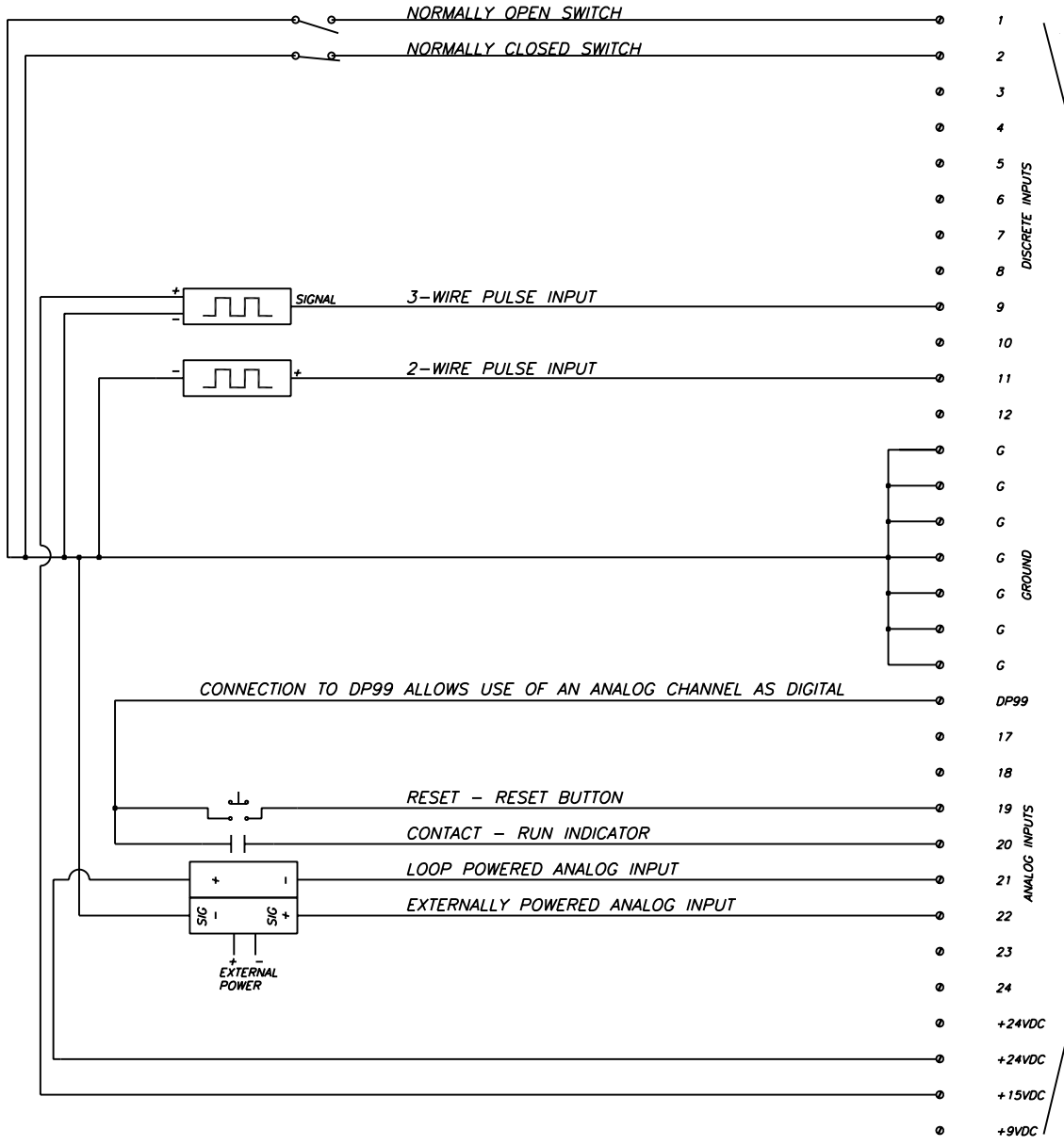
The ProControl unit can alert you to important conditions at your site via a page alert. Any system that is not in manual mode, that is, executing process tasks or the startup or shutdown sequences, can send a message up to eighty characters in length to an alphanumeric pager or up to nineteen digits in length to a numeric pager. If you are out of the office and away from a fax machine, you will still be alerted to any trouble at your site. With ProView you can select up to two pager numbers to be called. Each process task or startup/shutdown algorithm is capable of sending a message to either or both of these pagers. The pager messages are configured by EOS Research according to your specifications.

An example message for an alphanumeric pager would be:

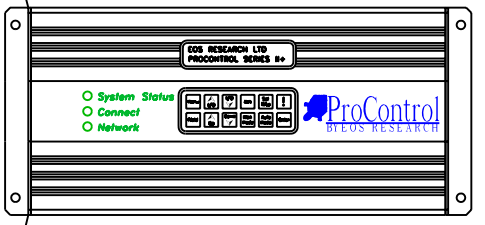
```
ANYTOWN SITE
High water level EQ Tank
System shut down!
Call Fred to fix: 555-6789
```

APPENDIX A

EXAMPLE WIRING DIAGRAM



SERIES 2*plus* Type B1-B2, A1-A2

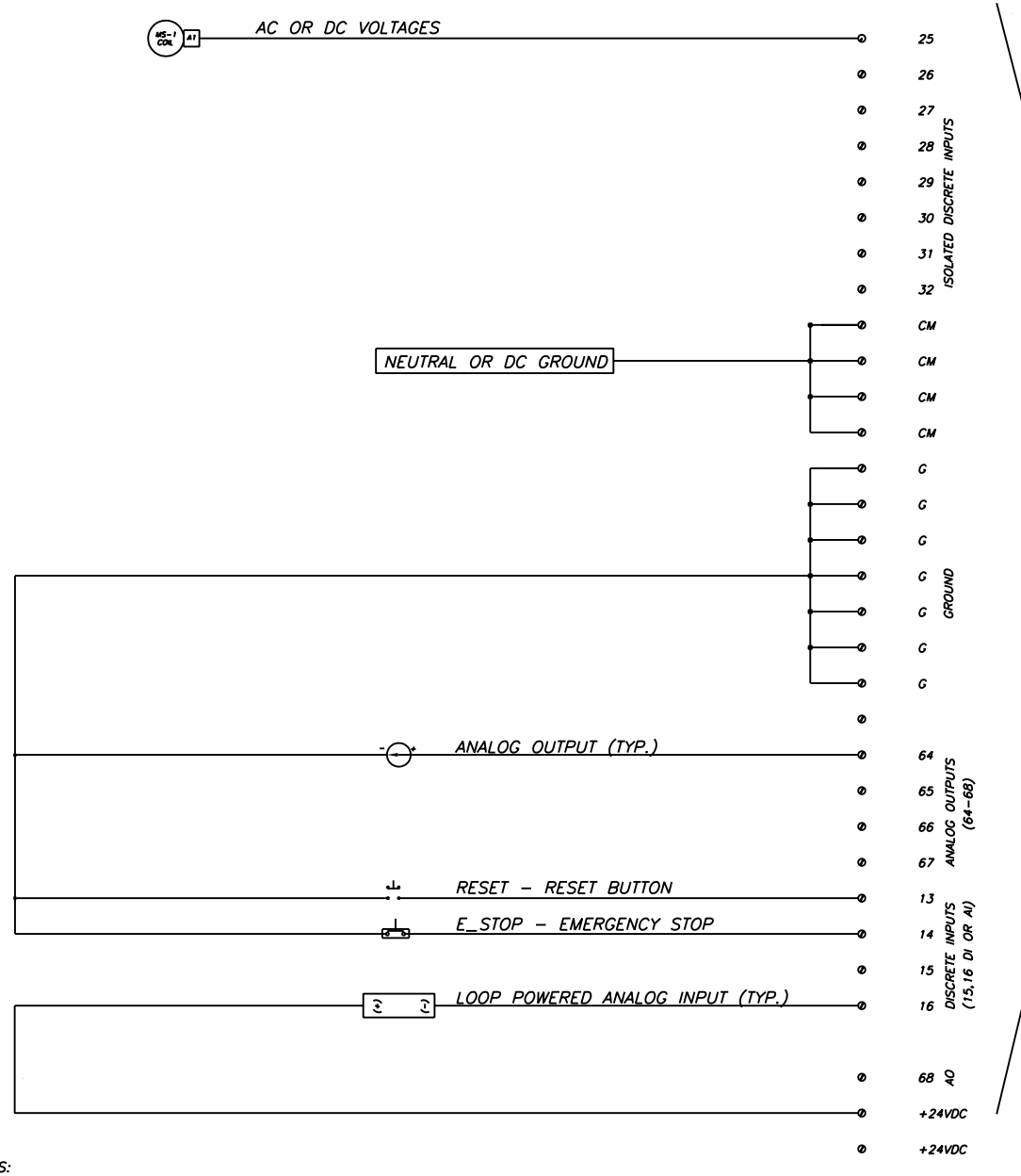


NOTES:
1. FOR ANALOG INPUTS, MAINTAIN VOLTAGE AND TOTAL LOOP RESISTANCE PER MFG. SPECIFICATIONS.
2. INPUT IMPEDANCE FOR SERIES 2Plus ANALOG INPUTS IS 135 OHMS.
3. ACTIVE DISCRETE INPUTS WILL SOURCE 1mA WHEN GROUNDED.
4. THE ProControl SOURCES 5VDC FOR DISCRETE INPUTS.
5. DISTRIBUTE ANALOG INSTRUMENTS EVENLY ACROSS +24VDC TERMINALS.

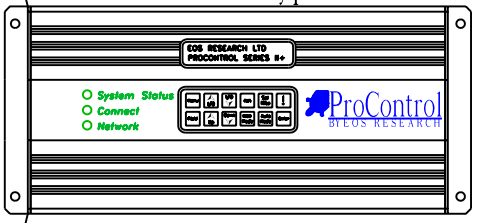
E O S
research
159 Walnut Street, Rochester, NH

TYPICAL ProControl WIRING
DIGITAL & ANALOG INPUTS - BOTTOM LEFT SIDE

EXAMPLE WIRING DIAGRAM



SERIES 2*plus* Type B2 ONLY

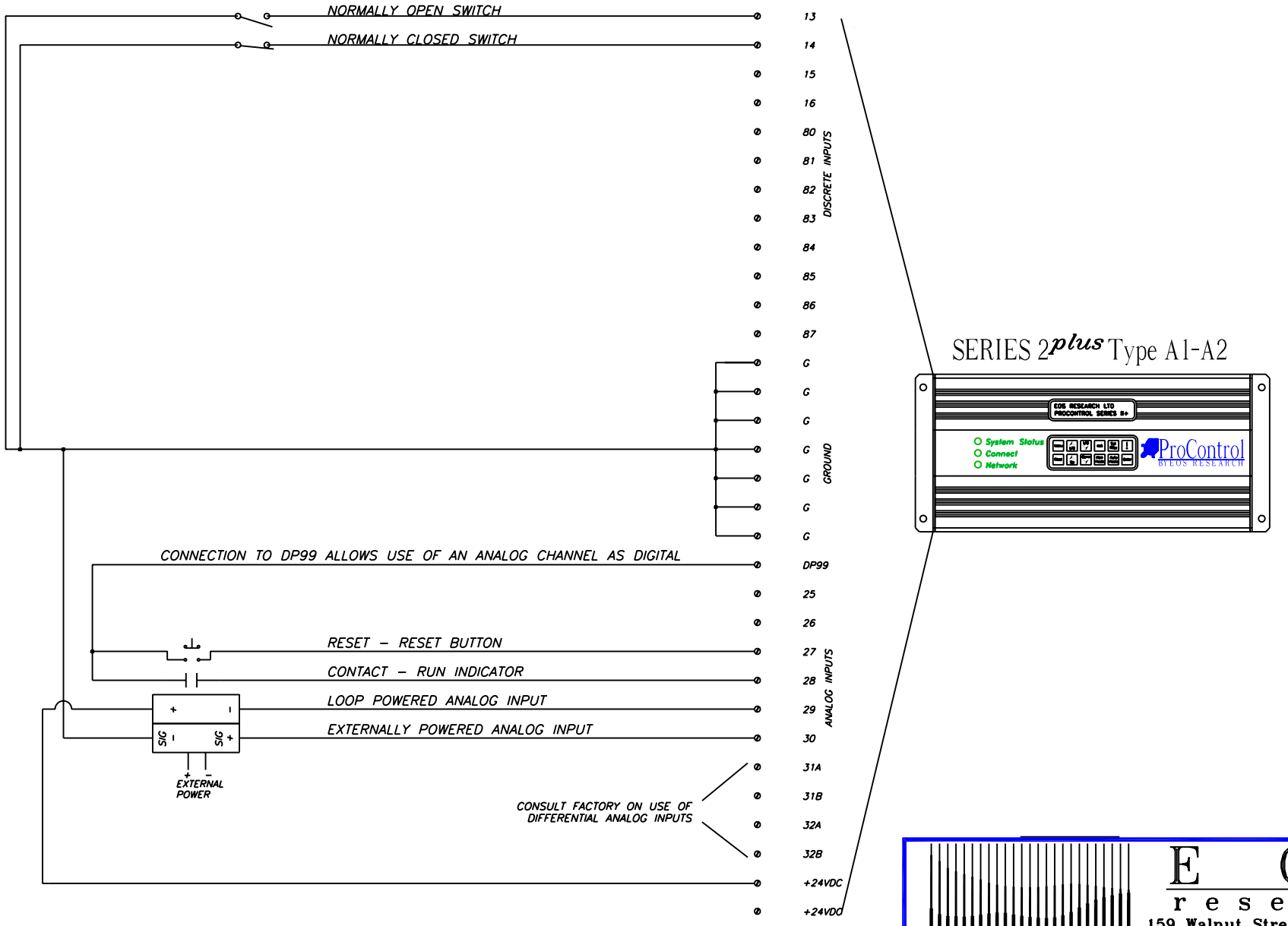


NOTES:
1. FOR ANALOG INPUTS, MAINTAIN VOLTAGE AND TOTAL LOOP RESISTANCE PER MFG. SPECIFICATIONS.
2. INPUT IMPEDANCE FOR SERIES 2Plus ANALOG INPUTS IS 135 OHMS.
3. MAXIMUM ISOLATED DISCRETE INPUT VOLTAGE 120V. ALL INPUTS MUST BE SAME VOLTAGE AND SHARE THE SAME COMMON OR NEUTRAL!
4. CM REPRESENTS COMMON FOR INPUTS 25-32. (ie. 120VAC, CM=NEUTRAL/ 24VDC, CM=DC GROUND)

E O S
research
159 Walnut Street, Rochester, NH

TYPICAL ProControl WIRING
DIGITAL INPUTS & ANALOG OUTPUTS
TYPE B2 - TOP LEFT SIDE

EXAMPLE WIRING DIAGRAM



SERIES 2*plus* Type A1-A2

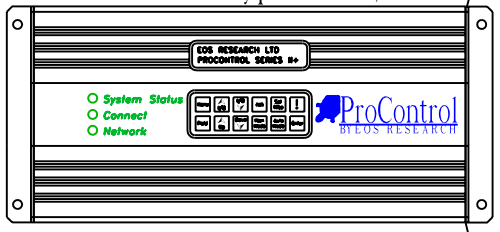
NOTES:
1. FOR ANALOG INPUTS, MAINTAIN VOLTAGE AND TOTAL LOOP RESISTANCE PER MFG. SPECIFICATIONS.
2. INPUT IMPEDANCE FOR SERIES 2Plus ANALOG INPUTS IS 135 OHMS.
3. ACTIVE DISCRETE INPUTS WILL SOURCE 1mA WHEN GROUNDED.
4. THE ProControl SOURCES 5VDC FOR DISCRETE INPUTS.
5. DISTRIBUTE ANALOG INSTRUMENTS EVENLY ACROSS +24VDC TERMINALS.

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159 Walnut Street, Rochester, NH

TYPICAL ProControl WIRING
DIGITAL & ANALOG INPUTS -
TYPE A - TOP LEFT SIDE

EXAMPLE WIRING DIAGRAM

SERIES 2*plus* Type B1-B2, A1-A2



RS-232/SERIAL RJ-45 LOCAL CONNECTION PORT

TEL./RS-485 RJ-11 TELEPHONE/NETWORKING PORT

NEUTRAL LINE GROUND +24VDC

DISCRETE OUTPUTS

46
45 SLNVLV - SOLENOID VALVE
44 AIRCMP - AIR COMPRESSOR — MS-2 COIL
43 DISPMP - DISCHARGE PUMP — MS-1 COIL
42
41
40
CM2 COMMON FOR 40-46
39
38
37
36
35 VACALM - HIGH VACUUM ALARM — R
34 PRSALM - LOW PRESSURE ALARM — R
33 SMPALM - HIGH LEVEL ALARM — R
CM1 COMMON FOR 33-39

INPUT POWER 10VAC

10VAC TRANSFORMER SUPPLIED WITH ProControl UNIT. (REV 4 AND ABOVE)

NOTE: 20VAC-CT TRANSFORMER SUPPLIED PRIOR TO REV 4.
DO NOT USE 20VAC TRANSFORMER ON REV 4 AND ABOVE!!

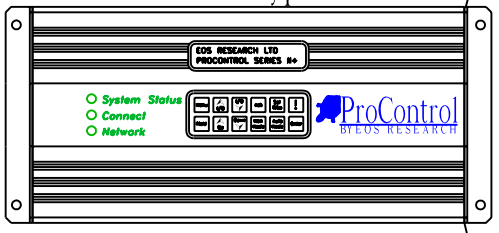
NOTES:
1. OUTPUT RELAYS RATED AT 125VAC/0.5A, 24VDC/0.5A
   UNITS SHIPPED AFTER 12/1/99 RATED AT 125VAC/1.0A, 24VDC/1.0A
2. CM1 IS SWITCHED TO 33-39 AND CM2 IS SWITCHED TO 40-46 WHEN OUTPUT IS ACTIVE.
3. DO NOT USE +24VDC FROM ProControl TO DRIVE OUTPUTS. FOR TRANSDUCER POWER ONLY.

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TYPICAL ProControl WIRING
DIGITAL OUTPUTS - RIGHT SIDE

EXAMPLE WIRING DIAGRAM

SERIES 2*plus* Type A1-A2



ANALOG OUTPUTS

G
G
71
70
69
68
67 — ANALOG OUTPUT (TYP.) (+ / -)
66
65
64
62
61
CM10

DISCRETE OUTPUTS

60 — AIRCMP – AIR COMPRESSOR — MS-2 COIL
59 — DISPMP – DISCHARGE PUMP — MS-1 COIL
CM9 — COMMON FOR 59-60

NEUTRAL
LINE
GROUND
+24VDC

58
57
CM8
56
55
CM7
54
53
CM6
52 — PRSALM – LOW PRESSURE ALARM — R
51 — SMPALM – HIGH LEVEL ALARM — R
CM5 — COMMON FOR 51-52

DISCRETE OUTPUTS

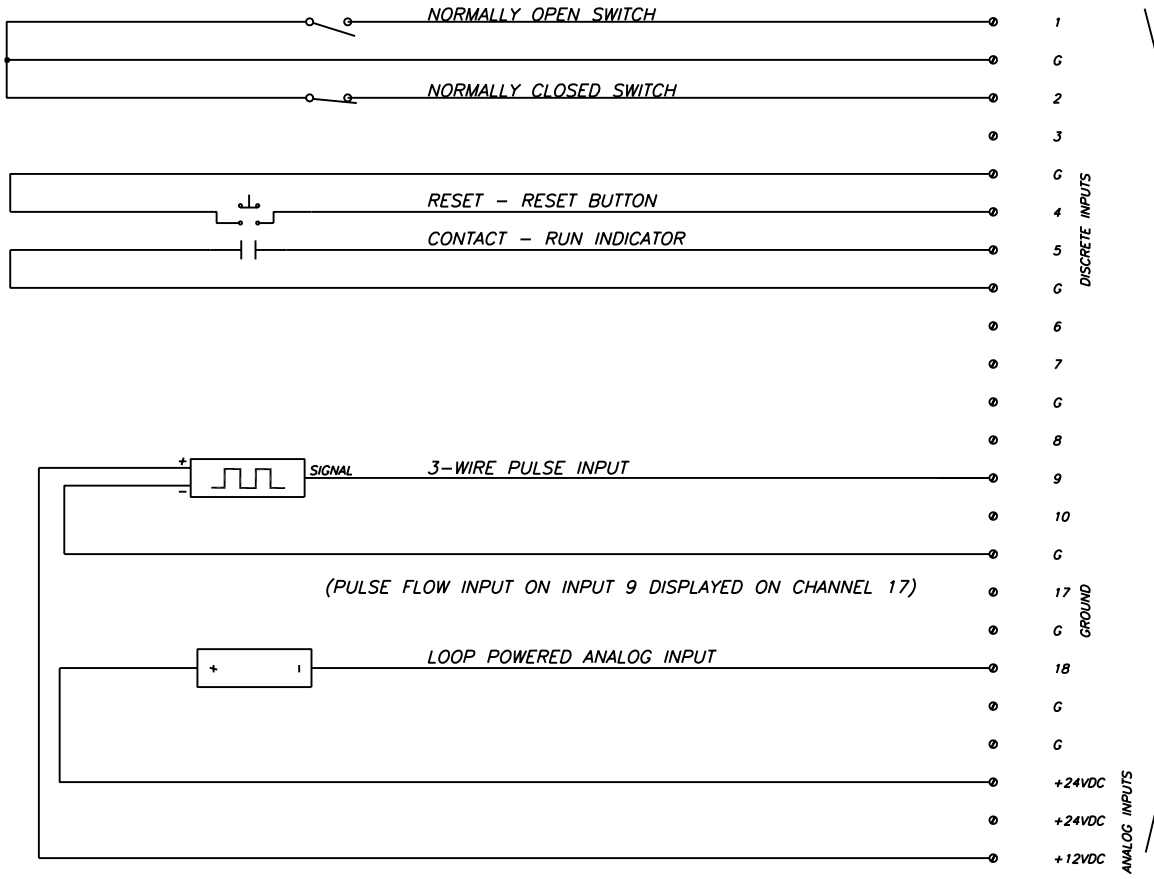
50
49
CM4
48
47
CM3

NOTES:
1. OUTPUT RELAYS ARE RATED AT 125VAC/0.5A, 24VDC/0.5A
2. CM3 IS SWITCHED TO 47-48, CM4 IS SWITCHED TO 49-50, ETC. WHEN OUTPUT IS ACTIVE.
3. DO NOT USE +24VDC FROM ProControl TO DRIVE OUTPUTS. FOR TRANSDUCER POWER ONLY.

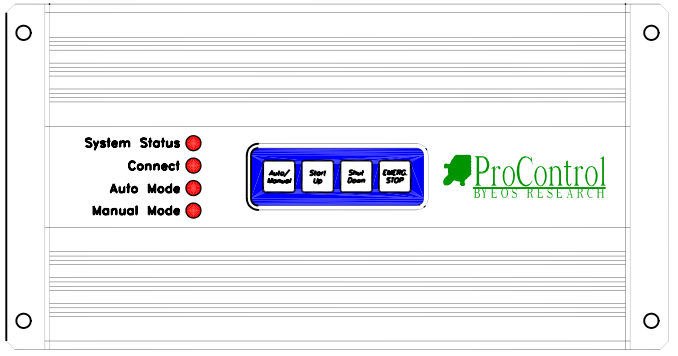
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TYPICAL ProControl WIRING
DIGITAL & ANALOG OUTPUTS
TYPE A - TOP RIGHT SIDE

EXAMPLE WIRING DIAGRAM



SERIES 2*plus* Type C1

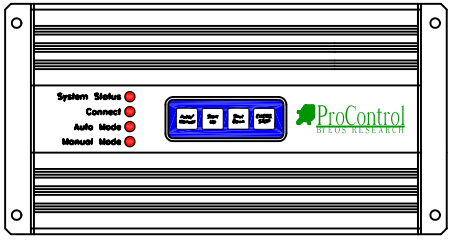


NOTES:
1. FOR ANALOG INPUTS, MAINTAIN VOLTAGE AND TOTAL LOOP RESISTANCE PER MFG. SPECIFICATIONS.
2. INPUT IMPEDANCE FOR SERIES 2Plus ANALOG INPUTS IS 135 OHMS.
3. ACTIVE DISCRETE INPUTS WILL SOURCE 1mA WHEN GROUNDED.
4. THE ProControl SOURCES 5VDC FOR DISCRETE INPUTS.
5. DISTRIBUTE ANALOG INSTRUMENTS EVENLY ACROSS +24VDC TERMINALS.

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TYPICAL ProControl Type C1 WIRING
DIGITAL & ANALOG INPUTS - BOTTOM LEFT SIDE

EXAMPLE WIRING DIAGRAM



RS-232/SERIAL RJ-45 LOCAL CONNECTION PORT

TEL./RS-485 RJ-11 TELEPHONE/NETWORKING PORT

GROUND +24VDC NEUTRAL LINE

DISCRETE OUTPUTS

40 PRSALM - LOW PRESSURE ALARM (R)

39 SMPALM - HIGH LEVEL ALARM (R)

CM4 COMMON FOR 39-40

38

37

CM3 COMMON FOR 37-38

36

35 SLNVLV - SOLENOD VALVE (CR-1 COIL)

CM2 COMMON FOR 35-36

34 AIRCMP - AIR COMPRESSOR (MS-2 COIL)

33 RW_PMP - RECOVERY WELL PUMP (MS-1 COIL)

CM1 COMMON FOR 33-34

INPUT POWER 10VAC

10VAC TRANSFORMER SUPPLIED WITH ProControl UNIT.

NOTES:
1. OUTPUT RELAYS RATED AT 125VAC/1.0A, 24VDC/1.0A
2. CM1 IS SWITCHED TO 33-34 AND CM2 IS SWITCHED TO 35-36, CM3 IS SWITCHED TO 37-38, CM4 IS SWITCHED TO 39-40 WHEN OUTPUT IS ACTIVE.
3. DO NOT USE +24VDC FROM ProControl TO DRIVE OUTPUTS. FOR TRANSDUCER POWER ONLY.

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TYPICAL ProControl TYPE C WIRING
DIGITAL OUTPUTS - RIGHT SIDE

ProView™

for ProControl Series 2plus

USER'S GUIDE



Version 2.2x

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CHAPTER 1: INTRODUCTION AND INSTALLATION

This chapter provides a brief introduction to ProView features, system requirements for running the program, and instructions for installing it.

Introduction to PROVIEW

ProView is a powerful but straightforward software package used in conjunction with the ProControl system to provide integrated stand-alone control and remote monitoring for your operation. ProView versions 2.1 and higher can serve as an on-site or remote human-machine interface (HMI) for the Series **2**^{plus} ProControl. With ProView you can:

- Monitor system sensors
- Control equipment that are outputs on the ProControl
- Change the way the system operates
- View and change system setpoints, alarm levels, etc.
- Extract and review datalogged system information

In short, ProView can be used to remotely gain the same level of control over your operation as if you were at the site. Although many system parameters can be set with the ProControl's display and keypad (if included), ProView allows a more comprehensive, easy-to-access view into system operations.

In order for ProView to function, your PC must be connected to the ProControl unit. It can be connected in one of two ways. The first way is locally with a cable (provided with your ProControl system) that connects your PC's serial port with the ProControl unit. This method of connection is most often used at the system site using a laptop PC. The second method is remotely via dial-up modem, Ethernet connection, or cellular data connection (depending on your unit) from your office or from anywhere that a connection to the telephone system (for dial-up systems) or internet (for Ethernet and cellular data systems) can be established.



You should be familiar with the operation of the ProControl unit and have read the ProControl User Manual before using ProView.

System Requirements

COMPUTER: You will need a PC or compatible with Microsoft Windows XP or later. A minimum of 10MB of Hard Disk space needs to be available. A mouse or similar pointing device is also required.



Several functions in ProView require the use of the right mouse button. Make sure the right mouse button is not assigned to some other function such as double-click. See your mouse driver software for details.

MODEM (for dial-up connections): You need a Hayes compatible (AT) Modem that supports a data rate of 9600 baud (this means almost any commonly-available modem). The modem can be external or internal. It must be assigned to COM Port 1, 2, 3 or 4.



*Some PCs have been supplied with so-called "WinModems" or "SoftModems", which are not true hardware modems and will **not** work with ProView for communication with a ProControl system. A true Hayes-compatible hardware modem is an inexpensive investment in reliable communications.*

SERIAL PORT REDIRECTOR (for Ethernet and cellular data connections): An Internet Protocol (IP) connection is used to connect to your ProControl unit, and IP is also used to provide outgoing email and text messaging capability for status and alarm reporting (please note that fax reporting is not available with this version). Third party software is required to create a virtual serial port (COM port 1, 2, 3, or 4) on your computer for connection to the static IP addess of the ProControl over the internet. Please refer to either the Ethernet or Cellular Data Quick Start Guide as applicable for more details.

How to Install ProView

1. Close **all** open programs before beginning the ProView installation procedure. Close any task bars for software packages like Microsoft Office that may be lurking at the edge of your screen. *If a ProView installation fails, it is almost always the result of having other programs open at the time of installation. Certain programs, when included in the Windows Startup group, may cause the ProView installation to fail, and must be removed temporarily from the Startup group prior to installing ProView.*

2. Go to our website at www.eosresearch.com, click on the ProView tab at the top, then under Downloads at the bottom of the page click on ProView_2.2xx.exe to download the executable to your computer (be sure to make note of the save location).

3. Go to the location of the saved file, double click on it to start the installation.

4. The ProView installation program will begin and will guide you through the rest of the installation process.

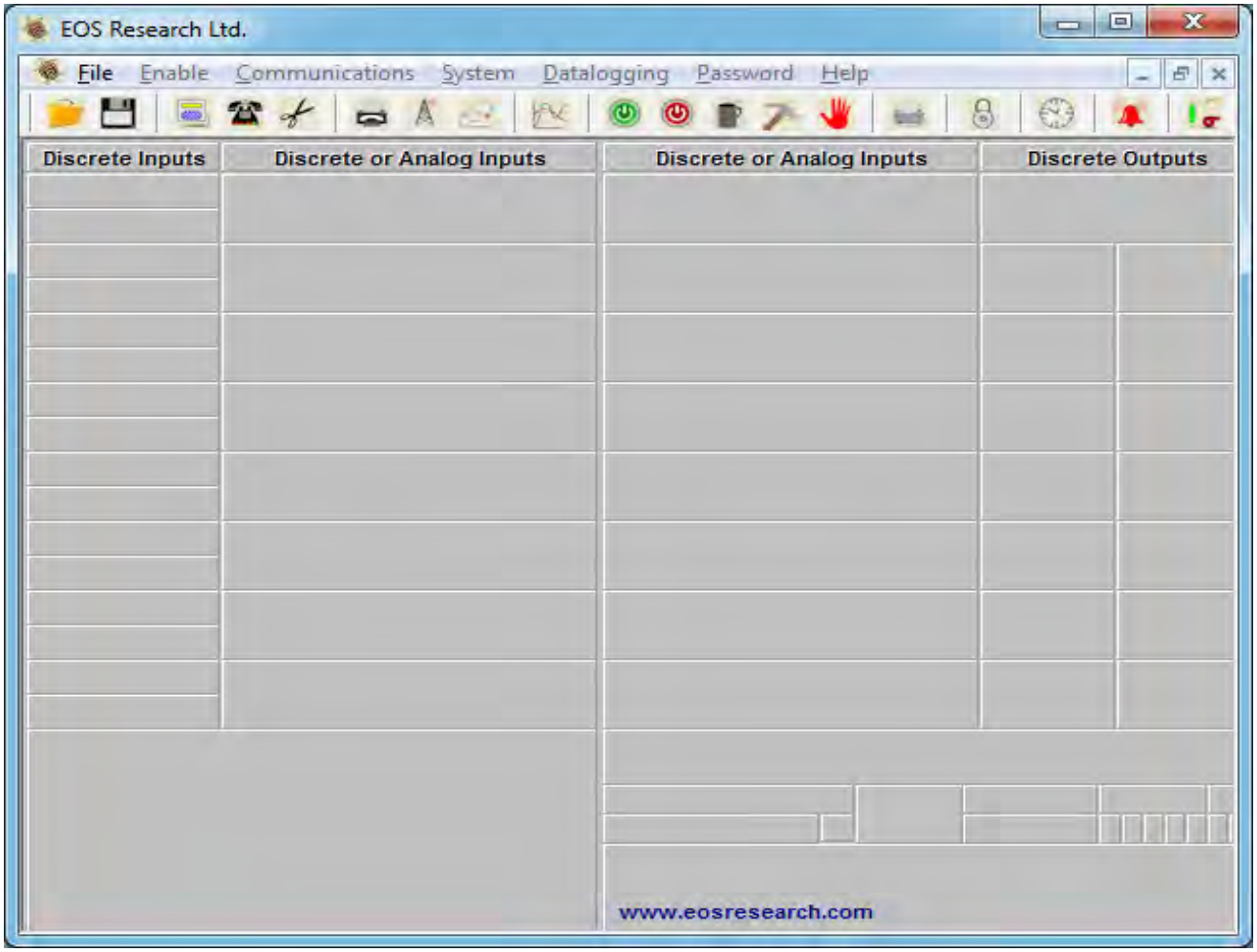
You will also be provided with configuration files (or ***site files***) for every ProControl unit you need to access. At a minimum, you will have a configuration file with a ".pvs" extension and one with a ".not" extension (these are normally supplied pre-configured for you by EOS or your system integrator). Using Windows Explorer, copy these site files to the folder in which your ProView software was installed for ease of access. Depending on your site configuration, you may have other files included along with the two standard site files. The files will have the extensions of .pid or .pvg. You must copy these files to the ProView folder as well.

When the installation is complete, you will see the ProView program group and icon. We recommend making a shortcut to ProView that you can then move to your Windows desktop. *Right*-click on the ProView turtle icon in the program group, then click on **Create Shortcut**. Drag your new shortcut to a prominent position on your Windows desktop.



Running ProView

After installing ProView as described above, double-click on the ProView icon. After an introduction screen, you will see the ProView Main screen.



The main screen contains a series of pull-down menus and a ***Toolbar*** that provides shortcut buttons for commonly-used commands. Placing the cursor over a Toolbar button and leaving it there for a short while produces a "balloon". A ***balloon*** is a small pop-up message that describes the action to be taken if the Toolbar button is "pushed".

Right now, since no site file has been loaded, the main screen is blank, and the toolbar is disabled. All menus except the **File** menu have been "ghosted". A selection is ghosted when the operation represented by the selection is unavailable.

Below the Toolbar are four columns of information arranged in a standard format. These columns are filled in based on the system setup and the current system status. The **Discrete Inputs** column contains information about the switches or sensors connected to inputs 1 through 16 on the ProControl unit. The two columns labeled **Discrete or Analog Inputs** contain information about the 4-20 milliamp (mA) sensors or discrete

switches connected to ProControl inputs 17 through 32 (examples include analog instruments such as flow meters or pressure transducers and digital devices such as float switches). The **Analog Outputs** area resides behind the third column, and is accessed by clicking on the **Discrete or Analog Inputs** label at the top of the column. The **Discrete Outputs** column contains information regarding the devices connected to the ProControl's output relays. The **Extended Outputs** area, behind the **Discrete Outputs** column, contains information regarding any outputs configured beyond the first 14, if available on the ProControl model you are using.

At the bottom of the screen are a series of information boxes. These show the status of certain important system parameters when ProView is connected to a ProControl unit.

A Word About Changing Settings

ProView has been designed to make it easy to view and change the settings that govern the way your system works. However, ProView must always be *connected* to the ProControl unit in order for these changes to take effect. It is important to remember that ProView itself is only a window into the operation of the ProControl unit. It does not provide any control functionality on its own. Chapter 3 discusses how to connect to the ProControl.

When a setting is changed in ProView (e.g., alarm level, password, datalog interval), a "?" is temporarily appended to the description or title of the information to indicate that the new value has been sent to the ProControl. When the "?" disappears, the data has been received by the ProControl and confirmed by ProView.

While many of the controls that change information in ProView are represented graphically, much of the information is displayed in text form. To edit text-based information, click on it and make your changes as you would in any Windows application. When you click on the text, it is highlighted to show that it has the current focus.



*After completing your text editing the changes must be saved by first pressing the **ENTER** key while the cursor is still within the text box being edited, and then clicking on the "OK" button for the current form.*

CHAPTER 2: GETTING STARTED

This chapter explains how to open a ProView site file, describes what's in all those little boxes on the screen, and shows you how to print the system configuration to a file.

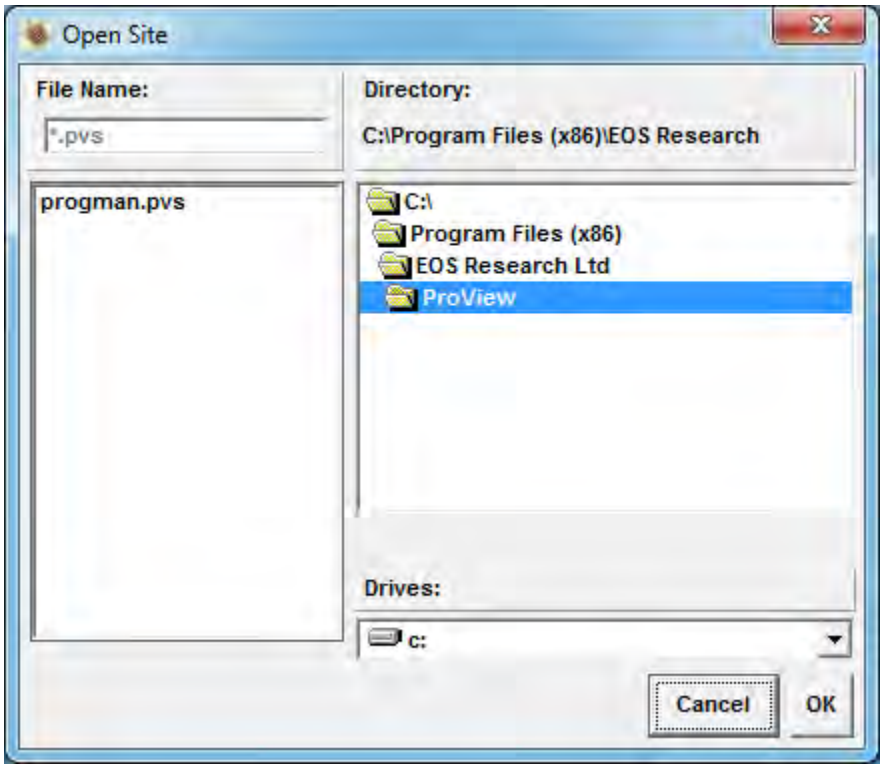
Opening a Site File

Every ProControl unit has a ***site file*** that tells the unit which inputs or outputs are enabled, what their descriptive ***Tagnames*** are and how they should respond to changes in input status. This same file is used by ProView to provide a window into what is going on within the remote ProControl unit and, by extension, with the site operation. To open a site file:

1. Click on the **File** menu, then click **Open Site**. You will see the **Open Site** dialog box. You can also use the ALT-Key combination represented by the first underlined character in the menu name. In this case, use ALT-F.



*For opening subsequent site files, you can use the **Open Site** Toolbar button at the top of the main screen. ProView will also list the last four site files that you accessed at the bottom of the **File** menu. If you wish to open one of these, just click on the appropriate file name.*



2. In the **Drives** area of the dialog box click once on the down arrow to pull down the Drives list, then click on the drive that contains the file you wish to open.

3. In the **Directory** area of the dialog box, click on the folder that contains the file. To move "up" in the directory tree, double-click on the level to which you want to move. To move "down" in the directory structure, double-click on the appropriate folder.

4. In the **File** area you will see all files in the selected drive and folder that have the extension **.pvs** or **.pvg**. Only files with these extensions can be opened. Select the file you wish to open by clicking on the file name in the file list box, then click the **OK** button to open the selected file.

The title bar of the main screen will change to include the file name and version number. The file name and version number are enclosed within brackets.

5. In the **Security** dialog box, enter the password for your site file, and click on the **OK** button or hit Enter.



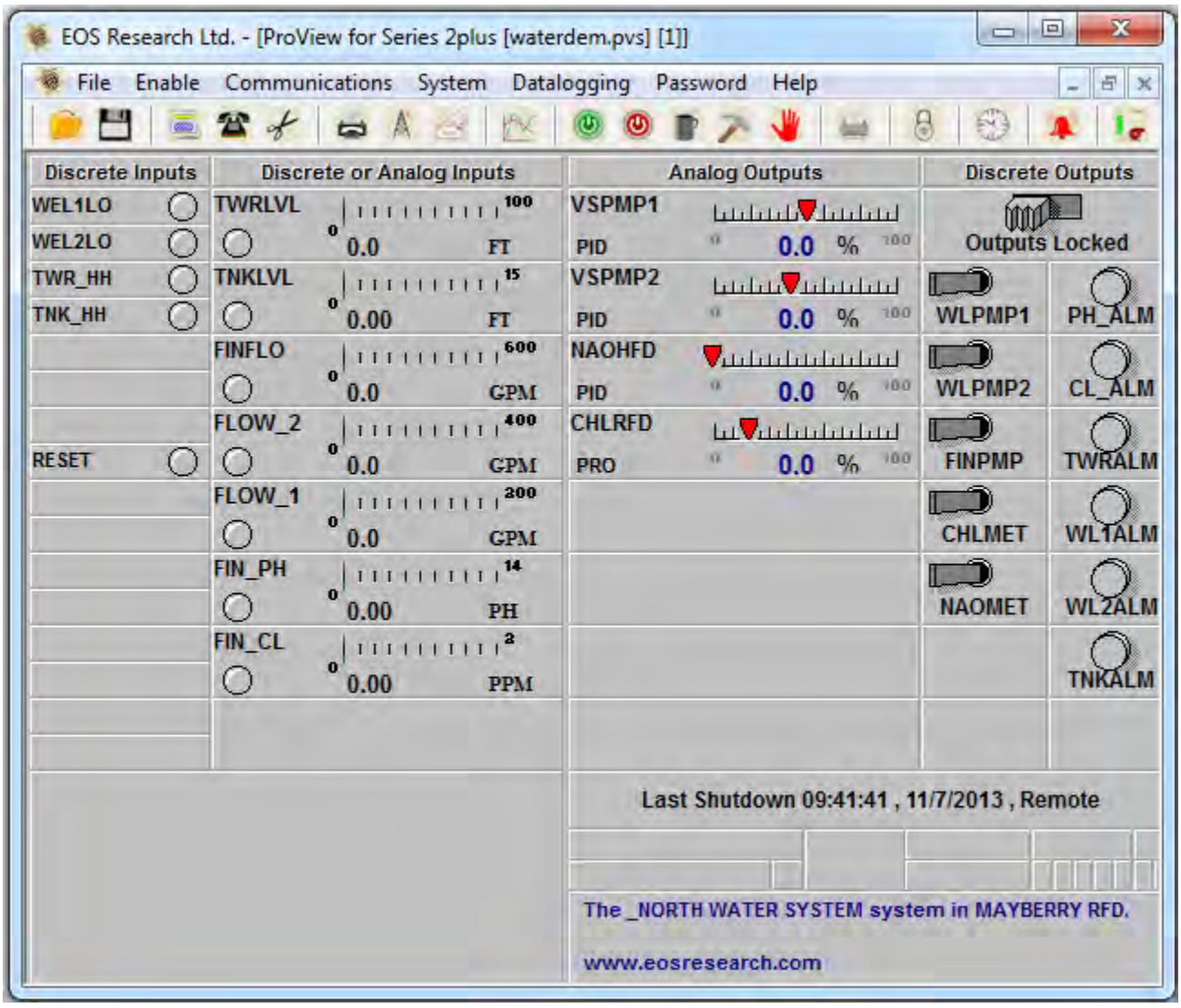
A word about passwords: *The password used in ProView can be different than the one used to access the ProControl unit through its on-board display. In either case the valid characters are 0-9 and A-Z, upper case only. Up to three characters are permitted. The password was designed as a low-level security feature sufficient to prevent inadvertent operation and to deter tampering. It is* ***NOT*** *sufficient in and of itself to withstand a* ***determined*** *effort at system entry. The default password is supplied to you with your ProControl unit by your system integrator.*

6. If the password is incorrect, the dialog box will disappear and a beep will sound. No system configuration information will be shown. You will need to select the **Password** menu and re-enter it.

7. If the password is correct, the **Security** dialog box will disappear and the system configuration information will be shown on the main screen.

FYI

ProView is supplied with a View-Only Mode password, "VOM", which may be used to connect to the ProControl to observe the system status and obtain logged data; however, no changes to any ProControl operating settings may be made when in this mode.



Examining the Main Screen

This particular site file shows five discrete inputs, seven analog inputs, eleven discrete outputs, and four analog outputs.

Discrete Inputs



On the left side of the screen below the heading **Discrete Inputs** are shown the tagnames of enabled discrete (or digital) inputs. To the right of the tagname is a virtual "LED". This LED's color or shape will change based on the status of the input. If a discrete input is "OFF", the LED next to the tagname is gray in color. If a discrete input is "ON", then the LED is green. If the discrete input is "ON" and has been set up as an alarm input the LED becomes a red "Alarm Bell". Some panels are blank because those inputs have not been enabled in this particular site configuration.

Analog Inputs



In the second column below the heading **Analog or Discrete Inputs** are shown the enabled analog inputs. Analog inputs can also be configured as simple discrete inputs. Below the tagname is another LED. This LED behaves in a similar fashion to those for discrete inputs; it is gray when the input is not "active", and green or red when it is in the active state (see the definition for Active State in the ProControl User Manual). A small bar graph provides a visual indication of the value of the analog input. At the left and right ends of the bar graph are numbers that represent the lower and upper limits, respectively, of the analog input values (corresponding to 4 and 20 mA). In this case FLOW_1 has been set up with a range of 0 to 200 GPM. Below the bar graph is a numerical representation of the current value of FLOW_1.

Discrete Outputs

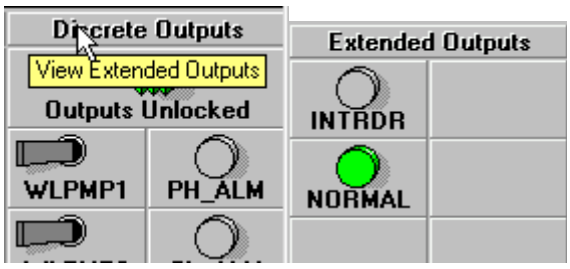


On the right side of the screen below the heading **Discrete Outputs** are shown the enabled discrete outputs, corresponding to the relay outputs in the ProControl. In this site configuration there are 11 outputs. Above the tagname of the output is either a virtual "Toggle Switch" or lamp/button representation. By its position and/or its color it shows the state of discrete output: if the switch is left-leaning and gray the output is "OFF"; if the switch is right-leaning and green then the output is "ON".



Discrete outputs can be configured as an alarm lamp or button when this would be more appropriate. If the lamp/button appears gray then the output is "OFF". If the lamp/button appears red or green then the output is "ON".

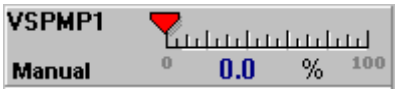
Your system may also have **Extended Outputs**, which are located on a panel behind the discrete outputs. To access these outputs, point your mouse at the words **Discrete Outputs** at the top of the column and click the left mouse button.



FYI

Regardless of what the discrete outputs look like in ProView, they all behave the same way on the ProControl itself – namely, the associated relay output is energized when the output is ON.

Analog Outputs



The third column contains the **Analog Outputs** area. It may be concealed by the second column of **Discrete or Analog Inputs**. To pull the analog outputs to the front, click on the title **Discrete or Analog Inputs** at the top of the third column of the ProView screen.

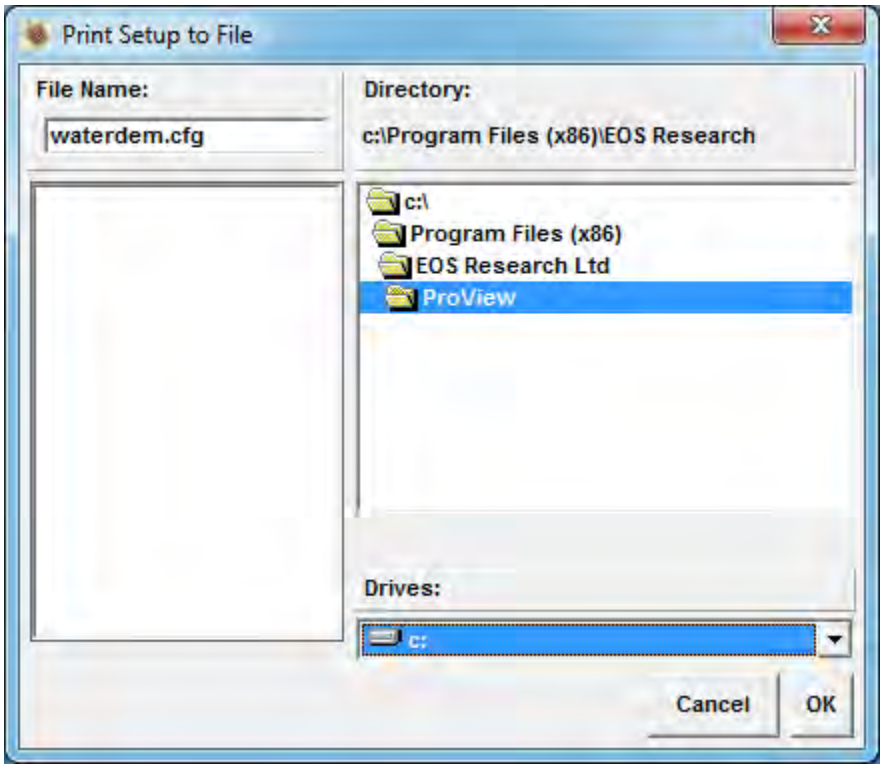
To the right of the tagname there is a slide-scale that indicates the current percentage of full-scale output (0% to 100%), displayed both graphically and with text. Below the tagname is the current mode of the output. This mode can be changed from **Manual**, which indicates the output is under user control, to **PID** or **PRO**, which would indicate that the output is involved in an output control scheme and is under automatic control. These output control schemes are described in Chapter 5 under Analog Output Options.

Printing the Setup to File

A more detailed listing of the site configuration can be made by printing the setup data to a text file. To print the setup, do the following:

1. Click on **Print Setup** in the **File** menu.
   Or
   Click on the Print Setup button. 

2. You will see the **Print Setup to File** dialog box.

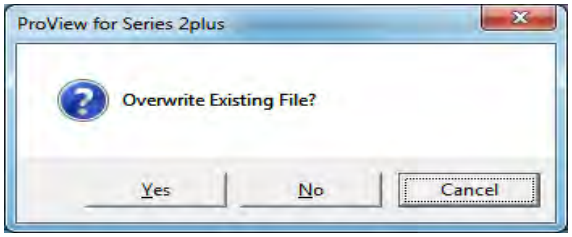


3. Specify the drive and folder in which the text file will be saved.

4. ProView will select a default file name for you, with the extension **.cfg**. However, you can give the file another name if you wish. You can also select an existing .cfg file name by clicking on the file name in the file list box.

5. Click on the OK button to print the setup to the selected file.

If you are overwriting an existing file, a message box pops up to make sure that you don't make a mistake.



A word about Files:
Do not confuse the site configuration file (.pvs), which is a binary file, with the printed setup file (.cfg), which is a text file. A text file can be viewed with a word processing program while a binary file typically cannot.

Examining the Setup File

To examine your site configuration file, use a text editor or word processor such as Notepad or Word to open the file you have just created.

The file produced by our sample site is shown below. The first section consists of identifying information about the ProControl unit and information about the inputs and outputs wired to it.

```
                    EOS RESEARCH LTD.
                  ProControl Series II+

              ProView Configuration File Information


*******************************************************
***** FAX Recipient:     BULLWINKLE MOOSE          *****
***** Customer:          MAYBERRY WATER DEPT       *****
***** Site Location:     MAYBERRY RFD              *****
*******************************************************
***** Setup:             1                         *****
***** Option:            B                         *****
***** Type:              122                       *****
***** Serial Number:     9999                      *****
***** Date:              12/03/2014                *****
***** Time:              15:20:11                  *****
***** ProView:           Version 2.200             *****
*******************************************************
```

THE INPUTS INCLUDED IN THIS SYSTEM ARE:

#	TAGNAME	TAGNAME DESCRIPTION	SETUP*	RANGE
1	WEL1LO	Well 1 Low Level	D,NO,AL	
2	WEL2LO	Well 2 Low Level	D,NO,AL	
3	TWR_HH	Water Tower High Alarm Level	D,NO,AL	
4	TNK_HH	Clearwell Tank High Alarm Level	D,NO,AL	
8	RESET	Reset Switch	D,NO,ST,SU	
17	TWRLVL	Water Tower Level	A,EP,ST	0-100 FT
18	TNKLVL	Clearwell Tank Water Level	A,EP,AL	0-15 FT
19	FINFLO	Finish Flow Rate	A,EP,ST	0-600 GPM
20	FLOW_2	Well 2 Flow Rate	A,EP,ST	0-400 GPM
21	FLOW_1	Well 1 Flow Rate	A,EP,ST	0-200 GPM
22	FIN_PH	Finish Water pH	A,EP,AL	0-14 PH
23	FIN_CL	Finish Water Chlorine Residual	A,EP,AL	0-2 PPM

*INPUT SETUP NOTES

D - This input is a (Discrete) or ON/OFF Input.
A - This input is a (Analog) or Variable Input.
C - This input is a Pulse Flowmeter Input.
P - This input is a Pulse Accumulator Input.
UPP - Units per Pulse. Number of units (i.e. Gallons) to record for each pulse
NO-This input is a (Normally Open) Discrete Input.
NC-This input is a (Normally Closed) Discrete Input.
EP-(Endpoint) This input is "Active" when its value is outside the low to high alarm levels.
WD-(Window) This input is "Active" when its value is between the low and high alarm levels.
ST-(Status) This input shows a green LED in ProView when it is in its Active State.
AL-(Alarm) This input shows a red alarm bell in ProView when it is in its Active State.
SU-(Startup) This is a menu function input. When activated it will run the startup routine.
SD-(Shutdown) This is a menu function input. When activated it will run an emergency shutdown.
MN-(Manual) This is a menu function input. When activated it place the unit in Manual Mode.
AU-(Auto) This is a menu function input. When activated it place the unit in Auto Mode.
SQ-(Square Root) This analog channel's reading is proportional to the square root of the input.
LT-(Lamp Test)This is a Lamp Test input. When activated it will turn on all Alarm Light outputs.

THE DISCRETE OUTPUTS INCLUDED IN THIS SYSTEM ARE:

#	TAGNAME	TAGNAME DESCRIPTION	SETUP*
1	WLPMP1	Well 1 Pump	
2	WLPMP2	Well 2 Pump	
3	FINPMP	Finish Water Pump	
4	CHLMET	Chlorine Metering Pump	
5	NAOMET	Sodium Hydroxide Metering Pump	
8	PH_ALM	pH Alarm	AI
9	CL_ALM	Chlorine Alarm	AI
10	TWRALM	Water Tower High Alarm	AI
11	WL1ALM	Well 1 Low Level Alarm	AI
12	WL2ALM	Well 2 Low Level Alarm	AI
13	TNKALM	Clearwell Tank High Level Alarm	AI

*OUTPUT SETUP NOTES

G1-(Group 1)- This output will not respond to processes 17-32.
G2-(Group 2)- This output will not respond to processes 01-16.
LT-(Lamp Test) - This output has been declared as an alarm light.
AI-(Alternate Image) - This output is displayed as an icon other than the default switch.

```
THE ANALOG OUTPUTS INCLUDED IN THIS SYSTEM ARE:

#  TAGNAME                TAGNAME DESCRIPTION                    SETUP*   INPUT
-- ------- ------------------------------------------------- ---------- ------
1  VSPMP1  Variable Speed Drive for Finish Water Pump         PID,FOR    TWRLVL
2  VSPMP2  Variable Speed Drive for Well 2 Pump               PID,FOR    TNKLVL
3  NAOHFD  Caustic Soda Feed Rate                             PID,FOR    FIN_PH
4  CHLRFD  Chlorine Feed Rate                                 PRO,FOR    FLOW_2

*ANALOG OUTPUT SETUP NOTES
--------------------------
PID  -This output is involved in a PID (Proportional,Integral,Derivative) control loop.
PRO  -This output is involved in an open (Proportional) control loop.
FOR  -The PID or PRO loop will run in the (Forward) direction.
REV  -The PID or PRO loop will run in the (Reverse) direction.
INPUT-This Tagname will serve as the input to the control loop.
```

Input and Output Configuration

The INPUTS section identifies all enabled system inputs from 1 to 32 and describes how they are configured. the input number is followed by its TAGNAME and the TAGNAME DESCRIPTION, which is taken from the Notes file (more on that in Chapter 5). In addition, a SETUP section further identifies each input in terms of its signal nature, analog (A) or discrete (D); its configuration if discrete as Normally Open (NO) or Normally Closed (NC); and its alarm display nature when active, Alarm (AL) or Status (ST). Discrete Inputs can also be configured as functions such as Startup (SU) or Emergency Shutdown (SD), and can be used as a lamp tester (LT) which will illuminate any Discrete Outputs that are configured as lamps. A RANGE is specified for all Analog Inputs as well as the Active State region, denoted Endpoint (EP) or Window (WD).



See the ProControl User Manual for a further explanation of Normally Open, Normally Closed, and related terminology and a description of Endpoint and Window Active States.

The DISCRETE OUTPUTS section is similar except that there are some different SETUP codes. Some outputs may be assigned to groups (G1,G2) that affect the way they are viewed by the process tasks. Outputs which display an Alternate Image (lamp image) than the standard switch image are designated AI.

The ANALOG OUTPUTS section details the setup of any enabled 4-20 mA output loops. The SETUP codes PID and PRO indicate whether or not the output is involved in one of two analog output control schemes known as PID loops or open loop Proportional control. The direction of the analog output control scheme is indicated by forward (FOR) or reverse (REV). The input that provides the reference signal upon which the analog output scheme is based is designated under the INPUT heading.



For a further explanation of PID or open loop Proportional control please see the Analog Output Options section in Chapter 5.

In this particular setup, TWRLVL is the input to the PID control loop that operates on the variable speed pump VSPMP1, with VSPMP1 maintaining a "setpoint" for the value of TWRLVL. The chlorine feed rate CHLRFD will be varied in proportion to the flow rate FLOW_2 under open loop proportional control.

Process Tasks

The next section of the setup file is a listing of PROCESS CONTROL TASKS. These determine how the ProControl unit responds to input changes while in Auto, Startup or Shutdown modes. It is important to note that the ProView software does not take any independent action itself. All automated control decisions are made by the ProControl unit, although you can change many operating parameters via ProView.

```
THE PROCESS CONTROL TASKS EXERCISED BY THIS SYSTEM ARE:

Process 01: If WEL1LO is ON
            THEN Delay for 2 Seconds, Send Report[FAX #1;Page #1],
            Switch WLPMP1 OFF
            Page Message: 'Well 1 Low Level Mayberry North '

Process 02: If WLPMP1 is OFF AND PH_ALM is OFF AND
               CL_ALM is OFF AND TWRALM is OFF AND TNKALM is OFF
            THEN Delay for 30 Seconds, Switch WLPMP1 ON

Process 03: If FIN_PH is High
            THEN Delay for 5 Seconds, Switch NAOMET OFF AND PH_ALM ON

Process 04: If FIN_CL is High
            THEN Delay for 5 Seconds, Switch CHLMET OFF AND CL_ALM ON

Process 05: If TWR_HH is ON
            THEN Delay for 2 Seconds, Send Report[FAX #1;FAX #2;Page #1;Page #2],
            Initiate Shutdown, Switch TWRALM ON
            Page Message: 'Tower's about to overflow, Bullwinkle - COME OUT NOW! '

Process 06: If TNK_HH is ON
            THEN Delay for 2 Seconds, Send Report[FAX #1;FAX #2;Page #1;Page #2],
            Switch TNKALM ON
            Page Message: 'Clearwell Tank High Mayberry North '

Process 07: If TWRLVL is High
            THEN Delay for 5 Seconds, Switch TWRALM ON

Process 08: If TWRLVL is NOT High or Low
            THEN Delay for 5 Seconds, Switch TWRALM OFF

Process 09: If TNKLVL is High
            THEN Delay for 5 Seconds, Switch TNKALM ON

Process 10: If TNKLVL is NOT High or Low
            THEN Delay for 5 Seconds, Switch TNKALM OFF

Process 11: If FIN_PH is High or Low
            THEN Delay for 5 Seconds, Send Report[FAX #1;Page #1],
            Switch PH_ALM ON
            Page Message: 'Finish Water pH Alarm Mayberry North '

Process 12: If FIN_PH is NOT High or Low
            THEN Delay for 5 Seconds, Switch NAOMET ON AND PH_ALM OFF

Process 13: If FIN_CL is High or Low
            THEN Delay for 5 Seconds, Send Report[FAX #1;FAX #2;Page #1;Page #2],
            Switch CL_ALM ON
            Page Message: 'Finish Water Chlorine Alarm Mayberry North '

Process 14: If FIN_CL is NOT High or Low
            THEN Delay for 5 Seconds, Switch CHLMET ON AND CL_ALM OFF

Startup 01: Switch WLPMP1 ON AND PH_ALM OFF AND CL_ALM OFF AND TWRALM OFF AND WL1ALM OFF AND
WL2ALM OFF AND TNKALM OFF
```

```
Startup 02: Delay for 2 Seconds, Switch WLPMP2 ON

Startup 03: Delay for 2 Seconds, Switch FINPMP ON

Startup 04: Delay for 5 Seconds, Switch CHLMET ON AND NAOMET ON


Shutdown 01: Switch CHLMET OFF AND NAOMET OFF

Shutdown 02: Delay for 2 Seconds, Switch WLPMP1 OFF AND WLPMP2 OFF

Shutdown 03: Delay for 2 Seconds, Switch FINPMP OFF
```

This sample configuration has a fairly straightforward process flow. On startup, some of the system outputs are switched on sequentially and all alarm indicators are switched off. On shutdown, all pump outputs and chemical metering devices are turned off. The process tasks are mostly self-explanatory. Some process tasks include fax and pager reporting functions. It is important to remember how and when the process tasks are run:

- Process tasks are run continuously while the ProControl unit is in AUTO mode. Process control tasks are ***event-driven***, i.e., they occur once when the "IF…" conditions are true (subject to any delays). No automatic action is taken in MANUAL mode.

- Startup and Shutdown processes are run in sequence. When the Startup sequence is finished, the unit is placed in AUTO mode and the **Process Tasks** are run. If any Startup process in the sequence fails, then all the non-lamp outputs are turned "OFF" and the unit reverts to MANUAL mode. A Startup process fails when any IF condition is not satisfied for 60 seconds after the Startup process begins (there may not be any IF conditions in your Startup sequence). The Startup sequence begins when the ProControl or ProView operator initiates it. The Startup sequence can also begin when power is first applied to the ProControl unit if the "Auto Startup" option has been enabled.

- The Shutdown sequence works in a similar manner. When the Shutdown sequence is finished, the ProControl unit reverts to MANUAL mode. If any Shutdown process in the sequence fails (is not run after 60 seconds), then all the non-lamp outputs are immediately turned "OFF" and the unit reverts to MANUAL mode. The Shutdown sequence can be initiated either by the ProControl or ProView operator or by a process task (Process 5 does this in our example).

Process Capability

The ProControl runs process tasks which are based on Boolean IF ___ AND ___ THEN ___ logic. There are 64 available processes, 16 of which can be used as part of a startup sequence, and 16 of which can be used as part of a shutdown sequence. Each process can:

- be based on several, simultaneously existing I/O conditions
- include short or long delays for de-bouncing or simple time delay
- use memory variables (registers) for linking processes
- cycle outputs with timers or during certain times of the day
- perform system shutdowns
- send reports to fax and/or pagers

FYI

If you wish to modify the ProControl programming, please contact your Control System Integrator for assistance.

CHAPTER 3: ESTABLISHING COMMUNICATION

This chapter explains how to connect to the ProControl unit using ProView by local serial cable and by remote modem.

By itself, ProView does not reveal very much about your site's operation. It must be connected to the ProControl unit in order to yield any data.

On-Site Local Connection

To establish a local connection to a ProControl equipped with serial port, perform the following:

1. Use the local serial cable supplied with the ProControl to connect the computer you are using to a ProControl unit. One end of the cable terminates with a female 9-pin connector. Use this end to plug into the serial port or USB-to-Serial adapter on your computer. The other end of the serial cable is terminated with a 9-pin RJ-45 connector. Use this connector to plug into the "RS-232/Serial" port on the right hand side of the ProControl unit.



*Be sure to disconnect the serial cable from the ProControl unit after you are finished. If you do not, remote communications and alarm reporting will **not** be possible.*



If the ProControl unit is powered OFF for any reason, wait 45 seconds after power up (3 minutes for a cellular data unit) before plugging in the cable to attempt a local connection. Otherwise, the ProControl's modem may not be properly configured.



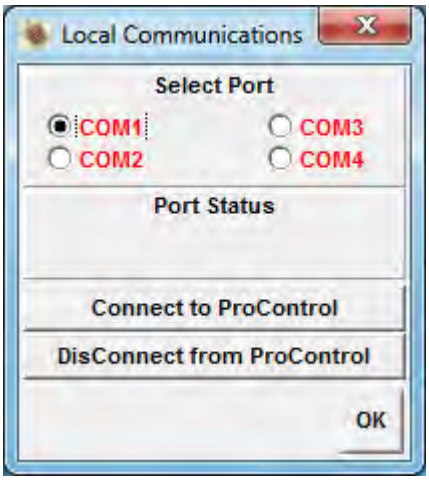
If you have a ProControl unit with Ethernet communications, consult the Ethernet Quick Start Guide for local connection information.

2. Click on **Local Connection** in the **Communications** menu. You can also use ALT-C.

Or

Click on the **Local Connection** toolbar button. 

You will see the **Local Communications** dialog box.



3. Select the COM port to which the ProControl is connected by clicking on the "radio button" next to the COM port you want to use. COM ports 1 through 4 are supported.

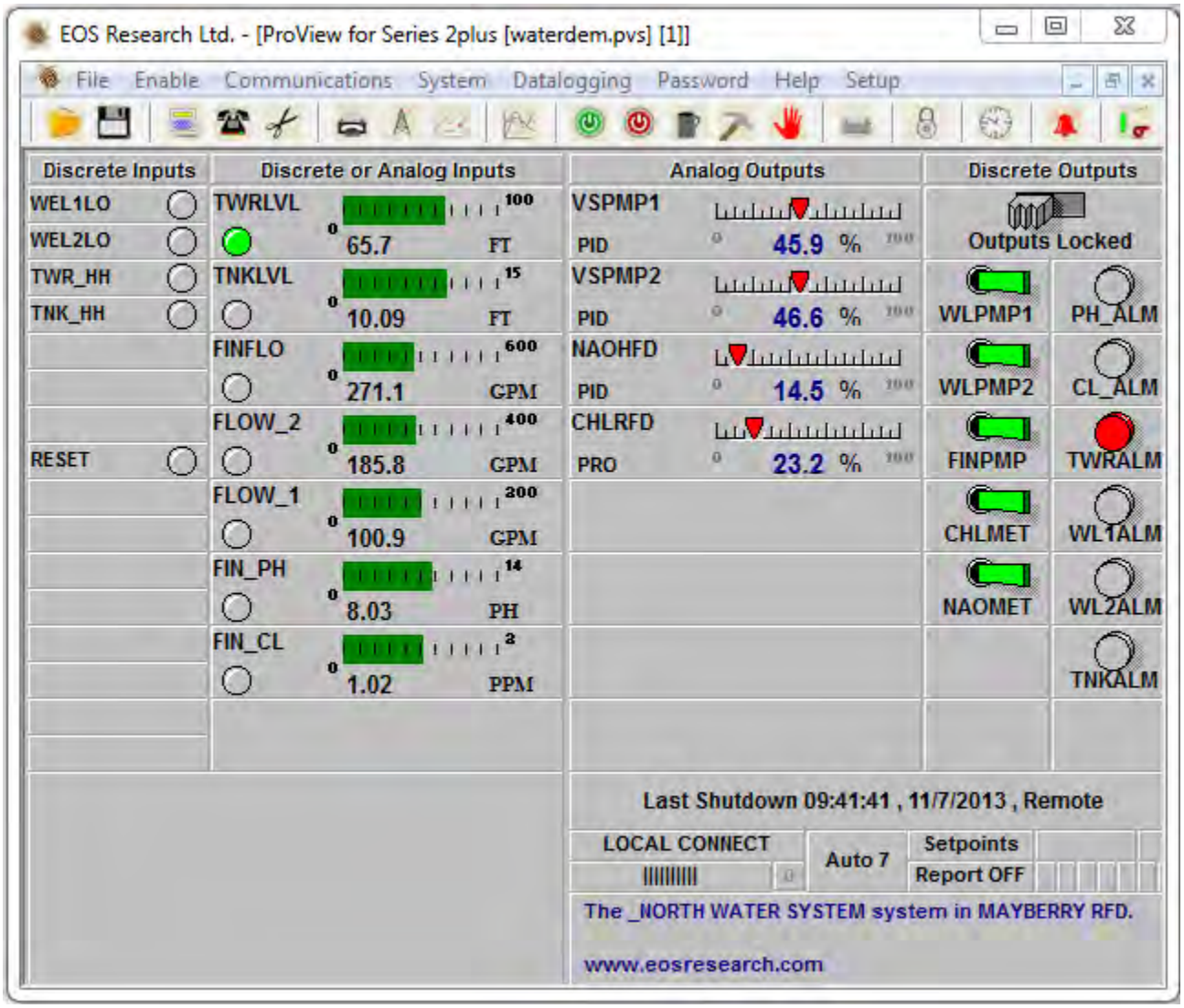
4. Click on the **Connect to ProControl** button.

5. You will see status messages in both the **Port Status** area of the **Local Communications** dialog box and in a small information box near the bottom of the main screen. Usually you will see "Trying Local..." followed by "LOCAL CONNECT" if the attempt is successful. If the attempt is unsuccessful you will see message boxes outlining the suspected problem.

6. After connecting, click on the **OK** button to hide the **Local Communications** dialog box.

After establishing a local connection, ProView will perform an initial scan of site conditions. This will take a few moments during which time the mouse pointer will turn into an hourglass. After the initial scan, data will be updated on the screen every second or so.

Here is a view of the main screen after a local connection has been established:



Note that the screen has been updated to reflect the current operating conditions at the site. At the bottom of the screen, various message panels have been filled in as well.

Dial-Up Remote Connection

For a dial-up remote connection, the procedure is a little different. Follow these steps:

1. Make sure that your modem has been installed properly and that the phone line is plugged in to the proper port on the modem.

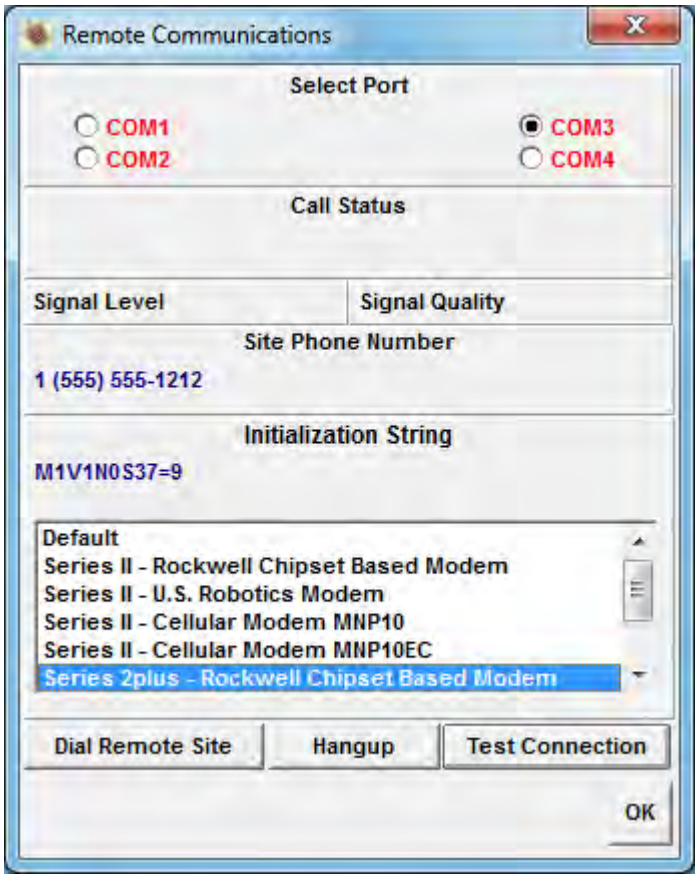
Your modem must be Hayes (AT) compatible and capable of operation at 9600 baud.

2. Click on **Remote Connection** in the **Communications** menu.

Or

Click on the **Remote Connection** toolbar button.

You will see the **Remote Communications** dialog box.



3. Select the COM port to which your modem is connected by clicking on the "radio button" next to the COM port you want to use. COM ports 1 through 4 are supported.

4. Check to see that the **Site Phone Number** is the one you want to dial. If not, click on the phone number and change it. If you need to dial an 8, 9 or some other prefix first to get an outside line, add a comma or two after the prefix to obtain a pause before dialing the main number (e.g., 8,555-1212). Do not add parentheses or dashes.

5. Examine the **Initialization String** to see if it is correct for your type of modem. For Series 2^{plus} systems, you will usually use the **Initialization String** for Rockwell Chipset or U.S. Robotics modems. If these do not work, use the Default string instead.

6. Click on the **Dial Remote Site** button.

7. You will see status messages in both the **Call Status** area of the **Remote Communications** dialog box and in the lower portion of the main screen. Usually you will see the following messages:

Trying Remote...	ProView is attempting to contact your PC's modem
OK	ProView has successfully connected to the modem
Setup...	ProView is sending the initialization string to the modem
Dialing...	ProView is dialing the site phone number
CONNECT 9600	Connection has been established with the remote modem
REMOTE CONNECT	Connection has been established with the remote ProControl unit

8. If the attempt is unsuccessful you will see message boxes outlining the suspected problem.

9. After connecting, click on the **OK** button to hide the **Remote Communications** dialog box.

Cellular Data Connection

For a cellular data connection, please see the instructions in the current version of the Cellular Data QuickStart Guide.

Ethernet Connection

For an Ethernet data connection, please see the instructions in the current version of the Ethernet Quick Start Guide.

Ending a Connection

The simplest way to end a connection, to hang up in essence, is to click on the **Disconnect** button on the Toolbar.  This works for either a local or remote connection.

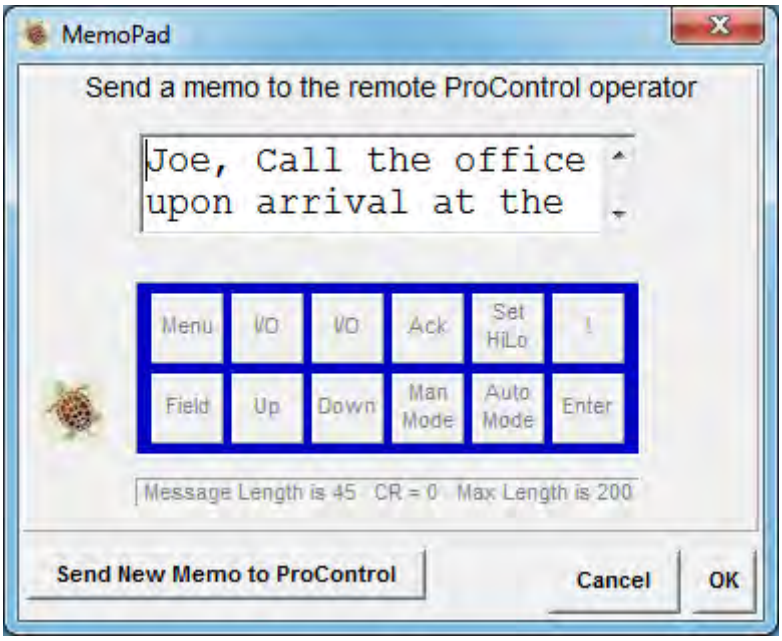
Alternatively, you can re-open the **Local** or **Remote Communications** dialog box and click on either the **Disconnect from ProControl** button (Local) or the **Hangup** button (Remote). After ending the connection, you should see **NOT CONNECTED** in a message box near the bottom of the screen. 

Sending a Memo

A useful feature of the ProControl is the ability to transmit short memos to a site operator. From ProView, you can send a message of up to 160 characters to the display of the ProControl unit. The site operator must acknowledge your memo before returning to his normal display. This feature may be useful in communicating with a person at the remote site.

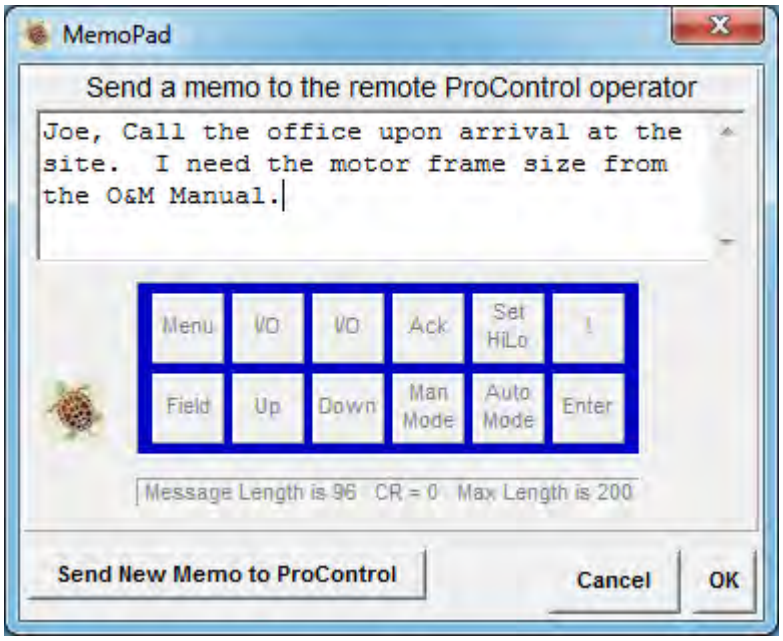
To send a memo, follow these steps:

1. From the **Communications** menu, select **Send Memo**.



2. Type your memo onto the screen of the **MemoPad**. It will appear on the ProControl's display exactly as it appears to you on the MemoPad, two lines at a time. Words will automatically wrap around to the next line, but you may hit Enter (Carriage Return or CR) to jump to the next line if necessary. However, the fewer <CR> characters you use, the longer the text message you can type, since each <CR> represents 20 characters. The **Message Length** counter will keep track of the number of characters you have used. The **Max Length** counter will decrease to let you know how many more characters can be entered.

3. By clicking the right mouse button when the pointer is over the text window, the text window will become larger, allowing you to view more text without having to scroll up and down.



4. Click the **Send New Memo to ProControl** button to send the memo to the ProControl's display, **OK** to temporarily save the memo but not transmit it, or **Cancel** to abort the entire procedure.

5. The **Ack** button on the MemoPad will flash red and your PC will beep to indicate when the ProControl operator has acknowledged your memo.

CHAPTER 4: MANAGING YOUR SITE

This chapter explains how to change the way your ProControl system operates by switching between Manual and Automatic modes, initiating a startup or shutdown sequence, and changing other general system settings.

Switching Between System Modes

There are four modes of operation for the ProControl: Manual, Automatic, Startup and Shutdown. To initiate a switch to a different mode, simply click on the appropriate Toolbar button  or click on **Process Operations** in the **System** menu.

Goto AUTO Mode:  Clicking on the coffee cup will place the ProControl into Automatic mode.

Goto MANUAL Mode:  Clicking on the hammer will place the ProControl into Manual mode.

STARTUP System:  Clicking on the green "power button" causes the ProControl to initiate a Startup sequence.

SHUTDOWN System:  Clicking on the red "power down" button causes the ProControl to initiate a Shutdown sequence.

Emergency OFF:  Clicking on the red hand will cause an Emergency Shutdown, which turns off all outputs immediately and places the ProControl in Manual mode.



*Be sure you understand the safety risks and other implications of issuing these commands. When the icons are clicked, the actions are **immediate** and equipment may start up or shut down automatically. **Most importantly, switching the ProControl to Manual mode will defeat any safeguards programmed into the system and allow equipment to continue running without any process control.** Manual mode should only be used on a short-term basis for system troubleshooting or clearing alarm conditions, preferably with de-powered equipment circuits.*

You can monitor the current system mode by looking at the message panel at the bottom of the main screen.



The system is currently in Manual mode.



The system is currently in Auto mode.

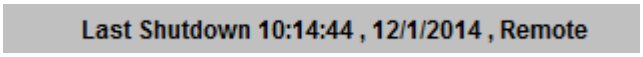


The system is currently in Startup mode, the last startup task run was startup task #2.



The system is currently in Shutdown mode, the last shutdown task run was shutdown task #2.

The last action to initiate a Shutdown is listed in another message panel at the bottom of the screen. In the example below, the shutdown was initiated by a remote user.



System Operations

Following are several other operational parameters that can be set by ProView.

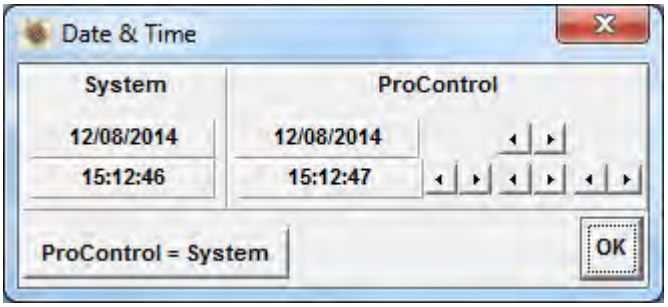
Date & Time

The ProControl unit maintains an internal real-time clock which it uses to time-stamp datalogged information and control other important system functions. To set the **Date & Time**:

1. Click on the **System Time** toolbar button. 

   Or

   Choose **System Operations** from the **System** menu and click **System Time**. You will see the **Date & Time** dialog box.



2. The left side of the dialog box displays the current date and time kept on your PC. The right side of the dialog box is the date and time according to the ProControl unit. Follow the procedure outlined below if you need to change the time.

3. To set the ProControl's clock equal to the PC's clock click on the **ProControl = System** button. To set the ProControl's clock to a specific time use the time spinners  . The upper spinner changes the date and lower set of three spinners change the hour, minute and second (left to right, respectively).

4. To set your PC's time (System time) use the Windows Control Panel.

FYI

Daylight Savings Time is not supported by the ProControl's clock. You will need to make any necessary changes manually.

Changing the time by a large amount can lead to discontinuities in the datalogging history of your ProControl unit, particularly if you move the ProControl's time forward. See the section on Datalogging Setup in Chapter 5 to check on your system's datalogging status.

Alarms

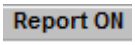
An alarm is only an **audible** indication to the operator that an input signal is in its ***active state***. On the ProControl unit, the beeper sounds if the **Alarms** are **Set**, the unit is in Manual mode and an input is in the active state. The Alarm continues to sound until it either is acknowledged by the operator or times out by itself. In ProView, a "Beep" sounds from the PC if the **Alarms** are **Set**, and an input that has been configured as an **Alarm Input** enters the active state. No acknowledgment is necessary.

The current status of the alarm feature is displayed in a message box at the bottom of the main screen. To enable or disable Alarms, click on the **Alarms** toolbar button,  which toggles this feature on and off.

Or

Click on **Set Alarms** in the **Enable** menu.

Remote Reporting

A report can be a fax or a pager message (for dial-up units) or an email or text message (for cellular data and Ethernet units) sent by the ProControl. In order for any reporting to occur, **Remote Reporting** must be enabled. The current status of the reporting feature is indicated in a message box at the bottom of the main screen. 

To enable or disable remote reporting, click on **Remote Reporting** under the **Enable** menu. A check mark is displayed if reporting is enabled.

Log Off Remote User

This function is used occasionally to reset the remote ProControl's display to the password menu. It is often used to ensure that an on-site user does not change any ProControl settings while you are remotely connected, and to ensure that password protection is restored if the last user did not Log Off locally.

To Log Off the remote user, choose **System Operations** from the **Systems** menu, and click on **Log Off Remote User**.

Initiate FAX NOW!

This function is the equivalent of pressing FAX NOW on the ProControl unit. It is used to generate and send a current fax status report to the currently enabled fax numbers. Fax reports must be enabled in the **FAX Report Setup** dialog box and ProView must be connected via modem (remotely) for this command to proceed.

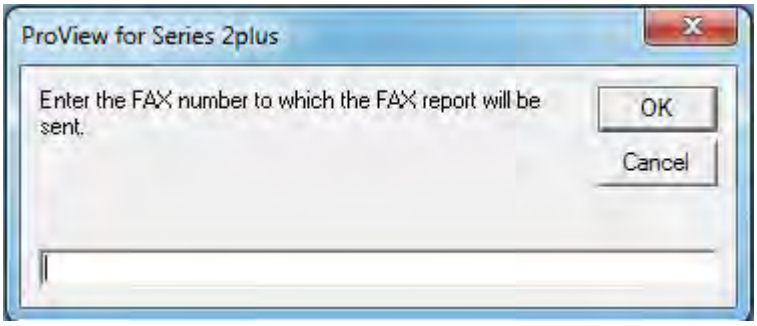
ProView will disconnect from the ProControl unit (hang up) after issuing this command to free the remote phone line for fax use. Normal FAX back operations and times will not be affected.

To initiate the fax, choose **System Operations** from the **Systems** menu, and click on **Initiate FAX NOW!**

Initiate New FAX NOW!

This function is identical to **Initiate FAX NOW!** except that you can specify a number that is not currently enabled to receive faxes from the ProControl. You can use this for testing the fax capabilities or to send a fax update to a third party.

To initiate the fax, choose **System Operations** from the **Systems** menu, and click on **Initiate New FAX NOW!**



ProView will alert you first that you will be disconnected from the system in order for the fax to proceed. Enter the FAX number to which the fax report will be sent, making sure you include a prefix or the numeral 1 and the area code, if necessary. Click the OK button to send the fax report.

CHAPTER 5: CHANGING SYSTEM PARAMETERS

This chapter explains how to change the settings that govern much of the operation of your system, such as the state of a discrete output, analog alarm levels and fax, text, email and datalogging setups.

Switching an Output State

The state of a discrete output can be changed manually by clicking on the "switch" associated with its tagname. ProView includes a "locking" feature for discrete outputs as a safety measure to prevent inadvertent output changes; you must "unlock" the outputs in order to turn them on or off. The outputs are locked and unlocked by clicking on the "slide switch" at the top of the **Discrete Outputs** section of the main screen.





You should leave the slide switch in the **Locked** position whenever possible.

! *Bear in mind that if the ProControl unit is in Auto mode, any discrete output change you make may be "overridden" by a process control task. Do not turn outputs on or off unless you are familiar with the process control in effect for your system.*

1. 

To change the state of a discrete output, click on the toggle switch.

2. 

The toggle switch will change positions, and a "?" will appear for a moment after the tagname. This indicates that the command was sent to the ProControl unit but that confirmation of the state change has not yet been received.

3. 

The "?" will disappear after confirmation of the state change has been received from the ProControl unit.

Depending on your site configuration, you may be able to change certain parameters that affect how the discrete outputs in your system operate in Auto mode.

Process Groups

The ability to set a ***Process Group*** is a rarely-used feature that prevents an individual output from being switched by certain process tasks when in Auto mode. If your ProControl has been configured for Process Groups, you can switch between Group 1 (ignore processes 17 – 32) and Group 2 (ignore processes 1 – 16).

Do NOT enable process groups unless your ProControl has been configured specifically to use this feature! *Be sure you understand the safety risks and other implications of issuing these commands.*

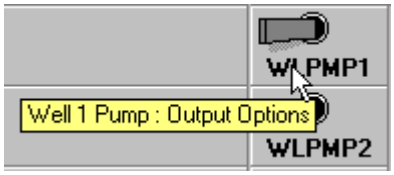
Output Cycle

Some of your outputs may have been configured as "Switched" outputs, where the output is turned on and off according to a timed cycle, or during a specific time of day.

Output Options

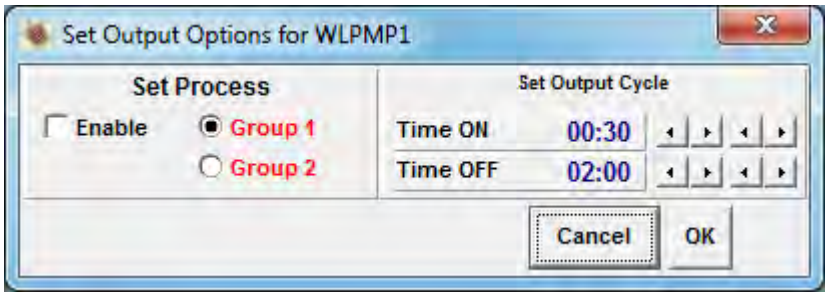
To change an output option, do the following:

1. Place your mouse pointer over the output's tagname until a balloon appears. Click the *right* mouse button until you see **Output Options**.



2. Click the *left* mouse button.

3. You will see the **Set Output Options** dialog box. The **Set Process** or **Set Output Cycle** panels may not be visible if those options do not apply. Both panels will be disabled if ProView is not connected to a ProControl unit.



4. To enable a Process Group click on the **Enable** check box and click either the **Group 1** or **Group 2** radio buttons in the **Set Process** panel. Once again, ***Do NOT enable process groups unless your ProControl has been configured specifically to use this feature!***

5. If the output has been configured to run in a switched mode, you will be able to change the **Output Cycle** times by clicking on the value you want to change and entering the new time in an **hours:minutes** format (be sure to hit Enter after you type in the new time). Alternatively, click on the up or down spinners to increase or decrease the time you want to change.

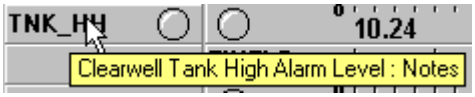
6. Click on the **OK** button to confirm the changes and send them to the ProControl unit. Click on **Cancel** to get rid of any changes.

Notes

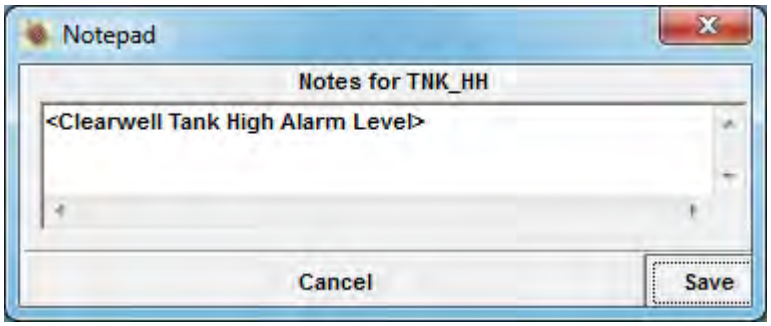
Each I/O point can have its own set of associated ***Notes***. The notes are stored on your PC in a file with a **.not** extension along with your **.pvs** file. You can attach notes that explain the functional purpose of the I/O point or define the I/O point in more detail. This can eliminate uncertainty that may result from the limitation of six characters in each point's tagname.

To edit an I/O point's notes do the following:

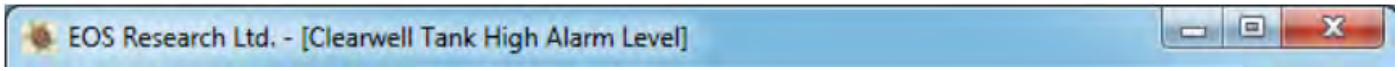
1. Position the mouse pointer over the I/O point's tagname until a balloon appears, and *right*-click until you see **Notes**.



2. Click the left mouse button to enter the "Notes" feature. The **Notepad** dialog box appears.



3. Click in the **Notes** window to edit or add descriptive text. Any notes enclosed in angle-brackets (i.e. <note>) will appear within the balloon when you position the mouse pointer over the tagname, and at the top of the main screen.



4. Click the **Save** button to save your notes and/or definitions or press **Cancel** to exit without saving. You must also save the site file before exiting ProView to retain any changes made in Notes.

FYI

Sometimes it is a good idea to provide a more complete description of what an input or output does in the Notes; e.g., "Causes System Shutdown" or "Turns ON when Tank is Full". Feel free to customize the notes to suit your purposes; they are stored locally on your PC and do not affect the operation of the ProControl itself.

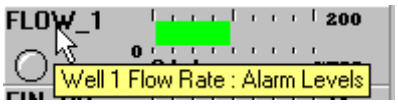
Analog Alarm Levels

The analog alarm levels define what parts of an analog input's range are considered "active" and which are not. This affects not only the color of LED's and bar graphs on the main screen but also can affect process control if the analog input is used in a process task. Depending on how your system has been configured, you

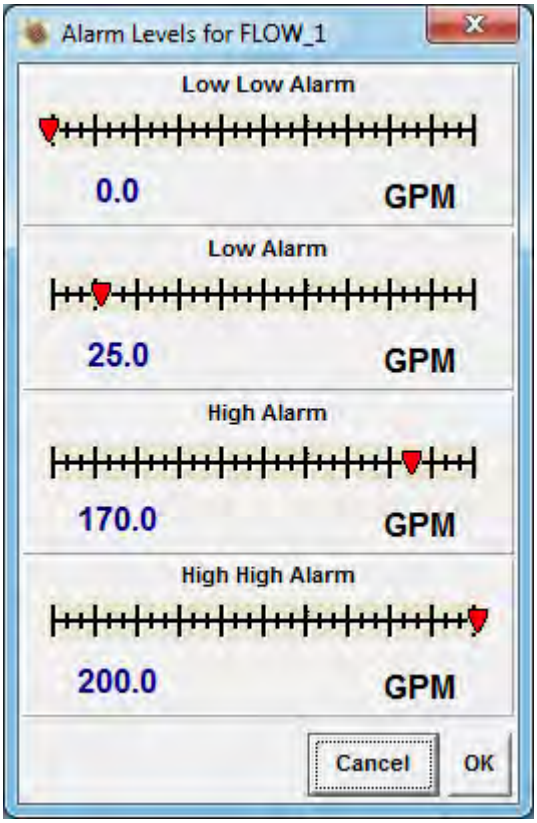
will be able to set up to four "activation levels" that define when an input becomes active. Some ProControl configurations allow you to set a ***Low Alarm Limit*** and a ***High Alarm Limit***, while others allow you to additionally define a ***Low-Low Alarm Limit*** and a ***High-High Alarm Limit***. These activation levels are somewhat more flexible in use than their names imply, in that they are not only used to trigger alarms. If an alarm limit value is exceeded, it could be used to simply turn on a pump or reset a switch, for example.

To set an analog alarm level, do the following:

1. Position the mouse pointer over the I/O point's tagname until a balloon appears, *right*-click until you see **Alarm Levels**.

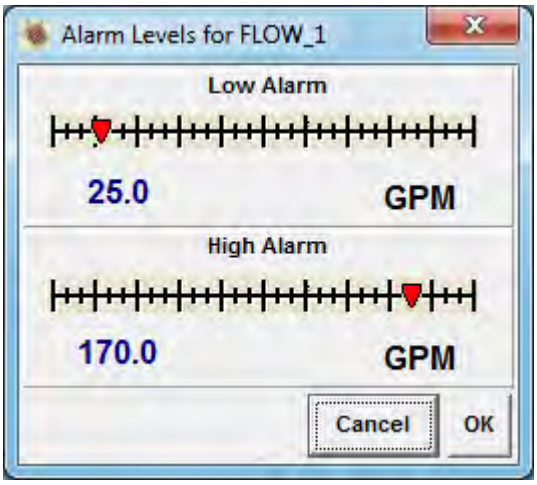


2. Left-click and the **Alarm Levels** dialog box appears.

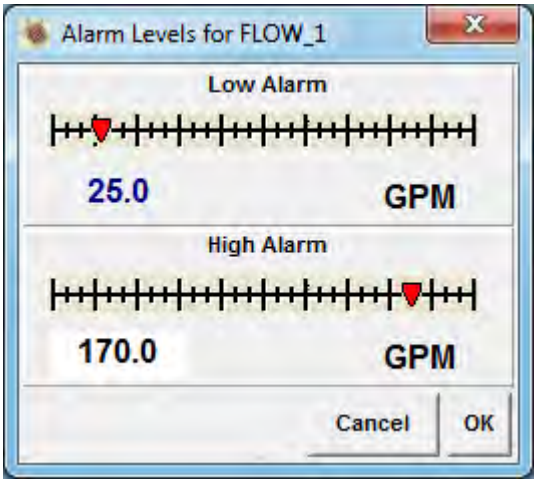


3. The present alarm levels are shown in text as well as in the position of the sliders. Note that the **High Alarm** value must be greater than the **Low Alarm** value, and the **High High Alarm** value must be greater than the **Low Low Alarm** value.

4. You may adjust the alarm values by clicking and holding a red slider and moving it to the left or right. As you move the slider the numeric value is updated to reflect the change you are making. The alarm level will be set to a new value when you release the mouse button.



5. Alternatively, you may click on the alarm level text and edit the value for the alarm level. This is usually a better way to input a precise value. Be sure to hit the Enter key to send the new value to the ProControl unit. Click on the **OK** button to hide the **Alarm Levels** dialog box.





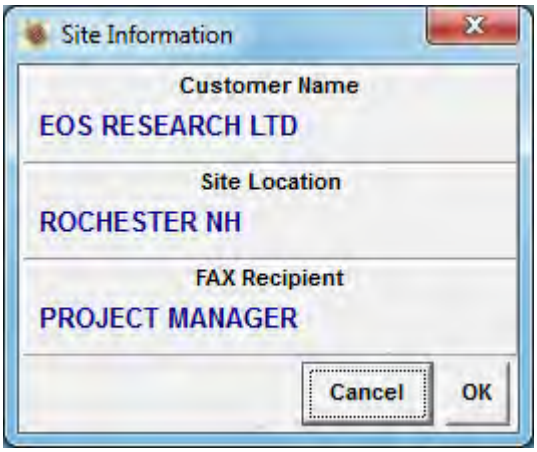
*Remember that any changes you make to the alarm levels are **immediate** and may impact the process control for your system. Be sure you understand the safety risks and other implications of issuing these commands.*

Site Information

Site Information refers to data used in the fax report and in the various files printed by ProView.

To view or change the Site Information do the following:

1. Click on **Site Information** in the **File** menu. The **Site Information** dialog box appears.



2. To change the **Customer Name**, **Site Location** or **FAX Recipient** click on the text you want to change and edit it. Only uppercase letters, numbers and blank spaces are allowed. The **Customer Name** field also appears on the main screen of the ProControl unit's display.

3. Click on the **OK** button to confirm the changes and send them to the ProControl unit. Click on **Cancel** to get rid of any changes.

FAX Report Setup

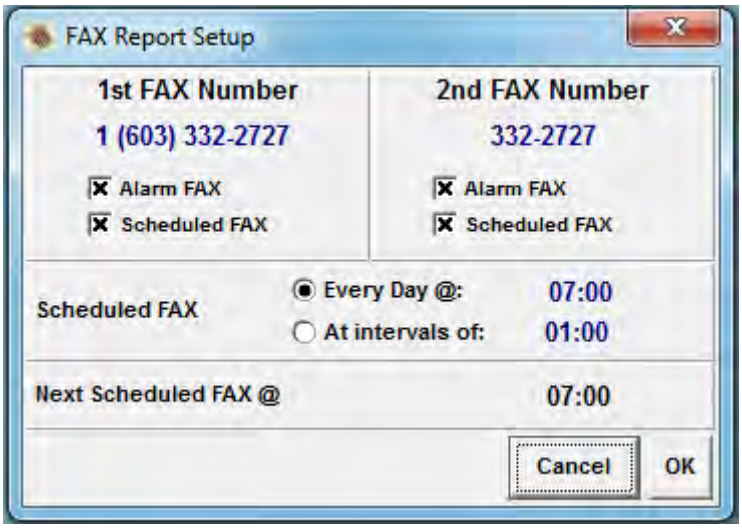
This setup screen is used to change when and where the ProControl's fax report is sent, and whether individual fax recipients are enabled (only applicable to dial-up ProControl units).

To view or change the FAX Report Setup, do the following:

1. Click on **FAX Report Setup** in the **Communications** menu.

Or

Click on the **FAX Report Setup** toolbar button.  You will see the **FAX Report Setup** dialog box.



2. If **Remote Reporting** is not enabled, the contents of the dialog box will appear "grayed out" or disabled.

3. The first and second FAX number panels determine what kinds of fax reports are sent by the ProControl unit and where they will be delivered. There are two kinds of fax reports generated by the ProControl. A **Scheduled FAX** report occurs on a regular basis to provide a status report, while an **Alarm FAX** report will be sent when issued by a Process Task that has been configured to do so (usually to report an alarm condition). To enable either type of fax report click on the **Alarm FAX** or **Scheduled FAX** check boxes. If you enable Scheduled FAX reports the Alarm FAX reports for that same number are automatically enabled as well. You cannot enable only Scheduled FAX reports.

4. To change the phone number to which the ProControl will fax reports click on the phone number and edit it. The ProControl can fax to two different phone numbers. It will make up to three attempts to send the fax. If the first try is unsuccessful, the second try will be initiated 5 minutes later, and a third attempt will be made 5 minutes after that. If the third try is unsuccessful the fax attempt will be abandoned and the ProControl will enter a fax failure into the Events log (see Chapter 6). The ProControl will try both phone numbers (if they are both enabled) on the first try before moving on to a second attempt.

5. In the **Scheduled FAX** panel, you can select when the regularly scheduled faxes are sent. Choose the **Every Day @** button and edit the time to the right of it to have a report sent at the same time every day (24-hour clock). To have a report sent at a specific time *interval*, choose the **At intervals of** button and enter the time interval in HH:MM format. When you hit Enter, the data will be sent to the ProControl unit.

6. The **Next Scheduled FAX** variable indicates when the next *scheduled* fax report will be sent. You can also change it yourself if, for instance, the ProControl is set to fax every hour but you would like it to skip a few hours before resuming. To set the **Next Scheduled FAX** time click on the time in that panel and enter the new time in 24 hour format. Note that if you enter a Next Scheduled FAX time that is earlier than the current time as determined by the ProControl's clock, you will prevent any scheduled faxes from being sent until the next day at that time.

7. Click on the **OK** button to confirm the changes and send them to the ProControl unit.

Texting/Paging Setup

This setup screen is used to change where the ProControl's alarm text or pager messages are sent, and whether individual recipients are enabled. Note that dial-up units require a modem access phone number for texting or paging - you will need to contact your paging/messaging service directly to obtain some of the information necessary for proper messaging setup. Cellular data and Ethernet units require the cell phone carrier's messaging web address (e.g., vtext.com for Verizon) in combination with the cell phone number. The texting/paging capability is similar to the ProControl's fax capability in that you can send information to two cell phones/pagers and it will make three attempts at reaching each number.



For dial-up units you will need to obtain your pager company's modem dial-up phone number and your pager's modem dial-up ID (this is often different than your regular pager ID). This information is generally not available from the customer service staff at the pager company. You may need to ask for someone in technical support who is familiar with TAP modem dial-up.

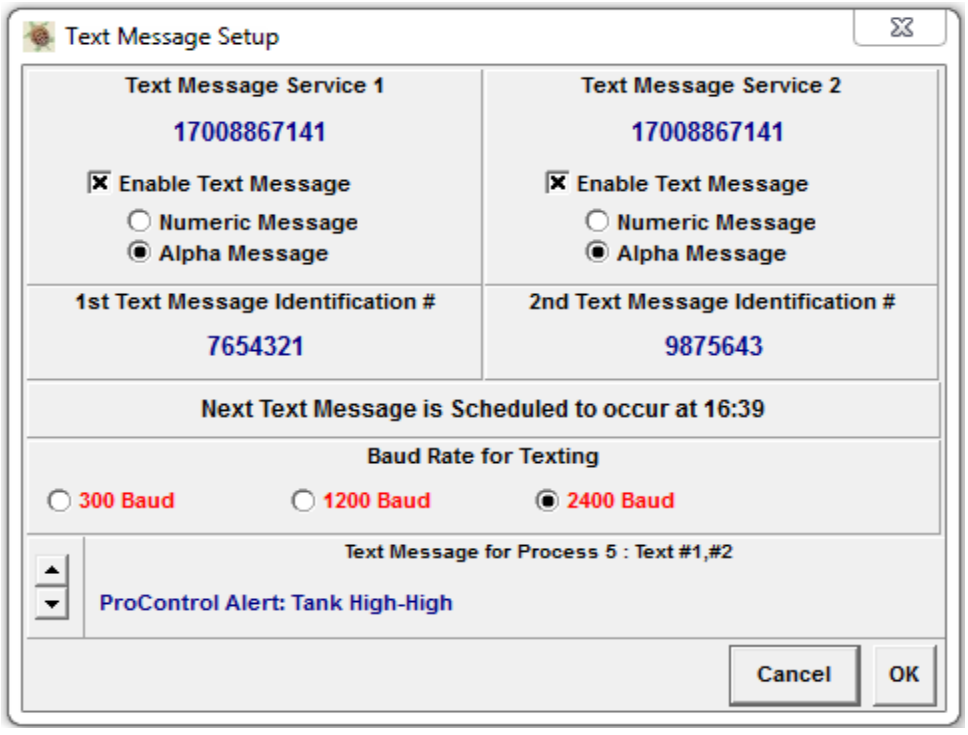
To view or change the texting/paging setup, do the following:

1. Click on **Text Message Setup** in the **Communications** menu.

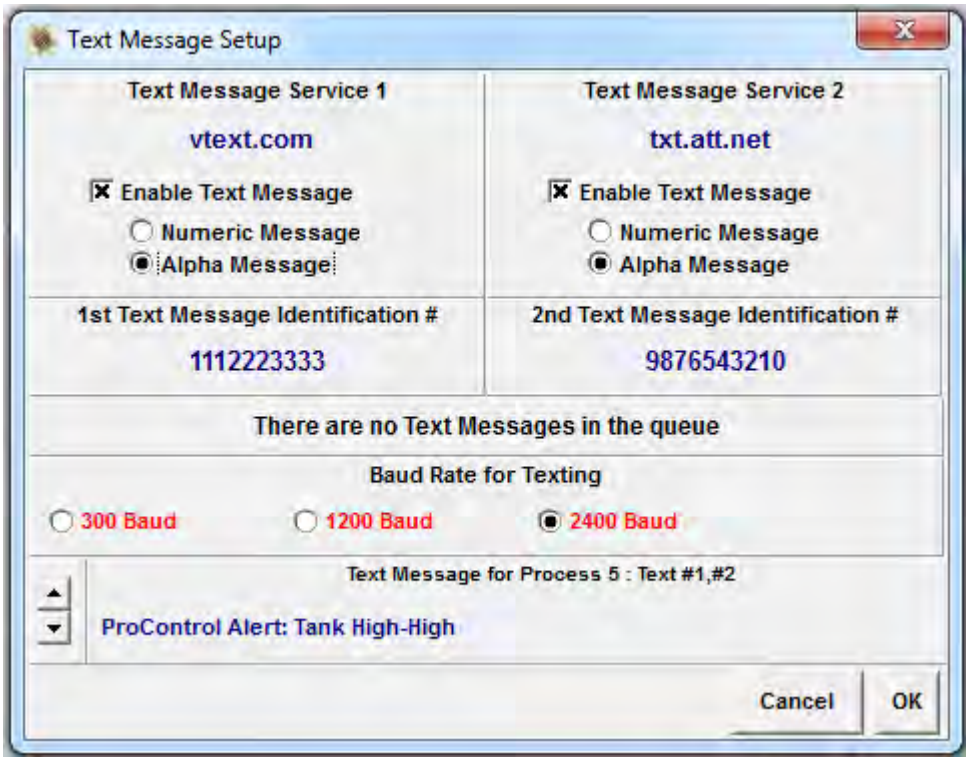
   Or

   Click on the **Text Massage Setup** toolbar button.  You will see the **Text Message Setup** dialog box.

Dial-Up Unit Example



Cellular Data/Ethernet Unit Example

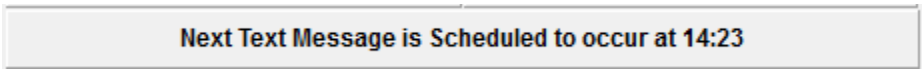


2. For dial-up units - In the **Text Message Service** panels, enter the telephone number for your pager/messaging service company's modem dial-up and hit enter to update the ProControl. For cellular data and Ethernet units enter the cell phone carrier's messaging web address and hit enter to update the ProControl.

3. Click on the **Enable Text Message** check box, and choose **Numeric Message** or **Alpha Message** (text). For cellular data and Ethernet units always select Alpha Message.

4. Enter the pager ID number you obtained from the pager company or 10-digit cell phone number in the **Text Message Identification #** panels and hit enter to update the ProControl.

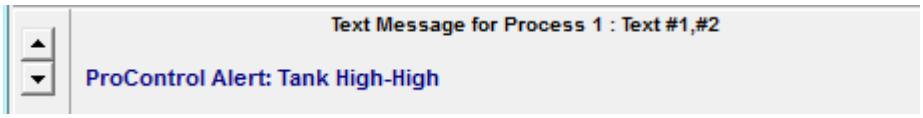
5. The next panel indicates whether there are any queued pages or text messages. In other words, if a message has not yet been successfully completed and you have connected to the ProControl with ProView, you may be interfering with the ProControl's attempts to send a message.



6. For dial-up units only, select the baud rate in the **Baud Rate for Texting** panel, which is the speed at which the message information is sent to your paging/cellular provider. It is generally recommended that you use 1200 baud or less for the greatest reliability. Even at 300 baud, the ProControl takes only a few seconds to transmit the information to your provider.

7. The **Text Message** field allows you to view and/or change the information that will be transmitted to your cell phone/pager from specific events. If you are using a numeric pager, this message cannot

exceed nineteen digits in length and may contain only numerals. If you are using an alphanumeric pager, this message can be up to 80 characters in length. After you edit the message, hit Enter to send the updated message to the ProControl unit. Use the up and down spinners to view the other Process Tasks that cause pages to be sent. You should be familiar with the process control of your system before attempting to make changes to these messages.

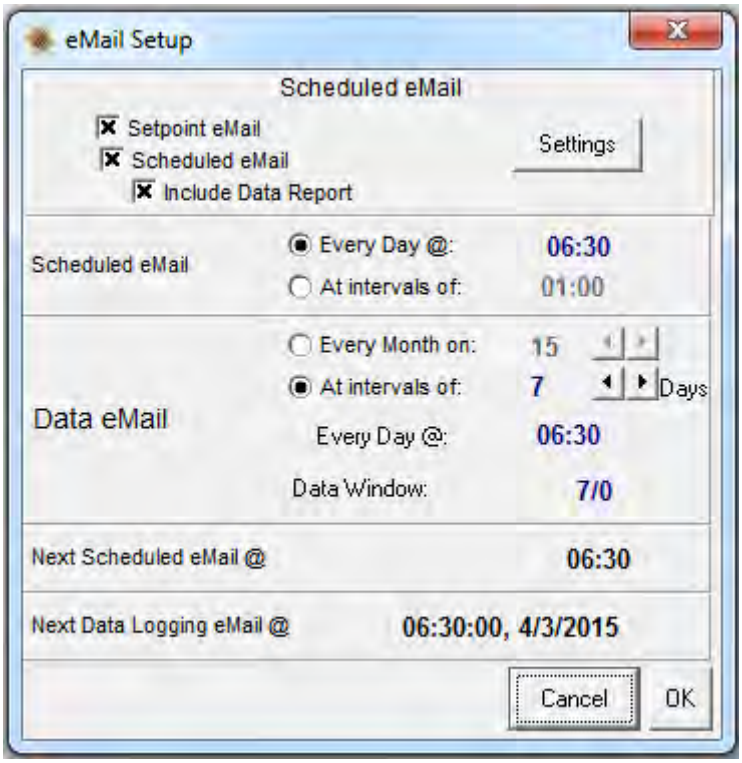


8. Once you have finished making your changes click **OK** to close the dialog box.

Email Set-Up for Cellular Data and Ethernet Units

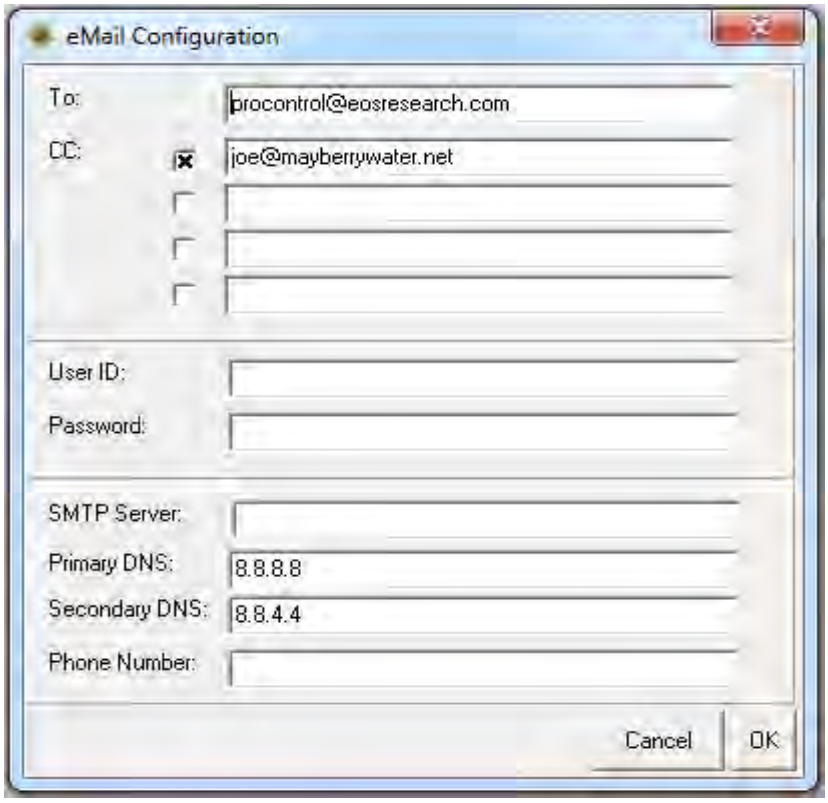
Cellular data and Ethernet units will send status, alarm, and datalog emails to up to 5 recipients

1. Click on the "eMail Report Setup" icon  and the following screen appears:



The report options are generally self-explanatory. Click the "Include Data Report" checkbox to have datalog files attached to the scheduled emails. The "Data Window" indicates the number of days/hours of data to include.

2. Click the "Settings" button to see the following screen:



Enter email addresses of the desired recipients here. Be sure to hit the "Enter" key after each entry. The only other settings in this window are the SMTP Server and DNS addresses. EOS Research personnel will configure these for you; **please contact EOS Research before making any changes to these settings**. Click the "OK" button to save the configuration.

Datalogging Setup

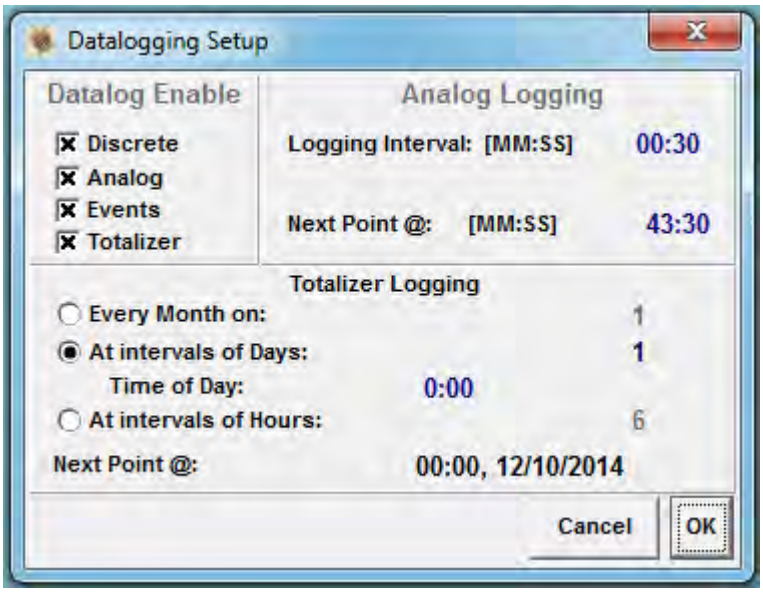
There are three different types of datalogging on the ProControl. Discrete input and output changes are logged as they happen. Events are also logged as they happen, and include changes in control mode (e.g., Auto, Manual), local and remote connections to the ProControl, system startup/shutdowns, fax or page failures, and execution of *Process Tasks*. Analog input and output values are logged at specific time intervals determined by the user. The **Datalogging Setup** dialog box is used to determine how datalogging is carried out in the ProControl unit.

To view or change the **Datalogging Setup** do the following:

1. Click on **Datalogging Setup** in the **Datalogging** menu.

Or

Click on the **Datalogging Setup** toolbar button.  You will see the **Datalogging Setup** dialog box.



2. To enable a type of datalogging click on the **Discrete**, **Analog, Event or Totalizer** check boxes located in the **Datalog Enable** panel.

3. To change the logging interval for analog inputs click on the time value indicated for **Logging Interval** and edit it. This interval can range from 1 second to 24 hours, expressed in minute/second format or hour/minute format (default). Clicking on the **HH:MM** adjacent to the **Logging Interval** will toggle between hour/minute format and minute/second format.

4. The **Next Point @** variable is set by the ProControl every time a data point is logged to show you when the next analog data points will be logged. You can change this value if you wish the ProControl to delay before resuming analog datalogging. Click on the time associated with **Next Point @** and enter the new time in either HH:MM or MM:SS format. Note that if you enter a **Next Point @** time that is earlier than the current time *as determined by the ProControl's clock*, you will prevent any analog datalogging from occurring until the next day at that time (or next hour if using MM:SS format).

5. Totalizer logging can be performed on intervals of hours, number of days, or up to a month.

6. Once you have finished making your changes click **OK** to close the dialog box.

FYI

When setting your analog logging interval, be aware of the available memory in the ProControl unit you are using. If, for instance, your ProControl has a capacity of 5,000 analog data points per input channel and you specify a 5-minute logging interval, there will be available memory for approximately 17 days worth of analog data. Changing the log interval to 10 minutes will make the memory last twice that long. Once the memory is full, the oldest data points are purged one at a time to make room for the current data.

Changing the Password

You can change the password for opening a site file in ProView or for access to the ProControl unit from its keypad. The passwords do not have to be the same. If you change the password while ProView is connected to a ProControl unit, the new password will be used for both ProView and the ProControl unit. If you change the password while not connected to a ProControl unit, the new password will be used only for that site file in ProView. In order to save the new password for the site file in ProView, you must save the site file (**File…Save Site**). However, any change to the password in the ProControl unit itself is immediate.

To change the password, follow these steps:

1. Click on the **Password** menu.

   Or

   Click on the **Password** toolbar button.  You will see the **Security** dialog box.



2. Click on the **Change Password** button. You will prompted to enter the **Old Password** in the text box. Click the **OK** button or hit the enter key. If you do not enter the password correctly, a beep sounds and the security dialog box disappears.



3. You will then be prompted to enter the **New Password** in the text box. Recall that the password can be up to three characters consisting of the numbers 0-9 and the letters A-Z. After clicking on the **OK** button or hitting the enter key, you will be prompted for the new password again.



4. If both new password attempts were identical, the new password will be accepted and the **Security** dialog box will disappear. If ProView is connected to the ProControl, the new password will be in effect for both ProView and the ProControl unit.

Analog Output Options

If your ProControl system is configured with analog outputs, you will be able to adjust the output level, or the parameters used in a control algorithm associated with that output. Your system integrator should have already configured your analog outputs with these algorithms if they apply to your process. Analog outputs can be involved in one of two different types of control scheme: **PID** or **Proportional** control. A **PID** (Proportional-Integral-Derivative) Loop is a feedback-based loop that maintains an analog input at a user-defined ***Setpoint***. The ProControl automatically adjusts the analog output using a mathematical formula that includes ***Gains*** for the proportional, integral and derivative terms. PID control is a commonly-used process control technique, descriptions of which can be found in most control theory texts.

FYI

If you are familiar with PID control terms, note that the PID gains used by the ProControl are defined differently than some of the terms in traditional use. **Proportional Gain** *on the ProControl corresponds with the classic definition of* **proportional band**. *However, the* **Integral Gain** *and* **Derivative Gain** *are the* ***inverse*** *of* **integral (or reset) time** *and* **derivative time**. *Hence, an* ***increase*** *in any of these gains tends to* ***increase*** *the corresponding proportional, integral and derivative action.*

A **PRO** (Open-loop Proportional) algorithm generates an analog output signal that is directly proportional to the value of an analog input. The analog output percentage is computed by multiplying a constant of proportionality by the associated input's percentage of full-scale.

If a control scheme is not assigned to an analog output (or if the output has been placed in **Manual** mode), you can change the output value by clicking on the slider for that output and dragging it up or down, or by highlighting the number beneath the slider scale and typing a new value.

You can modify the PID parameters of a PID-controlled analog output (the **P**, **I** and **D Gains**) if your analog output is not responding smoothly or quickly enough to changes in its associated input. The proportional (**P**) gain specifies the output level based on the error between the **Set Point** (desired input level) and the actual input level. Integral (**I**) gain smoothes the output level based on the tracking history of the input to the **Set Point** and provides a means of better steady state control. Derivative (**D**) gain will allow the output to respond to quick changes in the input and provides a means of establishing good transient or instantaneous control.

In the case of a **PRO** output, you can modify the **P Gain** to alter how much the output value changes as the associated input changes. A value of 100 indicates that the output will be 100% when the input is at full scale. A value of 50 indicates that the output will be 50% when the input is at full scale

The **Max Change** parameter allows you to regulate how much the analog output can change in one control cycle (one control cycle is about 1/4 of a second).

!

Be sure you fully understand PID and proportional control concepts before adjusting any of these parameters. Large changes in output can result from changing the gains or the set point, which can cause equipment damage or unforeseen safety hazards. For help in choosing appropriate gains for your process, contact EOS Research technical support.

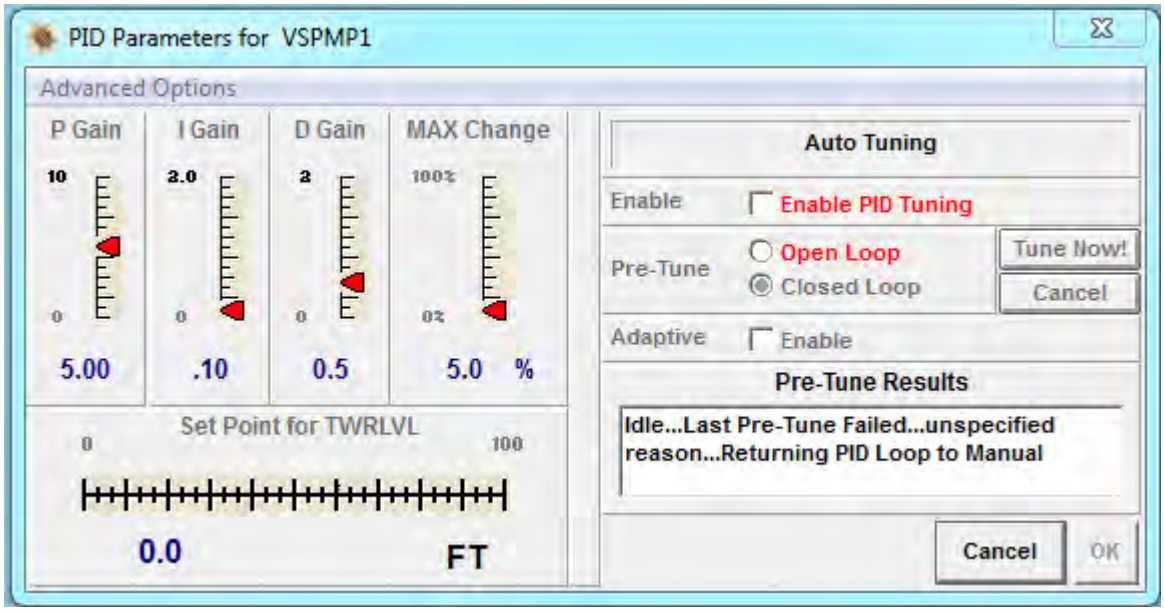
To change the **PRO** or **PID** parameters, **Set Point**, or **Max Change** parameters:

1. It is highly recommended to first place your analog output into **Manual** mode. Click on the **PID** (or **PRO**) beneath the Tagname and wait a second for it to change to **Manual**.

2. Position the mouse pointer over the analog output's tagname until a balloon appears, and *right*-click until you see **PID Options**.



3. Left-click and the **PID Parameters** dialog box appears.



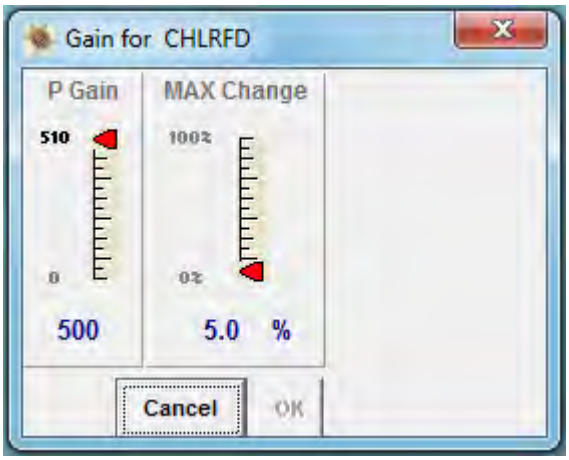
4. To change any of these parameters, you can either click and drag the sliding scale or click the numerical text and enter the value through the keyboard. You can also change the upper limit on all of the gain scales.

5. Click the **OK** button to save your changes. If not, click the **Cancel** button.

6. To restart your PID loop, click the word **Manual** underneath the Tagname and wait a second for it to change to **PID**. Your new parameters are now in use by the ProControl.

   One type of auto-tuning algorithm is provided with ProView, and can be used to calculate optimal PID parameters for *certain types* of process loops. Contact EOS Research technical support to see if this version of auto-tuning may benefit your process.

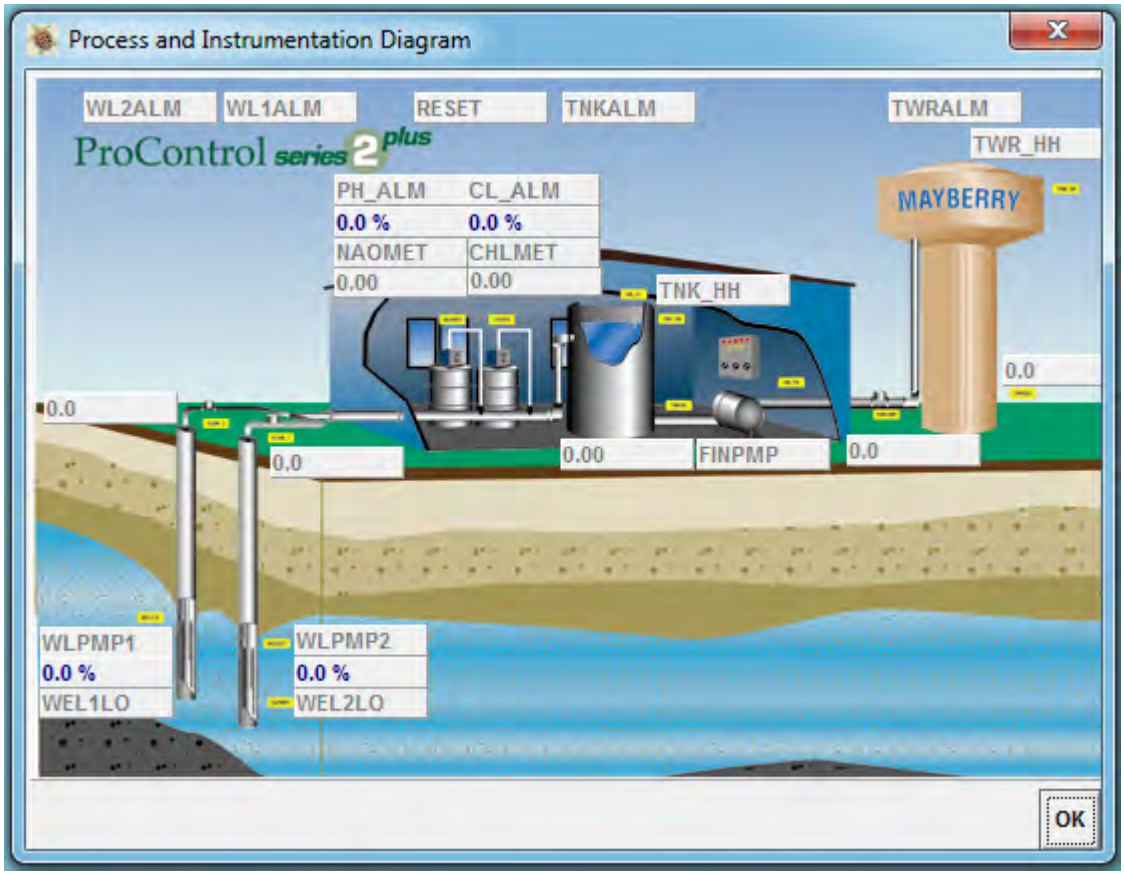
   If the analog output is configured for proportional output, the dialog box on the right will be displayed. You can make changes as outlined above.



Process and Instrumentation Diagram

The **P&ID** option allows you to pull up an alternate "process and instrumentation diagram" representation of your system, which can be used to display operating data that is superimposed on a process diagram (or map, or picture of your dog, etc.). The P&ID option is designed to provide an alternate human-machine interface (HMI) for ProView with customizable graphics. Note that the P&ID screen is not interactive like the main ProView screen is; that is, data can be displayed on this screen, but commands cannot be issued from it.

Typically, your system integrator would configure this screen for you. The P&ID capability must be enabled by the integrator in order for you to use this feature. If this option has been included in your system configuration, you can view this diagram by clicking on the P & ID icon. 



The **Process and Instrumentation Diagram** contains a graphical representation of your system. Digital inputs and outputs are displayed as tagname boxes that change color when the I/O point is active (red or green). Analog I/O are displayed as numerical values, with analog outputs also containing the **%** symbol to distinguish them from analog inputs. Click the **OK** button to go back to the main ProView screen.

As discussed above, the P&ID screen is typically supplied by your system integrator. However, if you would like to make changes to the P&ID screen, follow the procedures outlined below. If you want to change the

background image, you can create a new **.pid** file. The P&ID must be a bitmap format file (.bmp) that can be created with a drawing program. The bitmap image can be any size you choose, the file name must be the same as your ProView site file (**.pvs**) with the filename extension changed to **.pid**, and it must be placed in the same folder as your .pvs file.

When you open the P&ID screen in ProView, you can move or remove the I/O boxes as you choose. Remember to **Save** the site file before you exit ProView to store these changes.

To change the appearance of the P & ID:

1. To move a descriptive box containing either a tagname or value, hold the shift key and click the left mouse button when positioned on the appropriate box. This will enable you to drag and re-position the box wherever you choose.
2. To remove a descriptive box, double-click on the box. Once you have removed a box, it will no longer be available to you unless you restore all boxes.
3. To restore all descriptive boxes, position the mouse at the bottom of the P & ID window in the gray area. Then hold down the control and shift keys while simultaneously clicking the left mouse button.

CHAPTER 6: WORKING WITH LOGGED DATA

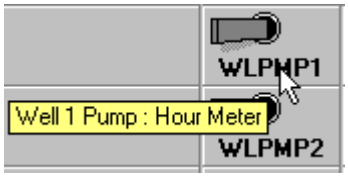
This chapter explains how to gather and analyze logged data that is being stored in the ProControl unit's battery-backed memory.

Hour Meters

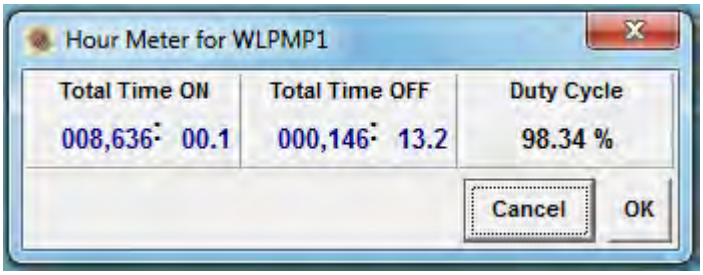
The ProControl maintains **Hour Meters** for inputs and outputs to indicate how long the I/O point has been ON and OFF. The hour meters are particularly useful in keeping track of equipment "run" times (discrete outputs), but are also maintained for discrete and analog inputs. For analog inputs, the hour meters indicate the time the input has been in and out of its *Active State* (see the definition of Active State in the Series 2^{plus} User Manual). The hour meters are updated every second on the ProControl unit. The ON and OFF times are displayed at a resolution of 1/10 (0.1) of a minute.

To read the Hour Meters, follow these steps:

1. Position the mouse pointer over the I/O point's tagname until a balloon appears, then *right*-click until you see **Hour Meter**.



2. Click the left mouse button to view the hour meter. The **Hour Meter** dialog box appears.



3. The **Hour Meter** box displays information in the form of **Hours : Minutes.10th Minutes** for both ON time and OFF time. The **Duty Cycle** or ratio of ON time to total time is also displayed. It may take a few seconds for the display to be updated once the dialog box appears.

4. To edit the **Total Time ON** or **Total Time OFF**, click and highlight the total time text and make the required changes. Press the enter key to confirm the changes and send the new value to the ProControl unit. Resetting the time values to zero, for instance, can be used when a motor is changed out, to keep track of lubrication intervals, etc.

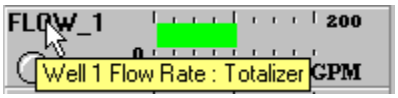
5. Click on the **OK** button to close the **Hour Meter** dialog box.

Totalizers

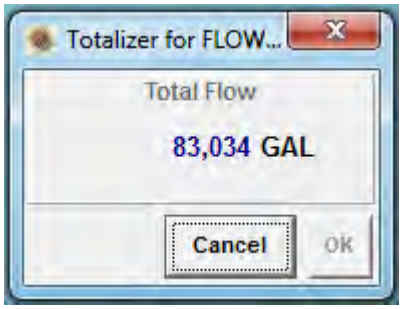
If your site configuration includes an analog input to which a flow meter or pulse counter is connected, it may also include a **Totalizer**. Totalizers provide the ability to view the cumulative total of a flow-based input or accumulated pulses from a counting device.

To view the **Totalizer,** do the following:

1. Position the mouse pointer over the I/O point's tagname until a balloon appears, then *right*-click until you see **Totalizer**.



2. Click the left mouse button to view the totalizer. The **Totalizer** dialog box appears.



3. The **Total Flow** for this input since the totalizer was last reset is displayed. It is updated every second while the dialog box is visible and while ProView is connected to the ProControl unit.

4. If you would like to set the totalizer to a different value, click on the value displayed in the dialog box. Enter the new value for the totalizer and press the enter key.

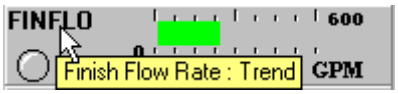
5. Click on the **OK** button to close the **Totalizer** dialog box.

Trend Graphing

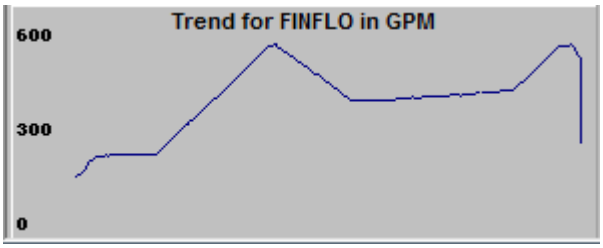
ProView can display a real-time trend graph while you are connected either locally or remotely to the ProControl. A 5-minute trend can be displayed in the lower left hand side of the ProView window.

To start trend graphing:

1. Position the mouse pointer over an analog input's tagname until a balloon appears, then *right*-click until you see **Trend**.



2. Click the left mouse button to produce the **Trend** window for that input.

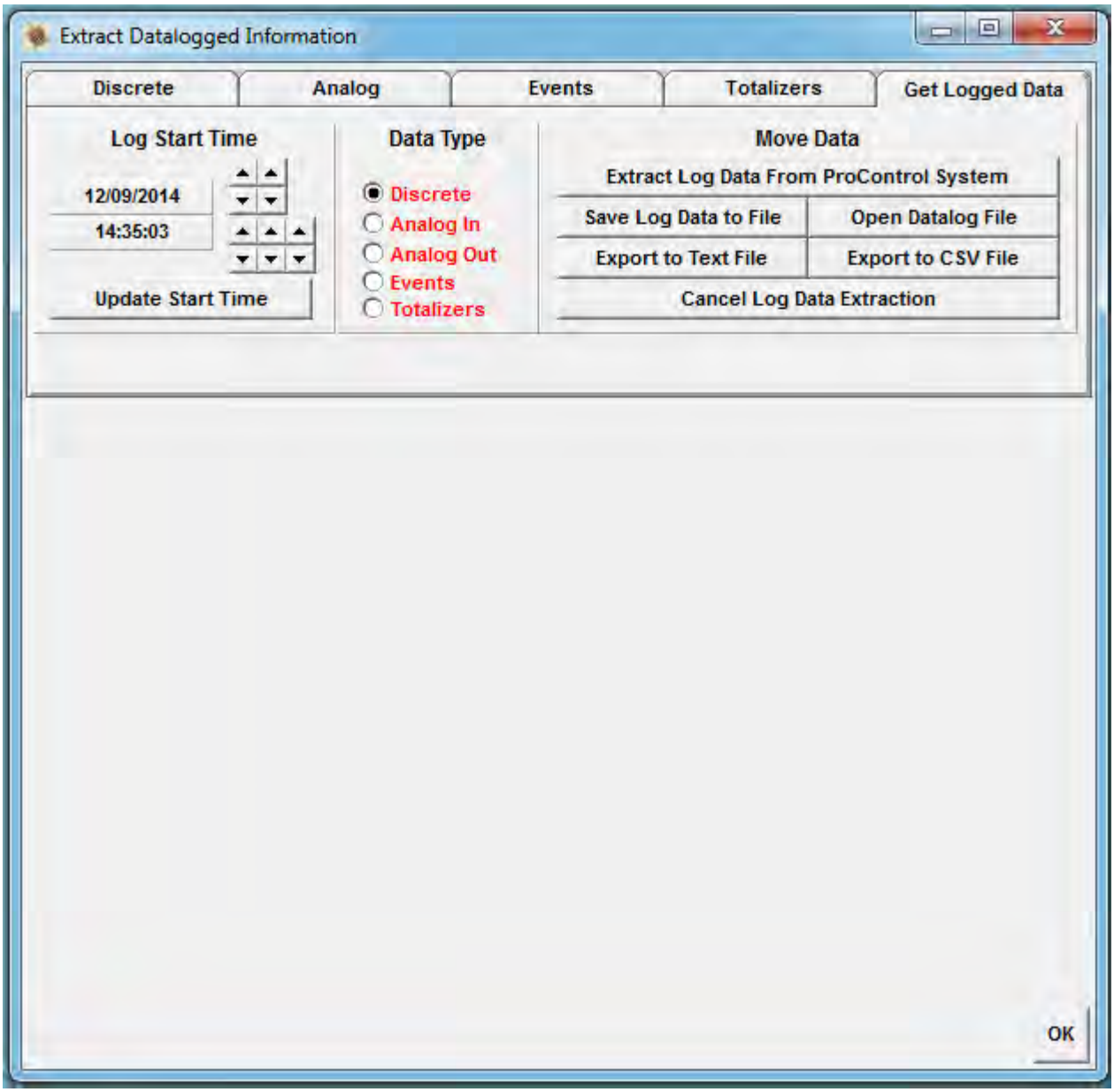


3. The trend window provides a 5-minute history of the real-time data for that analog input. You will see the trend "drift" from right to left across the window, and it will be updated as long as you are connected to the ProControl. If you wish to observe another trend, click on the tagname of another analog input and the trend window will be refreshed with the new data.

4. To stop trending and empty the trend window, click on the **Trend for…** text block in the trend panel.

Downloading Logged Data

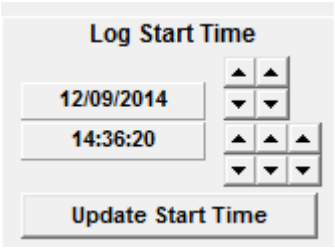
Operations data is stored electronically in the ProControl's memory in accordance with the datalogging setup (Chapter 5). To view the logged data, click on **Get Logged Data** in the **Datalogging** menu. This opens the **Extract Datalogged Information** dialog box.



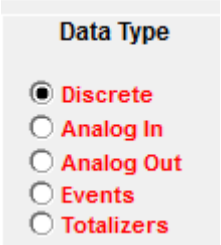
Getting Logged Data

To extract datalogged information from the ProControl unit, do the following:

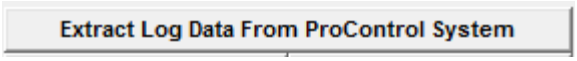
1. Select the start time in the **Log Start Time** panel. ProView will extract all data that has been logged since this time. Change the start time by clicking on the spin buttons to increase or decrease the Month, Day, Hour, Minute or Second. Click on the **Update Start Time** button to reset the start time to the current time.



2. Select the type of data you wish to extract. Click on the **Discrete**, **Analog In**, **Analog Out** or **Events** radio button.



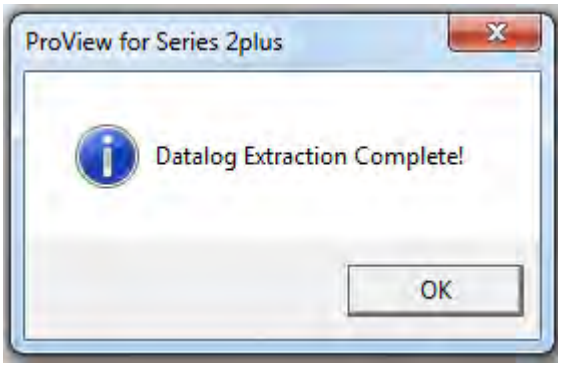
3. Click on the **Extract Log Data From ProControl System** button.



4. ProView performs a scan of available data. You can then monitor the progress of the data extraction.

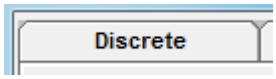


5. A message box will appear when the data extraction process is complete.

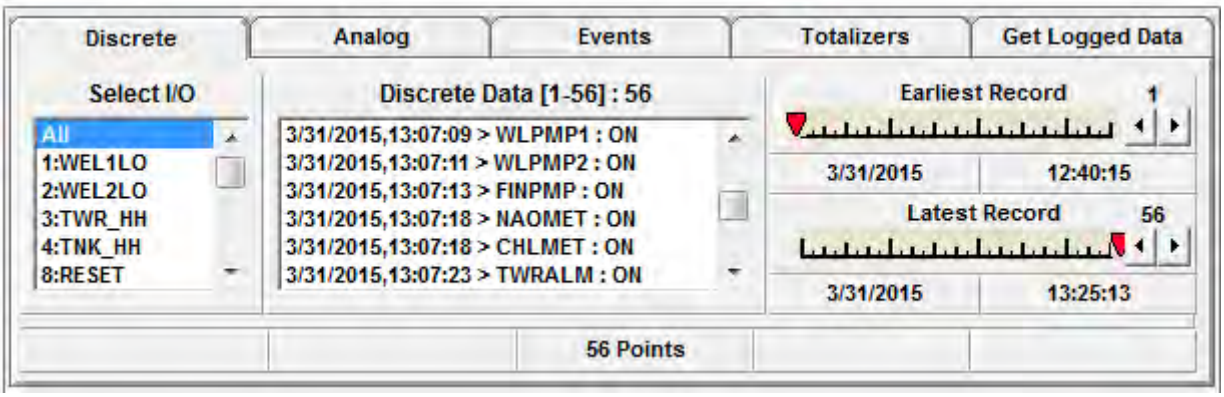


Looking at Discrete Data

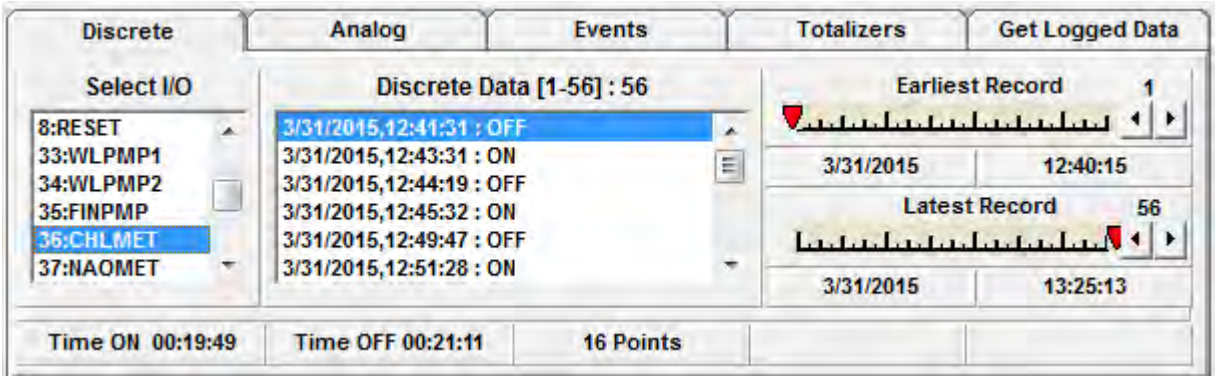
To examine the discrete datalog record that you have extracted click on the **Discrete** tab.



The **Discrete** data window appears. On the left, the **Select I/O** list box contains a list of all enabled discrete inputs and outputs. In the middle is the **Discrete Data** record. On the right, the **Earliest Record** extracted is shown as 13:07:09 on 3/31/15. The **Latest Record** is 13:25:13 on 3/31/15. A total of 56 records were extracted. Clicking on **All** in the **Select I/O** list box will show the entire discrete record in the **Discrete Data** window. You can scroll through the discrete records in the window.

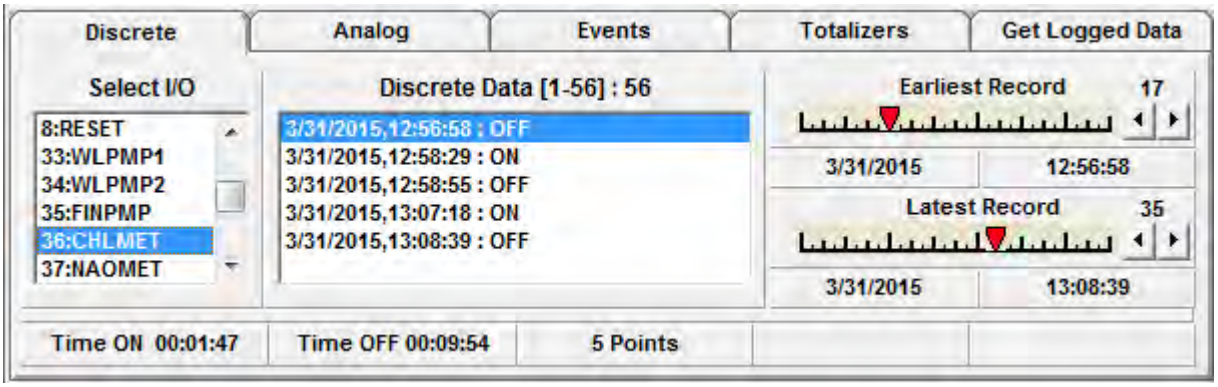


The **Select I/O** list box can be used to filter the data record to include just one discrete input or output. In the example below, the **CHLMET** output has been selected. Whenever a single input or output is selected, statistics are generated regarding the selected input or output, spanning the period of time from the first state change to the last one in the record. There are 16 data points for **CHLMET** below, and the input was ON for 19 minutes and 49 seconds and OFF for 21 minutes and 11 seconds for the period of time between the first and last record.



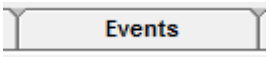
Moving the **Earliest Record** and **Latest Record** sliders or spin buttons will filter the total record with respect to time. Click and hold a slider and move the mouse to the left or right. You can also click on the spin buttons to change the time window. When you are finished filtering the time, click again on the input you

wish to examine in the **Select I/O** list box to see the results of your changes. In the example below, the total record has been limited to records 17 through 35. Within this time interval, 5 state changes of **CHLMET** occurred.

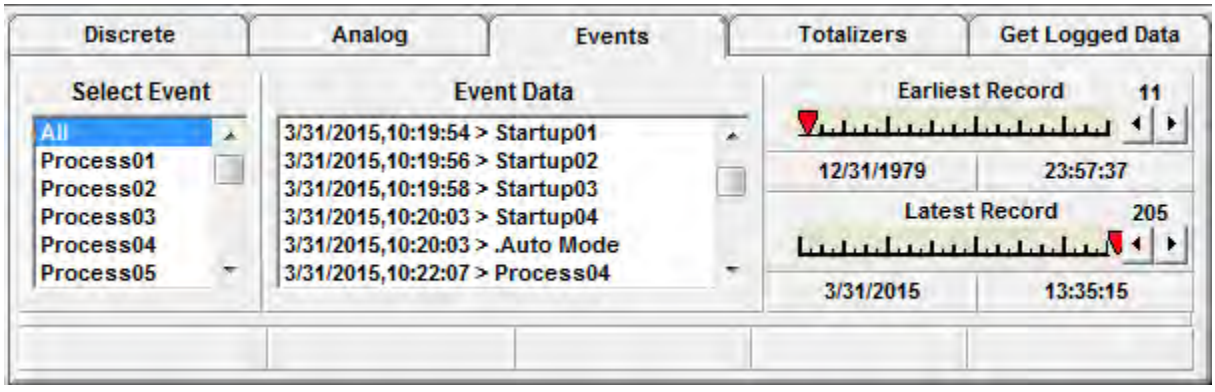


Looking at Events Data

First, go back to the **Get Logged Data** tab and extract the **Events** data. After the data has been extracted, click on the **Events** tab to examine the event datalogging record.



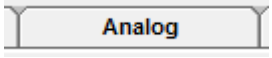
The **Events** data window appears. The **Select Event** list box contains a list of all enabled processes and other ProControl events. In the middle is the **Event Data** record. The **Earliest Record** and **Latest Record** extracted are shown to the right.



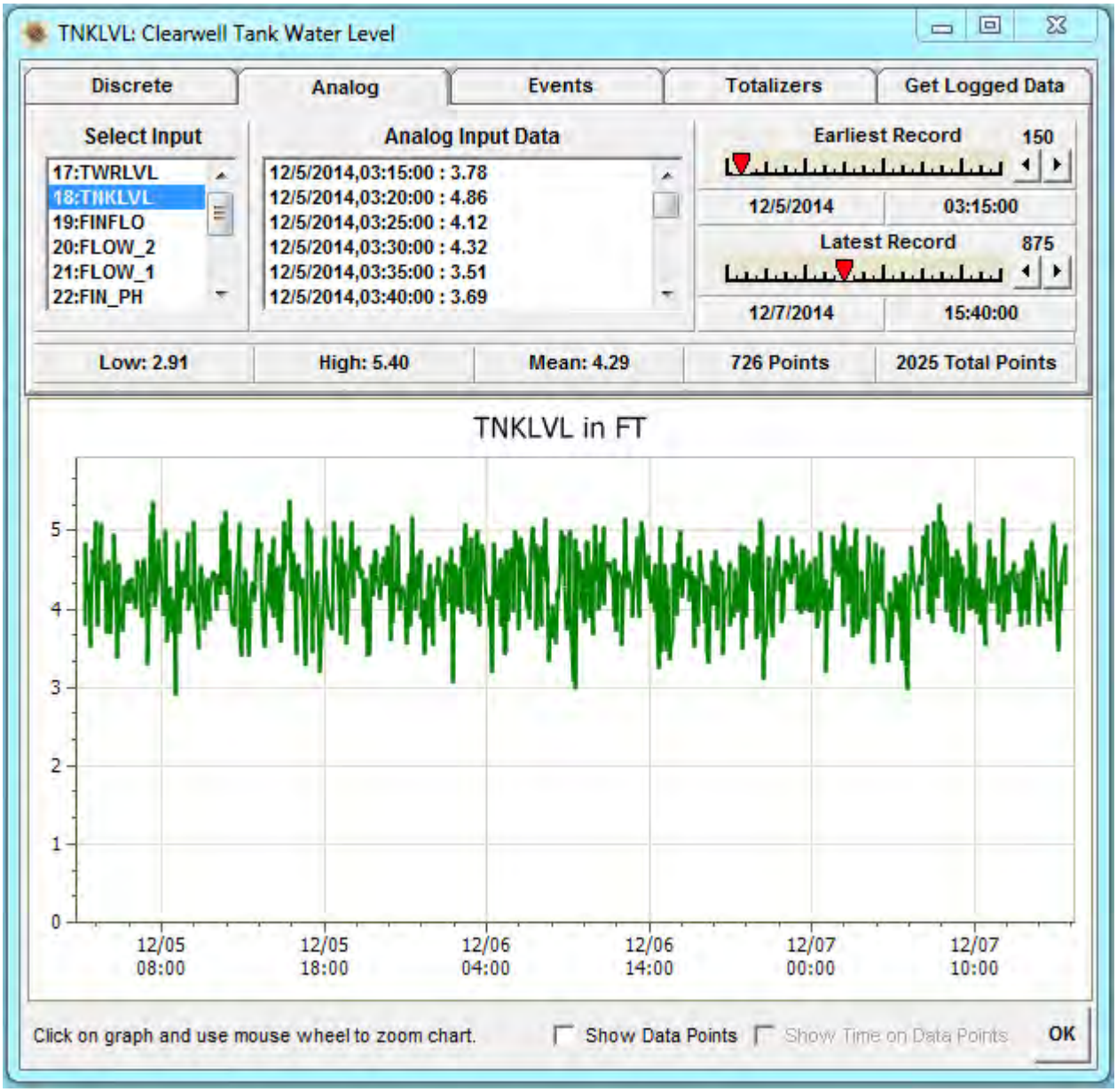
To view the data, follow the same procedure described for **Discrete Data**. Clicking on **All** in the **Select Event** list box will display all the events that were extracted. By clicking on an event in the **Event Data** window, a description is provided in the **Process Description** window below.

Looking at Analog Data

First, go back to the **Get Logged Data** tab and extract the **Analog In** or **Analog Out** data. After the data has been extracted, click on the **Analog** tab to examine the event datalogging record.



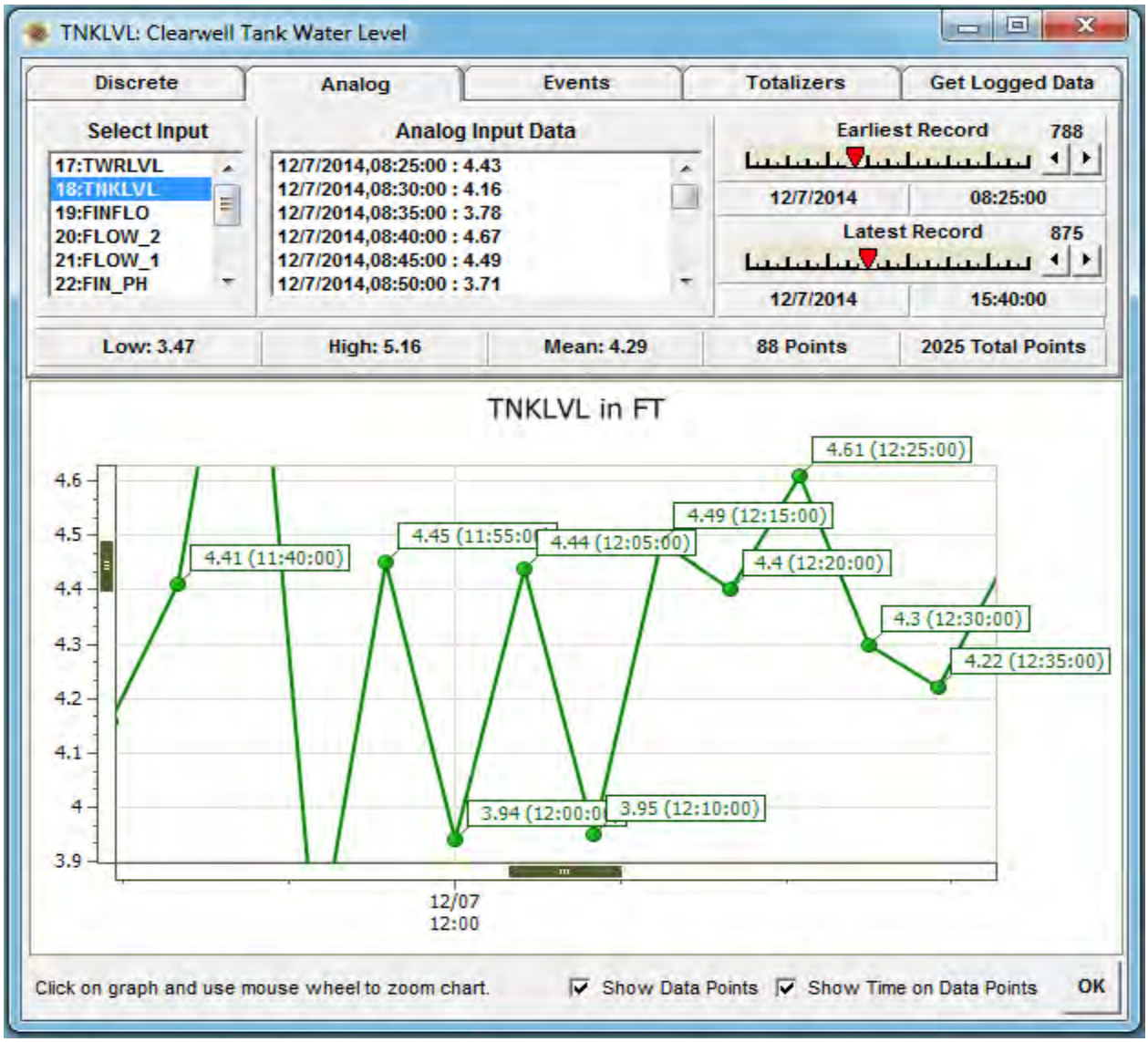
The **Analog** data window appears. The **Select Input** list box contains a list of all enabled analog inputs and outputs. In the middle is the **Analog Input Data** record. The **Earliest Record** and **Latest Record** extracted are shown to the right. By clicking on an input or output in the **Select Input** list box, a graph will be displayed in the window below.



In the example above, a tank level is shown as it varies over time. Immediately above the graph, statistics are shown regarding the selected analog point (in this case there are 726 data points with a **Low** of 2.91, a **High** of 5.40 and a **Mean** of 4.29). As with the digital and events data, the **Earliest Record** and **Latest Record** sliders and spin buttons can be used to filter the total record with respect to time, which is helpful in focusing on a smaller portion of the graph. If you filter the data in this way, be sure to click on the input tagname again in the **Select Input** list box to see the results of your changes.

Graphing Options

Graph options are available to change the look of the analog graph. You can left click on the chart and use your mouse wheel to zoom in on the data. Other graphing options are on the bottom right of the datalog window and allow you to show data points and show time on data points. Click on the check box adjacent to the option you want to use to enable it. It is generally recommended that you zoom in on a portion of the graph before you use the "show data point" options.



After you are finished examining the datalogged information, you may want to save it for future reference within ProView or export it to a spreadsheet, database program or word processor.

Saving Logged Data to File

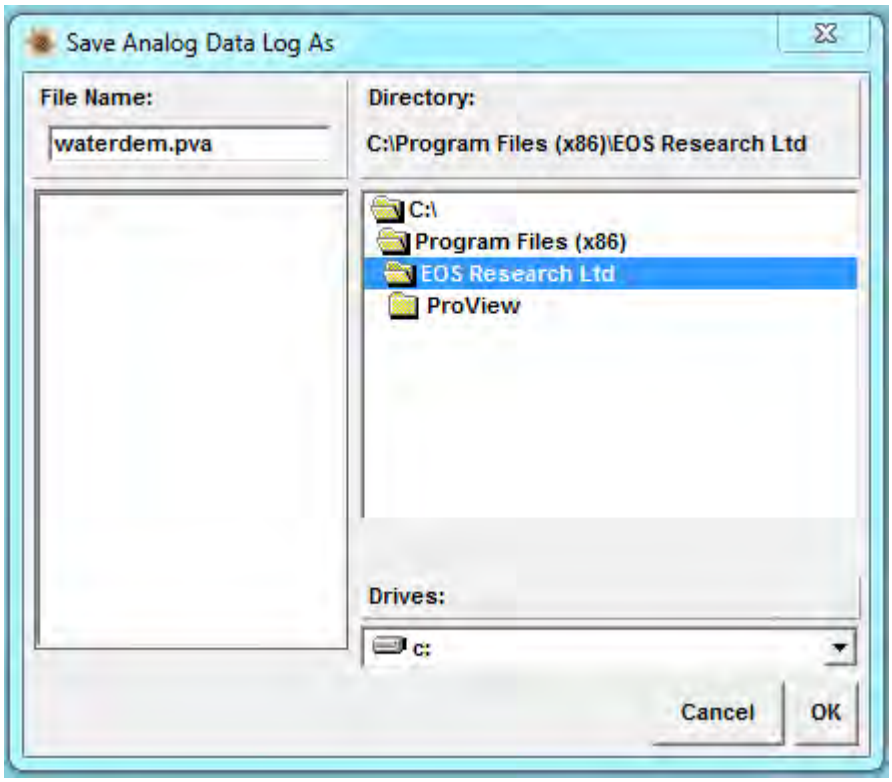
To save a datalogging record to a ProView-readable file, do the following:

1. Click on the **Get Logged Data** tab. Select the type of file you wish to save by clicking on the appropriate button in the **Data Type** panel. *Remember that you must have already completed the separate step of extracting the data type you wish to save.*

2. Click on the **Save Log Data to File** button.



3. This opens the **Save *xxxxxx* Data Log As** dialog box, where ***xxxxxx*** is the type of data you wish to save. ProView selects a default file name for you, which is the name of the site configuration file with the .pvd, .pva or .pve file extension depending on the type of data file you intend to save (discrete, analog, or events, respectively). However, you may wish to change the file name to indicate a date representative of the log you are saving, for instance.



5. Click the **OK** button to save the file.

Opening a Datalog File

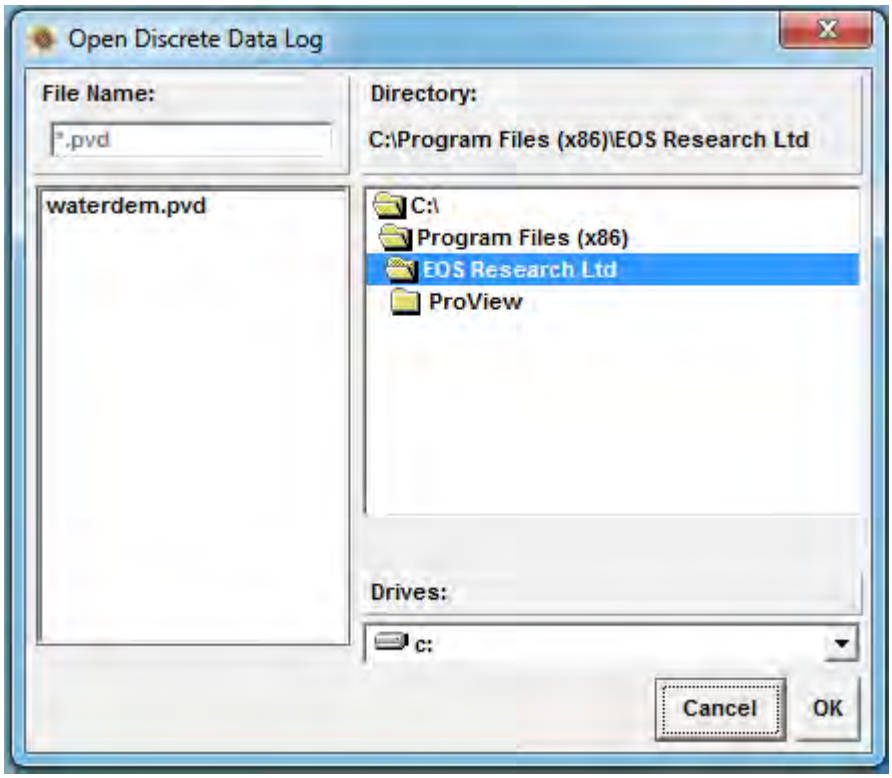
To view data that was previously saved in ProView-readable format, do the following:

1. In the **Get Logged Data** tab of the **Extract Datalogged Information** dialog box, select the type of data file you wish to open by clicking on the appropriate button in the **Data Type** panel.

2. Click on the **Open Datalog File** button.



3. This opens the **Open *xxxxxx* Data Log As** dialog box, where ***xxxxxx*** is the type of data you wish to view. ProView lists any files in the folder you have selected that contain the .pvd, .pva or .pve file extension (depending on the type of data file you intend to open). Click on the name of the file you wish to open, and it will appear in the **File Name:** text box. If the file you wish to open is stored elsewhere, select the location in the **Drives:** and **Directory:** list boxes.



4. Click on the **OK** button to open the file. View the data as you would any logged data that you have just extracted.

Exporting Logged Data for use in Other Applications

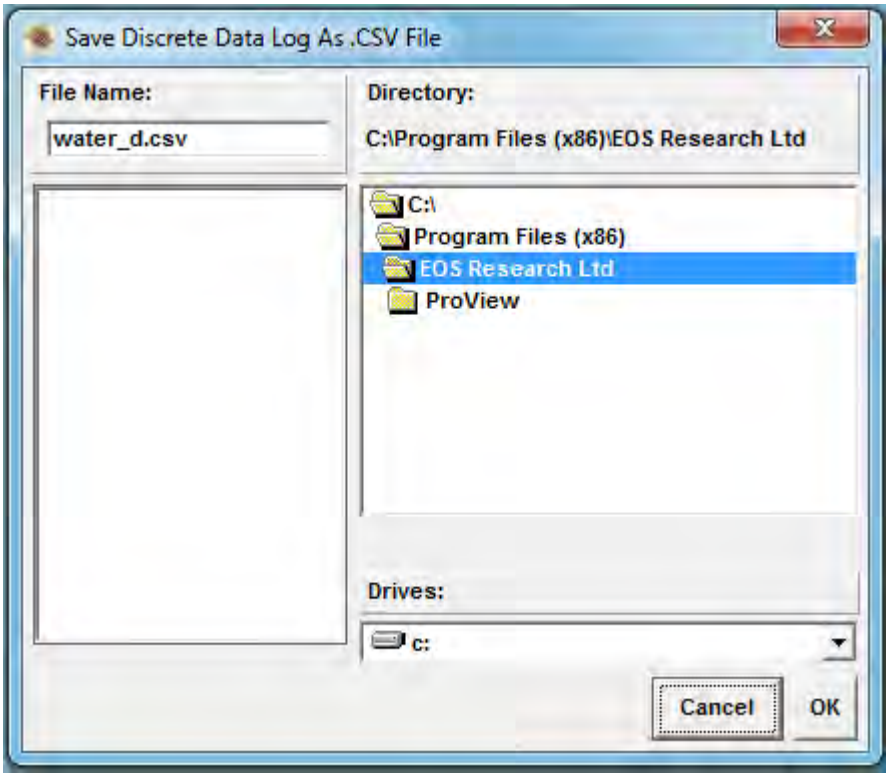
ProView provides users the ability to export data for use in other applications, so that you can take advantage of the data manipulation and graphing capabilities provided by widely-used software. ProView allows you to export analog, discrete or event data to a CSV (Comma-Separated Variable) file, which can then be opened by any spreadsheet or database program (e.g., Microsoft Excel™). You can also export discrete and event data to a text file for use in a word processor.

1. In the **Extract Datalogged Information** dialog box, click on the **Get Logged Data** tab. Select the type of file you wish to export by clicking on the appropriate button in the **Data Type** panel. Note that analog output data cannot be exported.

2. Click on the **Export to Text File** or **Export to CSV File** button.



3. This opens the **Save Analog Data Log As .CSV File,** the **Save Discrete Data Log As .TXT File** or other dialog box, depending on the type of file you wish to export. The default file name is the truncated name of the site configuration file with the .csv or .txt extension. However, you may wish to change the file name to indicate a date representative of the log you are saving, for instance.



5. Click the **OK** button to export the file.

6. You will be asked whether you would like to include header information in the file that is saved. The header provides two lines of basic site information and titles for the columns of data.

!

*The CSV file format is considered a **Text** format by most spreadsheet and database software. When you open the .csv file created by ProView, be sure to specify that you are opening a Text file. For instance, in Excel, in the **File….Open** dialog box, choose **Text Files** from the list in the **File of type** list box.*

FYI

*A word about the date format in the exported files: Discrete and event data are exported using a time stamp in which the date and the time are in separate columns or separated by a comma (for example, 9/15/2000,09:39:08). Analog data are exported using a combined date/time in standard Windows format (which is the decimal equivalent of the number of days and fractions of a day since January 1, 1900). When an analog data file is opened in a spreadsheet or database software package, you will probably want to reformat the date/time information in the leftmost column. For instance, in Excel, select the column, choose **Format….Cells**, and select a **Number** format that includes both the date and the time.*

CHAPTER 7: OTHER OPERATIONS

This chapter explains how to save the site setup, print current operating data to a file, view the process configuration, use the annunciator feature and exit the program.

Saving the Site Configuration to File

While you work in ProView, you may change certain system settings that are stored in your site configuration (or .pvs) file. Examples of some of the parameters stored with your site file include remote communication settings, passwords, and notes for your tagnames. You should save your .pvs file before closing ProView if you make any changes to these parameters.

FYI

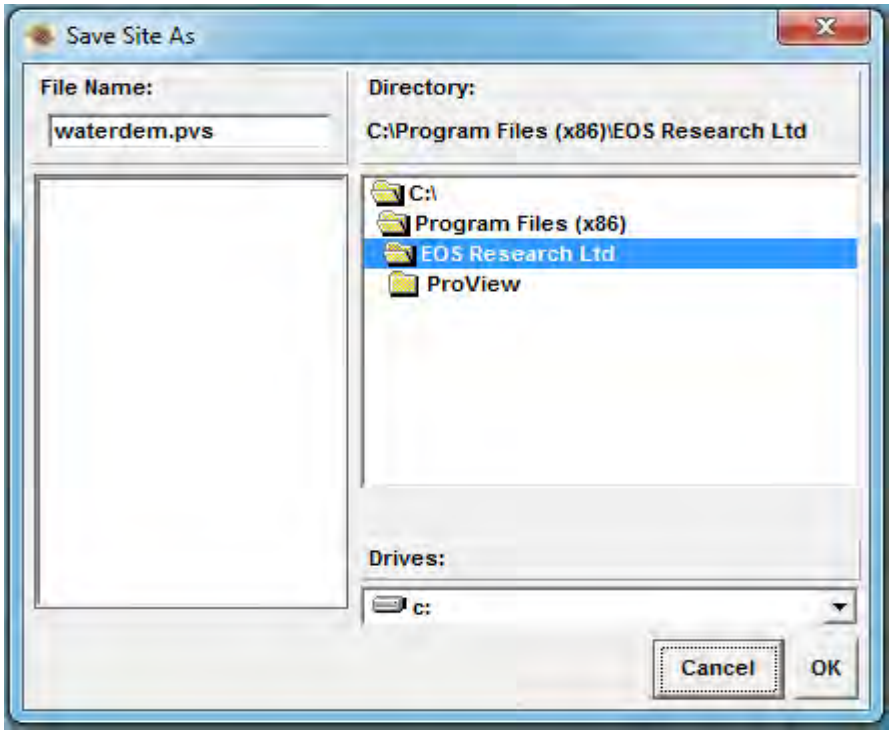
Remember that most operational settings, such as alarm levels, fax report numbers, datalogging setup, PID gains, etc. are stored in the ProControl unit, not in your site file. ProView "pulls up" this information stored in the ProControl unit when you connect to it. There is no need to save your site file if you only make changes to these operational settings.

To save your site configuration do the following:

1. Click on **Save Site** or **Save Site As…** in the **File** menu.

   Or

   Click on the **Save File** button on the toolbar. The **Save Site As** dialog box appears. If you chose **File…Save Site**, ProView bypasses the dialog box.



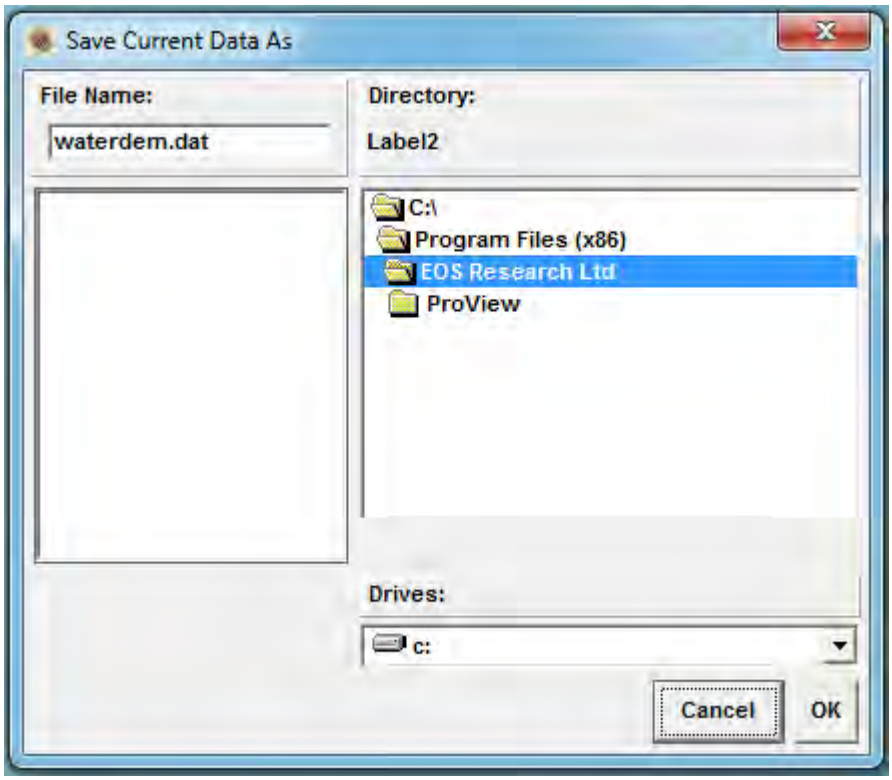
2. Select the **Drive**, **Directory** and **File Name** you would like and click on the **OK** button to save the file. You will be asked whether you wish to overwrite the existing file. Choose **Yes** to complete the file save.

Printing the Current Data to File

While you are connected to your ProControl via ProView, you can print the current operating data to a text file for future reference. This can prove useful for documentation and reporting purposes.

To save your current process data to a text file, do the following:

1. Click on **Print Current Data** in the **File** menu. You will see the **Save Current Data As** dialog box.



2. Select the **Drive**, **Directory** and **File Name** you would like. ProView selects a default file name for you, which is the name of the site configuration file with a .dat file extension. However, you may wish to change the file name to indicate a date representative of the information you are saving, for instance. Click the **OK** button to save the current data to the file.

You can examine the current data file with any text editor or word processor. An example of a file generated for our sample operation is shown on the following pages.

EOS RESEARCH LTD.
ProControl Series II+

ProView Current Operational Information

***** FAX Recipient:	BULLWINKLE MOOSE
***** Customer:	MAYBERRY WATER DEPT
***** Site Location:	MAYBERRY RFD
***** Setup:	1
***** Option:	B
***** Type:	102
***** Serial Number:	9999
***** Date:	12/9/2014
***** Time:	14:52:35
***** ProView:	Version 2.200

***** Communications State:	REMOTE CONNECT
***** System Mode:	Auto 14
***** Last Shutdown:	Last Shutdown 12:28:27 , 2/20/2014 , Remote
***** Alarms:	Alarms SET
***** FAX:	Report ON

THE CURRENT INPUT STATUS:

#	TAGNAME	CURRENT VALUE	LO ALARM	HI ALARM	TOTALIZER		HOURS ON		HOURS OFF	
1	WEL1LO	is OFF					000,000	23.6	002,704	52.8
2	WEL2LO	is OFF					000,000	02.7	002,705	13.8
3	TWR_HH	is OFF					000,000	01.0	002,705	15.5
4	TNK_HH	is OFF					000,000	01.5	002,705	14.9
8	RESET	is OFF					000,000	00.8	002,705	15.7
17	TWRLVL	41.0 FT	30.0	55.0			000,044	36.7	002,660	39.6
18	TNKLVL	10.07 FT	9.00	11.00			000,018	38.8	002,686	37.7
19	FINFLO	220.0 GPM	0.0	600.0	2,707,032	GAL	000,749	30.0	001,955	46.4
20	FLOW_2	178.1 GPM	0.0	400.0	11,535,456	GAL	000,758	50.8	001,946	25.6
21	FLOW_1	95.8 GPM	35.8	170.0	10,479,505	GAL	000,003	03.4	002,702	13.1
22	FIN_PH	8.39 PH	7.50	8.50			001,004	05.6	001,701	10.8
23	FIN_CL	0.99 PPM	0.80	1.15			000,499	10.1	002,206	06.3

THE CURRENT OUTPUT STATUS:

#	TAGNAME	CURRENT VALUE	HOURS ON		HOURS OFF	
1	WLPMP1	is ON	001,871	40.2	000,833	36.1
2	WLPMP2	is ON	001,871	26.7	000,833	48.8
3	FINPMP	is ON	001,871	27.5	000,833	48.5
4	CHLMET	is ON	001,655	51.6	001,049	24.9
5	NAOMET	is ON	001,099	11.9	001,606	04.6
8	PH_ALM	is OFF	000,991	03.1	001,714	13.3
9	CL_ALM	is OFF	000,485	39.2	002,219	37.3
10	TWRALM	is OFF	000,028	11.2	002,677	05.1
11	WL1ALM	is OFF	000,000	12.0	002,705	04.6
12	WL2ALM	is OFF	000,000	00.1	002,705	16.5
13	TNKALM	is OFF	000,003	42.3	002,701	34.3

```
THE CURRENT ANALOG OUTPUT STATUS:

#  TAGNAME  VALUE  PID Mode SETPOINT  P Gain I Gain  D Gain  MAX CHG
-- ------- ------- -------- --------- ------ ------- ------- -------
1  VSPMP1  39.1  %   ALG    40.0      10.0   .010    0.1     5.0   %
2  VSPMP2  46.9  %   ALG    10.00     7.33   .010    0.5     5.0   %
3  NAOHFD  32.0  %   ALG    8.25      9.16   .010    0.1     5.0   %
4  CHLRFD  22.3  %   ALG              50                     5.0   %

ANALOG OUTPUT NOTES
-------------------
VALUE   - The current output level expressed as a percentage 0%=4ma 100%=20ma.
MAN     - (Manual) The PID or PRO control loop algorithm has been turned off.
PID     - The (Proportional, Integral, Derivative) control loop is running.
PRO     - The open loop (Proportional) algorithm is running.
MAX CHG - The maximum amount the output can change in one control cycle.


THE CURRENT REPORTING SETUP:

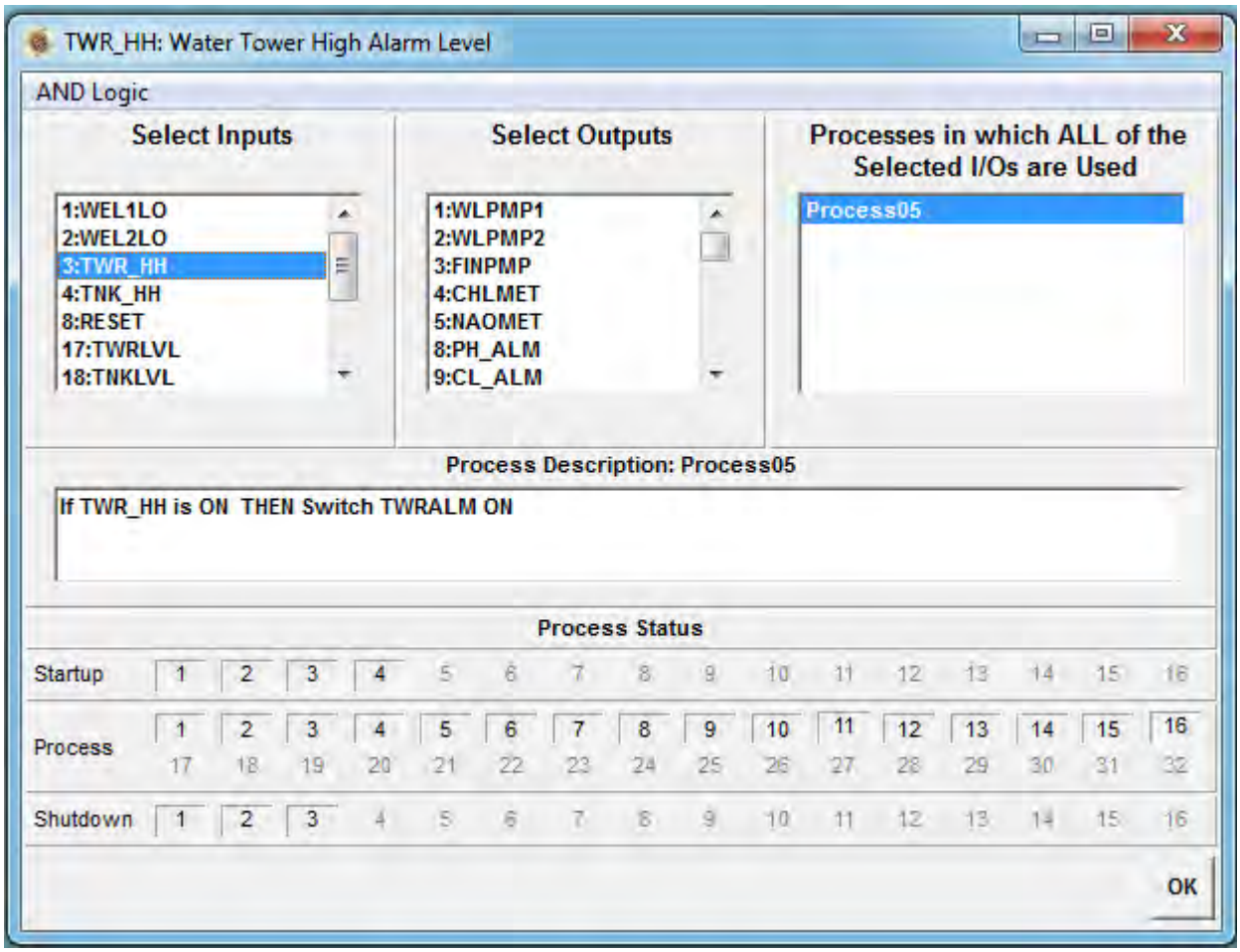
     ***************************************************************************
     ***** Report Enable:          ON                                      *****
     ***** FAX Number 1:           1 (999) 555-1234                        *****
     ***** FAX Number 2:           555-4321                                *****
     ***** Scheduled FAX:          Every Day at:       07:00               *****
     ***** Next Scheduled FAX:     07:00                                   *****
     ***** Pager #1:               Enabled, Numeric                        *****
     ***** Pager #2:               Enabled, AlphaNumeric                   *****
     ***** Paging:                 Will occur at 2400 baud                 *****
     ***** Page Number 1:          1 (700) 555-6789                        *****
     ***** Pager ID    1:          9876543                                 *****
     ***** Page Number 2:          1 (700) 555-6789                        *****
     ***** Pager ID    2:          3456789                                 *****
     ***************************************************************************

THE CURRENT DATALOGGING SETUP:

     ***************************************************************************
     ***** Enabled Datalogging:    Digital ,Analog ,Event                  *****
     ***** Datalogging Interval:   00:01                                   *****
     ***** Next Datalog Time:      13:47                                   *****
     ***************************************************************************
```

Reviewing the Process Configuration

ProView includes a utility that can help you understand the control logic that is programmed into your ProControl unit (if your site file is not the most up-to-date version, note that the control logic shown may not match what is in your ProControl unit). Click on **Process Configuration** under the **File** menu, and the following screen will appear, showing the inputs and outputs that are configured for your system:



By selecting inputs and outputs from the left and center columns, respectively, you will see a listing of process tasks that include your selected I/O. For instance, if you choose an output from the center column, you will see a list of processes that turn that output ON or OFF in the window on the right. Clicking on a process will provide a description in the **Process Description** window. You can select both inputs and outputs to filter the list of processes. To de-select an I/O point, **<Ctrl> - left click** on it.

Annunciators

The Annunciator feature is useful for those ProControl users that remain connected to their systems for extended periods of time via ProView. The Annunciator is a visual alarm indicator for the ProView screen that is designed to draw attention to an alarm condition that *presently exists*, or *has occurred but has now cleared*. Clicking on **Annunciation** in the **File** menu toggles the Annunciation feature on and off. If any discrete or analog input that is configured as an alarm input becomes *active*, the input's tagname will turn red, and the System Status panel (the panel that indicates **Auto** or **Manual** mode) will begin to flash red. The annunciator continues to flash even if the input is no longer active, so that the operator does not miss an alarm condition. To acknowledge the alarm, click on **Clear Annunciators** in the **System** menu. If an alarm condition still exists, the annunciator will begin flashing again. *Note that only those alarm conditions that occur in the current ProView session will be annunciated.*

Exiting ProView

You can exit ProView by clicking on the  at the top of the main screen or by clicking **Exit** in the **File** menu. You will be asked whether you want to save your site file and any logged data that you have extracted.

ProControl Cellular Data Modem Kit
Quick Start Guide

Introduction

The ProControl Cellular Data Modem Kit works in conjuction with a special version of firmware in your ProControl unit to provide a wireless internet protocol (IP) connection to your ProControl unit, along with outgoing email and text messaging capability for status and alarm reporting (please note that fax reporting is not available with this version). The kit includes a CDMA IP modem from MultiTech Systems that is configured to work seamlessly with the ProControl to enable a wireless connection anywhere Verizon Wireless data service is available.

What's Included

The ProControl Cellular Data Modem Kit includes the following:

- Special firmware in your ProControl unit to operate seamlessly with the IP modem.
- A MultiTech wireless IP modem, which has already been activated for data communication by EOS Research. It is labeled with the static IP address that has been assigned to the modem
- Power cord for the modem to obtain power from the ProControl
- Serial interface cable to connect the modem to the ProControl
- A 3 dBi magnetic-mount antenna to ensure highest signal strength for the modem

Installation

1. Mount the modem in a dry, non-condensing location (NEMA 4 enclosure recommended) in close proximity to your ProControl. The operating temperature range for the modem is -22° to 122° F.
2. For best cellular data reception, mount your antenna in the center of a flat metal surface at least 12" x 12" in size, preferably outdoors. Route your antenna cable with a drip loop outside of the building, and screw the adapter on the other end of the cable to the bronze-colored antenna port on the back of the modem.

3. Connect the 9-pin connector on the modem serial interface cable to the "RS-232" port on the modem and tighten the holding screws. Connect the other end to the "RS-232/Serial" port on the ProControl.
4. With your ProControl powered down, attach the power adapter cable to the modem, tighten the connecting barrel, and tie the other end of the cable to the terminal designated "+24v cell" (red striped wire) and "G" (black wire).

Initial Start-Up

Simply power up your ProControl, and it will be ready to communicate after approximately 2 minutes of configuring the modem and self-testing. After a minute or so, the signal strength LEDs on the front of the modem will be lit; signal strength should be two bars or greater for reliable communication. *Please note that your standard Local Connect cable can also be used for a local connection to the ProControl using ProView - simply unplug the IP modem's serial cable first. When reconnecting the IP modem, we recommend that you repower the ProControl.*

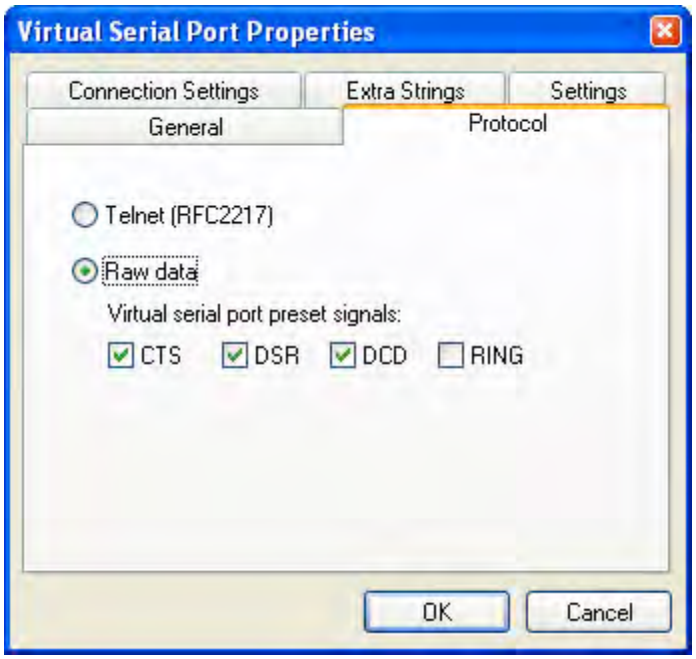
Communicating with your ProControl Using ProView

1. If you haven't done so already, download and install Serial Port Redirector software on your PC: www.fabulatech.com/serial-port-redirector-purchase.html Current purchase price is $99 for one license on one PC (discounts available for multiple licenses), and this can be used along with ProView to connect to any number of ProControl units. A free 15-day trial is available.
2. Serial Port Redirector creates a "virtual serial port" on your PC. Click the  icon and the following screen appears:

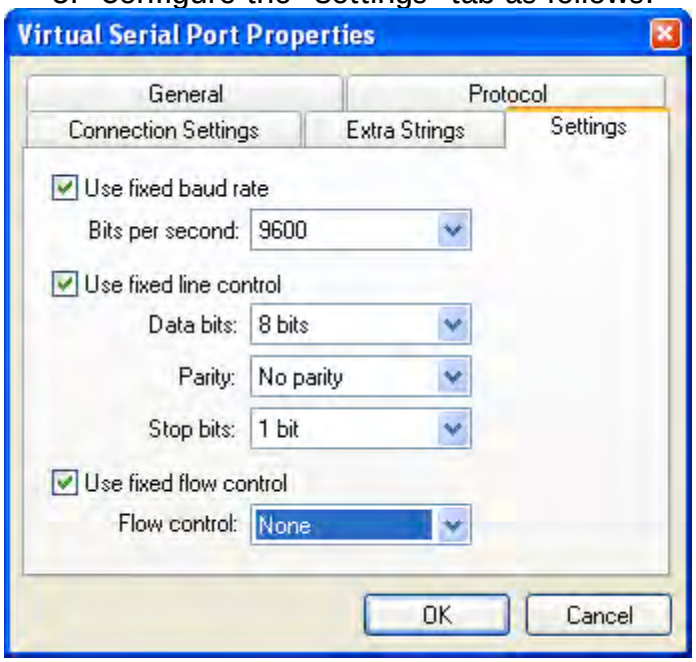


3. Choose a virtual serial port (COM1 – COM4) that is not already in use on your PC, enter the IP address of your IP modem, and enter 14000 into the "TCP-port" box.

4. Click the Advanced button to configure other settings as follows. In the Protocol tab, choose “Raw Data”:



5. Configure the “Settings” tab as follows:

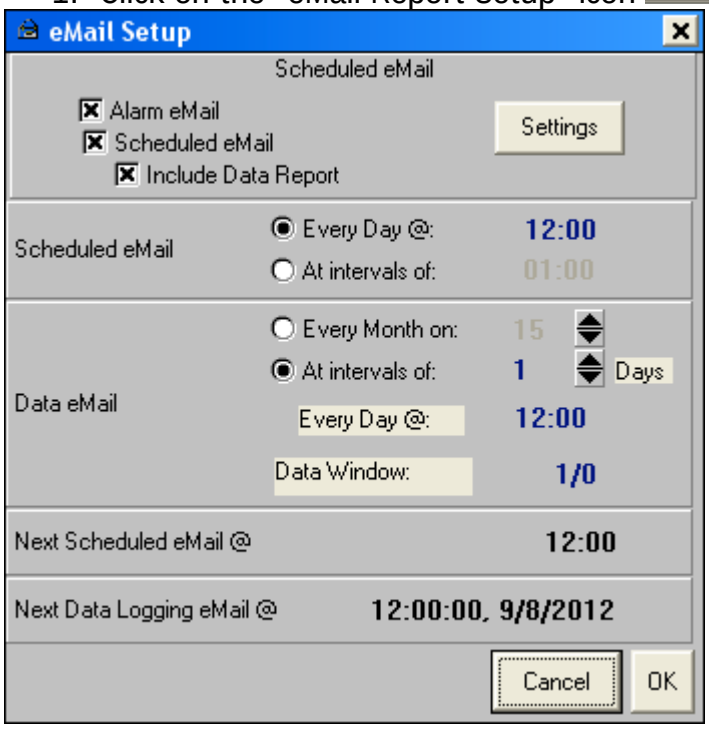


6. All other settings remain at default. Once you have established these settings, you will not need to change them again, unless you wish to connect to a different IP address.
7. Open ProView and open the appropriate site file. We recommend keeping the Serial Port Redirector screen visible on your desktop to view the status of the virtual serial port, and click on the Local Connect icon.

8. Choose the COM port that you just set up using Serial Port Redirector, and click the "Connect to ProControl" button. Please note that there is usually a delay of several seconds while your IP modem is located, at which point the connection in the small status light next to the "pipeline" in Serial Port Redirector will turn green. Only then will ProView start its Initial Query of your ProControl.
9. You may now use ProView as you normally would. *After you disconnect from the ProControl, please allow two minutes before attempting to reconnect.*

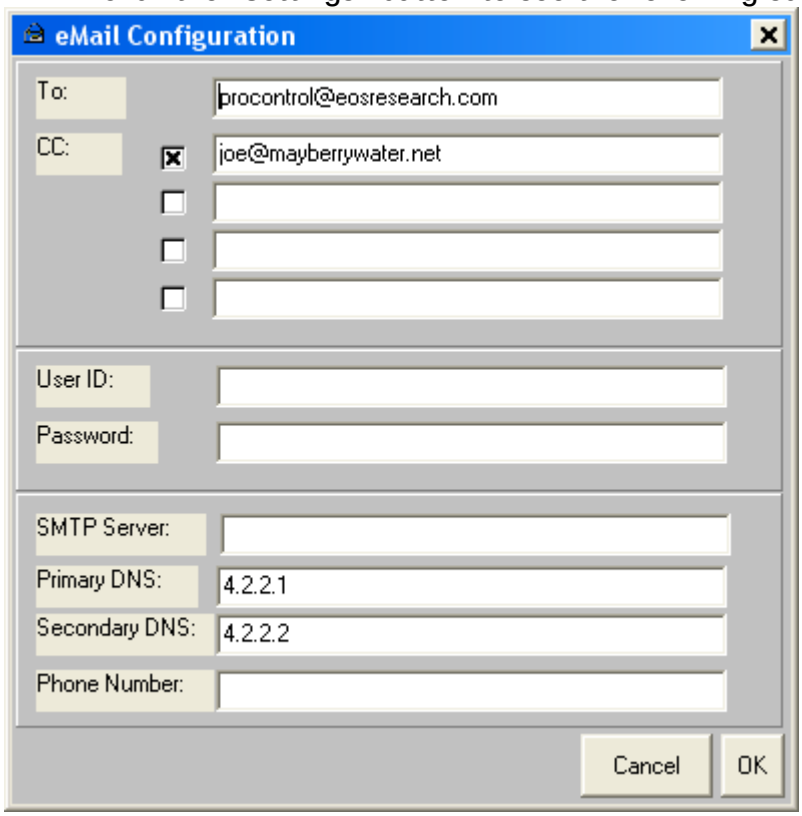
Email Report Settings

1. Click on the "eMail Report Setup" icon  and the following screen appears:



The report options are generally self-explanatory. Click the "Include Data Report" checkbox to have datalog files attached to the scheduled emails. The "Data Window" indicates the number of days/hours of data to include.

2. Click the “Settings” button to see the following screen:



Enter email addresses of the desired recipients here. Be sure to hit the “Enter” key after each entry. The only other settings in this window applicable to a cellular IP connected ProControl are the SMTP Server and DNS addresses. EOS Research personnel will configure these for you; please contact EOS Research before making any changes to these settings. Click the “OK” button to save the configuration.

Text Messaging

Contact EOS Research to set up outgoing alarm text messaging.

IMPORTANT NOTE ABOUT DATA USAGE:

Your cellular IP modem has been allocated a monthly usage allowance of 10 MB. This is easily sufficient for modest duration, daily connections to your ProControl using ProView, and outgoing email traffic from the ProControl. Avoid extended connection periods – you will be billed for monthly use over 10 MB at $7/MB.

MultiModem® iCell

Intelligent CDMA Cellular Modem



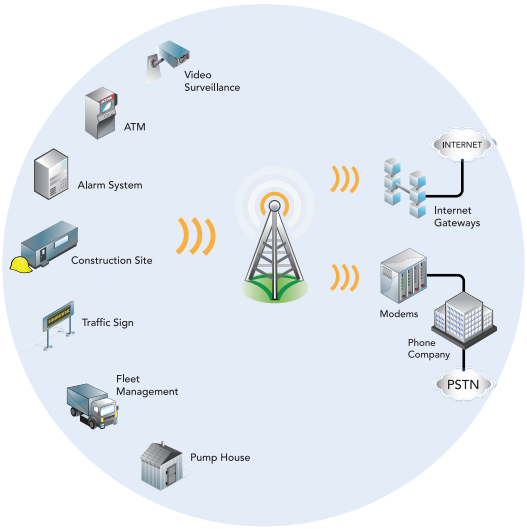
Benefits

- Intelligent Universal IP stack
- Enhanced M2M functionality
- Programmable GPIO ports
- Carrier approved

The MultiModem® iCell intelligent CDMA cellular modem offers standards-based dual-band CDMA2000 1xRTT performance. This ready-to-deploy, standalone modem provides wireless data communication and GPS tracking and integrates seamlessly with virtually any application. The intelligence of the embedded Universal IP™ stack allows for automatic/persistent connectivity for mission-critical applications and enhanced M2M functionality. The MultiModem iCell intelligent cellular modem is based on industry-standard open interfaces and can be desktop or panel mounted.

Features

- CDMA2000 1xRTT
- Dual-band 800/1900 MHz CDMA
- Intelligent Universal IP stack for enhanced machine-to-machine functionality
- Models with GPS tracking capability
- NMEA-0183 V3.01 compliant GPS messages
- Event monitoring and reporting via integrated GPIO ports
- Supports Short Message Service
- Available with RS-232 and USB 2.0 interfaces
- Packet data up to 153.6K bps
- Circuit-switched data up to 14.4K bps
- SMA antenna connector(s)
- Desktop or panel mounting
- FCC, IC and CDG certified
- AT command compatible
- Two-year warranty



MultiTech® Systems

Highlights

Applications. The MultiModem iCell intelligent cellular modem with CDMA support is ideal for highly data-intensive, mission-critical applications such as remote video surveillance and other multimedia applications where you are sending digital images, web pages and photographs. For asset tracking and fleet management applications, models with a dedicated GPS receiver are available.

Universal IP for Enhanced M2M Connectivity. Multi-Tech's Universal IP stack consists of a common set of TCP/IP networking protocols and M2M applications implemented using a standard AT command interface. Universal IP provides developers a common programming interface effectively future proofing their application as new cellular technologies are introduced. Some of the benefits of Universal IP are Automatic/Persistent Connectivity, Device Monitor, Event Monitoring/Reporting, Ping & TCP Keep Alive and Wake-up on Caller ID/Wake-up on Ring.

Reduces Development Time. The MultiModem iCell intelligent cellular modem can make your existing and next generation device communication-ready without requiring any hardware changes to its design. It actually provides faster time-to-market because it relieves the burden and expense of obtaining RF and carrier approvals.

Multiple Interface Options. The MultiModem iCell intelligent cellular modem is designed around a broad range of interface options including RS-232, USB and GPIO to provide you with seamless connectivity for your application. Each interface option offers unique features and benefits related to the technology it supports.

Comprehensive Service and Support. The Multi-Tech commitment to service means we provide a two-year product warranty and service that includes technical support, 24-hour web site and ftp support.

Ordering Information

Product	Description	Region
MTCMR-C1*	Intelligent CDMA Modem	Regional
MTCMR-C1-GP*	Intelligent CDMA Modem (GPS)	Regional
Ordering Codes		
-N2	For Sprint Networks (USA)	
-N3	For Verizon Wireless Networks (USA)	
-N16	For Aeris Communications Networks (USA)	
-NAM	Includes US Style Power Plug	

* Use ordering codes for specific build options. Go to www.multitech.com for detailed product model numbers.

Produced in the US of US and non-US components.

Features and specifications are subject to change without notice.

Trademarks / Registered Trademarks: MultiModem, Universal IP, Multi-Tech, and the Multi-Tech logo: Multi-Tech Systems, Inc. / All other products and technologies are the trademarks or registered trademarks of their respective holders.

Specifications

Packet Data Features
CDMA2000 1xRTT dual-band 800/1900 MHz
CDMA IS-95A, IS-95B backwards compatible

Circuit Switched Data
Asynchronous, non-transparent up to 14.4K bps

SMS Features
Text, Point-to-Point MO & MT, cell broadcast

Universal IP Features
TCP/IP features: DNS resolve, FTP client, Ping, POP3 client, PPP (dial-out), SMTP client, TCP RAW client & server, UDP RAW client & server, PAP, CHAP

GPS
Position: 2.5 meters
Aquisition: Hot start 1 second; cold start 29 seconds avg.
Sensitivity: Tracking -161 dBm
Protocol: NMEA-0183 V3.01, GGA, GLL, GSA, GSV, RMC, VTG

Connectors
RF & GPS Antenna: 50 ohm SMA female
RS-232: DE-9 female / USB: USB Type B
Power: 2.5mm miniature screw
GPIO: 6-pin Molex female with ESD protection

Power Requirements
9V to 32VDC

GPIO Functions
Pin 1-2: Digital input, 24V tolerance
Pin 3-4: Configurable as digital input (5V tolerant TTL/CMOS levels); digital outputs (3.3V high), or ADC inputs (0 to 3.3V rail)
Pin 5: ADC input (0 to 3.3V rail)
Pin 6: Ground (must be connected to the ground of the attached device)

Operating System Support
Windows 2000/XP/2003/Vista/2008/7 (32-bit/64-bit), Linux

Physical Description
4.9" w x 1.1" h x 3.5" d; 8 oz.
(12.4 cm x 2.8 cm x 8.9 cm; 227g)

Environment
Temperature Range: -40° to +185° F (-40° to +85° C)
Humidity: 20% to 90% RH non-condensing

Approvals
EMC Compliance: FCC Part 15 Class B
Radio Compliance: FCC Part 22, 24; RSS 132, 133
Safety Compliance: cUL 60950-1, UL 60950-1; IEC 60950-1
Network: CDG 1 & 2
RoHS Compliant

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MultiModem® iCell

MTCMR User Guide

MultiModem® iCell User Guide

Models: MTCMR-E1, -C1, -G2, -H5, -EV2, -EV3, optional -GP builds

Part Number: S000484, Version 9.1

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Knowledge Base

The Knowledge Base provides immediate access to support information and resolutions for all Multi-Tech products. Visit http://www.multitech.com/kb.go.

Support Portal

To create an account and submit a support case directly to our technical support team, visit: https://support.multitech.com.

Support

Business Hours: M-F, 9am to 5pm CT

Country	By Email	By Phone
Europe, Middle East, Africa:	support@multitech.co.uk	+(44) 118 959 7774
U.S., Canada, all others:	support@multitech.com	(800) 972-2439 or (763) 717-5863

Warranty

To read the warranty statement for your product, visit www.multitech.com/warranty.go. For other warranty options, visit www.multitech.com/es.go.

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Fax (763) 785-9874

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Product Overview

Overview

MultiModem iCell modems provide wireless data communications and integrate seamlessly with other applications. MultiModem iCell includes Universal IP® stack, which allows users to implement functions such as persistent connectivity and event monitoring.

Model Options

Model	Description
MTCMR-E1	Quad-band E-GPRS Class 12 performance
MTCMR-E1-GP	Quad-band E-GPRS Class 12 performance; GPS
MTCMR-C1	Multi-band CDMA2000 1xRTT performance
MTCMR-C1-GP	Multi-band CDMA2000 1xRTT performance; GPS
MTCMR-G2	Quad-band GSM/GPRS Class 10 performance
MTCMR-G2-GP	Quad-band GSM/GPRS Class 10 performance; GPS
MTCMR-H5	Standards based tri-band UMTS/HSPA performance
MTCMR-H5-GP	Standards based tri-band UMTS/HSPA performance; GPS
MTCMR-EV2	Dual-band 800/1900 MHz with receive diversity support on EVDO bands
MTCMR-EV2-GP	Dual-band 800/1900 MHz with receive diversity support on EVDO bands; GPS
MTCMR-EV3	Dual-band 800/1900 MHz with receive diversity support on EVDO bands
MTCMR-EV3-GP	Dual-band 800/1900 MHz with receive diversity support on EVDO bands; GPS

Related Documentation

Use AT Commands to configure your device. The following documentation is available on the Multi-Tech website at www.multitech.com/setup/product.go.

Model	Document
All	S000457 Universal IP AT Commands Reference Guide
MTCMR-H5	S000528 HSPA+ AT Commands Reference Guide
MTCMR-EV3	S000546 EV-DO and CDMA AT Commands Reference Guide
MTCMR-EV2	S000482 CDMA 1xEV-DO AT Commands Reference Guide
MTCMR-G2	S000463 GPRS G2 Modems AT Commands Reference Guide
MTCMR-E1	S000474 Wireless EDGE (E1) Modems AT Commands Reference Guide
MTCMR-C1	S000478 CDMA-C1 AT Commands Reference Guide
MTCMR-C2	S000546 EV-DO and CDMA AT Commands Reference Guide

Package Contents

Note: For HSPA+, EDGE, and GPRS devices, your wireless provider supplies the SIM card. Other models do not use SIM cards.

Unbundled Package with No Accessories	Bundled Package with Accessories
1 modem **Note:** Package does not include mounting screws, AC or DC power supply, and antenna(s).	1 modem 1 antenna (-GP builds have an additional GPS antenna) 1 RS-232 cable 1 USB cable 1 GPIO cable 1 power supply (-GP builds do not include power supply) **Note:** Package does not include mounting screws

Safety Notices and Warnings

General Safety

The modem is designed for and intended to be used in fixed and mobile applications. Fixed means the device is physically secured at one location and cannot be easily moved to another location. Mobile means the device is used in other than fixed locations.

CAUTION: Maintain a separation distance of at least 20 cm (8 inches) between the transmitter's antenna and the body of the user or nearby persons. The modem is not designed for or intended to be used in portable applications within 20 cm (8 inches) of the user's body.

Radio Frequency (RF) Safety

Due to the possibility of radio frequency (RF) interference, it is important that you follow any special regulations regarding the use of radio equipment. Follow the safety advice given below.

- Operating your device close to other electronic equipment may cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers' recommendations.
- Different industries and businesses restrict the use of cellular devices. Respect restrictions on the use of radio equipment in fuel depots, chemical plants, or where blasting operations are in process. Follow restrictions for any environment where you operate the device.
- Do not place the antenna outdoors.
- Switch OFF your wireless device when in an aircraft. Using portable electronic devices in an aircraft may endanger aircraft operation, disrupt the cellular network, and is illegal. Failing to observe this restriction may lead to suspension or denial of cellular services to the offender, legal action, or both.
- Switch OFF your wireless device when around gasoline or diesel-fuel pumps and before filling your vehicle with fuel.
- Switch OFF your wireless device in hospitals and any other place where medical equipment may be in use.

Interference with Pacemakers and Other Medical Devices

Potential interference

Radiofrequency energy (RF) from cellular devices can interact with some electronic devices. This is electromagnetic interference (EMI). The FDA helped develop a detailed test method to measure EMI of implanted cardiac pacemakers and defibrillators from cellular devices. This test method is part of the Association for the Advancement of Medical Instrumentation (AAMI) standard. This standard allows manufacturers to ensure that cardiac pacemakers and defibrillators are safe from cellular device EMI.

The FDA continues to monitor cellular devices for interactions with other medical devices. If harmful interference occurs, the FDA will assess the interference and work to resolve the problem.

Precautions for pacemaker wearers

If EMI occurs, it could affect a pacemaker in one of three ways:

- Stop the pacemaker from delivering the stimulating pulses that regulate the heart's rhythm.
- Cause the pacemaker to deliver the pulses irregularly.
- Cause the pacemaker to ignore the heart's own rhythm and deliver pulses at a fixed rate.

Based on current research, cellular devices do not pose a significant health problem for most pacemaker wearers. However, people with pacemakers may want to take simple precautions to be sure that their device doesn't cause a problem.

- Keep the device on the opposite the side of the body from the pacemaker to add extra distance between the pacemaker and the device.
- Avoid placing a turned-on device next to the pacemaker (for example, don't carry the device in a shirt or jacket pocket directly over the pacemaker).

Vehicle Safety

When using your device in a vehicle:

- Do not use this device while driving.
- Respect national regulations on the use of cellular devices in vehicles.
- If incorrectly installed in a vehicle, operating the wireless device could interfere with the vehicle's electronics. To avoid such problems, use qualified personnel to install the device. The installer should verify the vehicle electronics are protected from interference.
- Using an alert device to operate a vehicle's lights or horn is not permitted on public roads.
- UL evaluated this device for use in ordinary locations only. UL did NOT evaluate this device for installation in a vehicle or other outdoor locations. UL Certification does not apply or extend to use vehicles or outdoor applications or in ambient temperatures above 40° C.

User Responsibility

Respect all local regulations for operating your wireless device. Use the security features to block unauthorized use and theft.

Device Maintenance

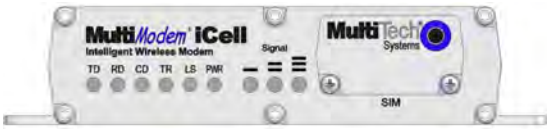
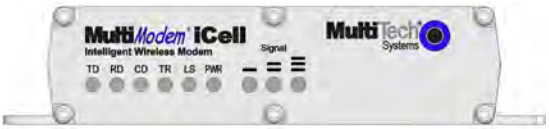
When maintaining your device:

- Do not attempt to disassemble the device. There are no user serviceable parts inside.
- Do not expose your device to any extreme environment where the temperature or humidity is high.
- Do not expose the device to water, rain, or spilled beverages. It is not waterproof.
- Do not place the device alongside computer discs, credit or travel cards, or other magnetic media. The information contained on discs or cards may be affected by the device.
- Using accessories, such as antennas, that Multi-Tech has not authorized or that are not compliant with Multi-Tech's accessory specifications may invalidate the warranty.

If the device is not working properly, contact Multi-Tech Technical Support.

LEDs, Connectors, and Specifications

Front

MTCMR-E1, -G2, -H5	MTCMR-C1, -EV2, -EV3
	

LEDs

LED	Description		
TD	**Transmit Data:** Lights when device transmits data. Not valid while in USB mode.		
RD	**Receive Data:** Lights when device receives data. Not valid while in USB mode.		
CD	**Carrier Detect:** Lights when there is a data connection. Not valid while in USB mode.		
LS	**Link Status:** LED behavior depends on model.		
	H5, EV3, and EV2 models	**G2 and C1 models**	**E1 model** **Note:** Set AT^SSYNC to 1 for the following default LED timings:
	Continuous ON indicates device is powered on and registered on the network.	Continuous ON indicates device is not registered on the network.	Continuous ON indicates connected to remote party (CSD call).
	Slow flashing (5 seconds) indicates device is on and searching for a network.	Flashing at 200 ms on / 2 sec indicates registration on network.	**Flashing at 600 ms on/600 ms off** is limited network service: No SIM card inserted or no PIN entered, or network search in progress or ongoing user authentication, or network login in progress.
	Fast flashing (0.3 seconds) indicates device is transmitting or receiving.	Flashing at 200 ms on / 600 ms off indicates it is registered on a network and communication is in progress.	**Flashing at 75 ms on/3 sec off** is idle mode: Registered to the GSM network (monitoring control channels and user interactions). No call is in progress.

LED	Description		
	OFF indicates device is turned off or not powered.	OFF indicates device is turned off or in download mode.	**Flashing at 75 ms on/ 75 ms off/75 ms on/3 sec off** indicates one or more GPRS contexts activated.
			Flashing at 500 ms on/ 25 ms off indicates packet switched data transfer in progress.
			OFF indicates ME is in one of the following modes: power down mode, airplane mode, non-cyclic sleep mode with no temporary wake-up event in progress.
TR	**Terminal Ready:** Indicates a readiness signal from the PC.		
PWR/GPS	**Power:** Lights device has DC power.		
	GPS: If device has valid GPS signal, LED blinks at 1 second ON and 0.5 second OFF. If invalid GPS signal, LED is solid.		
Signal	■ **ALL OFF** – Unit is off, not registered on a network or has an extremely weak signal (0 < = RSSI < 6). ■ **1 Bar ON** – Very weak signal (7 < = RSSI < 14) ■ **1 and 2 Bars ON** – Weak signal (15 < = RSSI < 23) ■ **1, 2, and 3 Bars ON** – Good signal (24 < = RSSI < 31)		

Back

MTCMR No GPS	MTCMR with GPS
	

MTCMR-H5 Specifications

Category	Description
General	
Performance	HSPA+
Frequency Bands	Penta band 850/900/1700/1900/2100 MHz
Speed	
Packet Data	HSDPA data service of up to 21.0 Mbps
	HSUPA data service of up to 5.76 Mbps
Physical Description	
Weight	0.45 lbs. (200 g)
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style
Power	2.5mm miniature (screw-on)
USB	Type B
SIM Holder	Standard 1.8V and 3V
Environment	
Operating Temperature	-22° to 158° F (-30° to 70° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS, Wi-Fi, Bluetooth	
SMS	Point-to-Point messaging
	Text and PDU
	Cell broadcast
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B
	EN55022 Class B

Category	Description
Radio Compliance	FCC Part 22
	FCC Part 24
	RSS 132
	RSS 133
	EN 301 511
	EN 301 489-1
	EN 301 489-3 (GPS models only)
	EN 301 489-7
	EN 301 489-24
	EN 301 908
	AS/ACIF S042.1, S042.3
Safety Compliance	UL/cUL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1
Network Compliance	PTCRB
	AT&T

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MTCMR-EV3 Specifications

Category	Description
General	
Performance	EV-DO Rev A
Frequency Bands	Dual band 900/1800 MHz
Speed	
Packet Data	Up to 3.1M downlink and 5.76M bps uplink
Physical Description	
Weight	0.45 lbs. (200 g)
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style

Category	Description
Power	2.5mm miniature (screw-on)
USB	Type B
Environment	
Operating Temperature	-22° to 185° F (-30° to 85° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS, Wi-Fi, Bluetooth	
SMS	Point-to-Point messaging
	Text and PDU
	Cell broadcast
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B
	EN55022 Class B
	EN55024
Radio Compliance	FCC Part 22
	FCC Part 24
Safety Compliance	UL/cUL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1

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MTCMR-EV2 Specifications

Category	Description
General	
Performance	EV-DO Rev A backwards compatible to EV-DO Rev 0 and CDMA2000 1xRTT
Frequency Bands	Dual band 800/1900 MHz
Speed	
Packet Data	Up to 3.1 Kbps download and 1.8 Kbps upload.
Circuit Switched Data	IS-95A, IS-95B up to 14.4K bps
Physical Description	
Weight	0.45 lbs. (200 g)

Category	Description
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style
Power	2.5mm miniature (screw-on)
USB	Type B
Environment	
Operating Temperature	-22° to 185° F (-30° to 85° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS, Wi-Fi, Bluetooth	
SMS	Point-to-Point messaging
	Text and PDU
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B
	EN55022 Class B
Radio Compliance	FCC Part 22
	FCC Part 24
Safety Compliance	UL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1

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MTCMR-G2 Specifications

Category	Description
General	
Performance	GPRS: Class 10
Frequency Bands	Quad-band GSM/GPRS/EDGE: 850/900/1800/1900 MHz
Speed	
Packet Data	Up to 85.6K bps, coding schemes CS1 to CS4
Circuit Switched Data	Up to 14.4 Kbps transparent and non-transparent
Physical Description	
Weight	0.45 lbs. (200 g)
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style
Power	2.5mm miniature (screw-on)
USB	Type B
SIM Holder	Standard 1.8V and 3V
Environment	
Operating Temperature	-40° to 185° F (-40° to 85° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS, Wi-Fi, Bluetooth	
SMS	Point-to-Point messaging
	Text and PDU
	Cell broadcast
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B
	EN55022 Class B

Category	Description
Radio Compliance	FCC Part 22
	FCC Part 24
	RSS 132
	RSS 133
	EN 301 511
	EN 301 489-1
	EN 301 489-3 (GPS models only)
	EN 301 489-7
	EN 301 908
	AS/ACIF S042.1, S042.3
Safety Compliance	UL/cUL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1
Network Compliance	PTCRB
	AT&T

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MTCMR-C1 Specifications

Category	Description
General	
Performance	CDMA2000 1xRTT
Frequency Bands	Dual band 800/1900 MHz
Speed	
Packet Data	Up to 153.6K bps forward and reverse
Circuit Switched Data	IS-95A, IS-95B up to 14.4K bps forward and reverse
Physical Description	
Weight	0.45 lbs. (200 g)
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style

Category	Description
Power	2.5mm miniature (screw-on)
USB	Type B
Environment	
Operating Temperature	-40° to 185° F (-40° to 85° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS	
SMS	Point-to-Point messaging
	Text and PDU
	Cell broadcast
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B
	EN55022 Class B
Radio Compliance	FCC Part 22
	FCC Part 24
	RSS 132
	RSS 133
Safety Compliance	UL/cUL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1

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MTCMR-E1 Specifications

Category	Description
General	
Performance	EDGE: E-GPRS Class 12
	GPRS: Class 10
Frequency Bands	Quad-band GSM/GPRS/EDGE: 850/900/1800/1900 MHz
Speed	

Category	Description
Packet Data	EDGE: E-GPRS Up to 240K bps, coding scheme MCS 1-9, mobile station Class B, LLC layer, 4 time slots.
	GPRS: Full PBCCH support, coding scheme 1-4, mobile station Class B
Circuit Switched Data	Up to 14.4K bps, non-transparent
Physical Description	
Weight	0.45 lbs. (200 g)
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style
Power	2.5mm miniature (screw-on)
USB	Type B
SIM Holder	Standard 1.8V and 3V
Environment	
Operating Temperature	-22° to 158° F (-30° to 70° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS, Wi-Fi, Bluetooth	
SMS	Point-to-Point messaging
	Text and PDU
	Cell broadcast
Certifications and Compliance	
EMC Compliance	EN55022 Class B

Category	Description
Radio Compliance	FCC Part 22
	FCC Part 24
	RSS 132
	RSS 133
	EN 301 511
	EN 301 489-1
	EN 301 489-3 (GPS models only)
	EN 301 489-7
	EN 301 908
	AS/ACIF S042.1, S042.3
Safety Compliance	UL/cUL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1
Network Compliance	PTCRB
	AT&T

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Power Measurements

Multi-Tech Systems, Inc. recommends that you incorporate a 10% buffer into your power source when determining product load.

Note: Note the following:

- **Maximum:** The continuous current during maximum data rate with the radio transmitter at maximum power.
- **Peak:** The peak current during a transmission burst period.
- **In-rush Current:** The input current during power up, or a reset.

MTCMR-H5

GSM 850

	Idle	Typical	Maximum	Peak TX	In-rush Current
9 volts					
Current (AMPS)	0.057	0.080	0.185	1.18	1.61
Watts	0.526	0.740	1.700		
20 volts					
Current (AMPS)	0.030	0.044	0.087	0.530	1.71
Watts	0.600	0.880	1.740		
32 volts					
Current (AMPS)	0.021	0.031	0.054	0.332	1.46
Watts	0.672	0.992	1.73		

HSPA+

	Idle	Typical	Maximum	Peak TX	In-rush Current
9 volts					
Current (AMPS)	0.057	0.140	0.270	0.340	1.61
Watts	0.526	1.290	2.47		
20 volts					
Current (AMPS)	0.030	0.070	0.131	0.196	1.71
Watts	0.600	1.400	2.62		
32 volts					
Current (AMPS)	0.021	0.048	0.086	0.152	1.46
Watts	0.672	1.54	2.75		

MTCMR-H5-GP

GSM 850

	Idle	Typical	Maximum	Peak TX	In-rush Current
9 volts					
Current (AMPS)	0.097	0.125	0.225	1.32	1.63
Watts	0.895	1.150	2.070		
20 volts					
Current (AMPS)	0.051	0.063	0.108	0.570	1.74
Watts	1.020	1.260	2.160		
32 volts					
Current (AMPS)	0.035	0.043	0.072	0.340	1.47
Watts	1.120	1.380	2.300		

HSPA+

	Idle	Typical	Maximum	Peak TX	In-rush Current
9 volts					
Current (AMPS)	0.096	0.182	0.310	0.384	1.63
Watts	0.890	1.670	2.840		
20 volts					
Current (AMPS)	0.051	0.092	0.153	0.220	1.74
Watts	1.020	1.840	3.060		
32 volts					
Current (AMPS)	0.035	0.062	0.100	0.164	1.47
Watts	1.120	1.980	3.200		

MTCMR-EV3

CDMA 2000

	Typical	Maximum	Peak TX	In-rush Current
9 volts				
Current (AMPS)	0.121	0.330	0.404	2.55
Watts	1.09	2.97		
20 volts				
Current (AMPS)	0.061	0.155	0.228	1.89
Watts	1.22	3.10		
32 volts				

	Typical	Maximum	Peak TX	In-rush Current
Current (AMPS)	0.045	0.107	0.176	1.70
Watts	1.44	3.42		

EV-DO

	Typical	Maximum	Peak TX	In-rush Current
9 volts				
Current (AMPS)	0.118	0.275	0.360	2.55
Watts	1.06	2.48		
20 volts				
Current (AMPS)	0.061	0.133	0.204	1.89
Watts	1.22	2.66		
32 volts				
Current (AMPS)	0.043	0.091	0.156	1.70
Watts	1.38	2.91		

MTCMR-EV3-GP

CDMA 2000

	Typical	Maximum	Peak TX	In-rush Current
9 volts				
Current (AMPS)	0.160	0.354	0.430	2.42
Watts	1.44	3.19		
20 volts				
Current (AMPS)	0.086	0.173	0.24	1.86
Watts	1.72	3.46		
32 volts				
Current (AMPS)	0.049	0.110	0.18	1.65
Watts	1.57	3.52		

EV-DO

	Typical	Maximum	Peak TX	In-rush Current
9 volts				
Current (AMPS)	0.168	0.330	0.412	2.42
Watts	1.51	2.97		
20 volts				

	Typical	Maximum	Peak TX	In-rush Current
Current (AMPS)	0.084	0.158	0.232	1.86
Watts	1.68	3.16		
32 volts				
Current (AMPS)	0.056	0.105	0.176	1.65
Watts	1.79	3.36		

MTCMR-EV2

CDMA 2000

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.061	0.160	0.485
Watts	0.56	1.47	4.41
20 volts			
Current (AMPS)	0.030	0.081	0.230
Watts	0.60	1.62	4.60
32 volts			
Current (AMPS)	0.023	0.055	0.152
Watts	0.74	1.76	4.86

EV-DO

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.108	0.330	0.580
Watts	1.00	3.04	5.27
20 volts			
Current (AMPS)	0.052	0.165	0.313
Watts	1.04	3.30	6.26
32 volts			
Current (AMPS)	0.041	0.105	0.205
Watts	1.31	3.36	6.56

MTCMR-EV2

CDMA 2000

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.119	0.220	0.560
Watts	1.10	2.02	5.09
20 volts			
Current (AMPS)	0.062	0.110	0.265
Watts	1.24	2.20	5.30
32 volts			
Current (AMPS)	0.044	0.075	0.175
Watts	1.141	2.40	5.60

EV-DO

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.167	0.370	0.625
Watts	1.54	3.40	5.68
20 volts			
Current (AMPS)	0.087	0.192	0.345
Watts	1.74	3.84	6.90
32 volts			
Current (AMPS)	0.062	0.121	0.225
Watts	1.198	3.87	7.20

MTCMR-G2

	Sleep	Typical	Maximum	Peak TX
9 volts				
Current (AMPS)	0.069	0.109	0.194	1.53
Watts	0.640	1.010	1.790	
20 volts				
Current (AMPS)	0.038	0.056	0.096	0.668
Watts	0.760	1.120	1.920	
32 volts				
Current (AMPS)	0.030	0.041	0.065	0.453
Watts	0.960	1.300	2.100	

MTCMR-G2-GP

	Sleep	Typical	Maximum	Peak TX
9 volts				
Current (AMPS)	0.083	0.130	0.233	1.83
Watts	0.770	1.190	2.130	
20 volts				
Current (AMPS)	0.046	0.067	0.115	0.801
Watts	0.920	1.340	2.300	
32 volts				
Current (AMPS)	0.036	0.050	0.078	0.543
Watts	1.150	1.600	2.500	

MTCMR-C1

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.048	0.128	0.360
Watts	0.44	1.18	3.31
20 volts			
Current (AMPS)	0.027	0.065	0.171
Watts	0.54	1.30	3.42
32 volts			
Current (AMPS)	0.021	0.046	0.115

	Sleep	Typical	Maximum
Watts	0.67	1.47	3.68

MTCMR-C1-GP

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.096	0.175	0.435
Watts	0.89	1.62	4.00
20 volts			
Current (AMPS)	0.052	0.092	0.205
Watts	1.04	1.84	4.10
32 volts			
Current (AMPS)	0.037	0.062	0.135
Watts	1.18	1.98	4.32

MTCMR-E1

	Sleep	Typical	Maximum	Peak TX
9 volts				
Current (AMPS)	0.091	0.149	0.416	2.5
Watts	0.84	1.37	3.77	
20 volts				
Current (AMPS)	0.048	0.077	0.190	0.895
Watts	0.96	1.54	3.80	
32 volts				
Current (AMPS)	0.034	0.054	0.124	0.625
Watts	1.088	1.73	3.97	

MTCMR-E1-GP

	Sleep	Typical	Maximum	Peak TX
9 volts				
Current (AMPS)	0.098	0.160	0.410	2.25
Watts	0.91	1.48	3.77	
20 volts				
Current (AMPS)	0.051	0.080	0.190	0.890
Watts	1.02	1.60	3.80	

	Sleep	Typical	Maximum	Peak TX
32 volts				
Current (AMPS)	0.035	0.056	0.122	0.609
Watts	1.125	1.79	3.90	

RF Specifications

	GSM 850	EGSM 900	GSM 1800	GSM 1900	CDMA 800	CDMA 1900
Frequency RX	869 to 894 MHz	925 to 960 MHz	1805 to 1800 MHz	1930 to 1990 MHz	869 to 894 MHz	1930 to 1990 MHz
Frequency TX	824 to 849 MHz	880 to 915 MHz	1710 to 1785 MHz	1850 to 1910 MHz	824 to 849 MHz	1850 to 1910 MHz
RF Power Stand	2W at 12.5% duty cycle	2W at 12.5% duty cycle	1W at 12.5% duty cycle	1W at 12.5% duty cycle	--	--

Antenna Information

GSM/EGSM Antenna Requirements/Specifications

Category	Description
Frequency Range	824—960 MHz / 1710—1990 MHz
Impedance	50 Ohms
VSWR	VSWR should not exceed 2.0:1 at any point across the bands of operation
Typical Radiated Gain	3 dBi on azimuth plane
Radiation	Omni-directional
Polarization	Linear Vertical
Wave	Half Wave Dipole

Antennas Available from Multi-Tech

Part Number	Description	Quantity
Quad Band		
ANQB-1HRA	Hinged Right Angle 800/900/1800/1900 MHz Cellular Antenna, 7.5"	1
ANQB-10HRA	Hinged Right Angle 800/900/1800/1900 MHz Cellular Antenna, 7.5"	10
ANQB-50HRA	Hinged Right Angle 800/900/1800/1900 MHz Cellular Antenna, 7.5"	50
Penta Band		
ANPB-1HRA	Hinged Right Angle Penta Band Antenna	1
ANPB-10HRA	Hinged Right Angle Penta Band Antenna	10
Dual Band		

Part Number	Description	Quantity
ANF1-1HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	1
ANF1-10HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	10
ANF1-50HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	50
ANF2-1HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	1
ANF2-10HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	10
ANF2-50HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	50
Bluetooth and Wi-Fi		
ANBT-1	Hinged 2.4 MHz Bluetooth/Wi-Fi Antenna, 4"	1
ANBT-10	Hinged 2.4 MHz Bluetooth/Wi-Fi Antenna, 4"	10
Mag Mount Dual Band		
ANF1-1MMHW	Mag Mount 900/1800 MHz 1/2 Wave Cellular Antenna, 12.5"	1
ANF1-10MMHW	Mag Mount 900/1800 MHz 1/2 Wave Cellular Antenna, 12.5"	10
ANF1-50MMHW	Mag Mount 900/1800 MHz 1/2 Wave Cellular Antenna, 12.5"	50
ANF1-1MMQW	Mag Mount 900/1800 MHz 1/4 Wave Cellular Antenna, 4"	10
ANF1-10MMQW	Mag Mount 900/1800 MHz 1/4 Wave Cellular Antenna, 4"	10
ANF1-50MMQW	Mag Mount 900/1800 MHz 1/4 Wave Cellular Antenna, 4"	50
ANCF2-1MMHW	Mag Mount 850/1900 MHz 1/2 Wave Cellular Antenna, 12.5"	1
ANCF2-10MMHW	Mag Mount 850/1900 MHz 1/2 Wave Cellular Antenna, 12.5"	10
ANCF2-50MMHW	Mag Mount 850/1900 MHz 1/2 Wave Cellular Antenna, 12.5"	50
ANCF2-1MMQW	Mag Mount 850/1900 MHz 1/4 Wave Cellular Antenna, 4"	1
ANCF2-10MMQW	Mag Mount 850/1900 MHz 1/4 Wave Cellular Antenna, 4"	10
ANCF2-50MMQW	Mag Mount 850/1900 MHz 1/4 Wave Cellular Antenna, 4"	50
GPS		
ANGPS-1MM	Mag Mount GPS Antenna, 5 Meter Cable	1
ANGPS-10MM	Mag Mount GPS Antenna, 5 Meter Cable	10

PTCRB Requirements

There cannot be any alteration to the authorized antenna system. The antenna system must be the same type with similar in-band and out-of-band radiation patterns and maintain the same specifications.

FCC Requirements Note

FCC Requirements Note The antenna gain, including cable loss, for the radio you are incorporating into your product design must not exceed the requirements at 850 MHz and 1900 MHz as specified by the FCC grant for mobile operations and fixed mounted operations as defined in 2.1091 and 1.1307 of the FCC rules for satisfying RF exposure compliance. The antenna used for transmitting must be installed to provide a separation distance of at least 20 cm from all persons and must not transmit simultaneously with any other antenna transmitters. User and

installers must be provided with antenna installation instructions and transmitter operating conditions to satisfying RF exposure compliance.

Global Positioning System (GPS)

This information applies only to the models with the GPS option.

Category	Description
Receiver Type	L1 Frequency GPS C/A code SBAS Capable 51 Channel Acquisitions 14 Channel Tracking
Sensitivity Tracking	-161dBm
Accuracy	Position 2.5m CEP Velocity 0.1m/sec
Update Rate	1Hz standard
Dynamics	4G
Open Sky TTFF	Hot start 1 second Cold start 29 seconds average Reacquisition < 1s
Operational Limits	Altitude < 18,000m or Velocity < 515m/s
Datum	Default WGS-84
Interface	UART
Protocol	NMEA-0183 V3.01, GGA, GLL, GSA, GSV, RMC, VTG

Underwriters Laboratories, Inc. Global Positioning System (GPS) Statement

Underwriters Laboratories Inc.(“UL”) has not tested the performance or reliability of the Global Positioning System (“GPS”) hardware, operating software or other aspects of this product. UL has only tested for fire, shock or casualties as outlined in UL’s Standard(s) for Safety. UL60950-1 Certification does not cover the performance or reliability of the GPS hardware and GPS operating software. UL MAKES NO REPRESENTATIONS, WARRANTIES OR CERTIFICATIONS WHATSOEVER REGARDING THE PERFORMANCE OR RELIABILITY OF ANY GPS RELATED FUNCTIONS OF THIS PRODUCT.

Connecting Direct DC Power accessories

To connect direct DC power in a vehicle:

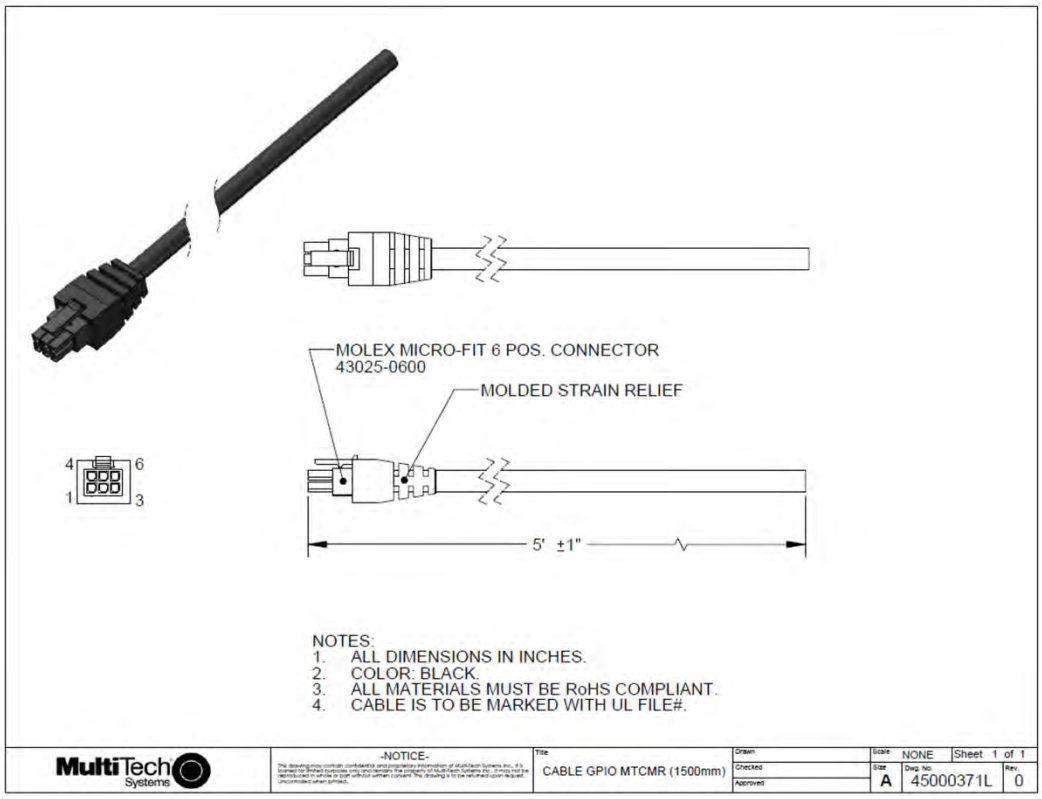
Warning: The device has over-voltage protection. To ensure complete protection, you can add additional filtering to the DC input.
Note: For automotive applications you can use permanent “+” or keyswitched “+” source.

1. Connect the DC power cable to the power connector on the modem.

2. Attach the two wires at the DC power cable's other end to a DC fuse/terminal block where you are mounting the device.
3. Connect red wire to the "+" (positive) terminal and black wire to the "–" (negative) terminal.
4. Verify the ground connection is correct.

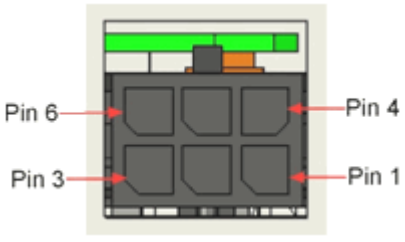
GPIO

GPIO Cable



GPIO Connector

Use Universal IP (UIP) AT Commands to configure GPIO pins. Refer to the Universal IP (UIP) AT Command Reference Guide for more information.

Pin Number	Description	GPIO 6-pin Connector
Pin 1	DIO 0	
Pin 2	DIO 1	
Pin 3	DIO 2/ADC 0	
Pin 4	DIO 3/ADC 1	
Pin 5	ADC2	
Pin 6	Gnd	

You can program GPIO pins independently.

- Pin 1 Digital Input, 24 Volt tolerant.
- Pin 2 Digital Input, 24 Volt tolerant.
- Configure Pin 3 as either Digital Input (5V tolerant TTL/CMOS levels), Digital Output (3.3V High) or as an ADC input (0 to 3.3V rail)
- Configure Pin 4 as either Digital Input (5V tolerant TTL/CMOS levels), Digital Output (3.3V High) or as an ADC input (0 to 3.3V rail)
- Pin 5, ADC input (0 to 3.3V rail)
- Pin 6 is GND and must be connected to the ground of the attached device

GPIO DC Characteristics

Pins 1-5 contain ESD protection.

Pins 1, 2 Input Voltage

Parameter	Min	Max	Units
Input Low-level Voltage	0.3	1.0	V
Input High-level Voltage	3.0	24	V

Pins 1,2 are digital input only.

Pins 3,4 Input Voltage

Parameter	Min	Max	Units
Input Low-level Voltage	-0.3	0.8	V
Input High-level Voltage	2.0	5.5	V

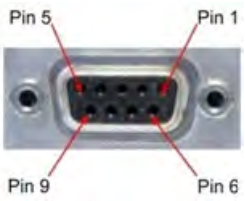
Pins 3,4 Output Voltage

Parameter	Min	Max	Units
Output Low-level Voltage	0.0	0.4	V
Output High-level Voltage	2.9	3.3	V

Pins 3,4 Output Current

Parameter	Min	Max	Units
Output Current	-	2	mA

RS-232 9-Pin Female Connector



Pin	Abbreviation	Description	In/Out
1	CD	Carrier Detect	O
2	RX	Receive	O
3	TX	Transmit	I
4	DTR	Data Terminal Ready	I
5	GND	Ground	--
6	DSR	Data Set Ready	O
7	RTS	Request to Send	I
8	CTS	Clear to Send	O
9	RI	Ring Indicator	O

Device Activation and Installation

Account Activation for Cellular Devices

Some Multi-Tech cellular modems are pre-configured to operate on a specific cellular network, such as Sprint or Verizon Wireless. Before you can use the modem, you must set up a cellular data account with your service provider. Each service provider has its own process for adding devices to their network. Refer to Multi-Tech's Cellular Activation site http://www.multitech.com/activation.go for step-by-step instructions on activating your cellular modem with your service provider.

Device Phone Number

Every device has a unique phone number. Your service provider supplies a phone number when you activate your account, or if your device has a SIM card, the phone number may be on it. Wireless service provider implementation may vary. Consult with your service provider to get the phone number for your device.

Installing and Removing SIM Cards

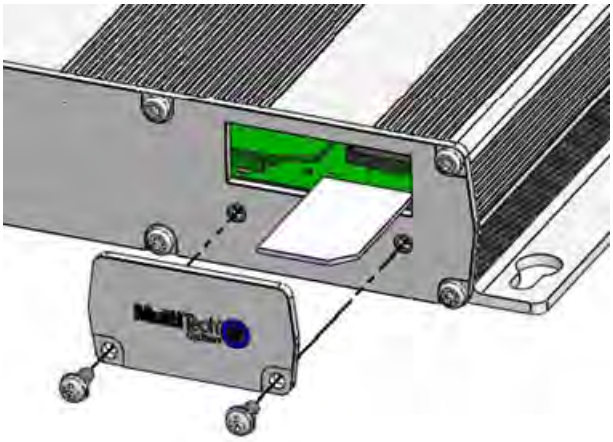
Installing a SIM Card

Some models require a SIM card, which is supplied by your service provider. To install the SIM card:

You need:

- Phillips screwdriver
- SIM card

1. Disconnect power, if it is connected.
2. Use a small Phillips screwdriver to remove the two SIM cover screws and remove the SIM door.



3. Insert the SIM card into the card holder with the contact side facing down as shown.
4. Verify that the SIM card fits into the holder properly and replace the cover.

Removing a SIM Card

To remove the SIM card:

You need:

- Phillips screwdriver
- Needle-nose pliers

1. Disconnect power, if it is connected.
2. Use a small Phillips screwdriver to remove the two SIM cover screws and remove the SIM door.
3. Use a needle-nose pliers to grasp the SIM card and pull it from the card holder. Do not touch the contact with the pliers.

Attaching Power Supply Blades

Power Supply and Blades

If your device shipped with a power cord, attach the blades for your region.



Power Supply No Blades



Power Supply with EU blad



Power Supply with NAM blade



Power Supply with UK blade

Attaching the Blades

To attach a power supply blade:

1. Remove the power supply cover (not shown). To do this, slide the lock down and hold it while you lift off the cover.
2. Insert the latch on the blade into the notch on the power supply.
3. Slide the lock down and hold it while you press the blade in place. Then, release it.



1 - Latch

2 - Notch

3 - Sliding lock

Connecting Antennas, Cables, and Power

To cable your device.

1. Connect your antenna to the SMA connector, labelled ANT.
2. If using a serial interface, connect the RS-232 cable to the RS-232 serial port on the device. Connect the cable's other end to your computer's serial port.
3. If using a USB interface, connect a USB cable to the USB port on the device. Connect the cable's other end to your computer's USB port.
4. Connect the GPIO cable to the I/O connector on the device and the other end to the external device.
5. Connect the power supply or DC power cable to the device. If using the power supply, refer to Attaching Power Supply Blades. If using a DC power cable, refer to Connecting Direct DC Power.
6. Plug the power supply into your power source.

Connecting Direct DC Power accessories

To connect direct DC power in a vehicle:

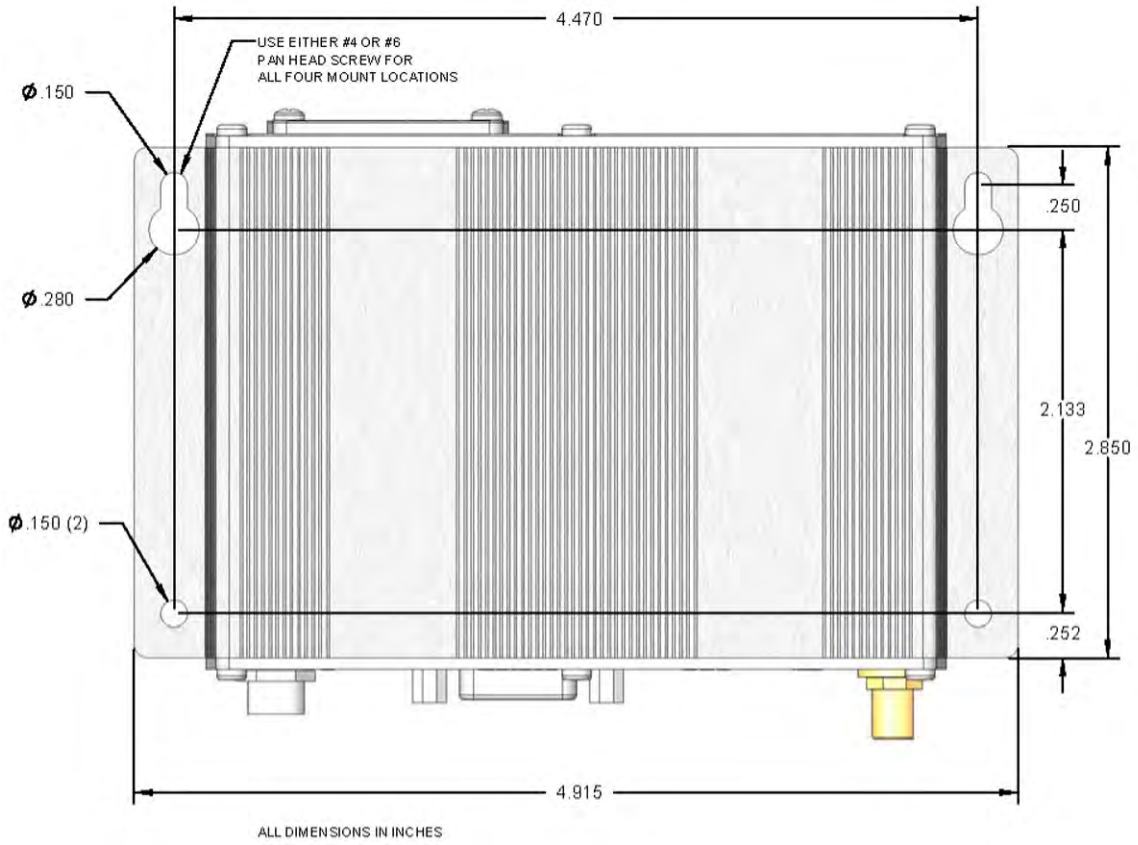
Warning: The device has over-voltage protection. To ensure complete protection, you can add additional filtering to the DC input.
Note: For automotive applications you can use permanent “+” or keyswitched “+” source.

1. Connect the DC power cable to the power connector on the modem.
2. Attach the two wires at the DC power cable's other end to a DC fuse/terminal block where you are mounting the device.
3. Connect red wire to the "+" (positive) terminal and black wire to the "–" (negative) terminal.
4. Verify the ground connection is correct.

Mounting the Device on a Flat Surface

To permanently mounting the device:

- Verify the location has a strong signal strength.
- Position the device so the antenna is always vertical and pointing upward.
- Use the dimensions in the following image to space screw holes.
- Use either #4 or #6 pan head screws.



Installing Drivers

If your device has a SIM card, install it before installing drivers.

For Linux: This device is compatible with kernel 2.6 and higher. It uses the standard CDC-ACM driver.

For Windows: The following installation procedure is compatible with 32 and 64-bit versions of Microsoft Windows 7, 8, Vista, XP, and Server 2003/2008.

Note: If using Windows XP, you need Service Pack 3.

1. Download the driver from **multitech.com/support.go**.
2. Unzip the driver.
   For serial devices, skip to Step 5.
   For USB devices continue with Step 3.
3. Open the **Drivers** folder and run **install.bat.**
4. Connect the USB cable to the computer and your device.
5. In Windows, open **Phone and Modem** from the Control Panel.
6. Click the **Modems** tab and click **Add**.
7. Check **Don't detect my Modem** and click **Next**.
8. Click **Have Disk**.
9. Browse to the **Drivers** folder.
10. Select **MTSMCIP_MTCMRIP.INF** and click **Open**.
11. Select your device from the list and click **Next**.

12. Choose the **COM Port** your device is connected to and click **Next**.
13. Click **Finish** to complete the install.

Verifying that Modem Installed Successfully in Windows

To verify that device installed correctly:

1. In the Phone and Modem Options window, highlight your modem and click **Properties**.
2. Go to the **Diagnostics** tab and click **Query Modem**.

If the device is working, the Command and Response section lists the commands sent and their response. When you are done testing, close the Phone and Modem windows.

Note: If nothing appears in Command and Response, verify that you selected the correct modem. Click Query Modem again and check the device's LEDs. If you selected the correct device, the TR LED lights and the TD and RD LEDs blink.

Basic Operations

Device Phone Number

Every device has a unique phone number. Your service provider supplies a phone number when you activate your account, or if your device has a SIM card, the phone number may be on it. Wireless service provider implementation may vary. Consult with your service provider to get the phone number for your device.

Sending AT Commands

AT commands allow you to configure, operate, and query your device. To send AT commands, use terminal software such as HyperTerminal, TerraTerm, Kermit, or Putty.

Download the AT Command Reference Guide for your model from multitech.com/support.go.

Verifying Signal Strength

To verify the device signal strength, enter:

AT+CSQ

The command indicates signal quality, in the form:

+CSQ: <rssi>,<ber>

Where:

<rssi>	Received signal strength indication.
0	(-113) dBm or less
1	(-111) dBm
2-30	(-109)dBm-(-53)dBm / 2 dBm per step
31	(-51)dBm or greater
99	Not known or not detectable
<ber>	Bit error rate (in percent)
0	Less than 0.2%
1	0.2% to 0.4%
2	0.4% to 0.8%
3	0.8% to 1.6%
4	1.6% to 3.2%
5	3.2% to 6.4%

6	6.4% to 12.8%
7	More than 12.8%
99	Not known or not detectable

Note: Signal strength of 10 or higher for successful packet data sessions.

Example

A example response to AT+CSQ:

+CSQ: 15,1

Checking Network Registration

Before establishing a packet data connection, verify the is device registered on the network. To do this enter the network registration report read command:

AT+CREG?

If the device returns:

+CREG: 0,1

The device is registered.

If the device returns:

+CREG: 0,2

The device is in a network searching state.

Checking Network Registration for EV2 Devices

To verify an EV2 devices is registered on the network, enter:

AT!STATUS

The device returns several lines of modem status information. The second to last line indicates either:

Modem has registered.

or

Modem has NOT registered.

Connecting to the Internet

To access the Internet, establish a dial-up connection.

Note: For HSPA+, EDGE, and GPRS devices, setup your device's Access Point Number before creating the dial-up connections.

Creating a Windows Dial-Up Connection

Each version of the Windows operating system has different steps for creating dial-up Internet connections. Consult Windows Help for the specific steps for your version.

You need the phone number, username, and password for your ISP.

Setting the Access Point Number (APN) in Modem's Properties

Some devices require an Access Point Number. If your service provider supplies an APN number for your account, enter it in the Phone and Modem Operations Window.

1. In Windows, open **Phone and Modem** from the Control Panel.
2. Open the **Properties** window for your modem..
3. On the Advanced tab, enter the following in **Extra initialization.**

AT+CGDCONT=1,"IP","<APN>"

Where <APN> is your Access Point Number, for example, AT+CGDCONT=1,"IP", "ISP.AT&T".

4. Close the Phone and Modem windows.

Creating a Dial-up Connection in Linux

To create a Linux dial-up connection:

1. Disable the IP stack
   Enter:
   AT+WOPEN=0
2. If required by your device, set up the APN.
   Enter:
   AT+CGDONT=1,"IP","<APN>"
   Where <APN> is the Access Point Number supplied by your service provider.
3. Dial the network.
   Enter:
   - For HSPA+, EDGE, or GPRS, use**ATD*99***1#**
   - For CDMA or EV-DO, use**ATD#777**

Setting the Serial Baud Rate

Your device defaults to a serial baud rate of 115200. Use AT+IPR=<baudspeed> to change the device to a higher speed. Options are 230400, 460800, or 921600.

Note: The host serial port must be capable of the new speed.

To reset the speed, change NVRAM settings.

1. Open a terminal program with the following settings:
   19200, 8, NONE, Hardware Flow Control
2. When the modem boots there is a 500ms window to enter the following AT command sequence:
   Enter:

Enter: **M**
Response: MU
Enter: D
Response: M
Enter: S
Response: S<cr><if><OK<cr><if>

Recovery

To do this manually:

1. Shut off the device.
2. Press **Caps Lock** and hold down **M**.
3. Turn on the device. MU displays.
4. Press**D** and **S** quickly.

Regulatory Statements

EMC, Safety, and R&TTE Directive Compliance

CE

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

Council Directive 2004/108/EC of 15 December 2004 on the approximation of the laws of Member States relating to electromagnetic compatibility;
and
Council Directive 2006/95/EC of 12 December 2006 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits;
and
Council Directive 1999/5/EC of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

International Modem Restrictions

Some dialing and answering defaults and restrictions may vary for international modems. Changing settings may cause a modem to become non-compliant with national regulatory requirements in specific countries. Also note that some software packages may have features or lack restrictions that may cause the modem to become non-compliant.

47 CFR Part 15 Regulation Class B Devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada Class B Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement Canadien sur le matériel brouilleur.

This device complies with Industry Canada RSS Appliance radio exempt from licensing. The operation is permitted for the following two conditions:

1. the device may not cause harmful interference, and
2. the user of the device must accept any interference suffered, even if the interference is likely to jeopardize the operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Environmental Notices

Waste Electrical and Electronic Equipment Statement

WEEE Directive

The WEEE Directive places an obligation on EU-based manufacturers, distributors, retailers, and importers to take-back electronics products at the end of their useful life. A sister directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all Multi-Tech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

July, 2005



REACH Statement

Registration of Substances

After careful review of the legislation and specifically the definition of an “article” as defined in EC Regulation 1907/2006, Title II, Chapter 1, Article 7.1(a)(b), it is our current view Multi-Tech Systems, Inc. products would be considered as “articles”. In light of the definition in § 7.1(b) which requires registration of an article only if it contains a regulated substance that “is intended to be released under normal or reasonably foreseeable conditions of use,” Our analysis is that Multi-Tech Systems, Inc. products constitute nonregisterable articles for their intended and anticipated use.

Substances of Very High Concern (SVHC)

Per the candidate list of Substances of Very High Concern (SVHC) published October 28, 2008 we have reviewed these substances and certify the Multi-Tech Systems, Inc. products are compliant per the EU “REACH” requirements of less than 0.1% (w/w) for each substance. If new SVHC candidates are published by the European Chemicals Agency, and relevant substances have been confirmed, that exceeds greater than 0.1% (w/w), Multi-Tech Systems, Inc. will provide updated compliance status.

Multi-Tech Systems, Inc. also declares it has been duly diligent in ensuring that the products supplied are compliant through a formalized process which includes collection and validation of materials declarations and selective materials analysis where appropriate. This data is controlled as part of a formal quality system and will be made available upon request.

Restriction of the Use of Hazardous Substances (RoHS)

Multi-Tech Systems, Inc

Certificate of Compliance

2011/65/EU

Multi-Tech Systems confirms that its embedded products comply with the chemical concentration limitations set forth in the directive 2011/65/EU of the European Parliament (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment - RoHS).

These Multi-Tech products do not contain the following banned chemicals[1]:

- Lead, [Pb] < 1000 PPM
- Mercury, [Hg] < 1000 PPM
- Hexavalent Chromium, [Cr+6] < 1000 PPM
- Cadmium, [Cd] < 100 PPM
- Polybrominated Biphenyl, [PBB] < 1000 PPM
- Polybrominated Diphenyl Ether, [PBDE] < 1000 PPM

Environmental considerations:

- Moisture Sensitivity Level (MSL) =1
- Maximum Soldering temperature = 260C (in SMT reflow oven)

[1]Lead usage in some components is exempted by the following RoHS annex, therefore higher lead concentration would be found in some modules (>1000 PPM);

- Resistors containing lead in a glass or ceramic matrix compound.

Information on HS/TS Substances According to Chinese Standards

In accordance with China's Administrative Measures on the Control of Pollution Caused by Electronic Information Products (EIP) # 39, also known as China RoHS, the following information is provided regarding the names and concentration levels of Toxic Substances (TS) or Hazardous Substances (HS) which may be contained in Multi-Tech Systems Inc. products relative to the EIP standards set by China's Ministry of Information Industry (MII).

Hazardous/Toxic Substance/Elements

Name of the Component	Lead (PB)	Mercury (Hg)	Cadmium (CD)	Hexavalent Chromium (CR6+)	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ether (PBDE)
Printed Circuit Boards	O	O	O	O	O	O
Resistors	X	O	O	O	O	O
Capacitors	X	O	O	O	O	O
Ferrite Beads	O	O	O	O	O	O
Relays/Opticals	O	O	O	O	O	O
ICs	O	O	O	O	O	O
Diodes/ Transistors	O	O	O	O	O	O
Oscillators and Crystals	X	O	O	O	O	O
Regulator	O	O	O	O	O	O
Voltage Sensor	O	O	O	O	O	O
Transformer	O	O	O	O	O	O
Speaker	O	O	O	O	O	O
Connectors	O	O	O	O	O	O
LEDs	O	O	O	O	O	O
Screws, Nuts, and other Hardware	X	O	O	O	O	O
AC-DC Power Supplies	O	O	O	O	O	O
Software /Documentation CDs	O	O	O	O	O	O
Booklets and Paperwork	O	O	O	O	O	O
Chassis	O	O	O	O	O	O

X Represents that the concentration of such hazardous/toxic substance in all the units of homogeneous material of such component is higher than the SJ/Txxx-2006 Requirements for Concentration Limits.
O Represents that no such substances are used or that the concentration is within the aforementioned limits.

Information on HS/TS Substances According to Chinese Standards (in Chinese)

依照中国标准的有毒有害物质信息

根据中华人民共和国信息产业部 (MII) 制定的电子信息产品 (EIP) 标准－中华人民共和国《电子信息产品污染控制管理办法》（第 39 号），也称作中国 RoHS, 下表列出了 Multi-Tech Systems, Inc. 产品中可能含有的有毒物质 (TS) 或有害物质 (HS) 的名称及含量水平方面的信息。

有害/有毒物质/元素

成分名称	铅 (PB)	汞 (Hg)	镉 (CD)	六价铬 (CR6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板	O	O	O	O	O	O
电阻器	X	O	O	O	O	O
电容器	X	O	O	O	O	O
铁氧体磁环	O	O	O	O	O	O
继电器/光学部件	O	O	O	O	O	O
ICs	O	O	O	O	O	O
二极管/晶体管	O	O	O	O	O	O
振荡器和晶振	X	O	O	O	O	O
调节器	O	O	O	O	O	O
电压传感器	O	O	O	O	O	O
变压器	O	O	O	O	O	O
扬声器	O	O	O	O	O	O
连接器	O	O	O	O	O	O
LEDs	O	O	O	O	O	O
螺丝、螺母以及其它五金件	X	O	O	O	O	O
交流-直流电源	O	O	O	O	O	O
软件/文档 CD	O	O	O	O	O	O
手册和纸页	O	O	O	O	O	O
底盘	O	O	O	O	O	O

X 表示所有使用类似材料的设备中有害/有毒物质的含量水平高于 SJ/Txxx-2006 限量要求。
O 表示不含该物质或者该物质的含量水平在上述限量要求之内。

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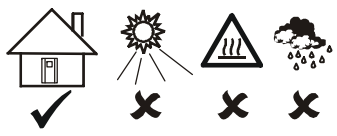
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User Manual Back-UPS® BE350G Series

Safety



This unit is intended for indoor use only.

Do not operate this unit in direct sunlight, in contact with fluids, or where there is excessive dust or humidity.

Connect the Back-UPS power cord directly to a wall outlet. Do not use a surge protector or an extension cord.

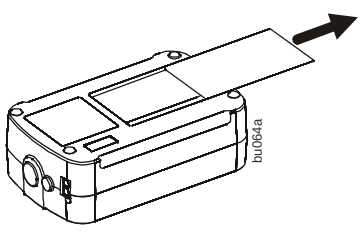
Specifications

Input	Voltage	120 Vac Nominal
	Frequency	60 Hz ± 3
	Brownout Transfers	92 Vac Typical
	Over-voltage Transfer	139 Vac Typical
Output	UPS Capacity (3 outlets)	350 VA, 200 W
	Total Amperage (6 outlets)	8 A (including UPS output)
	Voltage - On Battery	115 Vac ± 8%
	Frequency - On Battery	60 Hz ± 1
	Transfer Time	6 ms Typical, 10 ms maximum
Protection and Filtering	AC Surge Protection	Full time, 340 Joules
	EMI/RFI Filter	Full time
	AC Input	Resettable circuit breaker
Battery	Type	Sealed, maintenance-free, lead acid Replacement battery cartridge RBC35
	Average Life	3 - 5 years depending on the number of discharge cycles and environmental temperature
Physical	Net Weight	9 lb (4 kg)
	Dimensions Length x Width x Height	11 in x 6 in x 3 in 29 cm x 16 cm x 9 cm
	Operating Temperature	32º F to 104º F (0º C to 40º C)
	Storage Temperature	5º F to 113º F (–15º C to 45º C)
	Operating Relative Humidity	0 to 95% non-condensing humidity
	Operating Elevation	0 to 10,000 ft (0 to 3000 m)
EMC Compliance	This device complies with part 68 and part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.	

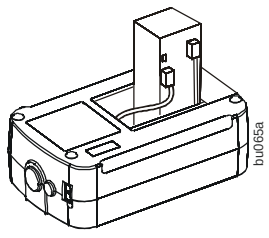
Connect the Battery

The Back-UPS is shipped with one battery cable disconnected. Remove the *"Stop! Connect the Battery"* label that covers the outlets. Prior to connecting any equipment to the unit, connect the battery cable to the unused battery terminal. It is normal for small sparks to be seen when the battery cable is connected to the battery terminal.

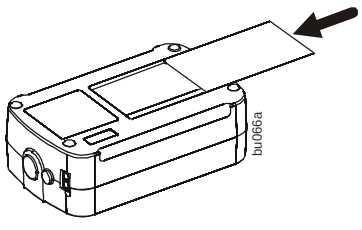
❶ Press the battery compartment cover release tab located on the rear side of the unit. Slide the battery cover off.



❷ Connect the battery cable securely to the battery terminal.



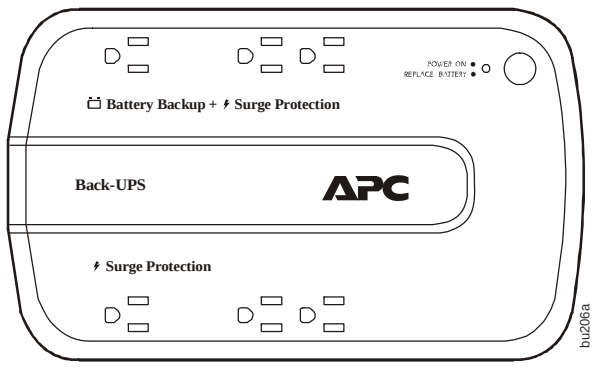
❸ Reinstall the battery compartment cover. Be sure that the release tab locks into place.



Wall Mount Installation

- Horizontal installation, use 2 screws 5.0" (127 mm) apart.
- Vertical installation, use 2 screws 4.3" (110.4 mm) apart.
- Allow 5/16" (8 mm), of the screw to protrude from the wall.

Connect Equipment



Battery Backup + Surge Protection Outlets

Battery backup outlets provide protection to connected equipment when the Back-UPS is turned on and connected to utility power.

Battery backup outlets receive power from the Back-UPS for a limited period of time when a power outage, or brownout condition occurs.

Battery backup outlets provide protection from power surges or spikes.

Connect a computer, monitor and other peripheral devices to the outlets.

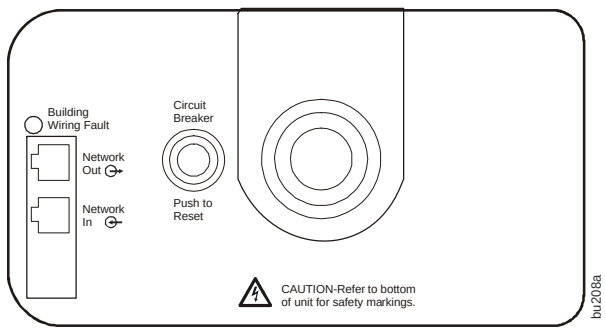
Surge Protection Outlets

Surge protection outlets provide protection to connected equipment when the Back-UPS is connected to utility power, and is switched on or off.

Surge protection outlets provide protection from power surges or spikes.

Connect a printer, scanner or other peripheral devices that do not need to remain on during power outages, or utility problems to the surge protection outlets.

Connect Network



The Back-UPS protects equipment connected to a 10/100 Base-T ethernet, from power surges when connected through the Back-UPS coaxial connectors.

Turn On the Back-UPS

Press the POWER ON button located on the top of the Back-UPS. **The Power On/ Replace Battery** LED will illuminate and a single short beep will be audible to indicate that the Back-UPS is providing protection for connected equipment.

The Back-UPS battery charges fully during the first 16 hours while connected to utility power. The Back-UPS battery will charge while the Back-UPS is switched on or off and is connected to utility power. Do not expect full battery run capability during the initial charge time.

If the red **Building Wiring Fault** LED located on the side of the Back-UPS illuminates, do not operate the Back-UPS. Have a qualified electrician correct the building wiring fault.

Voltage Sensitivity Adjustment (optional)

The Back-UPS detects and reacts to line voltage distortions by transferring to battery backup power to protect connected equipment. In situations where either the Back-UPS or the connected equipment is too sensitive for the input voltage level it is necessary to adjust the transfer voltage.

1. Connect the Back-UPS to a wall outlet. The Back-UPS will be in **Standby** mode, no indicators will be illuminated.
2. Press and hold the ON/OFF button for 10 seconds. The **OnLine** LED will illuminate alternately green-amber-red, to indicate that the Back-UPS is in **Program** mode.
3. The **Power On/Replace Battery** LED will flash either green, amber, or red to indicate the current sensitivity level. Refer to the table for an explanation of the transfer voltage sensitivity levels.
4. To select LOW sensitivity, press and hold the ON/OFF button until the LED flashes green.
5. To select MEDIUM sensitivity, press and hold the ON/OFF button until the LED flashes red.
6. To select HIGH sensitivity, press and hold the ON/OFF button until the LED flashes amber.
7. To exit **Program** mode wait five seconds and all LED indicators will extinguish. **Program** mode is no longer active.

LED Flashes	Sensitivity Setting	Input Voltage Range (Utility Operation)	Recommended Use
Green	LOW	88 Vac to 142 Vac	Use this setting with equipment that is less sensitive to fluctuations in voltage or waveform distortions.
Red	MEDIUM	92 Vac to 139 Vac	Factory default setting. Use this setting under normal conditions.
Amber	HIGH	96 Vac to 136 Vac	Use this setting when connected equipment is sensitive to voltage and waveform fluctuations.

Status Indicators

Status	LED Indicator	Audible Indicator On	Audible Indicator Terminates
Power On The Back-UPS is supplying utility power to connected equipment.	The green LED illuminates.	None	N/A
On Battery Back-UPS supplying battery power to battery backup outlets.	The green LED illuminates.The LED is not illuminated during the beeps.	Back-UPS beeps 4 times every 30 seconds.	Beeping stops when utility power is restored or the Back-UPS is turned off.
Low Battery warning The Back-UPS is supplying battery power to the battery backup outlets and the battery is near a total discharge state.	The green LED illuminates with rapid green flashes.	The Back-UPS emits rapid beeping, every 1/2 second.	Beeping stops when utility power is restored or the Back-UPS is turned off.
Replace Battery • The battery is disconnected. • The battery needs to be charged, or replaced.	• **Replace Battery** LED flashes. • **Replace Battery** and **Power On** LEDs flash alternately.	Constant tone Constant tone	Back-UPS is turned off.
Overload Shutdown While on battery power an overload condition has occurred in one or more of the battery backup outlets while the Back-UPS is operating on battery power.	None	Constant tone	Back-UPS is turned off.
Sleep Mode While on battery power the battery is completely discharged. The Back-UPS will “awaken” once utility power is restored.	None	The Back-UPS beeps once every four seconds.	The beeping stops when: • Utility power is restored • If utility power is not restored within 32 seconds • The Back-UPS is turned off
Building Wiring Fault The building wiring presents a shock hazard that must be corrected by a qualified electrical.	**Building Wiring Fault** LED illuminates red	None	The Back-UPS is unplugged from the wall outlet or is plugged into an improperly wired outlet.

Troubleshooting

Problem and Possible Cause	Solution
The Back-UPS will not turn on	
The Back-UPS has not been turned on.	Press the POWER ON button.
The Back-UPS is not connected to utility power, there is no utility power available at the wall outlet, or the utility power is experiencing a brownout or over voltage condition.	Make sure the power cord is securely connected to the wall outlet, and that there is utility power available at the wall outlet.Where applicable, check that the wall outlet is switched on.
The battery is not connected.	Connect the battery. Refer to “Connect the Battery” on page 1 of this manual. In the event that the Back-UPS receives no utility power and the battery is connected, a cold-start can be initiated. Press and hold the **Power On** button until the Back-UPS emits two beeps.
The Back-UPS is on, the Replace Battery LED flashes and the unit emits a constant tone	
The battery is disconnected.	Refer to the “Connect the Battery” on page 1.
Connected equipment loses power	
A Back-UPS overload condition has occurred.	Remove all nonessential equipment connected to the outlets. One at a time reconnect equipment to the Back-UPS.
The Back-UPS battery is completely discharged.	Connect the Back-UPS to utility power and allow the battery to recharge for eight hours.
PowerChute software has performed a shutdown due to a power failure.	This is normal Back-UPS operation.
Connected equipment does not accept the step-approximated sine waveform from the Back-UPS.	The output waveform is intended for computers and peripheral devices. It is not intended for use with motor driven equipment.
The Back-UPS may require service.	Contact APC Technical Support for more in depth troubleshooting.
The Power On LED is illuminated and the Back-UPS beeps 4 times every 30 seconds	
The Back-UPS is operating on battery power.	The Back-UPS is operating normally on battery power. At this point the user should save all open files, and shutdown the computer. When utility power is restored the battery will recharge.
The Power On LED flashes once every second while the Back-UPS beeps once every second	
The Back-UPS battery has approximately two minutes of remaining runtime.	The Back-UPS battery is near a total discharge state. At this point the user should save all open files, and shutdown the computer. When utility power is restored the battery will recharge.
The Building Wiring Fault LED illuminates	
The building wiring presents a shock hazard that must be corrected by a qualified electrical.	Do not operate the Back-UPS. Call a qualified electrician to correct the building wiring fault.
The Back-UPS has an inadequate battery runtime	
The battery is not fully charged. The battery is near the end of useful life and should be replaced.	Leave the Back-UPS connected to utility power for 16 hours while the battery charges to full capacity. As a battery ages, the runtime capability decreases. Contact APC at the Web site **www.apc.com**, to order replacement batteries.
The connection from the Back-UPS to the internet is lost during a power outage	
The modem has lost power.	Connect the modem cable into one of the Battery Backup + Surge Protection outlets.

Replace Battery

Use only approved APC replacement battery cartridges.

Deliver used batteries to a battery replacement facility in the packaging provided by APC with the replacement battery cartridge.

To order replacement battery cartridges contact APC through the Web site www.apc.com

Warranty

The standard warranty is 3 years in the USA and Canada, 2 years in all other regions from the date of purchase. APC standard procedure is to replace the original unit with a factory reconditioned unit. Customers who must have the original unit back due to assigned asset tags and set depreciation schedules must declare such a need at first contact with APC Technical Support. APC will ship the replacement unit once the defective unit is received by the repair department or cross-ship upon the provision of a valid credit card number. The customer pays for shipping to APC, and APC pays ground freight transportation costs back to the customer.

Service

If the unit requires service, do not return it to the dealer. Follow these steps:

1. Review the *Troubleshooting* section of the manual to eliminate common problems.
2. If the problem persists, contact APC Customer Support.
   a. Note the model number and serial number and the date of purchase. The model and serial numbers are located on the rear panel of the unit and are available through the LCD display on select models.
   b. Call APC Customer Support and a technician will attempt to solve the problem over the phone. If this is not possible, the technician will issue a Returned Material Authorization Number (RMA#).
   c. If the unit is under warranty, the repairs are free.
   d. Service procedures and returns may vary internationally. Refer to the APC Web site for country specific instructions.
3. Pack the unit properly to avoid damage in transit. Never use foam beads for packaging. Damage sustained in transit is not covered under warranty. **Always DISCONNECT THE UPS BATTERY before shipping in compliance with U.S. Department of Transportation (DOT) and IATA regulations.** The battery may remain in the unit.
4. Write the RMA# provided by Customer Support on the outside of the package.
5. Return the unit by insured, pre-paid carrier to the address provided by Customer Support.

Contact

APC Web site, **www.apc.com**

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990-3950B
7/2011

Product data sheet
Characteristics

ATV61HU75M3
variable speed drive ATV61 - 7.5kW 10HP - 200...240V - IP20

Product availability: Stock - Normally stocked in distribution facility

Price*: 1586.00 USD



Main

Commercial Status	Commercialised
Range of product	Altivar 61
Product or component type	Variable speed drive
Product specific application	Pumping and ventilation machine
Component name	ATV61
Motor power kW	5.5 kW single phase at 200...240 V 7.5 kW 3 phases at 200...240 V
Motor power hp	7.5 hp single phase at 200...240 V 10 hp 3 phases at 200...240 V
[Us] rated supply voltage	200...240 V (- 15...10 %)
Network number of phases	3 phases Single phase
Line current	47.3 A for 200 V single phase 5.5 kW / 7.5 hp 45 A for 200 V 3 phases 7.5 kW / 10 hp 40.1 A for 240 V single phase 5.5 kW / 7.5 hp 39.4 A for 240 V 3 phases 7.5 kW / 10 hp
EMC filter	Level 3 EMC filter
Assembly style	With heat sink
Apparent power	16.4 kVA for 240 V 3 phases 7.5 kW / 10 hp 9.5 kVA for 240 V single phase 5.5 kW / 7.5 hp
Prospective line Isc	22 kA single phase 22 kA 3 phases
Maximum transient current	39.6 A for 60 s 3 phases 33 A for 60 s single phase
Nominal switching frequency	12 kHz
Switching frequency	12...16 kHz with derating factor 1...16 kHz adjustable
Asynchronous motor control profile	Voltage/Frequency ratio, 2 points Voltage/Frequency ratio, 5 points Flux vector control without sensor, standard Voltage/Frequency ratio - Energy Saving, quadratic U/f
Synchronous motor control profile	Vector control without sensor, standard
Communication port protocol	CANopen Modbus

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein.
This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications.
It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof.
Neither Schneider Electric Industries SAS nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. *Prices are indicative

Type of polarization	No impedance for Modbus
Option card	Profibus DP V1 communication card Profibus DP communication card Multi-pump card Modbus/Uni-Telway communication card Modbus TCP communication card Modbus Plus communication card METASYS N2 communication card LonWorks communication card Interbus-S communication card I/O extension card Fipio communication card Ethernet/IP communication card DeviceNet communication card Controller inside programmable card CC-Link communication card BACnet communication card APOGEE FLN communication card

Complementary

Product destination	Asynchronous motors Synchronous motors
Supply voltage limits	170...264 V
Supply frequency	50...60 Hz (- 5...5 %)
Network frequency limits	47.5...63 Hz
Continuous output current	27.5 A at 12 kHz, 230 V single phase 33 A at 12 kHz, 230 V 3 phases
Speed drive output frequency	0.1...1000 Hz
Speed range	1...100 in open-loop mode, without speed feedback
Speed accuracy	+/- 10 % of nominal slip for 0.2 Tn to Tn torque variation without speed feedback
Torque accuracy	+/- 15 % in open-loop mode, without speed feedback
Transient overtorque	130 % of nominal motor torque, +/- 10 % for 60 s
Braking torque	30 % without braking resistor <= 125 % with braking resistor
Regulation loop	Frequency PI regulator
Motor slip compensation	Adjustable Automatic whatever the load Can be suppressed Not available in voltage/frequency ratio (2 or 5 points)
Local signalling	1 LED red presence of drive voltage
Output voltage	<= power supply voltage
Isolation	Between power and control terminals
Type of cable	Without mounting kit: 1-strand IEC cable at 113 °F (45 °C), copper 90 °C XLPE/EPR Without mounting kit: 1-strand IEC cable at 113 °F (45 °C), copper 70 °C PVC With UL Type 1 kit: 3-strand UL 508 cable at 104 °F (40 °C), copper 75 °C PVC With an IP21 or an IP31 kit: 3-strand IEC cable at 104 °F (40 °C), copper 70 °C PVC
Electrical connection	L1/R, L2/S, L3/T, U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB terminal 16 mm² / AWG 4 AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR terminal 2.5 mm² / AWG 14
Tightening torque	L1/R, L2/S, L3/T, U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB 26.55 lbf.in (3 N.m) / 26.5 lb.in AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR 5.31 lbf.in (0.6 N.m)
Supply	Internal supply 24 V DC (21...27 V), <= 200 mA for overload and short-circuit protection Internal supply for reference potentiometer (1 to 10 kOhm) 10.5 V DC +/- 5 %, <= 10 mA for overload and short-circuit protection External supply 24 V DC (19...30 V), 30 W
Analogue input number	2
Analogue input type	AI2 software-configurable voltage 0...10 V DC, input voltage 24 V max, impedance 30000 Ohm, resolution 11 bits AI2 software-configurable current 0...20 mA, impedance 242 Ohm, resolution 11 bits AI1-/AI1+ bipolar differential voltage +/- 10 V DC, input voltage 24 V max, resolution 11 bits + sign

Sampling duration	Discrete input LI6 (if configured as logic input)2 ms, +/- 0.5 ms Discrete input LI1...LI5 2 ms, +/- 0.5 ms Analog output AO1 2 ms, +/- 0.5 ms Analog input AI2 2 ms, +/- 0.5 ms Analog input AI1-/AI1+ 2 ms, +/- 0.5 ms
Accuracy	AO1 +/- 1 % for a temperature variation 60 °C AI2 +/- 0.6 % for a temperature variation 60 °C AI1-/AI1+ +/- 0.6 % for a temperature variation 60 °C
Linearity error	AO1 +/- 0.2 % AI2 +/- 0.15 % of maximum value AI1-/AI1+ +/- 0.15 % of maximum value
Analogue output number	1
Analogue output type	AO1 software-configurable logic output 10 V, <= 20 mA AO1 software-configurable voltage, analogue output range 0...10 V DC, impedance 470 Ohm, resolution 10 bits AO1 software-configurable current, analogue output range 0...20 mA, impedance 500 Ohm, resolution 10 bits
Discrete output number	2
Discrete output type	(R2A, R2B) configurable relay logic NO, electrical durability 100000 cycles (R1A, R1B, R1C) configurable relay logic NO/NC, electrical durability 100000 cycles
Response time	R2A, R2B <= 7 ms, tolerance +/- 0.5 ms R1A, R1B, R1C <= 7 ms, tolerance +/- 0.5 ms <= 100 ms in STO (Safe Torque Off)
Minimum switching current	Configurable relay logic 3 mA at 24 V DC
Maximum switching current	R1, R2 on resistive load, 5 A at 30 V DC, cos phi = 1, L/R = 0 ms R1, R2 on resistive load, 5 A at 250 V AC, cos phi = 1, L/R = 0 ms R1, R2 on inductive load, 2 A at 30 V DC, cos phi = 0.4, L/R = 7 ms R1, R2 on inductive load, 2 A at 250 V AC, cos phi = 0.4, L/R = 7 ms
Discrete input number	7
Discrete input type	(PWR) safety input, 24 V DC, voltage limits <= 30 V, impedance 1500 Ohm (LI6) switch-configurable PTC probe, 0...6, impedance 1500 Ohm (LI6) switch-configurable, 24 V DC, voltage limits <= 30 V, with level 1 PLC, impedance 3500 Ohm (LI1...LI5) programmable, 24 V DC, voltage limits <= 30 V, with level 1 PLC, impedance 3500 Ohm
Discrete input logic	LI6 (if configured as logic input)positive logic (source), < 5 V (state 0), > 11 V (state 1) LI6 (if configured as logic input)negative logic (sink), > 16 V (state 0), < 10 V (state 1) LI1...LI5 positive logic (source), < 5 V (state 0), > 11 V (state 1) LI1...LI5 negative logic (sink), > 16 V (state 0), < 10 V (state 1)
Acceleration and deceleration ramps	Automatic adaptation of ramp if braking capacity exceeded, by using resistor Linear adjustable separately from 0.01 to 9000 s S, U or customized
Braking to standstill	By DC injection
Protection type	Motor thermal protection Motor power removal Motor motor phase break Drive thermal protection Drive short-circuit between motor phases Drive power removal Drive overvoltages on the DC bus Drive overheating protection Drive overcurrent between output phases and earth Drive line supply undervoltage Drive line supply overvoltage Drive input phase breaks Drive break on the control circuit Drive against input phase loss Drive against exceeding limit speed
Insulation resistance	> 1 mOhm at 500 V DC for 1 minute to earth
Frequency resolution	Display unit 0.1 Hz Analog input 0.024/50 Hz
Type of connector	Male SUB-D 9 on RJ45 for CANopen 1 RJ45 for Modbus on terminal 1 RJ45 for Modbus on front face
Physical interface	2-wire RS 485 for Modbus
Transmission frame	RTU for Modbus

Transmission rate	9600 bps, 19200 bps for Modbus on front face 4800 bps, 9600 bps, 19200 bps, 38.4 Kbps for Modbus on terminal 20 kbps, 50 kbps, 125 kbps, 250 kbps, 500 kbps, 1 Mbps for CANopen
Data format	8 bits, odd even or no configurable parity for Modbus on terminal 8 bits, 1 stop, even parity for Modbus on front face
Number of addresses	1...247 for Modbus 1...127 for CANopen
Method of access	Slave for CANopen
Marking	CE
Operating position	Vertical +/- 10 degree
Product weight	15.43 lb(US) (7 kg)
Width	8.27 in (210 mm)
Height	11.61 in (295 mm)
Depth	8.39 in (213 mm)

Environment

Noise level	57.4 dB conforming to 86/188/EEC
Dielectric strength	4230 V DC between control and power terminals 2830 V DC between earth and power terminals
Electromagnetic compatibility	Voltage dips and interruptions immunity test conforming to IEC 61000-4-11 Radiated radio-frequency electromagnetic field immunity test conforming to IEC 61000-4-3 level 3 Electrostatic discharge immunity test conforming to IEC 61000-4-2 level 3 Electrical fast transient/burst immunity test conforming to IEC 61000-4-4 level 4 Conducted radio-frequency immunity test conforming to IEC 61000-4-6 level 3
Standards	EN 55011 class A group 2 EN 61800-3 environments 1 category C3 EN 61800-3 environments 2 category C3 EN/IEC 61800-3 EN/IEC 61800-5-1 IEC 60721-3-3 class 3C1 IEC 60721-3-3 class 3S2 UL Type 1
Product certifications	CSA C-Tick DNV GOST NOM 117 UL
Pollution degree	2 conforming to EN/IEC 61800-5-1
IP degree of protection	IP54 on lower part conforming to EN/IEC 61800-5-1 IP54 on lower part conforming to EN/IEC 60529 IP41 on upper part conforming to EN/IEC 61800-5-1 IP41 on upper part conforming to EN/IEC 60529 IP21 conforming to EN/IEC 61800-5-1 IP21 conforming to EN/IEC 60529 IP20 on upper part without blanking plate on cover conforming to EN/IEC 61800-5-1 IP20 on upper part without blanking plate on cover conforming to EN/IEC 60529
Vibration resistance	1.5 mm peak to peak (f = 3...13 Hz) conforming to EN/IEC 60068-2-6 1 gn (f = 13...200 Hz) conforming to EN/IEC 60068-2-6
Shock resistance	15 gn for 11 ms conforming to EN/IEC 60068-2-27
Relative humidity	5...95 % without dripping water conforming to IEC 60068-2-3 5...95 % without condensation conforming to IEC 60068-2-3
Ambient air temperature for operation	122...140 °F (50...60 °C) with derating factor 14...122 °F (-10...50 °C) without derating
Ambient air temperature for storage	-13...158 °F (-25...70 °C)
Operating altitude	3280.84...9842.52 ft (1000...3000 m) with current derating 1 % per 100 m <= 3280.84 ft (1000 m) without derating

Ordering and shipping details

Category	22137 - ATV61 460V 7.5 THRU 50 HP DRIVES
Discount Schedule	CP4C
GTIN	00785901639527
Nbr. of units in pkg.	1
Package weight(Lbs)	20.84
Product availability	Stock - Normally stocked in distribution facility
Returnability	Y
Country of origin	ID

Contractual warranty

Period	18 months

Altivar® 61

Variable Speed Drives Simplified Manual

0.5–60 hp (0.37–45 kW) / 200–240 V
1–100 hp (0.75–75 kW) / 380–480 V
3–100 hp (2.2–90 kW) / 500–690 V

Instruction Bulletin

30072-451-60C

Retain for future use.

For Use in the United States of America



Schneider Electric

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Hazard Categories and Special Symbols

The following symbols and special messages may appear in this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

A lightning bolt or ANSI man symbol in a “Danger” or “Warning” safety label on the equipment indicates an electrical hazard which, as indicated below, can or will result in personal injury if the instructions are not followed.

The exclamation point symbol in a safety message in a manual indicates potential personal injury hazards. Obey all safety messages introduced by this symbol to avoid possible injury or death.

Symbol	Name
	Lightning Bolt
	ANSI Man
	Exclamation Point

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

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CAUTION
CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result in** property damage.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

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Before you begin

Read and understand these instructions before performing any procedure on this drive[1].

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the Altivar 61 drives. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for conforming to all applicable code requirements with respect to grounding the equipment.
- Many parts in this drive, including printed wiring boards, operate at the line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- DO NOT short across DC bus capacitors or touch unshielded components or terminal strip screw connections with voltage present.
- Before servicing the drive:
  - — Disconnect all power including external control power that may be present before servicing the drive.
  - — Place a “DO NOT TURN ON” label on the drive disconnect.
  - — Lock disconnect in the open position.
  - — WAIT 15 MINUTES for the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure on page 24 to verify that the DC voltage is less than 42 V. The drive LEDs are not indicators of the absence of DC bus voltage.
- Install and close all covers before applying power or starting and stopping the drive.

Failure to follow these instructions will result in death or serious injury.

[1] The word drive as it is used in this manual refers to the controller portion of the adjustable speed drive as per the NEC.

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⚠ WARNING

LOSS OF CONTROL FROM A COMMUNICATION INTERRUPTION

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.[1]
- Each implementation of an Altivar 61 drive must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems."

CAUTION

IMPROPER DRIVE OPERATION

- If, for a prolonged period of time, voltage is not applied to the drive, the performance of its electrolytic capacitors will be reduced.
- If it is stopped for a prolonged period, turn the drive on every two years for at least 5 hours to restore the performance of the capacitors, then check its operation. It is recommended that the drive not be connected directly to the line voltage. The voltage should be increased gradually using an adjustable AC source.

Failure to follow these instructions can result in equipment damage.

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Product Support

For more information, call, fax, or write:

Schneider Electric AC Drives Product Support Group
P.O. Box 27446
Raleigh, NC 27611-7446

For support and assistance, contact the Product Support Group. The Product Support Group is staffed Monday through Friday from 8:00 am until 6:00 pm Eastern time to assist with product selection, start-up, and diagnosis of product or application problems. Emergency phone support is available 24 hours a day, 365 days a year.

Toll free:	1-888-SquareD (1-888-778-2733)
E-mail:	drive.products.support@us.schneider-electric.com
Fax Line:	919-217-6508

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Setting Up the Drive

■ 1 Take delivery of the drive

- Ensure that the catalog number printed on the label is the same as that on the purchase order.
- Remove the drive from its packaging and ensure that it has not been damaged in transit.

■ 2 Check the line voltage

- Ensure that the line voltage is compatible with the voltage range of the drive.

■ 3 Mount the drive (page **20**)

- Mount the drive according to the instructions in this document.
- Install any internal and external options.

Steps 1–4 must be performed with the power off.

■ 4 Wire the drive (page **25**).

- Connect the motor, ensuring that its connections correspond to the voltage.
- With power off, connect the line supply.
- Connect the control wiring.
- Connect the speed reference.



■ 5 Energize drive with no inputs active.

- Removing the control terminal card ensures no active inputs.
- See page 30 for control terminal card removal procedure.

■ 6 Select the language (page **42**),

if the drive is equipped with a graphic display terminal.

■ 7 Configure the menu [SIMPLY START] (SIM-) (page **44**)

- 2-wire or 3-wire control
- Macro configuration
- Motor parameters

☞ Optimize performance

To optimize performance:

- Refer to the auto-tuning section on page 53.
- Motor thermal current
- Acceleration and deceleration ramps
- Speed variation range

■ 8 Start.

NOTE: Ensure that the wiring of the drive is compatible with its configuration.

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Short-Circuit Marking System Applied to Schneider Electric AC Drives

Altivar drives have a prospective short-circuit rating that is based on three performance attributes that affect all drives. The performance attributes are characterized by three rating parameters described below and listed in Tables 1–4 on pages 14–16. The overall maximum rating of the drive is the lowest of the three ratings. Higher ratings can be attained for Altivar drives. Contact Schneider Electric for tested combinations of overcurrent protective devices (OCPD), line reactors, and enclosures or refer to the *Altivar 61and 71 Supplementary Short Circuit Protection Information* bulletin shipped with the drive.

Output Interrupting Rating

The maximum prospective input short-circuit current at which the drive is capable of interrupting a short-circuit at its motor output terminals. The output interrupting rating conforms to the existing short-circuit requirements of UL508C 3rd edition with revisions effective February 15, 2008.

Input Withstand Current Rating (without line reactor or choke)

The maximum prospective input short-circuit current at the drive input terminals with which the drive was designed to operate. The input withstand current rating is an important parameter in determining the maximum thermal and electrical operating limits for the drive. Exceeding the maximum prospective input short-circuit current rating may cause overheating with reduction of drive life expectancy or damage to the drive.

CAUTION

DRIVE OVERHEATING

Ensure the prospective input short-circuit current does not exceed the input withstand current rating.

Failure to follow these instructions can result in equipment damage.

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Drive Containment Rating with OCPD

The maximum prospective input short-circuit current at the drive input terminals with the marked OCPD present at which an internal component breakdown in the drive will not create a shock, flame, fire or expulsion hazard outside the marked enclosure structure. This rating applies to drives with a listed enclosure rating or to drives that have a listed enclosure rating with the addition of conduit box.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Only use the overcurrent protective device marked on the drive or in the manual.
- Do not operate the drive on an input mains line with a prospective input short circuit current greater than the Drive Containment Rating.
- Ensure that the drive has a listed enclosure rating or uses the conduit kit to achieve an enclosure rating.

Failure to follow these instructions will result in death or serious injury.

Use of the drive with different prospective short-circuit currents may be possible. Contact Schneider Electric for tested combinations of OCPD, line reactors, drives and enclosures or refer to the *Altivar 61 and 71 Supplementary Short Circuit Protection Information* bulletin shipped with the drive.

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Three phase motor 200 V to 240 V

For drives with an input line voltage of 200 V to 240 V, a Class J time delay or non-time delay fuse is required.

Table 1 on page 14 shows the maximum available short-circuit current value for each of the rating parameters.

Table 1: 200 V to 240 V 50/60 Hz Single Phase Supply Voltage

Power Indicated on Plate[1]		Altivar 61 Drive				
		Part Number[2]	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW	hp		kA	kA	kA	A
0.37	0.5	ATV61H075M3	100	5	5	15
0.75	1	ATV61HU15M3	100	5	5	25
1.5	2	ATV61HU22M3	100	5	5	25
2.2	3	ATV61HU30M3	100	5	5	40
3	–	ATV61HU40M3[3]	100	5	5	45
4	5	ATV61HU55M3[3]	100	22	5	60
5.5	7.5	ATV61HU75M3[3]	100	22	5	70

1 These power ratings and currents are given for an ambient temperature of 50 °C (122 °F) at the factory-set switching frequency, used in continuous operation.

2 These part numbers are also available without a graphic terminal display by adding a Z to the end of the part number, for example, ATV61H075M3Z.

3 A line choke must be used. Refer to the drives catalog for more information.

Table 2: 200 V to 240 V 50/60 Hz Three Phase Supply Voltage

Power Indicated on Plate[1]		Altivar 61 Drive				
		Part Number[2]	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW	hp		kA	kA	kA	A
0.75	1	ATV61H075M3	100	5	5	15
1.5	2	ATV61HU15M3	100	5	5	25
2.2	3	ATV61HU22M3	100	5	5	25
3	–	ATV61HU30M3	100	5	5	40
4	5	ATV61HU40M3	100	5	5	45
5.5	7.5	ATV61HU55M3	100	22	5	60
7.5	10	ATV61HU75M3	100	22	5	70

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Table 2: 200 V to 240 V 50/60 Hz Three Phase Supply Voltage *(continued)*

Power Indicated on Plate[1]		Altivar 61 Drive				
		Part Number[2]	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW	hp		kA	kA	kA	A
11	15	ATV61HD11M3X	100	22	5	90
15	20	ATV61HD15M3X	100	22	5	110
18.5	25	ATV61HD18M3X	100	22	5	125
22	30	ATV61HD22M3X	100	22	5	150
30	40	ATV61HD30M3X	100	22	5	200
37	50	ATV61HD37M3X	100	22	5	225
45	60	ATV61HD45M3X	100	22	10	300

1 These power ratings and currents are given for an ambient temperature of 50 °C (122 °F) at the factory-set switching frequency, used in continuous operation.

2 These part numbers are also available without a graphic terminal display by adding a Z to the end of the part number, for example, ATV61H075M3Z.

Three phase motor 380 V to 480 V

For drives with an input line voltage of 380 V to 480 V, a Class J time delay or non-time delay fuse is required. Table 3 shows the fuse size required and available short circuit current rating associated with each drive.

Table 3: 380 V to 480 V, 50/60 Hz Three Phase Supply Voltage

Power Indicated on Plate[1]		Altivar 61 Drive				
		Part Number[2]	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW	hp		kA	kA	kA	A
0.75	1	ATV61H075N4	100	5	5	6
1.5	2	ATV61HU15N4	100	5	5	12
2.2	3	ATV61HU22N4	100	5	5	15
3	–	ATV61HU30N4	100	5	5	17.5
4	5	ATV61HU40N4	100	5	5	25
5.5	7.5	ATV61HU55N4	100	22	5	40
7.5	10	ATV61HU75N4	100	22	5	40
11	15	ATV61HD11N4	100	22	5	60

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Table 3: 380 V to 480 V, 50/60 Hz Three Phase Supply Voltage *(continued)*

Power Indicated on Plate[1]		Altivar 61 Drive				
		Part Number[2]	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW	hp		kA	kA	kA	A
15	20	ATV61HD15N4	100	22	5	70
18.5	25	ATV61HD18N4	100	22	5	70
22	30	ATV61HD22N4	100	22	5	80
30	40	ATV61HD30N4	100	22	5	90
37	50	ATV61HD37N4	100	22	5	110
45	60	ATV61HD45N4	100	22	10	150
55	75	ATV61HD55N4	100	22	10	175
75	100	ATV61HD75N4	100	22	10	225

1 These power ratings and currents are given for an ambient temperature of 50 °C (122 °F) at the factory-set switching frequency, used in continuous operation.

2 These part numbers are also available without a graphic terminal display by adding a Z to the end of the part number, for example, ATV61H075M3Z.

Three phase motor 500 V to 690 V

For drives with an input line voltage of 500 V to 690 V, a Class J time delay or non-time delay fuse is required. Table 4 shows the fuse size required and available short circuit current rating associated with each drive.

Table 4: 500 V to 690 V, 50/60 Hz Three Phase Supply Voltage

Power Indicated on Plate[1]			Altivar 61 Drive				
			Part Number	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW (500 V)	hp (600 V)	kW (690 V)		kA	kA	kA	A
2.2	3	3	ATV61HU30Y	100	22	22	10
3	–	4	ATV61HU40Y	100	22	22	15
4	5	5.5	ATV61HU55Y	100	22	22	15
5.5	7.5	7.5	ATV61HU75Y	100	22	22	20
7.5	10	11	ATV61HD11Y	100	22	22	25

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Table 4: 500 V to 690 V, 50/60 Hz Three Phase Supply Voltage *(continued)*

Power Indicated on Plate[1]			Altivar 61 Drive				
			Part Number	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW (500 V)	hp (600 V)	kW (690 V)		kA	kA	kA	A
11	15	15	ATV61HD15Y	100	22	22	35
15	20	18.5	ATV61HD18Y	100	22	22	45
18.5	25	22	ATV61HD22Y	100	22	22	60
22	30	30	ATV61HD30Y	100	22	22	60
30	40	37	ATV61HD37Y	100	22	22	90
37	45	45	ATV61HD45Y	100	22	22	110
12	55	55	ATV61HD55Y	100	22	22	125
22	75	75	ATV61HD75Y	100	22	22	150
75	100	90	ATV61HD90Y	100	22	22	175

[1] These power ratings and currents are given for an ambient temperature of 50 °C (122 °F) at the factory-set switching frequency, used in continuous operation.

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Receiving, Handling, and Storage

Handling and storage

To help protect the drive prior to installation, handle and store the device in its packaging. Ensure that the ambient conditions are acceptable. Refer to “Dimensions and Weights” on page 22.

⚠ WARNING

DAMAGED PACKAGING

If the packaging appears damaged, it can be dangerous to open it or handle it. Handle with care.

Failure to follow these instructions can result in death or serious injury.

⚠ WARNING

DAMAGED DRIVE EQUIPMENT

Do not operate or install any drive or drive accessory that appears damaged.

Failure to follow these instructions can result in death or serious injury.

Handling during installation



Altivar 61 drives up to 20 hp (see Table 1and Table 2 on page) and 25 hp (table & page) can be removed from their packaging and installed without a handling device.

A hoist must be used for higher ratings and for ATV61H•••Y drives; for this reason the controllers are fitted with handling holes. Attach a spreader bar to the top handling holes on the drive.

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⚠ WARNING

RISK OF TOPPLING

Do not stand the drive upright. Keep the drive on the pallet until it is installed.

Failure to follow these instructions can result in death or serious injury.

Before You Begin

You must observe the following precautions.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Before turning on and configuring the Altivar 61 drive, ensure that the PWR (POWER REMOVAL) input is deactivated (at state 0) in order to help prevent unintended operation.
- Before turning the controller on or upon exiting the configuration menus, ensure that the inputs assigned to the run command are deactivated (at state 0) since they can cause the motor to start immediately.
- Refer to the characteristics and functions table in the Control Terminals section on page 30 for more information about the Power Removal Input.

Failure to follow these instructions will result in death or serious injury.

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CAUTION

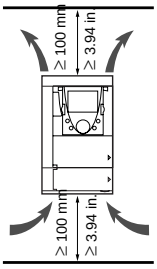
INCOMPATIBLE LINE VOLTAGE

Before turning on and configuring the drive, ensure that the line voltage is compatible with the supply voltage range shown on the drive nameplate. The drive may be damaged if the line voltage is not compatible.

Failure to follow these instructions can result in equipment damage.

NOTE: The Power Removal function takes priority over any run command. For use as an emergency stop, this function requires the use of connection diagrams conforming to category 3 of standard EN 954-1 and safety integrity level 2 according to IEC/EN 61508. Consult the *ATV61 Installation Manual* on the CD-ROM supplied with the drive.

Mounting and Temperature Conditions

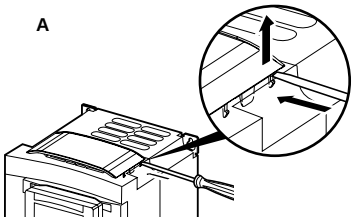


- Install the drive vertically, ±10°.
- Do not place it close to heating elements.
- Leave a minimum of 10 mm (0.39 in.) free space in front of the drive to ensure that the air required for cooling purposes can circulate from the bottom to the top of the unit.
- Where IP20 protection is adequate, we recommend that you remove the cover on top of the drive, as shown below in diagrams A and B.

Removing the top cover

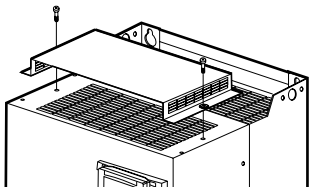
ATV61H 075M3 to D15M3X[1] and ATV61H 075N4 to D18N4[2]

A



ATV61H D18M3X to D45M3X[1], ATV61H D22N4 to D75N4[2], and ATV61H U30Y to D90Y[3]

B

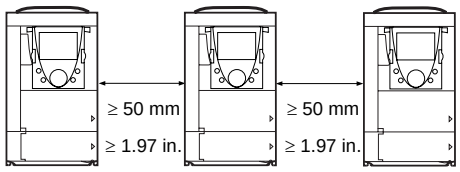


[1] For drive part numbers, see Table 2 on page 14.
[2] For drive part numbers, see Table 3 on page 15.
[3] For drive part numbers, seeTable 4 on page 16.

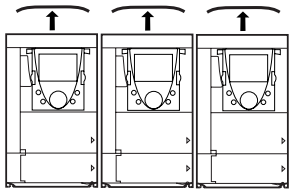
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3 types of mounting are possible:

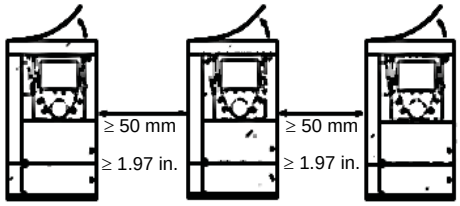
Type A mounting:
Free space ≥ 50 mm (≥ 1.97 in.) on each side, with cover in place.



Type B mounting:
Drives mounted side by side, with the cover removed (the degree of protection becomes IP20).



Type C mounting:
Free space ≥ 50 mm (≥ 1.97 in.) on each side, with cover removed (the degree of protection becomes IP20).



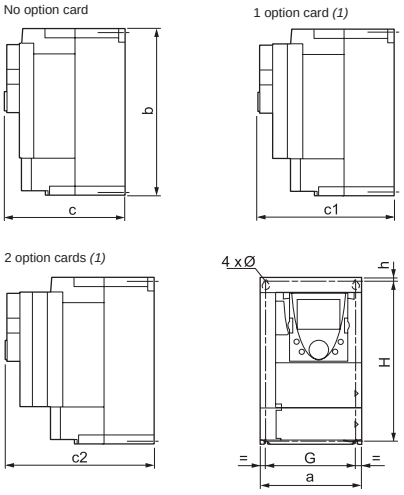
With these types of mounting, the drive can be used without derating up to an ambient temperature of 50°C (122°F), with the factory-set switching frequency. For other temperatures and other switching frequencies, consult the Installation Manual on the CD-ROM supplied with the drive.

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Dimensions and Weights

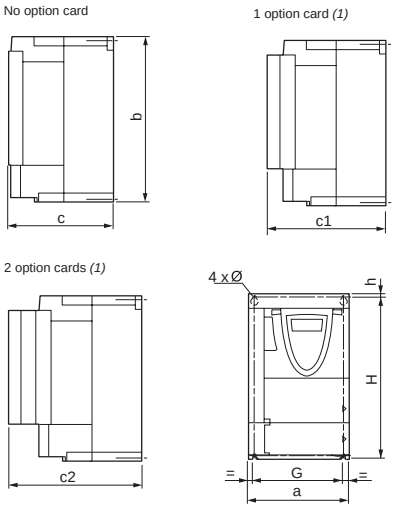
Refer to the Dimensions table on page 23.

With graphic display terminal



(1) For the addition of I/O extension cards, communication cards, or the Controller Inside programmable card.

Without graphic display terminal



For a drive without a graphic display terminal, dimensions c, c1 and c2 are reduced by 26 mm (1.01 in.). The other dimensions are unchanged.

(1) For the addition of I/O extension cards, communication cards, or the Controller Inside programmable card.

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Table 5: Dimensions

ATV61H…	Dimensions, mm (in.)									Screws	Weight
	a	b	c	c1	c2	G	H	h	Ø		kg (lb)
075M3, U15M3, 075N4, U15N4, U22N4	130 (5.12)	230 (9.05)	175 (6.89)	198 (7.80)	221 (8.70)	113.5 (4.47)	220 (8.66)	5 (0.20)	5 (0.20)	M4	3 (6.61)
U22M3, U30M3, U40M3, U30N4, U40N4	155 (6.10)	260 (10.23)	187 (7.36)	210 (8.27)	233 (9.17)	138 (5.43)	249 (9.80)	4 (0.16)	5 (0.20)	M4	4 (8.82)
U55M3, U55N4, U75N4	175 (6.89)	295 (11.61)	187 (7.36)	210 (8.27)	233 (9.17)	158 (6.22)	283 (11.14)	6 (0.24)	5 (0.20)	M4	5.5 (12.13)
U75M3, D11N4	210 (8.27)	295 (11.61)	213 (8.39)	236 (9.29)	259 (10.20)	190 (7.48)	283 (11.14)	6 (0.24)	6 (0.24)	M5	7 (15.43)
D11M3X, D15M3X, D15N4, D18N4	230 (9.05)	400 (15.75)	213 (8.39)	236 (9.29)	259 (10.20)	210 (8.26)	386 (15.20)	8 (0.31)	6 (0.24)	M5	9 (19.84)
D18M3X, D22M3X, D22N4, U30Y to D30Y	240 (9.45)	420 (16.54)	236 (9.29)	259 (10.20)	282 (11.10)	206 (8.11)	403 (15.87)	11 (0.45)	6 (0.24)	M5	30 (66.14)
D30N4, D37N4,	240 (9.45)	550 (21.65)	266 (10.47)	289 (11.38)	312 (12.28)	206 (8.11)	531.5 (20.93)	11 (0.45)	6 (0.24)	M5	37 (81.57)
D30M3X, D37M3X, D45M3X	320 (12.60)	550 (21.65)	266 (10.47)	289 (11.38)	312 (12.28)	280 (11.02)	524 (20.93)	20 (0.79)	9 (0.35)	M8	37 (81.57)
D45N4, D55N4, D75N4 D37Y to D90Y	320 (12.60)	630 (24.80)	290 (11.42)	313 (12.32)	334 (13.15)	280 (11.02)	604.5 (23.80)	15 (0.59)	9 (0.35)	M8	45 (99.21)

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DC Bus Voltage Measurement Procedure

Before working on the drive, turn it off and wait 15 minutes to allow the DC bus to discharge. Then measure the DC bus voltage.

Measuring the DC bus voltage

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

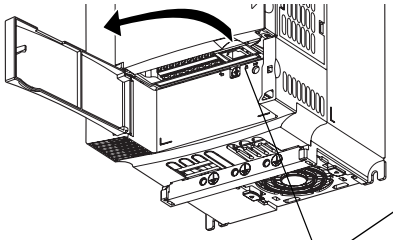
Read and understand the instructions on page 7 before performing this procedure.

Failure to follow these instructions will result in death or serious injury.

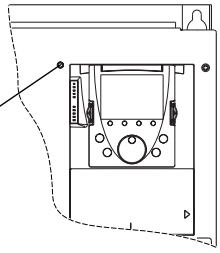
The DC bus voltage can exceed 1,000 V ⎓. Use a properly rated voltage-sensing device when performing this procedure. To measure the DC bus voltage:

1. Disconnect the drive power supply.
2. Wait 15 minutes to allow the DC bus to discharge.
3. Measure the voltage of the DC bus between the PO and PC/– terminals to ensure that the voltage is less than 42 V ⎓.
4. If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive.

ATV61H 075M3 to D15M3X[1] and ATV61H 075N4 to D18N4[2]



ATV61H D18M3X to D45M3X[1] ATV61H D22N4 to D75N4[2], and ATV61H U30Y to D90Y[3]



Red LED indicating that the DC bus is turned on. The drive LEDs are not indicators of the absence of DC bus voltage.

[1] For drive part numbers, see Table 2 on page 14.
[2] For drive part numbers, see Table 3 on page 15.
[3] For drive part numbers, see Table 4 on page 16.

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Wiring

Power

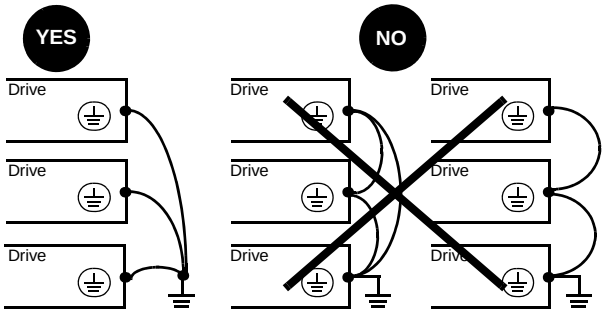
Ground the drive to local and national code requirements. A minimum wire size of 13.29 mm² (6 AWG) may be required to meet standards limiting leakage current.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Ground equipment using the provided ground connecting point as shown in the figure below. The drive panel must be properly grounded before power is applied.

Failure to follow these instructions will result in death or serious injury.



- Ensure that the resistance of the ground is 1 Ω or less.
- If grounding several drives you must connect each one directly, as shown in the figure above.
- Do not loop the ground cables or connect them in series

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⚠ WARNING

IMPROPER WIRING PRACTICES

- The ATV61 controller will be damaged if input line voltage is applied to the output terminals (U/T1,V/T2,W/T3).
- Check the power connections before energizing the ATV61 drive.
- If replacing another drive, verify that all wiring connections to the ATV61 controller comply with all wiring instructions in this manual.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Where local and national codes require upstream protection by means of a residual current device, use a Type A device for single-phase drives and a Type B device for three-phase drives as defined in the IEC 60755. Choose a suitable model integrating:

- Harmonic Frequency (HF) current filtering
- A time delay that helps prevent tripping caused by the load from stray capacitance on power-up. The time delay is not possible for 30 mA devices; in this case, choose devices with immunity against nuisance tripping.

If the installation includes several drives, provide one residual current device per drive.

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⚠ WARNING

INADEQUATE OVERCURRENT PROTECTION

- Overcurrent protective devices must be properly coordinated.
- The Canadian Electrical Code and the National Electrical Code require branch circuit protection. Use the over current protective device recommended on the drive nameplate or in document 30072-451-38_ to achieve published short-circuit current ratings.
- Do not connect the drive to a power feeder whose short-circuit capacity exceeds the controller short-circuit current rating listed on the controller nameplate or in document 30072-451-38_.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

CAUTION

IMPROPER USE OF A BRAKING RESISTOR

Wire the thermal protection contact on the resistor so that the drive power supply is disconnected immediately in the event of a detected fault (refer to the manual supplied with the resistor).

Failure to follow these instructions can result in equipment damage.

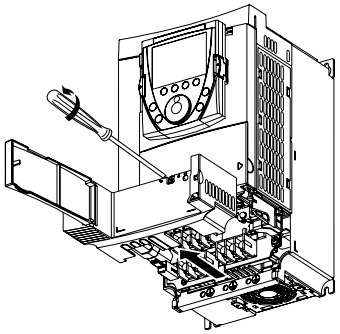
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Power Terminals

Access to the power terminals

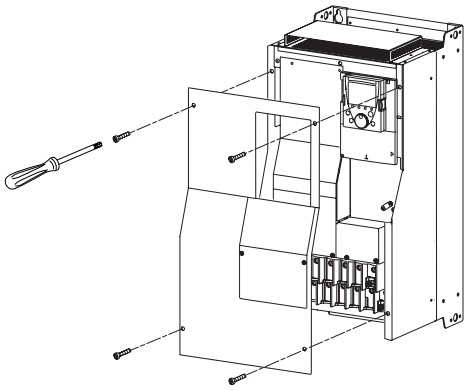
ATV61 H075M3 to HD15M3X[1] and ATV61 H075N4 to HD18N4[2]

Unlock the power-section access flap, and remove it as shown below.



ATV61 HD18M3X to HD45M3X[1], ATV61 HD22N4 to HD75N4[2], and ATV61H U30Y to HD90Y[3]

To access the power terminals, remove the front panel as shown below.



[1] For drive part numbers, see Table 2 on page 14.
[2] For drive part numbers, see Table 3 on page 15.
[3] For drive part numbers, see Table 4 on page 16.

Functions of power terminals

Terminals	Function
⏚	Protective ground connection terminal
R/L1 – S/L2 – T/L3	Power section line supply
PO	DC bus +polarity
PA/+	Output to braking resistor (+polarity)
PB	Output to braking resistor
PC/–	DC bus –polarity
U/T1 – V/T2 – W/T3	Outputs to the motor

NOTE: Remove the link between PO and PA/+ only if a DC choke has been added. The PO and PA/+ terminal screws must always be fully tightened, since a high current flows through the common link. Refer to the table on page 29 for tightening torque.

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Characteristics of power terminals

Table 6: Characteristics of power terminals

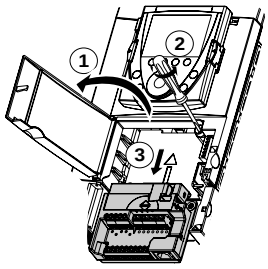
ATV61H...	Maximum wire size			Tightening torque
	mm²	AWG	kcmils	N•m (lb-in)
075M3, U15M3, U22M3, U30M3, U40M3,075N4, U15N4, U22N4, U30N4, U40N4,	4	10		1.4 (12.3)
U55M3, U55N4, U75N4	6	8		3 (26.5)
U73M3, D11N4	16	4		3 (26.5)
D11M3X, D15M3X, D15N4, D18N4	35	2		5.4 (47.7)
D18M3X, D22M3X, D22N4, D30N4, D37N4, U30Y to D30Y[1]	50	1/0		12 (106.2)
D30M3X, D37M3X, D45M3X, D45N4, D55N4, D75N4, D37Y to D90Y[1]	150		300	41 (360)

[1] For drive part numbers, see Table 4 on pages16 and 17.

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Control Terminals

Access to the control terminals



1. To access the control terminals, open the cover on the front panel of the control section.
2. To make it easier to wire the drive control section, remove the control terminal card by loosening the screw until the spring is fully extended.
3. Remove the card by sliding it downwards.

NOTE: For control wiring the maximum wire size is 2.5 mm² (14 AWG). The maximum tightening torque is 0.6 N•m (5.3 lb-in).

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- The accidental grounding of logic inputs configured for Sink Logic can result in unintended activation of drive functions.
- Protect the signal conductors against damage that could result in unintentional conductor grounding.
- Follow NFPA 79 and EN 60204 guidelines for proper control circuit grounding practices.

Failure to follow these instructions will result in death or serious injury.

CAUTION

IMPROPERLY SECURED TERMINAL CARD

When replacing the control terminal card, it is essential to fully tighten the captive screw. Torque the captive screw to 1.1 to 1.7 N•m (9.7 to 15 lb-in).

Failure to follow these instructions can result in equipment damage.

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Table 7: Characteristics and functions of the control terminals

Terminals	Function	Electrical characteristics
R1A R1B R1C	1 relay logic output, one N.C. contact and one N.O. contact with common point (R1A to R1C is N.O.; R1B to R1C is N.C.)	Minimum switching capacity: 3 mA for 24 V ⎓ Maximum switching capacity: • on resistive load (cos φ = 1): 5 A for 250 V a or 30 V V ⎓ • on inductive load (cos φ = 0.4 and L/R = 7 ms): 2 A for 250 V a or 30 V ⎓ Max. response time: 7 ms ±0.5 ms Electrical service life: 100,000 operations
R2A R2C	1 relay logic output one N.O. contact	
+10	+10 V ⎓ power supply for reference potentiometer 1 to 10 kΩ	• +10 V ⎓ (10.5 V ±0.5 V) • 10 mA max.
AI1+ AI1–	Differential analog input AI1	• –10 to +10 V ⎓ (max. safe voltage 24 V) • Reaction time: 2 ms ±0.5 ms, 11-bit resolution + 1 sign bit • Accuracy ±0.6% for Δθ = 60 °C (140 °F), linearity ±0.15% of max. value
COM	Analog I/O common	0 V
AI2	Depending on the software configuration: Analog voltage or current input	• Analog input 0 to +10 V ⎓ (max. safe voltage 24 V), impedance 30 kΩ • Analog input X–Y mA, X and Y programmable from 0 to 20 mA, impedance 250 Ω • Reaction time: 2 ms ±0.5 ms • 11-bit resolution, accuracy ±0.6% for Δθ = 60 °C (140 °F), linearity ±0.15% of max. value
COM	Analog I/O common	0 V
AO1	Depending on the software configuration: Analog voltage or current output or logic output	• Analog output 0 to +10 V c, min. load impedance 50 kΩ • Analog output X–Y mA, X and Y can be programmed from 0 to 20 mA, max. load impedance 500 Ω • 10-bit resolution, reaction time: 2 ms ±0.5 ms • Accuracy ±1% for Δθ = 60 °C (140 °F), linearity ±0.2% of max. value • Logic output: 0 or 10 V, 0 to 20 mA
P24	Input for external +24 V c control power supply	• +24 V ⎓ (min. 19 V, max. 30 V) • Power 30 W
0V	Logic input common and 0 V of external P24 power supply	0 V
LI1 LI2 LI3 LI4 LI5	Programmable logic inputs	• +24 V ⎓ (max. 30 V) • Impedance 3.5 kΩ • Reaction time: 2 ms ± 0.5 ms

SW1 Switch	State 0	State 1
Source (factory setting)	< 5 V ⎓	> 11 V ⎓
Sink Int or Sink Ext	> 16 V ⎓	< 10 V ⎓

LI6	Depending on the position of the SW2 switch: LI (Programmable logic input) or PTC (Input for PTC probes)	SW2 = LI (factory setting): • Same characteristics as logic inputs LI1 to LI5 SW2 = PTC: • Trip threshold 3 kΩ, reset threshold 1.8 kΩ • Short-circuit detection threshold < 50 Ω

NOTE: Δθ = temperature change

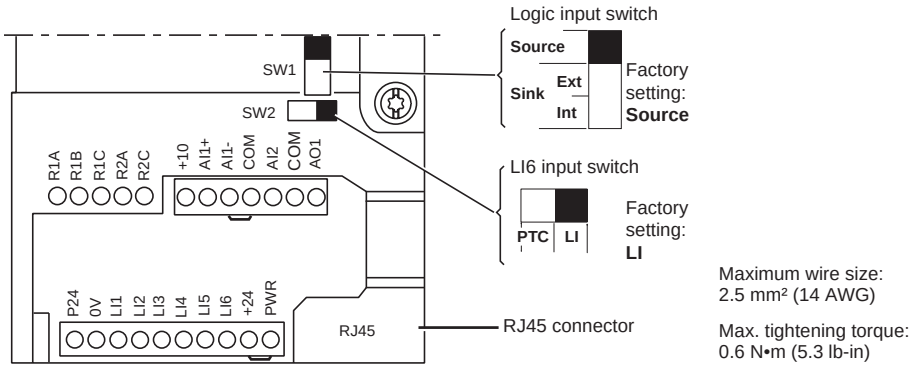
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Table 7: Characteristics and functions of the control terminals *(continued)*

Terminals	Function	Electrical characteristics
+24	Logic input power supply	SW1 switch in Source or Sink Int position: • Internal +24 V ⎓ power supply (min. 21 V, max. 27 V), protected against short-circuits and overloads • 200 mA max. SW1 switch in Sink Ext position: • Input for external +24 V ⎓ power supply for the logic inputs
PWR	Power Removal input.	• 24 V ⎓ (max. 30 V) • Impedance 1.5 kΩ • State 0 if < 2 V, state 1 if > 17 V • Reaction time: 10 ms
	When PWR is not connected to 24 V, the motor cannot be started (compliance with functional safety standard EN 954-1 and IEC/EN 61508).	

NOTE: Δθ = temperature change

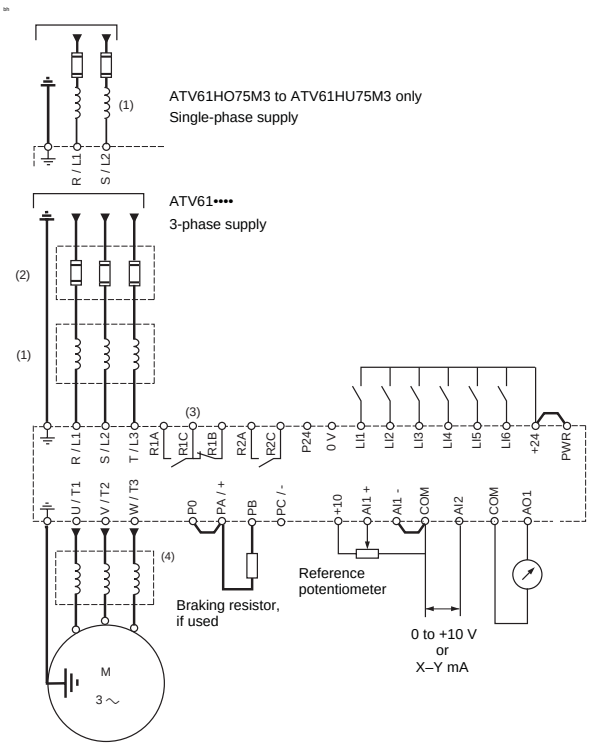
Arrangement of the control terminals



Note: The ATV61 controller is supplied with links between the PWR and +24 terminals and the AI1 and COM terminals.

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Connection diagrams



1 Line reactor, if used (required in single phase operation for ATV61H U40M3 to U75M3 drives). Recommended for 575 V installations.

2 For recommended fuses, refer to Tables 1–4 on pages14–16, the drive nameplate, or the *Altivar 61 and 71 Supplementary Short Circuit Protection Information* bulletin shipped with the drive.

3 R1 relay contacts, for remote signaling of drive status.

4 Installation of a load reactor or motor protecting filter is recommended for all 575 V installations.

NOTE:

- To operate the drive on a single phase supply, you must inhibit the input phase loss detection. If the input phase loss detection is set to its factory configuration, the drive will display a PHF code until the input phase loss is inhibited. For possible drives, see Table 1 on page 14.
- Install interference suppressors on all inductive circuits near the drive or coupled to the same circuit (such as relays, contactors, and solenoid valves).
- Use shielded cable for PWR input connections.
- See page 38 for factory configurations for logic inputs, analog inputs, relays and analog inputs.

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Operation on an Isolated, Impedance Grounded (IT), or Corner Grounded Delta System

Isolated or impedance grounded (IT) neutral system:
Use a permanent insulation monitor compatible with non-linear loads, such as a Merlin Gerin Type XM200 or equivalent. Altivar 61 drives feature built-in common mode RFI (EMC) filters. When any ATV61 drive is operating on an isolated or impedance grounded electrical distribution system, the filters must be isolated (disconnected).

NOTE: The ATV61D22N4 has two jumpers for filter disconnection.

CAUTION

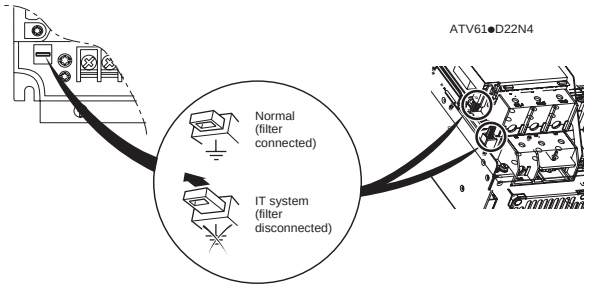
DRIVE DAMAGE

- Do not exceed 4 kHz switching frequency on ATV61H 075N4(Z), U15N4(Z), U22N4(Z), U30N4(Z), U40N4(Z drives if the filters are disconnected.
- Refer to the programming manual on the CD-ROM supplied with the drive to adjust parameter SFr.

Failure to follow these instructions can result in equipment damage.

Disconnecting the filter

For ATV61HO75M3–ATV61HD45M3X[1], ATV61HO75N4–ATV61HD75N4[2], and ATV61HU3OY–ATV61HD30Y[3]



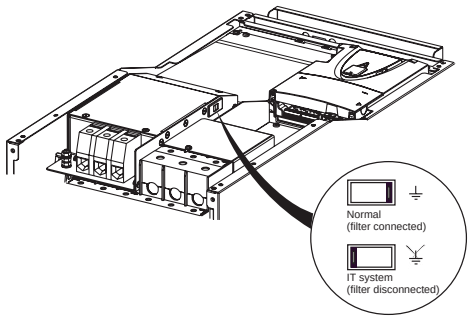
1 For ATV61 part numbers, see Tables 1 and 2 on pages 14 and 15.

2 For ATV61 part numbers, see Table 3 on pages15 and 16.

3 For ATV61 part numbers, see Table4 on pages 16 and 17.

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For ATV61HD37Y, ATV61HD45Y, ATV61HD55Y, ATV61HD75Y, and ATV61HD90Y



⚠ WARNING

RISK OF ELECTRIC SHOCK

ATV61•••Y drives must not be connected to a corner grounded system.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Corner grounded delta systems:
The ATV61HU30Y–ATV61HD90Y drives[1] must **never** be connected on a corner grounded delta electrical distribution system. When any other drive referenced in this manual is connected to a corner grounded delta electrical distribution system the filters must be isolated (disconnected) as shown in the diagram above.

[1] For ATV61 part numbers, see Table 4 on pages16 and 17.

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Electromagnetic Compatibility, Wiring

Principle and precautions

Important: The high frequency equipotential ground connection between the drive, motor, and cable shielding does not eliminate the need to connect the ground (PE) conductors (green-yellow) to the appropriate terminals on each unit. To help accomplish this, the user must follow the following points.

- Grounds between the drive, motor, and cable shielding must have high-frequency equipotentiality.
- When using shielded cable for the motor, use a 4-conductor cable so that one wire will be the ground connection between the motor and the drive. Size of the ground conductor must be selected in compliance with local and national codes. The shield can then be grounded at both ends. Metal ducting or conduit can be used for part or all of the shielding length, provided there is no break in continuity.
- When using shielded cable for the Dynamic Brake (DB) resistors, use a 3-conductor cable so that one wire will be the ground connection between the DB resistor assembly and the drive. Size of the ground conductor must be selected in compliance with local and national codes. The shield can then be grounded at both ends. Metal ducting or conduit can be used for part or all of the shielding length, provided there is no break in continuity.
- When using shielded cable for control signals, if the cable is connecting equipment that is close together and the grounds are bonded together, then both ends of the shield can be grounded. If the cable is connected to equipment that may have a different ground potential, then ground the shield at one end only to prevent large currents from flowing in the shield. The shield on the ungrounded end may be tied to ground with a capacitor (for example: 10 nF, 100V or higher) in order to provide a path for the higher frequency noise.
- Keep the control circuits away from the power circuits. For control and speed reference circuits, use of shielded twisted cables with a pitch of between 25 and 50 mm (0.98 and 1.97 in.) is recommended.
- Ensure maximum separation between the power supply cable (line supply) and the motor cable and also ensure maximum separation between the control cables and any power cables.

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- The motor cables must be at least 0.5 m (20 in.) long.
- Do not use surge arresters or power factor correction capacitors on the variable speed drive output.
- If using an additional input filter, refer to the Installation Guide for more information.
- For installation of the EMC plate provided with the drive and instructions for meeting EN55011 Class A directive, refer to the Installation Guide.

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Setup—Preliminary Recommendations

Drive settings (factory configuration)

The Altivar 61 drive is factory-set for the following operating conditions:

Table 8: Factory configurations

Macro-configuration	Pumps/fans
Motor frequency	50 Hz
Motor control type	Energy-saving variable torque applications
Stop mode	Normal stop mode on deceleration ramp
	Freewheel, in the event of a detected fault
Linear, acceleration, and deceleration ramps	3 s
Low speed	0 Hz
High speed	50 Hz
Motor thermal current	Rated drive current
Standstill injection braking current	0.7 x rated drive current, for 0.5 s
Automatic starts	No automatic starts after a detected fault is cleared
Switching frequency	2.5 kHz to 12 kHz depending on drive rating
Logic inputs	• LI1: forward (1 operating direction), 2-wire control type is transition. See “Starting” on page 39. • LI2: inactive (not assigned) • LI3: switching of 2nd speed reference. If LI3 = 0 the speed reference AI1 is active. If LI3 = 1 the speed reference AI2 is active. • LI4: fault reset • LI5, LI6: inactive (not assigned)
Analog inputs	• AI1: 1st speed reference 0 to 10 V • AI2: 2nd speed reference 0 to 20 mA **NOTE:** For 4–20 mA, go to Menu [1.5 Input/Output CFG], then to [AI2 configuration] and change [AI2 min. value] from 0 to 4.
Relay R1	R1C to R1A contact opens and R1C to R1B contact closes in the event of a detected fault or when the drive is powered off.
Relay R2	R2A to R2C contact closes when the drive is running.
Analog output AO1	0 to 20 mA, motor frequency

For programming instructions, refer to the ATV61 programming manual on the CD-ROM included with the drive.

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Power switching via line contactor

CAUTION

EXCESSIVE LINE CONTACTOR SWITCHING

- Avoid operating the contactor frequently to avoid premature aging of the filter capacitors.
- Do not have cycle times less than 60 s.

Failure to follow these instructions can result in equipment damage.

Starting

Important: The factory setting for the programming parameter [2-wire type] is set to [Transition], when input line power is applied nSt may display as the drive state and the controller will not start. This could indicate that a run command was present before the input line power was applied and a transition or change of state must be made to this command before the drive will start.

If it is desired that the drive starts when the input line power is applied without a transition of the run command, make the following change to the program configuration. Go to the menu [1.5 Inputs/Outputs CFG] and change parameter [2-wire type] from [Transition] to [Level]. When the change is made, the drive can begin running immediately on application of the input line power if a run command is present. For more information, see page 42.

Test on a low-power motor or without a motor, using motors in parallel

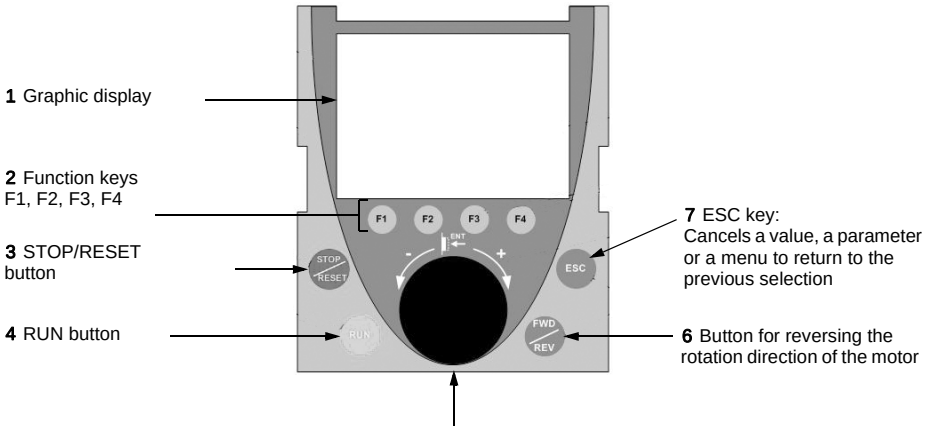
Consult the Programming Manual on the CD-ROM supplied with the drive.

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Display Terminals

Graphic Display Terminal

The graphic display terminal can be disconnected and connected remotely (on the door of an enclosure, for example) using the cables and accessories available as options.



5 Navigation button:

- Press (ENT):
  - To save the current value
  - To enter the selected menu or parameter
- Turn CW/CCW:
  - To increase or decrease a value
  - To go to the next or previous line
  - To increase or decrease the reference if control via the graphic display terminal is activated

NOTE: Buttons 3, 4, 5, and 6 can be used to control the drive directly, if control via the graphic display terminal is activated.

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Drive state codes

Table 9: Drive state codes

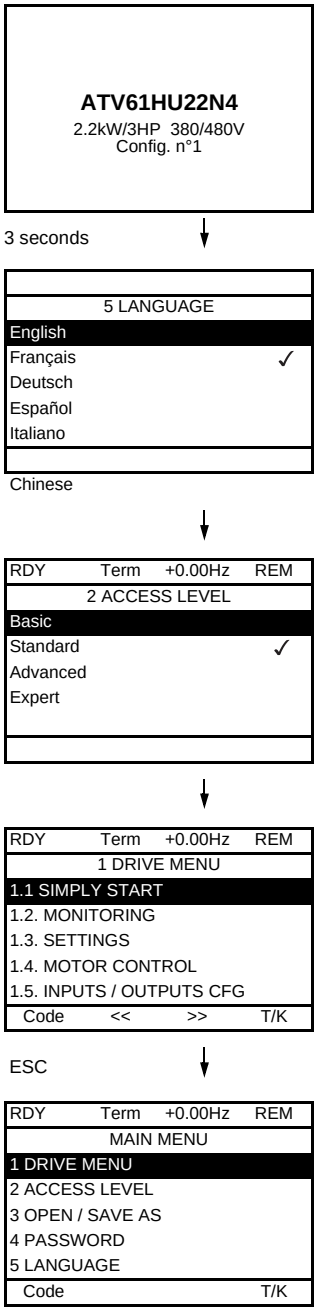
ACC	Acceleration
CLI	Current limiting
CTL	Controlled stop on input phase loss
DCB	DC injection braking in progress
DEC	Deceleration
FLU	Motor fluxing in progress
FRF	Drive at fallback speed
FST	Fast stop
NLP	No line power (no line supply on L1, L2, L3)
NST	Freewheel stop
OBR	Auto-adapted deceleration
PRA	Power Removal function active (drive locked)
RDY	Drive ready
RUN	Drive running
SOC	Controlled output cut in progress
TUN	Auto-tuning in progress
USA	Undervoltage alarm

The first time the drive is powered on, the user is automatically guided through the menus as far as [1. DRIVE MENU].

The parameters in the [1.1 SIMPLY START] submenu must be configured before the motor is started up. To optimize performance, perform an auto-tune (see page page 50).

Only the [1.1 SIMPLY START] menu is described in this document. For more information about the content of the other menus, consult the Programming Manual and the CD-ROM supplied with the drive.

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Displayed for 3 seconds following power-up

Switches to [5 LANGUAGE] menu automatically.

Select the language and press ENT.

Switches to [2 ACCESS LEVEL] menu (consult the Programming Manual on the CD-ROM supplied with the drive)

Select the access level and press ENT.

Switches to [1 DRIVE MENU] (consult the Programming Manual on the CD-ROM supplied with the drive)

Press ESC to return to [MAIN MENU]

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Integrated Display Terminal

The integrated display terminal with a 7-segment 4-digit display is an optional feature for the low-power ATV61 drives. The graphic display terminal described on page 40 is supplied as standard.



Pressing ▲ or ▼ does not store the choices.

Press and hold down (>2 s) ▲ or ▼ to scroll through the data quickly.

Press ENT to save and store the selection.

The display flashes once a value is stored.

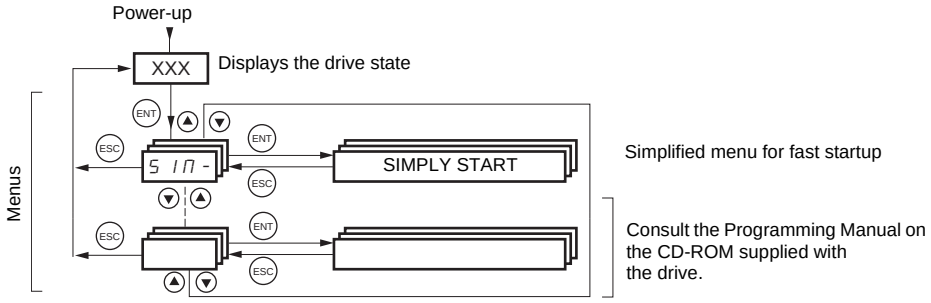
A normal display has no detected fault present and no startup:

- 43.0: Display of the parameter selected in the SUP menu (default selection: motor frequency)
- CLI: Current limit
- CtL: Controlled stop on input phase loss
- dCb: DC injection braking in progress
- FLU: Motor fluxing in progress
- FrF: Drive at fallback speed
- FSt: Fast stop
- nLP: No line power (no line supply on L1, L2, L3)
- nSt: Freewheel stop.
- Obr: Auto-adapted deceleration
- PrA: Power Removal function active (drive locked)
- rdY: Drive ready
- run: Drive running
- SOC: Controlled output cut in progress
- tUn: Auto-tuning in progress
- USA: Undervoltage alarm

The display flashes continuously to indicate the presence of a detected fault.

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Access to Menus



A dash appears after menu and submenu codes to differentiate them from parameter codes.

Example: SIM- menu, ACC parameter

[1.1 SIMPLY START] (SIM-) Menu

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Changes to parameters in other menus may change the [1.1 SIMPLY START] (SIM-) parameter settings.
- Read and understand the ATV61 Programming Manual before configuring parameter values.

Failure to follow these instructions will result in death or serious injury.

The [1.1 SIMPLY START] (SIM-) menu can be used to quickly configure key parameters to get the drive and motor running.

Modifying parameters in other menus may modify the parameter settings in the [1.1 SIMPLY START] (SIM-) menu. As an example, configuration of motor parameters in [1.4 MOTOR CONTROL] (drC-) will be reflected in the [1.1 SIMPLY START] (SIM-) parameters.

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The [1.1-SIMPLY START] (SIM-) menu can be used for quick startup, which is sufficient for many of applications.

NOTE: The parameters of the [1.1 SIMPLY START] (SIM-) menu must be entered in the order in which they appear, as the later ones are dependent on the first ones.

For example [2/3 wire control] (tCC) must be configured before any other parameters.

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Macro configuration

Selecting a macro configuration allows you to quickly configure the drive with settings that are suitable for a specific application.

Input/ output	[Start/Stop]	[Gen. Use]	[PID regul.]	[Network C.]	[Pumps.Fans]
AI1	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel] (PID reference)	[Ref.2 channel] ([Ref.1 channel] = integrated Modbus)	[Ref.1 channel]
AI2	[No]	[Summing ref. 2]	[PID feedback]	[No]	[Ref.1B channel]
AO1	[Motor freq.]	[Motor freq.]	[Motor freq.]	[Motor freq.]	[Motor freq.]
R1	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]
R2	[No]	[No]	[No]	[No]	[Drv running]
LI1 (2-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
LI2 (2-wire)	[Fault reset]	[Reverse]	[Fault reset]	[Fault reset]	[No]
LI3 (2-wire)	[No]	[Jog]	[PID integral reset]	[Ref. 2 switching]	[Ref 1B switching]
LI4 (2-wire)	[No]	[Fault reset]	[2 preset PID ref.]	[Forced local]	[Fault reset]
LI5 (2-wire)	[No]	[Torque limitation]	[4 preset PID ref.]	[No]	[No]
LI6 (2-wire)	[No]	[No]	[No]	[No]	[No]
LI1 (3-wire)	Stop	Stop	Stop	Stop	Stop
LI2 (3-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
LI3 (3-wire)	[Fault reset]	[Reverse]	[Fault reset]	[Fault reset]	[No]
LI4 (3-wire)	[No]	[Jog]	[PID integral reset]	[Ref. 2 switching]	[Ref 1B switching]
LI5 (3-wire)	[No]	[Fault reset]	[2 preset PID ref.]	[Forced local]	[Fault reset]
LI6 (3-wire)	[No]	[Torque limitation]	[4 preset PID ref.]	[No]	[No]

The assignment of inputs LI1 to LI6 differs in 3-wire control.

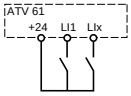
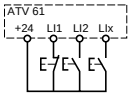
Factory settings

NOTE: All settings listed in the preceding table can be modified, adjusted and reassigned. Consult the ATV61 Programming Manual on the CD-ROM supplied with the drive.

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The following table describes the codes, adjustment range, and factory settings.

Table 10: Codes, adjustment range, and factory settings

Code	Name/Description	Adjustment range	Factory setting
tCC	**[2/3 wire control]**		[2 wire] (2C)
2C 3C	• **[2 wire]** (2C) • **[3 wire]** (3C) **2-wire control** **Maintained control:** Maintained closed to run and maintained opened to stop.  Example of source wiring: LI1: forward LIx: reverse **3-wire control** (Pulse control): A forward or reverse pulse is sufficient to command starting, a stop pulse is sufficient to command stopping.  Example of source wiring: LI1: stop LI2: forward LIx: reverse To change the assignment of [2/3 wire control] (tCC) press and hold the ENT key for 2 s. The [2 wire type] (tCt) function and the functions assigning the logic inputs and analog inputs will return to the factory settings. The selected macro configuration will reset, losing its custom settings. **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** • Ensure that this parameter is configured before configuring the [1.6 COMMAND] (Ctl-) and [1.7 APPLICATION FUNCT.] (FUn-). • Ensure that this assignment change is compatible with the wiring scheme used. For more information, consult the CD-ROM with the drive. **Failure to follow these instructions will result in death or serious injury.**		

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Table 10: Codes, adjustment range, and factory settings *(continued)*

Code	Name/Description	Adjustment range	Factory setting
CFG	**[Macro configuration]**		[Pumps.Fans] (PnF)
STS GEn PId nEt PnF	• **[Start/Stop]** (StS): Start/stop • **[Gen. Use]** (GEn): General use • **[PID regul.]** (PId): PID regulation • **[Network C.]** (nEt): Communication bus • **[Pumps.Fans]** (PnF): Pumps/fans To change the assignment of [Macro configuration] (CFG) press the ENT key for 2 s. **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** Ensure that the selected macro configuration is compatible with the wiring scheme used. **Failure to follow these instructions will result in death or serious injury.**		
CCFG	**[Customized macro]**		
YES	Read-only parameter, visible only if at least one macro configuration parameter has been modified. • **[Yes]** (YES)		
bFr	**[Standard mot. freq]**		[50 Hz IEC] (50)
50 60	• [50 Hz IEC] (50): IEC • [60 Hz NEMA] (60): NEMA This parameter modifies the presets of the following parameters: [Rated motor power] (nPr), [Rated motor volt.] (UnS), [Rated mot. current] (nCr), [Rated motor freq.] (FrS), [Rated motor speed] (nSP) and [Max frequency] (tFr), see below; and [Mot. therm. current] (ItH) and [High speed] (HSP), see page 51.		
IPL	**[Input phase loss]**		Varies with the drive rating.
nO YES	• **[Ignore]** (nO): A detected phase loss is ignored. To be used when the drive is supplied via a single phase supply or by the DC bus. • **[Freewheel]** (YES): A detected phase loss with freewheel stop. If one phase is lost, the drive indicates mode [Input phase loss] (IPL); but if 2 or 3 phases are lost, the drive continues to operate until it trips on an undervoltage fault. This parameter is only accessible in this menu on ATV61H037M3 to HU75M3 drives (used with a single phase supply).		
nPr	**[Rated motor power]**	According to drive rating	Varies with the drive rating.
	Rated motor power given on the nameplate, in kW if [Standard mot. freq] (bFr) = [50 Hz IEC] (50), in HP if [Standard mot. freq] (bFr) = [60 Hz NEMA] (60).		

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Table 10: Codes, adjustment range, and factory settings *(continued)*

Code	Name/Description	Adjustment range	Factory setting
UnS	**[Rated motor volt.]** Rated motor voltage given on the nameplate. ATV61•••M3: 100 to 240 V ATV61•••N4: 200 to 480 V ATV61•••Y: 400 to 690 V	According to drive rating	Varies with the drive rating and [Standard mot. freq] (bFr)
nCr	**[Rated mot. current]** Rated motor current given on the nameplate.	0.25 to 1.1 or 1.2 Hz depending on rating	Varies with the drive rating and [Standard mot. freq] (bFr)
FrS	**[Rated motor freq.]** Rated motor frequency given on the nameplate. The factory setting is 50 Hz, or preset to 60 Hz if [Standard mot. freq] (bFr) is set to 60 Hz.	10 to 500 or 1000 Hz depending on rating	50 Hz
nSP	**[Nom motor speed]** Rated motor speed given on the nameplate. 0 to 9999 rpm and 10.00 to 60.00 krpm on the integrated display terminal. If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows: • Nominal speed = Synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$ or • Nominal speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors) or • Nominal speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors)	0 to 60000 rpm	Varies with the drive rating.
tFr	**[Max frequency]** The factory setting is 60 Hz, or preset to 72 Hz if [Standard mot. freq] (bFr) is set to 60 Hz. The maximum value is limited by the following conditions: • It must not exceed 10 times the value of [Rated motor freq.] (FrS) • Values between 500 Hz and 1000 Hz are possible only in V/F control and for powers limited to 37 kW (50 HP) for ATV61H••• and 45 kW (60 HP) for ATV61W•••. In this case configure [Motor control type] (Ctt) before [Max frequency] (tFr).	10 to 1000 Hz	60 Hz

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Table 10: Codes, adjustment range, and factory settings *(continued)*

Code	Name/Description	Adjustment range	Factory setting
tUn	**[Auto tuning]**		[No] (nO)

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- During auto tuning, the motor operates at rated current.
- Do not service the motor during auto tuning.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- The following motor parameters must be correctly configured before starting auto tuning: [Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), and [Rated motor power] (nPr).
- If one or more of these parameters is modified after auto tuning has been performed, Auto tuning (tUn) will be set to [No] and the procedure must be repeated.

Failure to follow these instructions will result in death or serious injury.

nO
YES
dOnE

- **[No]** (nO): Auto-tuning not performed.
- **[Yes]** (YES) : Auto-tuning is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE).
- **[Done]** (dOnE): Use of the values given the last time auto-tuning was performed.

Important:

- It is essential that all motor parameters—[Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current.] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr)—are configured correctly before starting auto-tuning.
  If one or more of these parameters is modified after auto-tuning has been performed, [Auto tuning] (tUn) will return to [No] (nO) and the procedure must be repeated.
- Auto-tuning is performed only if no stop command has been activated. If a freewheel stop or fast stop function has been assigned to a logic input, this input must be set to 1 (active at 0).
- Auto-tuning takes priority over any run or prefluxing commands, which will take effect after the auto-tuning sequence.
- If auto-tuning is unsuccessful, the drive displays [No] (nO) and, depending on the configuration of [Autotune fault mgt] (tnL) (consult the CD-ROM supplied with the drive), may switch to [Auto-tuning] (tnF) detected fault.
- Auto-tuning may last for 1 to 2 seconds. Do not interrupt; wait for the display to change to [Done] (dOnE) or [No] (nO).

NOTE: During auto-tuning the motor operates at rated current.

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Table 10: Codes, adjustment range, and factory settings *(continued)*

Code	Name/Description	Adjustment range	Factory setting
tUS tAb PEnd PrOG FAIL dOnE	**[Auto tuning status]** (for information only, cannot be modified) • **[Not done]** (tAb): The default stator resistance value is used to control the motor. • **[Pending]** (PEnd): Auto-tuning has been requested but not yet performed. • **[In Progress]** (PrOG): Auto-tuning in progress. • **[Failed]** (FAIL): Auto-tuning unsuccessful. • **[Done]** (dOnE): The stator resistance measured by the auto-tuning function is used to control the motor.		[Not done] (tAb)
PHr AbC ACb	**[Output Ph rotation]** • **[ABC]** (AbC): Forward • **[ACB]** (ACb): Reverse This parameter can be used to reverse the rotation direction of the motor without reversing the wiring.		[ABC] (AbC)

Parameters that can be changed while the drive is running or stopped

Table 11: Parameters that can be changed while the drive is running or stopped

Code	Name/Description		Factory setting
ItH	**[Mot. therm. current]**	0 to 1.1 or 1.2 In (1) according to rating	Varies with the drive rating.
	Motor thermal overload current, to be set to the rated current indicated on the nameplate.		
ACC	**[Acceleration]**	0.1 to 999.9 s	3.0 s
	Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 49). Ensure that this value is compatible with the inertia being driven.		
dEC	**[Deceleration]**	0.1 to 999.9 s	3.0 s
	Time to decelerate from the [Rated motor freq.] (FrS) (page 49) to 0. Ensure that this value is compatible with the inertia being driven.		
LSP	**[Low speed]**		0
	Motor frequency at minimum reference, can be set between 0 and [High speed] (HSP).		
HSP	**[High speed]**		50 Hz
	Motor frequency at maximum reference, can be set between [Low speed] (LSP) and [Max frequency] (tFr). The factory setting changes to 60 Hz if [Standard mot. freq] (bFr) = [60 Hz] (60).		

(1) "In" corresponds to the rated controller current indicated in the installation manual and on the controller nameplate.

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Detected Faults and Troubleshooting

Drive does not start, no detected fault code displayed

- If the display does not light up, check the power supply to the drive.
- If the drive displays [Freewheel] (nSt) or [Fast stop] (FSt): The Fast Stop and Freewheel functions help prevent the drive from starting if the corresponding logic inputs are not powered up. This is normal—these functions are active at zero so that the drive will stop if there is a wire break.
- Make sure that the run command input or inputs are activated according to the selected control mode:
  - — [2/3 wire control] (tCC) parameter, described on page 47
  - — [2 wire type] (tCt) parameter, described on page 39 and in the ATV61 programming manual on the CD-ROM supplied with the drive).

Conditions requiring a power reset

⚠ DANGER

LOSS OF PERSONNEL AND EQUIPMENT PROTECTION FEATURES

- Enabling fault inhibition (InH) will disable the drive protection features.
- InH should not be enabled for typical applications of this equipment.
- InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection features poses a greater risk than personnel injury or equipment damage.

Failure to follow these instructions will result in death or serious injury.

Table 12 on page 53 lists the conditions requiring a power reset. A power reset is accomplished by cycling power to the drive after the cause of the condition has been removed.

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AI2F, EnF, SOF, SPF and tnF conditions can also be reset remotely by means of a logic input or control bit (consult the Programming Manual on the CD-ROM supplied with the drive).

EnF, InFA, InFb, SOF, SPF and tnF conditions can be inhibited and cleared remotely by means of a logic input or control bit (consult the Programming Manual on the CD-ROM supplied with the drive).

Table 12: Conditions requiring a power reset

Code	Name	Probable cause	Remedy
AI2F	[AI2 input]	• AI2 signal out of range	• Check the wiring of analog input AI2 and the value of the signal.
bOF	[DBR overload]	• Incorrect DB resistor settings	• Check the size of the resistor and wait for it to cool down. • Check parameters [DB Resistor Power] (brP) and [DB Resistor value] (brU) (consult the CD-ROM supplied with the drive).
bUF	[DB unit sh. Circuit]	• Short-circuit output from braking unit	• Check the wiring of the braking unit and the resistor. • Check the braking resistor.
CrF1	[Precharge]	• Charging relay control condition or charging resistor damaged	• Turn the drive off and then back on again. • Check the internal connections. • Contact Schneider Electric Product Support.
CrF2	[Thyr. soft charge]	• Improper DC bus charging condition (thyristors)	
EEF1	[Control Eeprom]	• Control card Internal memory	• Check the environment (electromagnetic compatibility). • Turn off, reset, return to factory settings. • Contact Schneider Electric Product Support.
EEF2	[Power Eeprom]	• Power card internal memory	
FCF1	[Out. contact. stuck]	• The output contactor remains closed although the opening conditions have been met	• Check the contactor and its wiring. • Check the feedback circuit.
HdF	[IGBT desaturation]	• Short-circuit or grounding at the drive output	• Check the cables connecting the drive to the motor, and the motor insulation. • Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu.
ILF	[internal com. link]	• Communication condition between option card and drive	• Check the environment (electromagnetic compatibility). • Check the connections. • Ensure that no more than 2 option cards (max. permitted) have been installed on the drive. • Replace the option card. • Contact Schneider Electric Product Support.
InF1	[Rating error]	• The power card is different from the card stored	• Check the catalog number of the power card and ensure that it is compatible with the drive.
InF2	[Incompatible PB]	• The power card is incompatible with the control card	• Check the catalog number of the power card and ensure that it is compatible with the drive.
InF3	[Internal serial link]	• Communication condition between the internal cards	• Check the internal connections. • Contact Schneider Electric Product Support.

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Table 12: Conditions requiring a power reset *(continued)*

Code	Name	Probable cause	Remedy
InF4	[Internal MFG area]	• Internal data inconsistent	• Contact Schneider Electric Product Support to have the drive recalibrated.
InF6	[Internal-option]	• The option installed in the controller is not recognized	• Check the catalog reference and compatibility of the option.
InF7	[Internal-hard init.]	• Initialization of the drive is incomplete	• Turn off the drive and reset.
InF8	[Internal-ctrl supply]	• The control section power supply is incorrect	• Check the control section power supply.
InF9	[Internal-I measure]	• The current measurements are incorrect	• Replace the current sensors or the power card. • Contact Schneider Electric Product Support.
InFA	[Internal-mains circuit]	• The input stage is not operating correctly	• Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu. • Contact Schneider Electric Product Support.
InFb	[Internal-th. sensor]	• The drive temperature sensor is not operating correctly	• Replace the temperature sensor. • Contact Schneider Electric Product Support.
InFC	[Internal-time meas.]	• Detected fault on the electronic time measurement component	• Contact Schneider Electric Product Support.
InFE	[internal- CPU]	• Internal microprocessor event	• Turn off the drive and reset. Contact Schneider Electric Product Support.
OCF	[Overcurrent]	• Motor parameters are not set correctly • Excessive inertia or load • Mechanical locking	• Check the motor parameters. • Check the size of the motor, controller, and load. • Check the state of the mechanism.
PrF	[Power removal]	• Detected fault with the drive's Power Removal safety function[1]	• Contact Schneider Electric Product Support.
SCF1	[Motor short circuit]	• Short-circuit or grounding at the drive output • Significant earth leakage current at the controller output if several motors are connected in parallel	• Check the cables connecting the drive to the motor, and the insulation of the motor • Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu. • Reduce the switching frequency. • Connect chokes in series with the motor.
SCF2	[Impedant sh. circuit]		
SCF3	[Ground short circuit]		
SOF	[Overspeed]	• Instability • Overhauling load	• Check the motor, gain and stability parameters. • Add a braking resistor. • Check the size of the motor, controller, and load.
SPF	[Speed Feedback Loss]	• Encoder feedback signal missing.	• Check the wiring between the encoder and the drive. • Check the encoder.
tnF	[Auto-tuning]	• Special motor, or motor power not suitable for the drive • Motor not connected to the drive	• Ensure that the motor and drive are compatible. • Ensure that the motor is present during auto-tuning. • If an output contactor is being used, close it during auto-tuning.

[1] Safety function as defined by IEC61508.

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Auto-Reset Conditions (customer configured)

⚠ DANGER

LOSS OF PERSONNEL AND EQUIPMENT PROTECTION FEATURES

- Enabling the fault inhibition (InH) will disable the drive protection features.
- InH should not be enabled for typical applications of this equipment.
- InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection features poses a greater risk than personnel injury or equipment damage.

Failure to follow these instructions will result in death or serious injury.

Table 13 lists the conditions that can be reset with the automatic restart function after the cause has been removed. These conditions can also be reset by turning the drive off then on again, or by means of a logic input or control bit (consult the Programming Manual on the CD-ROM supplied with the drive).

The following conditions can be inhibited and cleared remotely by means of a logic input or control bit: APF, CnF, COF, EPF1, EPF2, FCF2, LFF2, LFF3, LFF4, nFF, ObF, OHF, OLC, OLF, OPF1, OPF2, OSF, OtF1, OtF2, OtFL, PHF, PtF1, PtF2, PtFL, SLF1, SLF2, SLF3, SPIF, SSF, tJF, and ULF (consult the Programming Manual on the CD-ROM supplied with the drive).

Table 13: Auto-Reset Conditions (customer configured)

Code	Name	Probable cause	Remedy
APF	[Application fault]	• Controller Inside card	• Check the card programming. Refer to the card documentation.
CnF	[Com. network]	• Communication interruption	• Check the environment (electromagnetic compatibility). • Check the wiring. • Check the time-out. • Replace the option card. • Contact Schneider Electric Product Support.

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Table 13: Auto-Reset Conditions (customer configured) *(continued)*

Code	Name	Probable cause	Remedy
CAn	[CAN com.]	• Interruption in communication on the CANopen bus	• Check the communication bus. • Check the time-out. • Refer to the CANopen user's manual.
EPF1	[External flt-LI/Bit]	• An external device, depending on user	• Correct the device and reset the drive.
EPF2	[External fault com.]	• A communication network	• Correct the communication network and reset the drive.
FCF2	[Out. contact. open.]	• The output contactor remains open although the closing conditions have been met	• Check the contactor and its wiring. • Check the feedback circuit.
LCF	[input contactor]	• The drive is not turned on even though [Mains V. time out] (LCt) has elapsed.	• Check the contactor and its wiring. • Check the time-out. • Check the line/contactor/controller connection.
LFF2 LFF3 LFF4	[AI2 4-20mA loss] [AI3 4-20mA loss] [AI4 4-20mA loss]	• Loss of the 4 to 20 mA reference on analog input AI2, AI3 or AI4	• Check the connection on the analog inputs.
nFF	[No Flow Fault]	• Zero fluid	• Check and correct the cause of the low flow. • Check the zero fluid detection parameters (consult the Programming Manual on the CD-ROM supplied with the drive).
ObF	[Overbraking]	• Braking ramp too short • Overhauling load	• Increase the deceleration time. • Install a braking resistor if necessary. • Activate the [Dec ramp adapt.] (brA) function (consult the Programming Manual on the CD-ROM supplied with the drive), if it is compatible with the application.
OHF	[Drive overheat]	• Ambient temperature too high • Drive ventilation blocked • Drive cooling fan failure	• Check the motor load, the drive ventilation, and the ambient temperature. Wait for the controller to cool down before restarting.
OLC	[Proc.Overload Flt]	• Process overload (consult the programming manual on the CD-ROM)	• Check and remove the cause of the overload. • Check the parameters of the [PROCESS UNDERLOAD] (OLd-) function (consult the CD-ROM supplied with the controller).
OLF	[Motor overload]	• Motor power rating too small for the application • Overload setting incorrect for the motor full-load rating • Output phase loss (see OPF1)	• Check the setting of the motor thermal current parameter. Check the motor load. Wait for the motor to cool down before restarting.

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Table 13: Auto-Reset Conditions (customer configured) *(continued)*

Code	Name	Probable cause	Remedy
OPF1	[1 motor phase loss]	• Loose connection causing loss of one phase at controller output	• Check the connections from the drive to the motor.
OPF2	[3 motor phase loss]	• Motor not connected or motor power too low • Output contactor open • Instantaneous instability in the motor current	• Check the connections from the drive to the motor. • If an output contactor is being used, consult the Programming Manual on the CD-ROM supplied with the drive. • Test on a low-power motor or without a motor: In factory settings mode, motor phase loss detection is active [Output Phase Loss] (OPL) = [Yes] (YES). To check the drive in a test or maintenance environment without having to switch to a motor with the same rating as the drive (particularly useful in the case of high-power drives), deactivate motor phase loss detection [Output phase loss] (OPL) = [No] (nO). • Check and optimize the parameters [Rated motor volt.] (UnS) and [Rated mot. current.] (nCr) and perform an [Auto tuning] (tUn).
OSF	[Mains overvoltage]	• Line voltage too high • Disturbances in the line supply	• Check the line voltage.
OHF1	[PTC1 overheat]	• Overheating of the PTC1 probes detected	• Check the motor load and motor size. • Check the motor ventilation. • Wait for the motor to cool before restarting. • Check the type and state of the PTC probes.
OHF2	[PTC2 overheat]	• Overheating of the PTC2 probes detected	
OHFL	[PTC=LI6 overheat]	• Overheating of PTC probes detected on input LI6.	
PHF1	[PTC1 probe]	• PTC1 probes open or short-circuited	• Check the PTC probes and the wiring between them and the motor/controller.
PHF2	[PTC2 probe]	• PTC2 probes open or short-circuited	
PHFL	[LI6=PTC probe]	• PTC probes on input LI6 open or short-circuited	
SCF4	[IGBT short circuit]	• Power component	• Perform a test via the [1.10 DIAGNOSTICS] menu. • Contact Schneider Electric Product Support.

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Table 13: Auto-Reset Conditions (customer configured) *(continued)*

Code	Name	Probable cause	Remedy
SCFS	[Motor short circuit]	• Short-circuit at drive output	• Check the cables connecting the controller to the motor, and the motor insulation. • Perform a test via the [1.10 DIAGNOSTICS] menu. • Contact Schneider Electric Product Support.
SLF1	[Modbus com.]	• Interruption in communication on the Modbus bus	• Check the communication bus. • Check the time-out. • Refer to the Modbus User's Manual
SLF2	[PowerSuite com.]	• Communication with PowerSuite™ software	• Check the PowerSuite -connecting cable. • Check the time-out.
SLF3	[HMI com.]	• Communication with the graphic display terminal	• Check the terminal connection. • Check the time-out.
SPIF	[PI Feedback]	• PID feedback below the lower limit	• Check the PID function feedback. • Check the PID feedback supervision threshold and time delay (consult the Programming Manual on the CD-ROM supplied with the drive).
SSF	[Torque/current lim]	• Switch to torque limitation	• Check if there are any mechanical problems. • Consult the Programming Manual on the CD-ROM supplied with the drive.
tJF	[IGBT overheat]	• Drive overheated	• Check the size of the load, motor, and controller. • Reduce the switching frequency. • Wait for the drive to cool before restarting.
ULF	[Proc. Underload Flt]	• Process underload	• Check and remove the cause of the underload. • Consult the Programming Manual on the CD-ROM supplied with the drive.

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Auto-Reset Conditions

⚠ DANGER

LOSS OF PERSONNEL AND EQUIPMENT PROTECTION

- Enabling the fault inhibition parameter (InH) will disable the drive protection features.
- InH should not be enabled for typical applications of this equipment.
- InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection features poses a greater risk than personnel injury or equipment damage.

Failure to follow these instructions will result in death or serious injury.

Table 14 on page 60 lists the conditions that can be reset as soon as the cause of the condition has been removed. The USF condition can be inhibited and cleared remotely by means of a logic input or control bit ([Fault inhibit assign.] (InH), consult the CD-ROM supplied with the drive).

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Table 14: Auto Reset Conditions

Code	Name	Probable cause	Remedy
CFF	[Incorrect config.]	• Option card changed or removed • The current configuration is inconsistent	• Check that there are no card errors. • If the option card was changed or removed deliberately, consult the Programming Manual on the CD-ROM supplied with the drive. • Return to factory settings or retrieve the backup configuration, if it is valid (consult the Programming Manual on the CD-ROM supplied with the drive).
CFI	[Invalid config.]	• Invalid configuration. The configuration loaded in the controller via the bus or network is inconsistent.	• Check the configuration loaded previously. • Load a compatible configuration.
HCF	[Cards pairing]	• The [CARDS PAIRING] (PPI-) function has been configured and a drive card has been changed	• Consult the Programming Manual on the CD-ROM supplied with the drive.
PHF	[Input phase loss]	• Controller incorrectly supplied or a fuse blown • Loss of one phase • 3-phase ATV61 used on a single phase line supply • Unbalanced load Monitors only with the drive on load.	• Check the power connection and the fuses. • Use a 3-phase mains supply • Disable [Input phase loss] (IPL) = [No] (nO).
PrtF	[Power Ident]	• The [Power Identification] (Prt) parameter is incorrect. • Control card replaced by a control card configured on a drive with a different rating	• Enter the correct parameter (reserved for Schneider Electric product support). • Check that there are no card errors. • If the control card was changed deliberately, consult the Programming Manual on the CD-ROM supplied with the drive.
USF	[Undervoltage]	• Line supply too low • Transient voltage dip • Damaged pre-charge resistor	• Check the voltage and the voltage parameter (consult the Programming Manual on the CD-ROM supplied with the drive). • Replace the pre-charge resistor. • Contact Schneider Electric Product Support.

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Altivar® 61 Variable Speed Drive Controllers Simplified Manual and Supplementary Instructions
Instruction Bulletin

Schneider Electric USA
8001 Knightdale Boulevard
Knightdale, NC 27545 USA
1-888-SquareD (1-888-778-2733)
www.Schneider-Electric.us

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

30072-451-60C
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Replaces 30072-451-60B 05/2006

09/2008

Counting Instruments

Technical Data 211

Electronic Hour Meter, AC Hour Meter

T50 Series





T50A2, T50B2

ENM's Series T50 electronic AC hour meter is a low cost reliable hour meter incorporating the latest state-of-the-art in electronics. It's quartz-crystal time base insures accurate long term time-keeping. A reliable electromechanical wheel-type indicator is used to store accumulated hours.
This compact tamperproof meter is sealed against the environment to provide years of service.
The T50 elapsed time indicator was designed for use on test and recording equipment, for providing maintenance control, for establishing warranty programs, for measuring machine utilization and production time, or for any application where time-in-use is to be determined.

Features

- Low Power Consumption
- Solid State Electronic Drive Circuit
- Quartz-Crystal for Accurate Timing
- Non-reset
- UL/cUL Recognized, CE & RoHS Compliant
- High Impact, Tamperproof Plastic Case
- IP65
- Indicates Operating Time in Hours and Tenths
- No Battery Back-Up Required
- Quiet operation
- MADE IN THE U.S.A.

Specifications

Time Scale:	6-digits 99,999.9 Hours Automatic recycle to zero
Figures:	Hours - White on black Tenths - Red on white Height - 0.140"
Operation Voltage:	230, 115, 48, 24 VAC ±10% 50/60 Hz Other voltage available
Power Consumption:	Less than 0.4 Watts
Accuracy:	Better than ±0.02% over entire range
Temperature:	-40°F to +185°F (-40°C to +85°C)
Vibration Resistance:	Withstands 10-80 Hz at 20g's max. (SAE J1378)
Shock:	55g at 9-13 ms (SAE J1378)
Humidity:	95% (SAE J1378)
Terminations:	1/4" male blade terminals
Configuration:	Round SAE Bezel with new push-on retaining ring Round 3-Hole Bezel

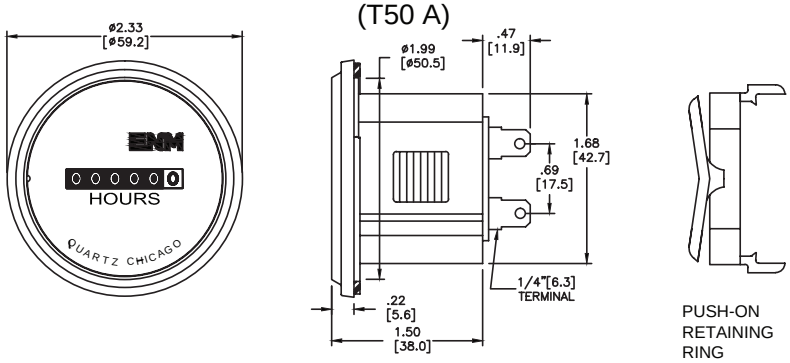
2013 ENM Co.®

Counting Instruments

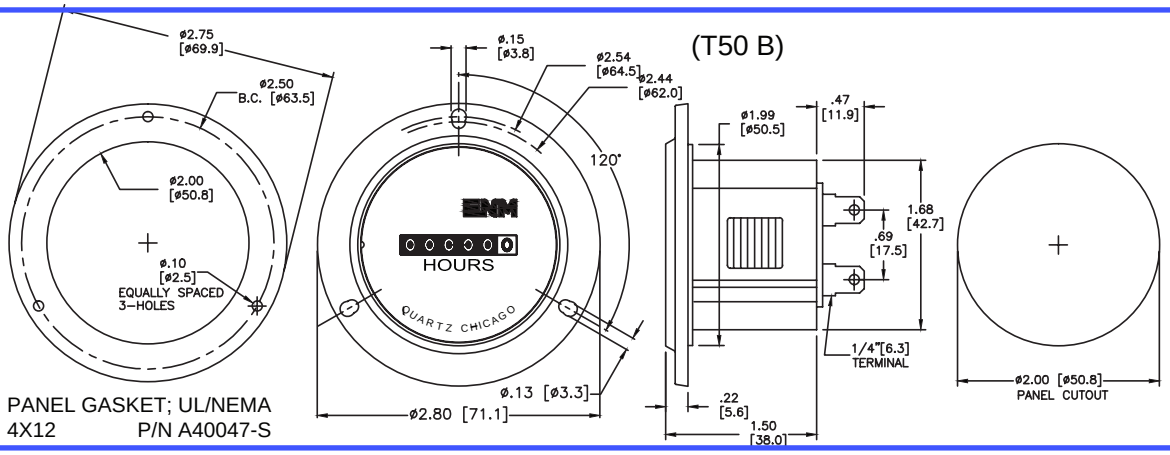
ENM Company
5617 Northwest Highway, Chicago, IL 60646-6135
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Toll Free (888) 372-0465 • e-mail: customerservice@enmco.com
web site: www.enmco.com

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(T50 A)



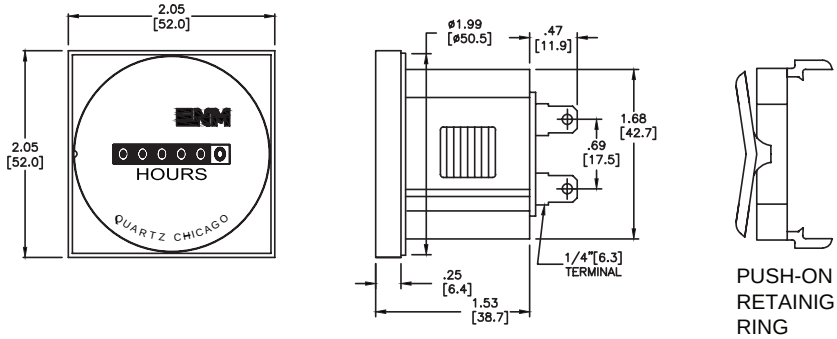
(T50 B)



PANEL GASKET; UL/NEMA 4X12 P/N A40047-S

PANEL GASKET; UL/NEMA 4X12 WITH MTG HARDWARE; P/N B20017

(T50 E)



2013 ENM Co.®

LIMITED WARRANTY

ENM Company resettable electromechanical counters are warranted to the consumer to be free from defects in material and workmanship for a period of 3 years. All ENM products which fall within the warranty period due to defects in material or workmanship will be repaired or replaced, at ENM's option, without charge to the consumer when returned with proof of purchase to any authorized ENM dealer in the United States, transportation charges prepaid, provided there is no evidence of improper installation, tampering, or other abuse. All implied warranties, including any implied warranty of merchantability or fitness for a particular purpose, shall be limited in duration to the express warranty period specified above. ENM disclaims any liability for consequential damages due to breach of any written or implied warranty on its products. Datasheet information subject to change.

Counting Instruments

ENM Company
5617 Northwest Highway, Chicago, IL 60646-6135
(773) 775-8400 • Fax: (773) 775-5968 • Toll Free (888) 372-0465
e-mail: customerservice@enmco.com
ISO 9001:2000 **web site: www.enmco.com**

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RHINO PSC Series Power Supplies Specifications



PSC-05-012, PSC-12-015, PSC-24-015



PSC-12-030, PSC-24-030

NEC Class 2 Compliant Supplies

The **RHINO PSC** series power supplies are plastic low-profile housed switching supplies available in 5, 12 and 24 VDC adjustable output models. There are 8 models with power ratings from 12W to 90W. They have an integral DIN rail mounting adapter and feature universal 85 to 264 VAC input voltage, adjustable DC output, DC-OK LED indication, and output current limitation.

The **RHINO PSC** series of switching power supplies provide tightly regulated output voltage for sensitive loads in industrial, commercial and residential environments. The plastic housing is lightweight and low-profile, designed to fit in shallow depth control panels often used in the building automation industry. Screw terminals are provided for simple and speedy wiring terminations.

The **RHINO PSC** series is both UL508 listed for demanding industrial applications and UL1310 recognized for NEC Class 2 compliance in industrial, commercial and residential applications.

Features

- Low-profile housing - only 2.15 inches (55mm) deep (MCB form factor)
- 5, 12, 24VDC adjustable outputs
- Output power ratings from 12 to 90W
- Integral DIN rail mouting adapter
- Universal input voltage range 85-264VAC
- Tight output voltage regulation
- DC-OK LED indication
- UL508 Listed
- UL1310 Recognized for NEC Class 2 compliance
- CE compliant
- RoHS compliant



PSC-12-060, PSC-24-060



PSC-24-090

Input Specifications						
Part Number	Input Voltage Range	Input Frequency Range	Input Current (Typical) at full load		Efficiency (Typ.)	C-Curve Circuit Breaker or Slow-blow Fuse
			115 VAC	230 VAC		
PSC-05-012	100-240VAC - Nominal 85 to 264VAC - Universal (output power derating 5% / V for operation below 90 VAC)	47-63 Hz	0.25A typ.	0.17A typ.	73%	6.0 A
PSC-12-015			0.29A typ.	0.20A typ.	79%	
PSC-24-015					81%	
PSC-12-030			0.57A typ.	0.39A typ.	81%	
PSC-24-030					83%	
PSC-12-060			1.00A typ.	0.68A typ	83%	
PSC-24-060			1.10A typ.	0.70A typ.	85%	
PSC-24-090			1.60A typ.	1.07A typ.	86%	

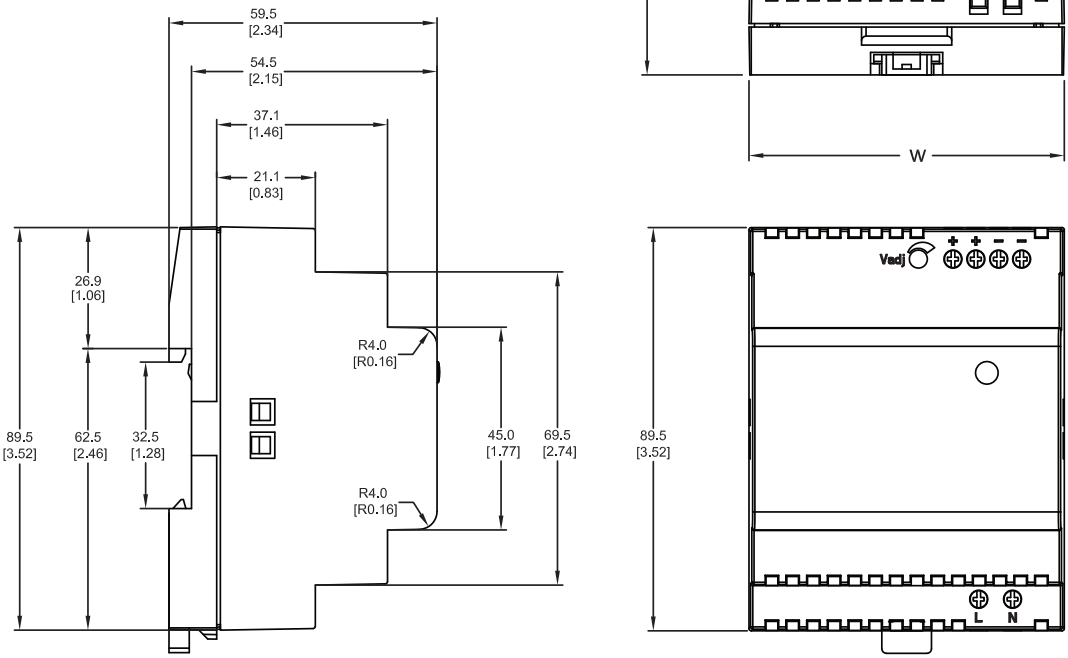
Output Specifications								
Part Number	Price	Output Voltage	Output Volt. Adjust. Range	Output Current (Max.)	Output Power (Max.)	Hold-Up Time		MTBF (IEC 1709 @ 25°C)
						115 VAC	230 VAC	
PSC-05-012	$45.00	5.0VDC	5.0 to 5.2VDC	2.4A	12 Watt	minimum 10 ms	minimum 20 ms	1,600,000 hours
PSC-12-015	$45.00	12.0VDC	12.0 to 16.0VDC	1.25A	15 Watt			
PSC-24-015	$45.00	24.0VDC	24.0 to 28.0VDC	0.63A				
PSC-12-030	$57.00	12.0VDC	12.0 to 16.0VDC	2.5A	30 Watt			1,300,000 hours
PSC-24-030	$57.00	24.0VDC	24.0 to 28.0VDC	1.25A				
PSC-12-060	$69.00	12.0VDC	12.0 to 16.0VDC	4.5A	54 Watt			2,100,000 hours
PSC-24-060	$69.00	24.0VDC	24.0 to 28.0VDC	2.5A	60 Watt			
PSC-24-090	$87.00	24.0VDC		3.75A	90 Watt			1,300,000 hours

RHINO PSC Series Power Supplies Specifications and Dimensions

General Specifications		
Temperature	**Operating:** -25°C (-13°F) to +60°C (+140°F) max at nominal load, above +60°C (+140°F) 2.5% / °C derating up to +70°C (+185°F) **Storage:** -25°C (-13°F) to +85°C (+185°F) max	
Humidity	95% (non-condensing) relative humidity max.	
Output Regulation	1%	
Safety Standards	UL508, UL1310, Class 2 IEC/EN 60950-1, UL60950-1, EN50178 EN60204, EN61558-2-8	
Output Voltage Ripple	<100 mV peak-to-peak	
Output Protection	Current limitation at 100 - 150% typ. (automatic recovery)	
Electromagnetic Compatibility (EMC)	Emissions - EN61000-6-3 Conducted RI suppression on input - EN55022 class B Radiated RI suppression - EN55022 class B	Immunity - EN61000-6-2 EN61000-4-X
Enclosure Rating	IP 20 (IEC 60529)	
Enclosure Material	Plastic FR2010-110C (UL 94V- 0 rated)	
Mounting	DIN-rails as per EN50022-35x15/735 (snap-on with self-locking springs)	
Connection	Screw terminals with combi-type screw heads for wire size 24 to 12 AWG (0.20 to 3.30mm²)	
Agency Approvals	UL508 Listed, file #E197592 UL1310 Class 2 Recognized, file #E198298	

Dimensions		
Part No.	***Width (W) - mm [inches]***	***Weight oz [g]***
PSC-05-012	26.3 [1.04]	3.53 [100]
PSC-12-015	26.3 [1.04]	3.53 [100]
PSC-24-015	26.3 [1.04]	3.53 [100]
PSC-12-030	52.5 [2.07]	5.64 [160]
PSC-24-030	52.5 [2.07]	5.64 160]
~~***PSC-12-060***~~	~~70.0 [2.76]~~	~~8.11 [230]~~
PSC-24-060	70.0 [2.76]	8.11 [230]
~~***PSC-24-090***~~	~~105.0 [4.13]~~	~~12.0 [340]~~

Wiring		
Input/Output	***Description***	***Wire size***
AC Input	all models: L, N only (2 pin terminal)	24 -12 AWG / 3.30mm² max
DC Output	15 -30 Watt models: single + and - terminals	24 -12 AWG / 3.30mm² max
DC Output	60 - 90 Watt models: double + and - terminals	24 -12 AWG / 3.30mm² max



TOLERANCE +/- 0.5mm [0.02"]

Product Data Sheet

ZB5AS54

MUSHROOM PB



List Price	$78.00 USD
Availability	**Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

Bezel Material	Black Plastic
Approvals	UL Listed File Number E164353 CCN NKCR - CSA Certified File Number LR44087 Class 321103 - CE Marked
Color	Red
Enclosure Rating	NEMA 1/2/3/4/4X/13
Degree of Protection	IP 65
Operator Type	Non-Illuminated
Markings	Unmarked
Style	Mushroom Button: 40mm
Operator Action	Maintained - Turn-to-Release
Shape of Head	Round
Size	22mm
Type	XB5

Shipping and Ordering

Category	22467 - Push Buttons, Plastic, 22mm, ZB5, XB5
Discount Schedule	I
GTIN	00785901354819
Package Quantity	1
Weight	0.08 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	FR

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

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Operation & Maintenance Manual

NES PROJECT NUMBER: 15-152, October 2015
PROJECT NAME: SVE Equipment & Controls
Former Ozone Industries Site
Queens, NY

Prepared for:

AECOM Environment
250 Apollo Drive
Chelmsford, MA 01824

Sales: (508)226-1100 Option 2
Technical Support: (508)226-1100 Option 3

Phone (508) 226-1100 Fax (508) 226-1180 84 Dunham Street Attleboro, MA 02703
www.nes-inc.biz

OPERATION & MAINTENANCE MANUAL

NES 15-152 SVE SYSTEM - FORMER OZONE INDUSTRIES

SECTION 1 - SUMMARY OF EQUIPMENT

COMPONENT SUMMARY

WARRANTY STATEMENT

SECTION 2 - MECHANICAL DRAWINGS & TABLE(S)

M-1, PROCESS & INSTRUMENTATION DIAGRAM (P&ID)

T-1, INSTRUMENTATION TABLE

M-2, SSD SKID & MANIFOLD LAYOUT DRAWING

M-3, MOISTURE SEPARATOR (MS) DRAWING

M-4, MS LEVEL SWITCH DRAWING

SECTION 3 - BLOWER ENCLOSURE ACCESSORIES

SOUND REDUCTION FOAM - AMERICAN ACOUSTICAL HC1.00EBUA3-ANATIO

EXHAUST FAN, 12"', 1286 CFM @ 0" S.P., 115 VAC, 1-PHASE - DAYTON 10D963

EXHAUST FAN THERMOSTAT, (-)30-90 F ADJUSTABLE - WHITE RODGERS 1687-9

SECTION 4 - PROCESS EQUIPMENT

REGENERATIVE BLOWER (675 SCFM @ 30"W.C. MANIFOLD INLET) - FPZ SCL K09-TS-25-3

MOISTURE SEPARATOR, TANK STYLE, 120 GALLONS - NES 120 GAL

VACUUM RELIEF VALVE, 3" FNPT, ADJUSTABLE - FPZ VRL8

INLINE FILTER, T-STYLE, 6" - SOLBERG CT-275P-600C

DILUTION FILTER SILENCER, 3" - SOLBERG FS-235P-300

SECTION 5 - PROCESS INSTRUMENTATION

MS HIGH LEVEL SWITCH, 1-FLOAT STYLE, SS FLOATS, 0.6 SG - FPI L500-1POS

MANIFOLD VACUUM GAUGES, (-)100-0" WC VAC. - DWYER LPG4-D7722N

INLET VACUUM GAUGES, (-)100-0" WC VAC. - DWYER LPG4-D7722N

INLET PRESSURE TRANSMITTER, 0-15 PSIA - DWYER 626-00-GH-P1-E3-S1

VACUUM SWITCH, 4 - 20 IWC - DWYER 1950-20-2F

INLET FLOWSENSOR PITOT TUBE, 6" - DWYER DS-300-6

PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP - DWYER 605-10

INLINE FILTER DIFFERENTIAL PRESSURE GAUGE, 0-10" WC DP - DWYER 2010

DISCHARGE FLOWSENSOR PITOT TUBE, 6" - DWYER DS-300-6

PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP - DWYER 605-10

TEMPERATURE INDICATORS, 0-250 DEGF - AV 1NFY4

DISCHARGE PRESSURE GAUGES, 0-100" WC PRESS. - DWYER LPG4-D8622N

DISCHARGE TEMPERATURE SWITCH, 0-225 DEGF ADJUSTABLE - UNITED ELECTRIC B54-103

SECTION 6 - ELECTRICAL DRAWINGS & TABLE(S)

T-2, INTERLOCK TABLE

I-1, CONTROL PANEL LAYOUT DRAWING

T-3, CONTROL PANEL BOM

I-2, WIRING DIAGRAMS & TERMINAL DETAILS

E-1, LINE DIAGRAM

T-4, VFD SETTINGS TABLE

SECTION 7 - CONTROL COMPONENTS

ENCLOSURE NEMA4 42 X 36 X 12 - MILD STEEL W/ LOCKING HANDLE - HAMMOND EN4SD423612GY

VENT FAN 210CFM 115VAC 6 IN - HAMMOND FAN150AC115

VENT FAN ADJ. 30-140F BI-METAL TEMP SWITCH N.O. - HAMMOND SKT011419NO

NON-FUSED THROUGH DOOR DISCONNECT 3-PHASE 100 AMP - ABB OT200U03

PROCONTROL PLC 24DI,16AI,30DO,8A - EOS A2

PROVIEW USER'S GUIDE - EOS

PROCONTROL CELL MODEM W/ 80FT ANTENNA CABLE - EOS CELL MODEM

UPS, 350VA, 200W, 120V, 1PH, 3 UPS & SURGE OUTLET 3 SURGE ONLY - APC BE350G

VFD 25 HP 208/230V 75 A 3-PHASE NEMA1 - SQUARE D ATV61HD18M3X

QUARTZ DRIVE ANALOG HOUR METER 2.8IN DIAMETER BEZEL 115VAC - ENM T50B212

POWER SUPPLY 24VDC 2.5A - ADI PSC-24-060

MUSHROOM SWITCH RED TRIGGER ACTION - TURN TO RELEASE - SQUARE D ZB5AS844

SECTION 1 - SUMMARY OF EQUIPMENT

COMPONENT SUMMARY

WARRANTY STATEMENT

Phone (508) 226-1100 Fax (508) 226-1180 84 Dunham Street Attleboro, MA 02703
www.nes-inc.biz

National Environmental Systems
84 Dunham Street
Attleboro, MA 02703

NES MAJOR COMPONENT SUMMARY **REVISION A** OCTOBER 2015

PROJECT NO.: **15-152** **SVE SYSTEM - FORMER OZONE INDUSTRIES - OZONE PARK, NY**

COMPONENT	TAG	QTY	MANUFACTURER	MODEL	SERIAL NUMBER
SECTION 1 - SUMMARY OF EQUIPMENT					
COMPONENT SUMMARY					
WARRANTY STATEMENT					
SECTION 2 - MECHANICAL DRAWINGS & TABLE(S)					
M-1, PROCESS & INSTRUMENTATION DIAGRAM (P&ID)	M-1				
T-1, INSTRUMENTATION TABLE	T-1				
M-2, SVE SKID & MANIFOLD LAYOUT DRAWING	M-2				
M-3, MOISTURE SEPARATOR (MS) DRAWING	M-3				
M-4, MS LEVEL SWITCH DRAWING	M-4				
SECTION 3 - BLOWER ENCLOSURE ACCESSORIES					
SOUND REDUCTION FOAM		1	AMERICAN ACOUSTICAL	HC1.00EBUA3-ANATIO	N/A
EXHAUST FAN, 12"", 1286 CFM @ 0" S.P., 115 VAC, 1-PHASE	EF-1	1	DAYTON	10D963	13987006
EXHAUST FAN THERMOSTAT, 30-90 F ADJUSTABLE		1	WHITE RODGERS	1687-9	N/A
SECTION 4 - PROCESS EQUIPMENT & VALVES					
REGENERATIVE BLOWER (675 SCFM @ 30"W.C. MANIFOLD INLET)	B-1	1	FPZ	SCL K09-TS-25-3	F03927 2015
BLOWER MOTOR, 25 HP 208 VAC, 3-PHASE, TEFC	B-1	1	LAFERT	AM160LXA2	1126288
MOISTURE SEPARATOR, TANK STYLE, 120 GALLONS	D-1	1	NES	120 GAL	N/A
VACUUM RELIEF VALVE, 3" FNPT, ADJUSTABLE	VRV-01	1	FPZ	VRL8	N/A
INLINE FILTER, T-STYLE, 6"	F-01	1	SOLBERG	CT-275P-600 C	N/A
DILUTION FILTER SILENCER, 3"	F-02	1	SOLBERG	FS-235P-300	N/A
HEAT EXCHANGER, PASSIVE, PARALLEL STEEL FINNED	H-1	1	NES	CUSTOM	N/A
VAPOR PHASE CARBON VESSELS, 2000 LB MEDIA (BY OTHERS)	GAC-1, 2	2			
SECTION 5 - PROCESS INSTRUMENTATION					
MS HIGH LEVEL SWITCH, 1-FLOAT STYLE, SS FLOATS, 0.6 SG	LSHH-111	1	FPI	L500-1POS	N/A
MANIFOLD VACUUM GAUGES, (-)100-0" WC VAC.	PI-SVE1/SVE27	27	DWYER	LPG4-D7722N	N/A
INLET VACUUM GAUGES, (-)100-0" WC VAC.	PI-108, 114	2	DWYER	LPG4-D7722N	N/A
INLET PRESSURE TRANSMITTER, 0-15 PSIA	PT-107	1	DWYER	626-00-GH-P1-E3-S1	N/A
INLET LOW VACUUM SWITCH, 4 - 20 IWC	VSL-107	1	DWYER	1950-20-2F	N/A
INLET FLOWSENSOR PITOT TUBE, 6"	DP-110	1	DWYER	DS-300-6	N/A
PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	FI & DPT-110	1	DWYER	605-10	N/A
INLINE FILTER DIFFERENTIAL PRESSURE GAUGE, 0-10" WC DP	DPI-115	1	DWYER	2010	N/A
DISCHARGE FLOWSENSOR PITOT TUBE, 6"	DP-119	1	DWYER	DS-300-6	N/A
PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	FI & DPT-119	1	DWYER	605-10	N/A
TEMPERATURE INDICATORS, 0-250 DEGF	TI-109, 118, 123	3	AV	1NFY4	N/A
DISCHARGE PRESSURE GAUGES, 0-100" WC PRESS.	PI-117, 121	2	DWYER	LPG4-D8622N	N/A
DISCHARGE TEMPERATURE SWITCH, 0-225 DEGF ADJUSTABLE	TS-122	1	UNITED ELECTRIC	B54-103	N/A
SECTION 6 - ELECTRICAL DRAWINGS & TABLE(S)					
T-2, INTERLOCK TABLE	T-2				
I-1, CONTROL PANEL LAYOUT DRAWING	I-1				
T-3, CONTROL PANEL BOM	T-2				
I-2, WIRING DIAGRAMS & TERMINAL DETAILS	I-2				
E-1, LINE DIAGRAM	E-1				
T-4, VFD SETTINGS TABLE	E-1				
SECTION 7 - CONTROL COMPONENTS					
ENCLOSURE NEMA4 42 X 36 X 12 - MILD STEEL/GRAY W/ LOCKING HANDLE	ENCL	1	HAMMOND	EN4SD423612GY	UL: A11975153
BACK-PANEL 42 X 36 MILD STEEL/WHT	ENCL	1	HAMMOND	EP4236	N/A
SWING-PANEL 42 x 36 MILD STEEL/WHT	ENCL	1	HAMMOND	ESP4236	N/A
VENT FAN 6 IN RAIN HOOD NEMA 3R	VF	2	HAMMOND	RH40000GY	N/A
MOUNTING FEET SET OF 4 - ZINC PLATED	ENCL	1	HAMMOND	EZPMFHD	N/A
VENT FAN 210CFM 115VAC 6 IN	VF	1	HAMMOND	FAN150AC115	N/A
VENT FAN ADJ. 30-140F BI-METAL TEMP SWITCH N.O.	VF	1	HAMMOND	SKT011419NO	N/A
VENT FAN FINGER GUARD 6 IN	VF	1	HAMMOND	FAN150FG	N/A
VENT FAN 6 IN RAIN HOOD GRILL & SOLID COVER KIT	VF	2	HAMMOND	RHA40000G	N/A

National Environmental Systems
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NES MAJOR COMPONENT SUMMARY **REVISION A** OCTOBER 2015

PROJECT NO.: **15-152** **SVE SYSTEM - FORMER OZONE INDUSTRIES - OZONE PARK, NY**

COMPONENT	TAG	QTY	MANUFACTURER	MODEL	SERIAL NUMBER
VENT FAN POWER CORD 24 INCH	VF	1	HAMMOND	DNMFC	N/A
NON-FUSED THROUGH DOOR DISCONNECT 3-PHASE 100 AMP	MDS	1	ABB	OT200U03	N/A
NON-FUSED THROUGH DOOR DISCONNECT SHAFT 13 IN	MDS	1	ABB	OXS6X330	N/A
NON-FUSED THROUGH DOOR DISCONNECT HANDLE NEMA3R	MDS	1	ABB	OHBS2AJ	N/A
PROCONTROL PLC 24DI,16AI,30DO,8A	PLC	1	EOS	A2	9844
PROCONTROL CELL MODEM W/ 80 FT ANTENNA CABLE	WM	1	EOS	CELL MODEM	18244203 / IP 166.249.126.67
UPS, 350VA, 200W, 120V, 1PH, 3 UPS & SURGE OUTLET 3 SURGE ONLY	UPS	1	APC	BE350G	4B1510P54501
VFD 25 HP 208/230V 75 A 3-PHASE NEMA1	VFD	1	SQUARE D	ATV61HD18M3X	6W1519000244
VFD KEYPAD REMOTE MOUNT KIT	VFD	1	SQUARE D	VW3A1102	N/A
RJ45-RJ45 CABLE FOR REMOTE LCD KYPD 3 Meters	VFD	1	SQUARE D	VW3A1104R30	N/A
QUARTZ DRIVE ANALOG HOUR METER 2.8IN DIAMETER BEZEL 115VAC	HM	1	ENM	T50B212	N/A
RELAY 120V 1PDT W/LIGHT BLADE PARALLEL	CR	2	IDEC	RH1B-UL-AC120V	N/A
SOCKET DIN RAIL/SURFACE 5-BLADE FOR RH1B	CR	2	IDEC	SH1B-05	N/A
RELAY 120V 2PDT W/LIGHT BLADE PARALLEL	CR	1	IDEC	RH2B-UL-AC120V	N/A
SOCKET DIN RAIL/SURFACE 5-BLADE FOR RH2B	CR	1	IDEC	SH2B-05	N/A
RELAY 3PDT 120VAC W/INDICATOR LIGHT	CR	1	IDEC	RH3B-UL-AC120V	N/A
SOCKET DIN RAIL/SURFACE 11-BLADE FOR RH3B	CR	1	IDEC	SH3B-05	N/A
POWER SUPPLY 24VDC 2.5A	PS	1	ADI	PSC-24-060	N/A
CIRCUIT BREAKER 6A 1-POLE 120/240 VAC	CB	1	SQUARE D	MG24430	N/A
CIRCUIT BREAKER 100A 3-POLES 208/240 VAC	CB	1	SQUARE D	QOU3100	N/A
CIRCUIT BREAKER 15A 1-POLE 120/240VAC	CB	1	SQUARE D	QOU115	N/A
DUPLEX GFCI RECEPTACLE 125 VAC 15 AMP 2-POLE NEMA 5-15R	RECP	1	LEGRAND	1595-TRWRW	N/A
1-GANG WEATHERPROOF RECEPT. BOX	RECP	1	RED DOT	IHD3- 1	N/A
MUSHROOM SWITCH NON-ILLUM RED TRIGGER ACTION - TURN TO RELEASE	ESTOP	1	SQUARE D	ZB5AS844	N/A
PUSH BUTTON OPERATOR NON-ILLUM BLACK	PB	1	SQUARE D	ZB5AA2	N/A
PILOT LIGHT HEAD RED LED	LT	7	SQUARE D	ZB5AV043	N/A
CONTACT BLOCK 1-N.O. SCREW CLAMP	PB	4	SQUARE D	ZBE101	N/A
CONTACT BLOCK 1-N.C. SCREW CLAMP	PB	2	SQUARE D	ZBE102	N/A
RED LED W/LATCH MODULE 24 V	LT	6	SQUARE D	ZB5AVB4	N/A
MOUNTING BASE,120V RED PROTECTED LED	SW	1	SQUARE D	ZB5AVG4	N/A
2 POS SELECTOR SWITCH ILLUM. GREEN MAINTAINED	SW	1	SQUARE D	ZB5AK1233	N/A
2 POS SELECTOR SWITCH NON-ILLUM. BLACK MAINTAINED	SW	1	SQUARE D	ZB5AD2	N/A
3 POS SELECTOR SWITCH ILLUM. GREEN MOMENTARY	SW	1	SQUARE D	ZB5AK1733	N/A
MOUNTING BASE 120V GREEN PROTECTED LED	SW	2	SQUARE D	ZB5AVG3	N/A
MOUNTING COLLAR LATCH	PB	3	SQUARE D	ZB5AZ009	N/A
TERMINAL BLOCK SCREW CLAMP 20 AMP 600 V GRAY	TB	55	SQUARE D	NSYTRV22	N/A
TERMINAL BLOCK END BARRIERS GRAY	TB	9	SQUARE D	NSYTRAC22	N/A
TERMINAL BLOCK END ANCHORS	TB	6	SQUARE D	NSYTRAABV35	N/A
TERMINAL BLOCK GROUND SCREW CLAMP 20 AMP 600 V GREEN	TB	5	SQUARE D	NSYTRV22PE	N/A
LEGEND PLATE HOLDER	PB	11	SQUARE D	ZBZ33	N/A
LEGEND PLATE LARGE BLACK/RED	PB	11	SQUARE D	ZBY5101	N/A
POWER DISTRIBUTION BLOCK 335 AMP 3-POLE 600 VAC	DB	1	SQUARE D	9080-LBA363104	N/A
COVER DISTRIBUTION BLOCK 3-POLE	DB	1	SQUARE D	9080-LB33	N/A
DISTRIBUTION BLOCK 175 AMP 1-POLE 600 VAC	DB	1	SQUARE D	9080-LBA162104	N/A
COVER DISTRIBUTION BLOCK 1-POLE	DB	1	SQUARE D	9080-LB21	N/A
LOAD CENTER GROUND BAR 15 TERMINALS	GB	1	SQUARE D	PK15GTA	N/A

WARRANTY

All products not manufactured by RapidTech LLC d/b/a National Environmental Systems, carry the original manufacturer's warranty. Copies are available on request.

RapidTech LLC d/b/a National Environmental Systems, warrants its packaged and manufactured equipment against any defect in material or workmanship, under normal use and storage for a period of twelve (12) months from date of manufacture and invoice, regardless of system start-up date. In the event that products are found to be defective within the warranty period, RapidTech LLC d/b/a National Environmental Systems, sole obligation and remedy shall be the furnishing of replacements for any defective parts, and such replacement parts shall be furnished but not installed by RapidTech LLC d/b/a National Environmental Systems RAPIDTECH LLC D/B/A NATIONAL ENVIRONMENTAL SYSTEMS, WILL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES IN ANY CLAIM SUIT OR PROCEEDINGS ARISING UNDER WARRANTY, NOR WILL RAPIDTECH LLC D/B/A NATIONAL ENVIRONMENTAL SYSTEMS, ACCEPT ANY LIABILITY FOR CLAIMS FOR LABOR, LOSS OR PROFIT, REPAIRS OR OTHER EXPENSES INCIDENTAL TO REPLACEMENT.

The warranty requires that the purchaser complete all operations and maintenance as detailed in each section of the Operation & Maintenance Manual supplied with the purchased system. In addition installation must comply with nationally recognized electrical and mechanical standards as well as best engineering practices in effect at the time of purchase.

The product warranty expressed above is our only warranty and may not be verbally changed or modified by any representative of RapidTech LLC d/b/a National Environmental Systems All freight costs incurred in shipping parts to or from RapidTech LLC d/b/a National Environmental Systems, or to the manufacturer if necessary are at the expense of the customer.

RapidTech LLC dba National Environmental Systems, will invoice the cost of any replacement parts. These parts will be credited upon certification the original part was defective and the defective part was returned within one week of notifying RapidTech LLC d/b/a National Environmental Systems, of the malfunction. If the part is found to have been misused no credit will be issued. In order for RapidTech LLC d/b/a National Environmental Systems, to ship a replacement part on account, all outstanding invoices must be current.

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SECTION 2 - MECHANICAL DRAWINGS & TABLE(S)

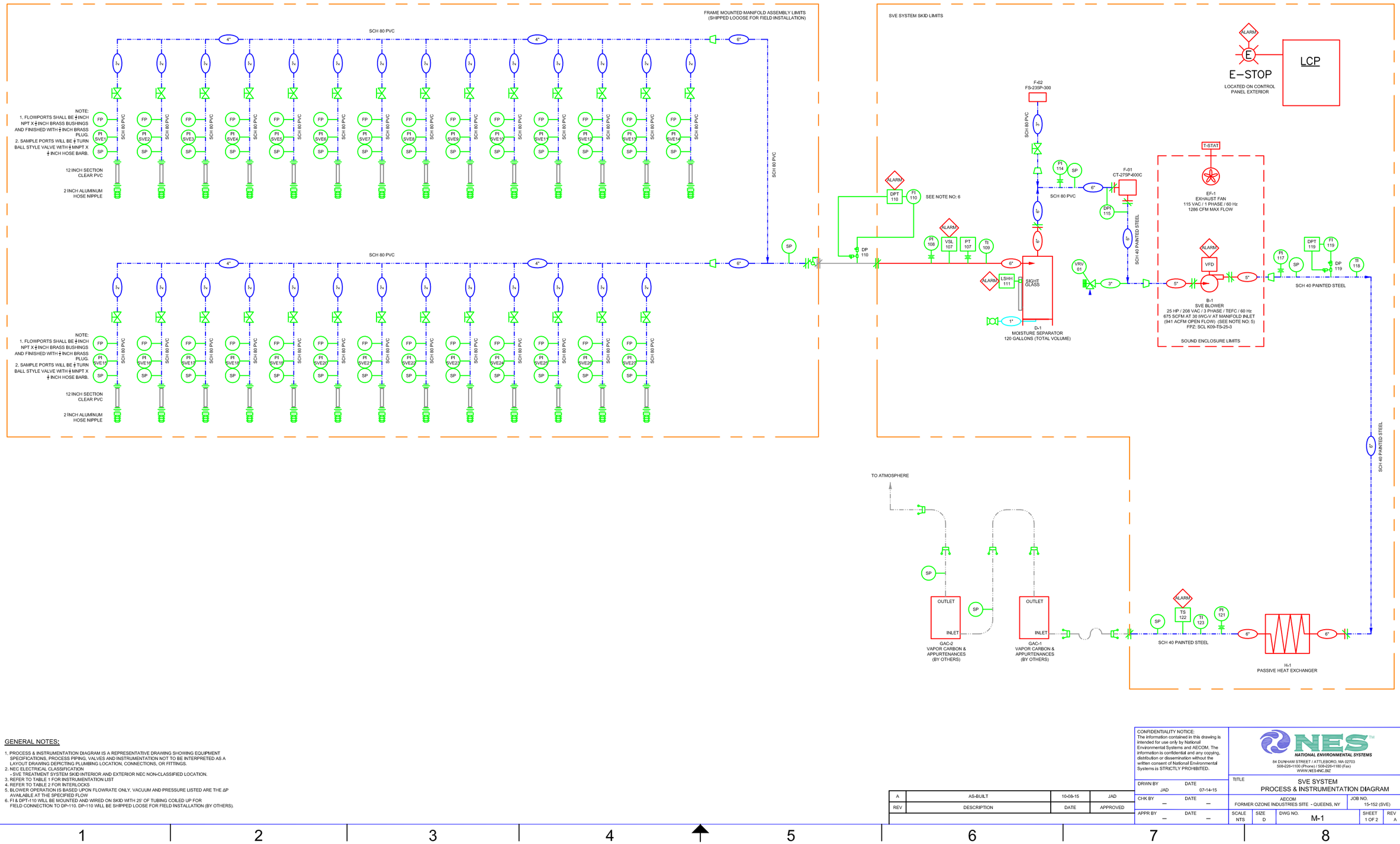
M-1, PROCESS & INSTRUMENTATION DIAGRAM (P&ID)

T-1, INSTRUMENTATION TABLE

M-2, SSD SKID & MANIFOLD LAYOUT DRAWING

M-3, MOISTURE SEPARATOR (MS) DRAWING

M-4, MS LEVEL SWITCH DRAWING



GENERAL NOTES:

1. PROCESS & INSTRUMENTATION DIAGRAM IS A REPRESENTATIVE DRAWING SHOWING EQUIPMENT SPECIFICATIONS, PROCESS PIPING, VALVES AND INSTRUMENTATION NOT TO BE INTERPRETED AS A LAYOUT DRAWING DEPICTING PLUMBING LOCATION, CONNECTIONS, OR FITTINGS.
2. NEC ELECTRICAL CLASSIFICATION
   - SVE TREATMENT SYSTEM SKID INTERIOR AND EXTERIOR NEC NON-CLASSIFIED LOCATION.
3. REFER TO TABLE 1 FOR INSTRUMENTATION LIST
4. REFER TO TABLE 2 FOR INTERLOCKS
5. BLOWER OPERATION IS BASED UPON FLOWRATE ONLY. VACUUM AND PRESSURE LISTED ARE THE ΔP AVAILABLE AT THE SPECIFIED FLOW
6. FI & DPT-110 WILL BE MOUNTED AND WIRED ON SKID WITH 25' OF TUBING COILED UP FOR FIELD CONNECTION TO DP-110. DP-110 WILL BE SHIPPED LOOSE FOR FIELD INSTALLATION (BY OTHERS).

REV	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	10-08-15	JAD

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WWW.NES-NC.BIZ

DRWN BY	JAD
DATE	07-14-15
CHK BY	–
DATE	–
APPR BY	–
DATE	–

TITLE: SVE SYSTEM
PROCESS & INSTRUMENTATION DIAGRAM

AECOM
FORMER OZONE INDUSTRIES SITE - QUEENS, NY

JOB NO. 15-152 (SVE)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	D	M-1	1 OF 2	A

INSTRUMENT IDENTIFICATION

INSTRUMENT TYPE / INSTRUMENT DESIGNATION (XX / XXX) — LOCALLY MOUNTED INSTRUMENT W / REMOTE DISPLAY

INSTRUMENT TYPE / INSTRUMENT DESIGNATION (XX / XXX) — LOCALLY MOUNTED INSTRUMENT W / DISPLAY

INSTRUMENT TYPE / INSTRUMENT DESIGNATION (XX / XXX) — LOCALLY MOUNTED SWITCH

INSTRUMENTATION ABBREVIATIONS

ADV	AUTOMATIC DRAIN VALVE
CC	CYCLE COUNTER
CF	COALESCING FILTER
DPI	DIFFERENTIAL PRESSURE INDICATOR
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FIT	FLOW INDICATING TRANSMITTER
FM	FLOW METER
FP	FLOW PORT
FS	FLOW SWITCH
FSL	FLOW SWITCH LOW
FT	FLOW TOTALIZER
LI	LEVEL INDICATOR
LIT	LEVEL INDICATING TRANSMITTER
LS	LEVEL SWITCH
LSHH	LEVEL SWITCH HIGH-HIGH
LSH	LEVEL SWITCH HIGH
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW-LOW
LT	LEVEL TRANSMITTER
MOV	MOTOR OPERATED VALVE
OLH	OIL LEVEL HIGH
OLL	OIL LEVEL LOW
PF	PARTICULATE FILTER
PI	PRESSURE INDICATOR
PIT	PRESSURE INDICATING TRANSMITTER
PRV	PRESSURE REGULATING VALVE
PS	PRESSURE SWITCH
PSH	PRESSURE SWITCH HIGH
PSL	PRESSURE SWITCH LOW
PSV	PRESSURE SAFETY VALVE
PT	PRESSURE TRANSMITTER
SP	SAMPLE PORT
SV	SOLENOID VALVE
TE	TEMPERATURE ELEMENT
TI	TEMPERATURE INDICATOR
TIT	TEMPERATURE INDICATING TRANSMITTER
TS	TEMPERATURE SWITCH
TSH	TEMPERATURE SWITCH HIGH
TSL	TEMPERATURE SWITCH LOW
VFD	VARIABLE FREQUENCY DRIVE
VI	VACUUM INDICATOR
VIT	VACUUM INDICATING TRANSMITTER
VS	VACUUM SWITCH
VSH	VACUUM SWITCH HIGH
VSL	VACUUM SWITCH LOW
VSV	VACUUM SAFETY VALVE

PIPE DESIGNATION

- AIR LINE
- WATER LINE
- WATER LINE HEAT TRACED AND INSULATED
- CHEMICAL LINE
- PRODUCT LINE
- VENT LINE
- CONTROL LINE
- INTRINSICALLY SAFE LINE
- ANALOG LINE
- BREAK
- FLOW DIRECTION
- PIPE SIZE (X")

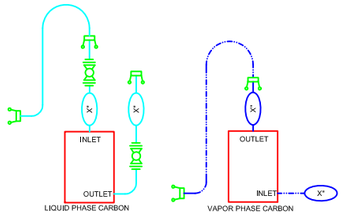
SYMBOLS

- ROTAMETER
- FLOW METER (FM XXX)
- ELAPSED TIME METER (ETM)
- AUTO DIALER (AD)
- TIMER (T)
- MOTOR (M)
- AMP METER (A)
- REMOTE TELEMETRY SYSTEM (RTS)
- VARIABLE FREQUENCY DRIVE (VFD)
- STATIC MIXER
- DISCHARGE SILENCER
- DILUTION AIR FILTER
- INLET/INLINE FILTER
- COALESCING FILTER (CF)
- PARTICULATE FILTER (PF)
- AUTOMATIC CONDENSATE DRAIN (CD)
- ALARM DESGINATION (ALARM)
- WARNING INDICATION (WARN)
- MULTIFUNCTION VALVE
- INJECT NOZZLE
- METERING PUMP INLET CHECK VALVE
- INDUSTRAIL INTERCHANGE COUPLER
- CONDUCTANCE PROBES

SYMBOLS CONTINUED

- FILTER REGULATOR (FR)
- METERING PUMP (MP)
- GLOBE VALVE
- GATE VALVE
- BALL VALVE/ UNION
- BALL VALVE/DRAIN VALVE
- CHECK VALVE
- RAIN CAP
- BUTTERFLY VALVE
- Y-STRAINER
- RELIEF VALVE
- FEMALE CAMLOCK
- MALE CAMLOCK
- SOLENOID VALVE (SV XXX)
- PRESSURE REGULATOR
- SIPHON BREAK
- UNION
- CLEAR PVC
- MECHANICAL FLOAT
- PULSE-DAMPING SNUBBER
- PITOT TUBE
- SIGHT GLASS
- ALARM LIGHT (AL)
- RUN LIGHT (R)
- E-STOP (E)
- NEEDLE VALVE
- FLANGED CONNECTION
- REQUIRED FIELD CONNECTION
- FLEX CONNECTOR
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- MOTOR OPERATED BUTTERFLY VALVE (MOV XXX)
- AUTOMATIC DRAIN VALVE (ADV XXX)
- MOTOR OPERATED VALVE (MOV XXX)

SYMBOLS CONTINUED



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REV	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	10-08-15	JAD

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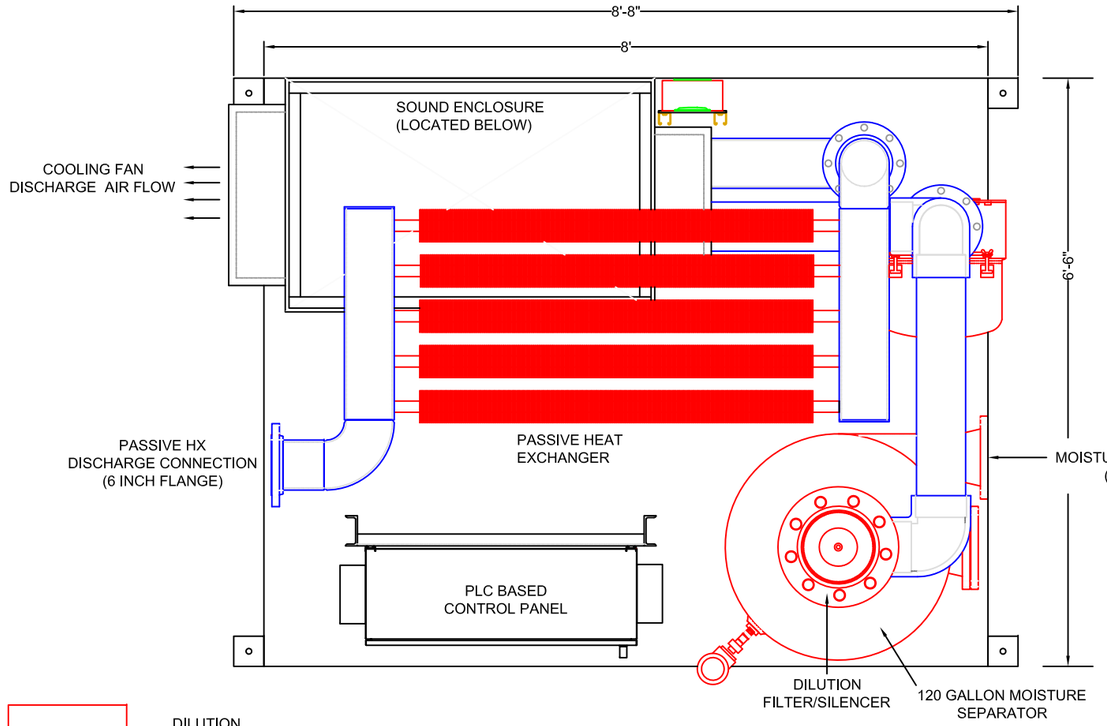
DRWN BY	JAD
DATE	07-14-15
CHK BY	—
DATE	—
APPR BY	—
DATE	—
TITLE	P&ID MASTER LEGEND
AECOM	FORMER OZONE INDUSTRIES SITE - QUEENS, NY
JOB NO.	15-152 (SVE)
SCALE	NTS
SIZE	D
DWG NO.	M-1
SHEET	2 OF 2
REV	A

TABLE 1
PROCESS INSTRUMENTATION DIAGRAM INSTRUMENT LIST

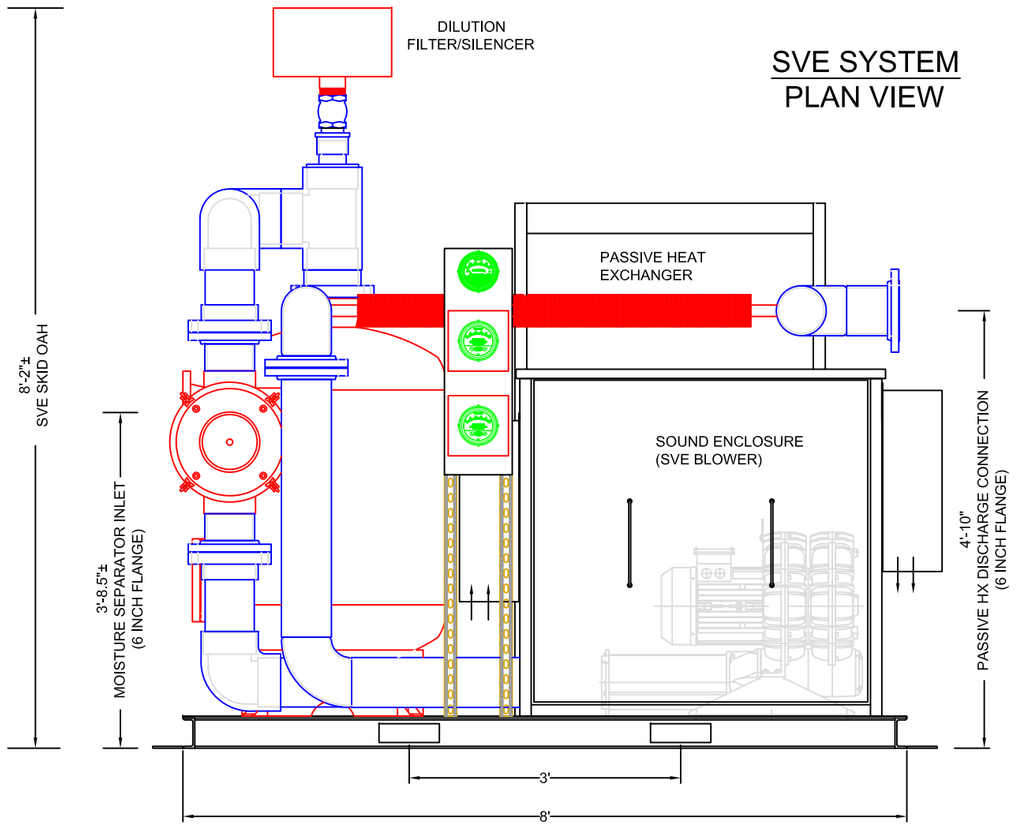
REVISION A OCTOBER 2015

15-152 SVE SYSTEM - FORMER OZONE INDUSTRIES - OZONE PARK, NY

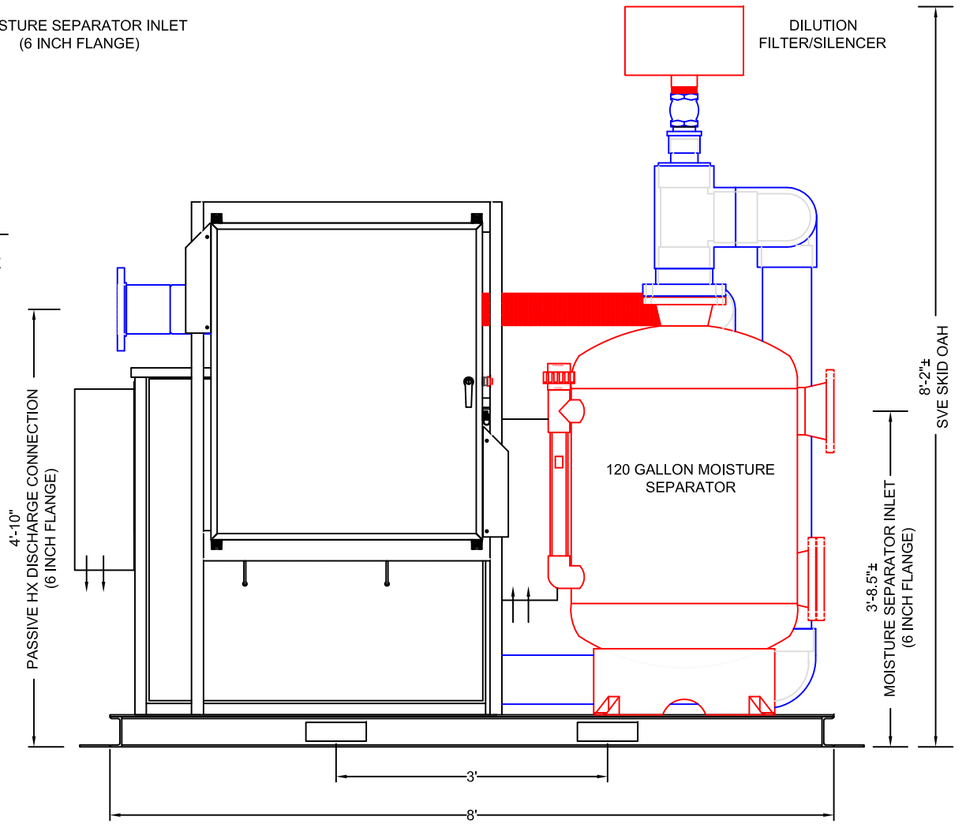
TAG	ITEM	MODEL	MANUFACTURER	SPECIFICATION
LSHH-111	MS HIGH LEVEL SWITCH, 1-FLOAT STYLE, SS FLOATS, 0.6 SG	L500-1POS	FPI	1-FLOAT STYLE / SS ROD / 2 INCH NPT / SS FLOATS - S.G. 0.60 / N.C. - HH / SPDT / 50W
PI-SVE1/SVE27	MANIFOLD VACUUM GAUGES, (-)100-0" WC VAC.	LPG4-D7722N	DWYER	(-)100 TO 0 IWC-V / 2.5 INCH STEEL CASE / BRASS WETTED PARTS / 0.25 INCH BOTTOM MOUNT CONNECTION
PI-108, 114	INLET VACUUM GAUGES, (-)100-0" WC VAC.	LPG4-D7722N	DWYER	(-)100 TO 0 IWC-V / 2.5 INCH STEEL CASE / BRASS WETTED PARTS / 0.25 INCH BOTTOM MOUNT CONNECTION
PT-107	INLET PRESSURE TRANSMITTER, 0-15 PSIA	626-00-GH-P1-E3-S1	DWYER	PIEZO-RESISTIVE PRESSURE TRANSMITTER / 0-15 PSIA 0.25% ACCURACY / 316L SS / 0 - 175 F TEMP LIMITS / 30 PSIG MAX PRESS / 4 - 20mA OUTPUT - 2 WIRE / 0.25 INCH MNPT / NEMA 4X / 9 FT CABLE
VSL-107	INLET LOW VACUUM SWITCH, 4 - 20 IWC	1950-20-2F	DWYER	PRESSURE SWITCH - XP - ADJUSTABLE / 4 TO 20 IWC / 0.4 MAX DEAD BAND @ 4 IWC / (-)40 TO 140 F TEMP RATING / 45 IWC MAX PRESSURE / SPDT SWITCH TYPE / 15AMP @ 125 VAC SWITCH RATING / 0.125 INCH PROCESS
DP-110	INLET FLOWSENSOR PITOT TUBE, 6"	DS-300-6	DWYER	6 INCH AVERAGING STYLE PITOT TUBE / STAINLESS STEEL CONSTRUCTION W ITH BRASS ISOLATION VALVES / 0 - 200 F TEMP LIMITS
FI & DPT-110	PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	605-10	DWYER	INDICATING DPT / 0-10 IN W.C. +/- 2% / 2 PSI MAX PRESS / 32-120 F TEMP LIMITS / POWER 10-32 VDC IN / 4-20 MA OUT / 0.125 IN PROCESS
DPI-115	INLINE FILTER DIFFERENTIAL PRESSURE GAUGE, 0-10" WC DP	2010	DWYER	0 - 10 IN WC D.P. RANGE (MINOR DIV. 0.20) / CAST ALUMINUM CASE / 4' ACRYLIC COVER / -20 IN Hg TO 15 PSIG PRESSURE LIMITS / 20 - 140 F RANGE / 0.125 IN CONNECTIONS
DP-119	DISCHARGE FLOWSENSOR PITOT TUBE, 6"	DS-300-6	DWYER	6 INCH AVERAGING STYLE PITOT TUBE / STAINLESS STEEL CONSTRUCTION W ITH BRASS ISOLATION VALVES / 0 - 200 F TEMP LIMITS
FI & DPT-119	PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP	605-10	DWYER	INDICATING DPT / 0-10 IN W.C. +/- 2% / 2 PSI MAX PRESS / 32-120 F TEMP LIMITS / POWER 10-32 VDC IN / 4-20 MA OUT / 0.125 IN PROCESS
TI-109, 118, 123	TEMPERATURE INDICATORS, 0-250 DEGF	1NFY4	AV	BIMETAL THERMOMETER / 0 TO 250 F / 2.5 INCH STEM / 3 INCH DIAL / 0.5 INCH MNPT BACK-MOUNT / SS CASE
PI-117, 121	DISCHARGE PRESSURE GAUGES, 0-100" WC PRESS.	LPG4-D8622N	DWYER	0 TO 100 IWC / 2.5 INCH STEEL CASE / BRASS WETTED PARTS / 0.25 INCH BOTTOM MOUNT CONNECTION
TS-122	DISCHARGE TEMPERATURE SWITCH, 0-225 DEGF ADJUSTABLE	B54-103	UNITED ELECTRIC	IMMERSION PROBE TEMPERATURE SWITCH / 1-SETPOINT ADJUSTABLE - SPDT / 0° to 225°F / NEMA 1 ALUMINUM INDOOR / NON HAZARDOUS / 2-1/8 IN L BRASS PROBE / 3/8 IN NPT / 15 AMP RATING



SVE SYSTEM
PLAN VIEW



SVE SYSTEM
BACK ELEVATION



SVE SYSTEM
FRONT ELEVATION

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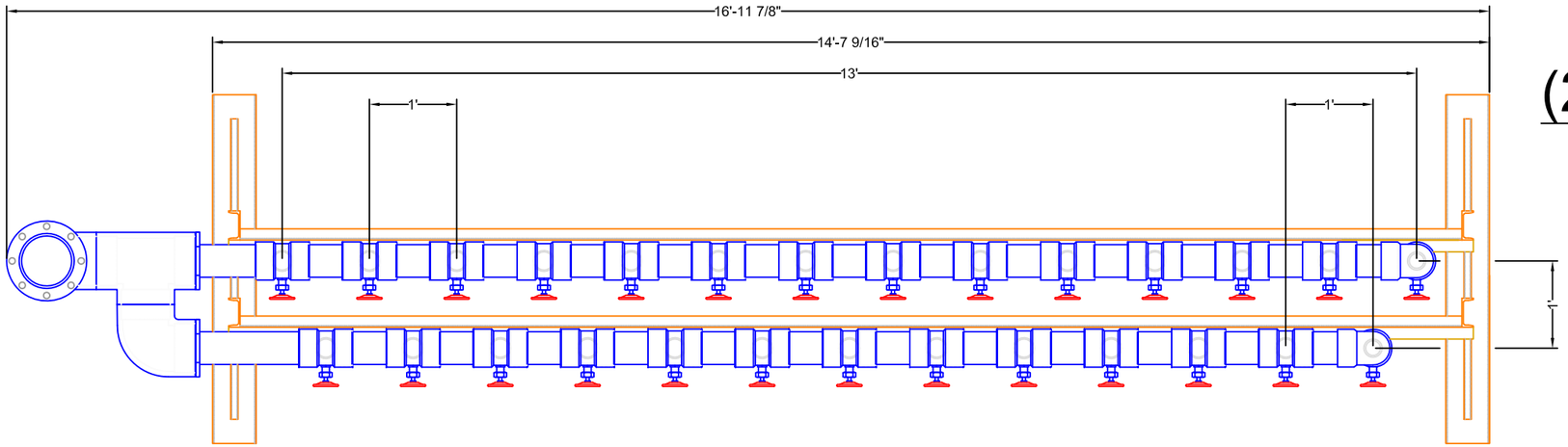
REV	DESCRIPTION	DATE	APPR
A	AS-BUILT	10-08-15	JAD

REVISIONS

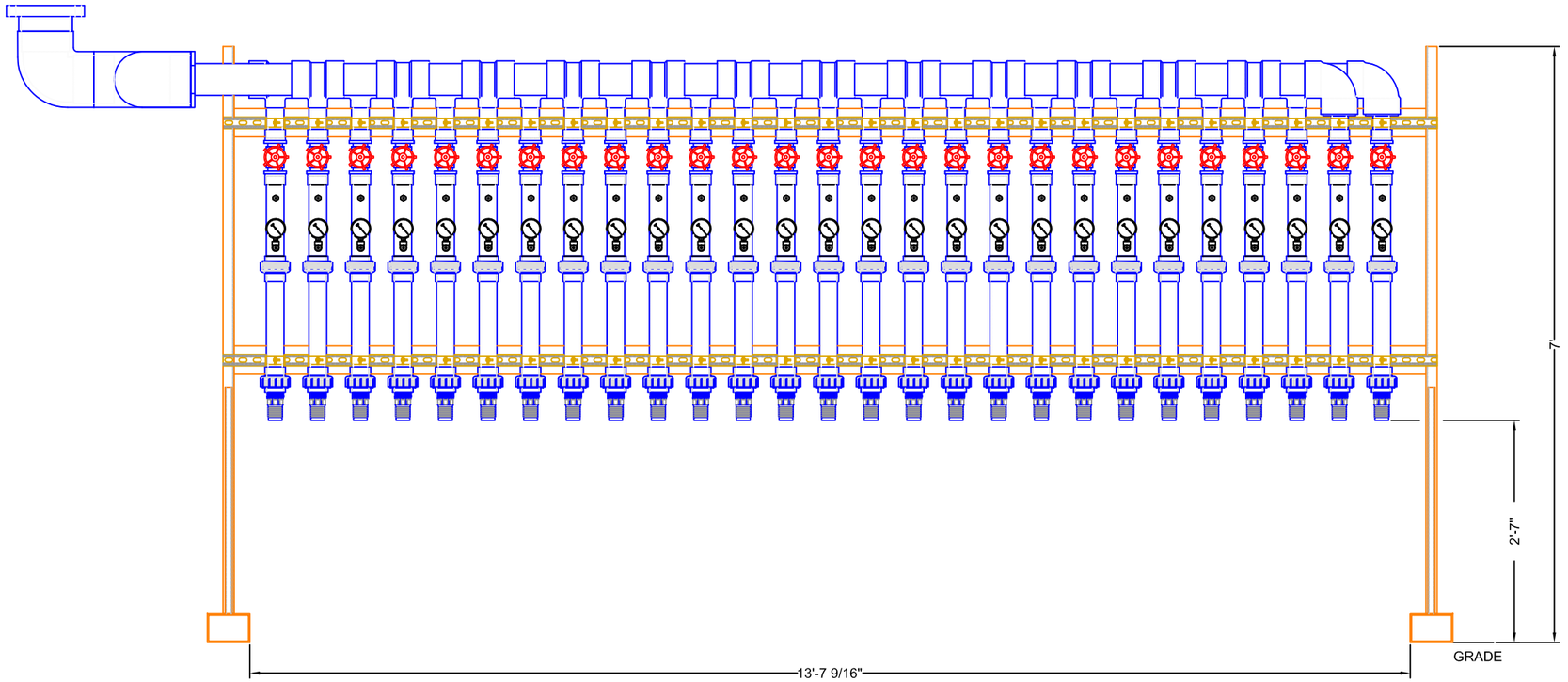
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NATIONAL ENVIRONMENTAL SYSTEMS
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508-226-1100 (Phone) / 508-226-1180 (Fax)
WWW.NES-ENC.BIZ

DRWN BY	JAD
DATE	07-14-15
CHK BY	
DATE	
APPR BY	
DATE	
TITLE	SVE SKID LAYOUT
	AECOM FORMER OZONE INDUSTRIES SITE OZONE PARK / QUEENS NY
JOB NO.	15-152 (SVE)
SCALE	NTS
SIZE	D
DWG NO.	M-2
SHEET	1 OF 2
REV	A

(27 LEG) SVE MANIFOLD LAYOUT DRAWING

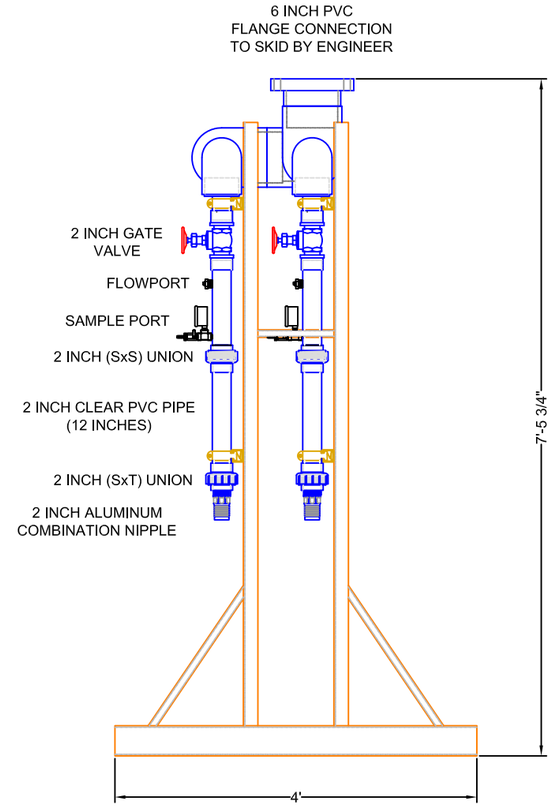


SVE MANIFOLD
PLAN VIEW



SVE MANIFOLD
FRONT ELEVATION

SVE MANIFOLD
SIDE ELEVATION



NOTES:
1. DRAWING DEPICTS PRELIMINARY LAYOUT ONLY AND IS SUBJECT TO CHANGES DURING CONSTRUCTION. ANY MAJOR DIFFERENCES WILL BE BROUGHT TO THE ATTENTION OF AECOM FOR REVIEW.
2. THE MANIFOLD WILL BE SUPPLIED WITH A CARBON STEEL FRAME FOR MOUNTING ONCE ON SITE.THE BASE FRAME WILL BE PRIMED AND PAINTED WITH AN INDUSTRIAL GRADE PAINT (RUSTOLEUM 7400 SERIES OR EQUAL)

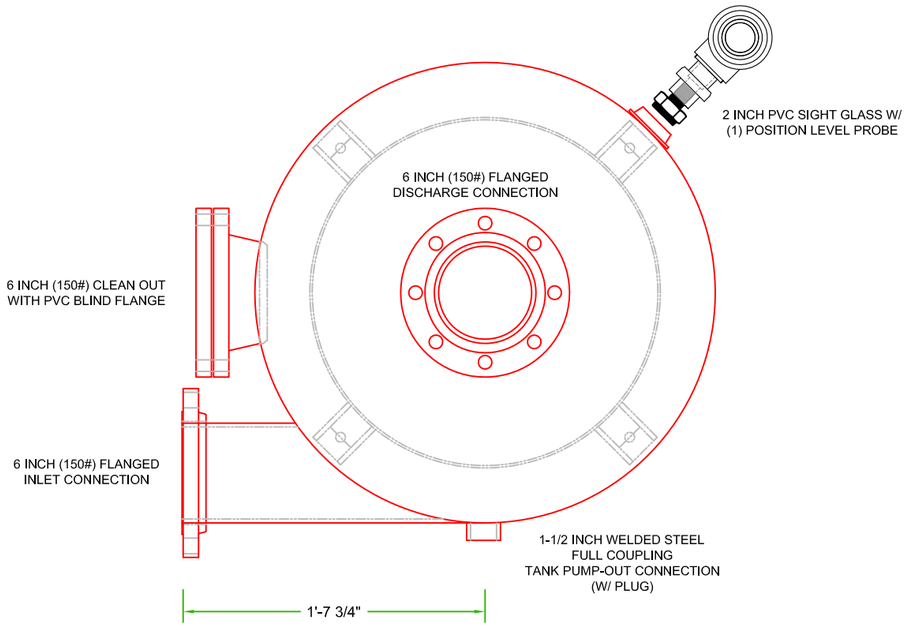
REV	DESCRIPTION	DATE	APPR
A	AS-BUILT	10-08-15	JAD

REVISIONS

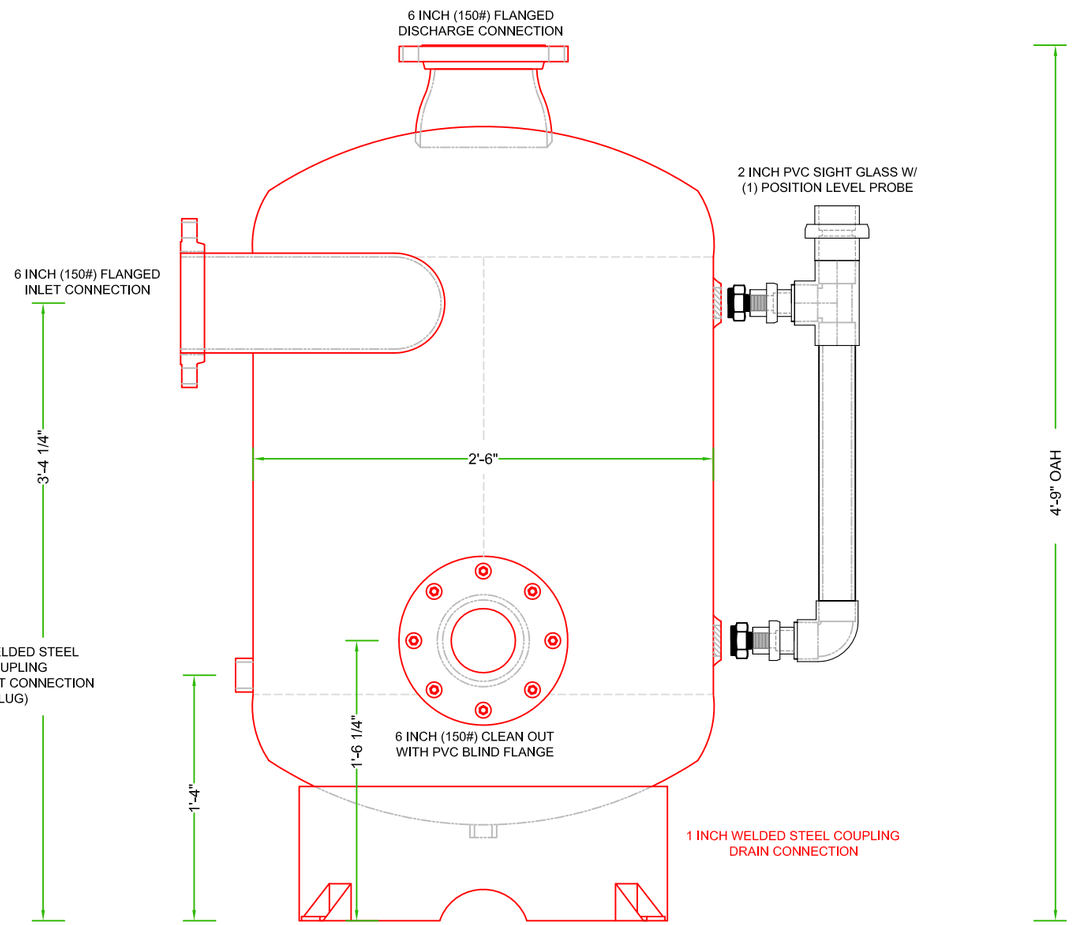
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DRWN BY	JAD
DATE	07-14-15
CHK BY	
DATE	
APPR BY	
DATE	
TITLE	SVE MANIFOLD LAYOUT
	AECOM - FORMER OZONE INDUSTRIES SITE, OZONE PARK / QUEENS NY
JOB NO.	15-152 (SVE)
SCALE	N/A
SIZE	D
DWG NO.	M-2
SHEET	2 OF 2
REV	A



(D-1) SEPARATOR TANK
PLAN VIEW



(D-1) SEPERATOR TANK
ELEVATIONAL VIEW

NOTES:
1. TANK CONSTRUCTION - CARBON STEEL. 200 PSI RATED VESSEL
2. EXTERIOR MECHANICALLY PRE-PARED, PRIMED AND PAINTED WITH INDUSTRIAL ENAMEL PAINT (RUSTOLEUM SERIES 7400 OR EQUAL)
3. ESTIMATED CONDENSATE LEVEL:
   LSHH-111 - 77 GALLONS

REV	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	10-08-15	JAD

REVISIONS

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DATE	---
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DATE	---

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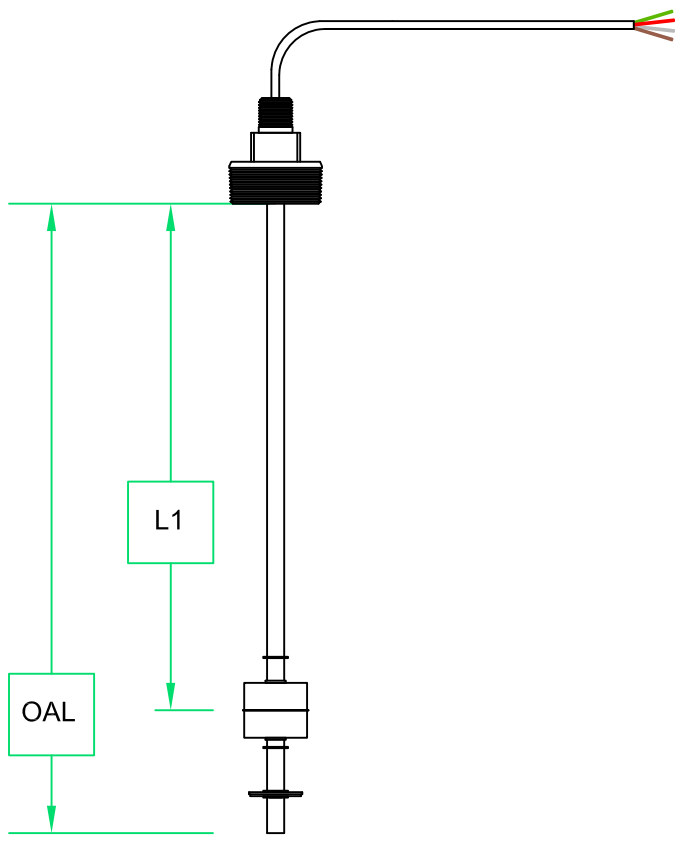
TITLE: 120 GALLON VAPOR LIQUID SEPARATOR (D-1)

AECOM
FORMER OZONE INDUSTRIES SITE - QUEENS, NY

JOB NO. 15-152 (SVE)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	M-3	1 OF 1	A

L1	RED BLACK	NORMALLY CLOSED	HIGH-HIGH (1) COMMON



UL LISTED

HOUSING	N/A
CONDUIT CONNECTION	$\frac{1}{2}$ NPT
FITTING AND STEM MATERIAL	STAINLESS STEEL
STEM DIAMETER	$\frac{1}{2}$ INCH
FITTING SIZE	2 INCH NPT
FLOAT STOP	SNAP RING
FLOAT MATERIAL	STAINLESS STEEL
SWITCH TYPE	SPST
SWITCH RATING	100 WATT
SPECIFIC GRAVITY	0.6
CENTERING DISC	STAINLESS STEEL

OAL - 14 INCHES
L1 - 12 INCHES
CABLE LENGTH - 120 INCHES
U.L. LISTED

GENERAL NOTES:

1. FOR TERMINAL BLOCK LOCATION SEE DRAWING (I-1)
2. FOR WIRING TERMINAL DESIGNATION SEE DRAWING (I-2)

REV	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	10-08-15	JAD

REVISIONS

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DRWN BY	JAD
DATE	07-29-15
CHK BY	
DATE	
APPR BY	
DATE	

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TITLE: 1 POSITION LEVEL SENSOR
LSHH-111

AECOM
FORMER OZONE INDUSTRIES SITE - QUEENS, NY

JOB NO. 15-152 (SVE)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	M-4	1 OF 1	A

SECTION 3 - BLOWER ENCLOSURE ACCESSORIES

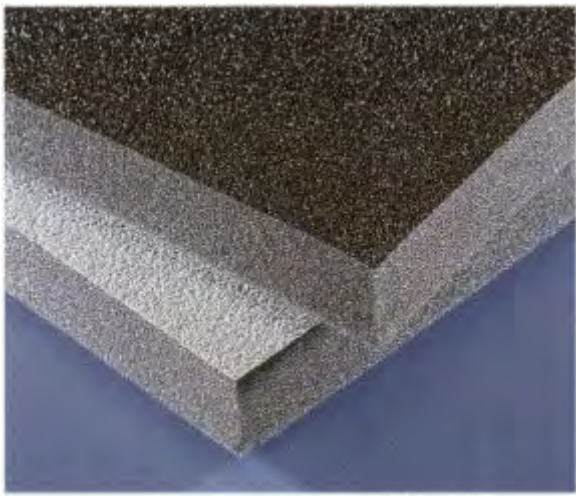
SOUND REDUCTION FOAM - AMERICAN ACOUSTICAL HC1.00EBUA3-ANATIO

EXHAUST FAN, 12"', 1286 CFM @ 0" S.P., 115 VAC, 1-PHASE - DAYTON 10D963

EXHAUST FAN THERMOSTAT, (-)30-90 F ADJUSTABLE - WHITE RODGERS 1687-9

Technical Data Sheet

Hushcloth Urethane Faced Foams



Hushcloth Urethane Faced (***HC BU/BNU***) acoustical foams are designed to provide maximum absorption of airborne sound with minimum thickness and weight. These flexible polyurethane open cell foam products are manufactured to optimize pore size, air flow resistance, and density.

HC BU/BNU foams provide a colorful - standard colors are Black (BU) or Bone White BNU - durable, abrasion and puncture resistant product. These urethane films are heat laminated to form a decorative textured surface and can be made impervious to most petroleum products, moisture, and dirt.

Matte facing can be added to our embossed foam to give a more pronounced decorative rosette pattern. (Type Deco-Foam CF) .

HC BU/BNU Foams can be purchased in rolls or sheets, and can be die cut, or fabricated to customer specifications. They are easily cut with a knife, saw or scissors. The addition of pressure sensitive adhesive provides a convenient method of fastening to most substrates.

Polyurethane Foam - Physical Properties

Property	Polyester Foam	Polyether Foam
Color	Charcoal Grey	
Density	2lb/ft³ (32 kg/m³) ±10% or 4 lb/ft³ (64 kg/m³) ±10% per ASTM D3574-86 test A	
Tear Strength	1.5 ppi (2.6 N/cm) per ASTM D3574-86 test F	1.58 ppi (2.8 N/m) per ASTM D3574-86 test F
Tensile Strength	20 psi (135 kPa) per ASTM D3574-86 test E	13 psi (90 kPa) per ASTM D3574-86 test E
Elongation	120% per ASTM D3574-86 test E	193% per ASTM D3574-86 test E
Compression Set (50% Deflection)	Max 10% ASTM D3574-86 test D	
Heat Resistance	Retention of tensile strength after 22 hours dry heat aging at 140°C min. 70% ASTM D3574-86 test K	
Humidity Resistance	Retention of tensile strength after 6 hours, steam autoclave at 105°C min. 70% ASTM D3574-86 test J	
Chemical Resistance	Good for common fluids, water, petroleum, solvents, and alkalis. Swelling will occur, will return to almost 100% after drying	
Flammability	MVSS 302, UL-94 HF1, and FAR 25.853(b)	
Service Temperature	-40°F (-40°C) to +225°F (107°C) continuous to 275°F(135°C) intermittent	
Thermal Conductivity	BTU-in/ft²h°F 0.25 (36mW/m°K) per ASTM C 177	

HC BU/BNU **Foams** can be made in combination with **Whispermat**™ barrier systems when both absorption and transmission loss is needed (see Whispermat brochure), or **VE**™ damping systems, when enhanced vibration control is required. (see VE damping brochure).

Pressure Sensitive Adhesive

Supported SBR (temps to 60°C/140°F)
Unsupported Acrylic (temps to 120°C/250°F)
Supported Acrylic (temps to 120°C/250°F)

Standard Sizes

Rolls 54" x 50ft (1370mm x 15m)
Sheets 54" x 72" or 36" or 24"(1370mm x 1800 or 900 or 600mm)
Fabricated or Die Cut
Thicknesses ¼" - 2"(6mm - 50mm)

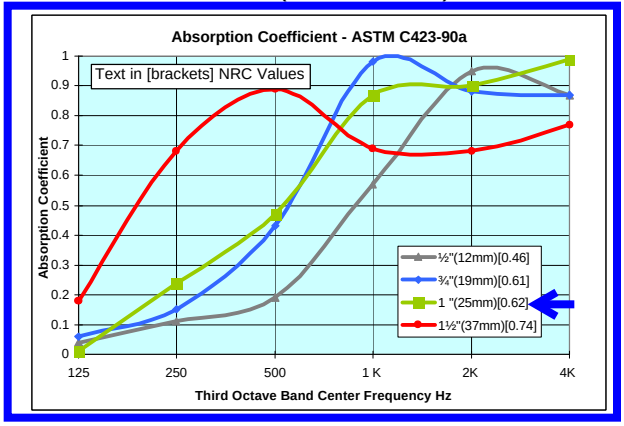


Figure 1 Absorption Performance for various thicknesses of HC BU/BNU Foams

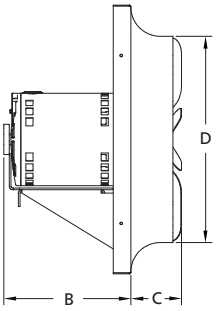
American Acoustical Products, 311 Hopping Brook Road, Holliston, Massachusetts 01746
Telephone (508) 429-1165 FAX (508) 429-8543 email info@aapusa.com
A division of Ward Process Incorporated

Please read and save these instructions. ***Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.***

Dayton® Direct-Drive Exhaust Fans

Description

Dayton exhaust fans are designed for commercial and industrial applications. Commercial units quietly exhaust high volumes of air for ventilating schools, offices, storage facilities and light manufacturing and assembly areas. Industrial units exhaust larger volumes of air at higher static pressures for ventilating factories, foundries and other industrial environments. Mount in vertical or horizontal position (vertical only for fans with intake guards). Construction includes galvanized steel frame, pre-punched mounting holes, and aluminum propeller. Motor is totally enclosed air over, with Class B insulation and ball bearings, except sleeve bearings on 10D952 thru 10D956. All fans have a maximum ambient temperature of 104°F and are UL/cUL Listed Standard 705.



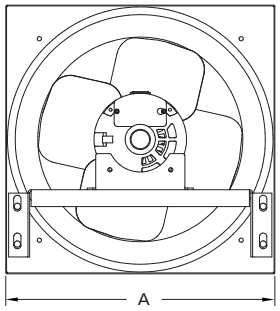


Figure 1 — Quiet-Design and Commercial Dimensions

c UL us LISTED
E53236

Optional Accessories

General or UL 705	
Description	**Model No.'s**
Aluminum Wall Shutter:	4C555-4C559, 3C308-3C310
Fan Guard:	1WBT8, 1WBT9, 1WBU1-1WBU5
Wall Collar:	3FKF3, 1WBV1-1WBV3
Wall Housing:	3FKF4-3FKF9, 3FKG1
Speed Control (For 115V):	1DGV1, 1DGV2

Dayton Electric Mfg. Co. certifies that the fans shown herein are licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

Dimensions and Specifications

Model	Prop. Dia.	Shaft Dia.	A	B	C	D	Blades	Recommended Wall Opening — Direct to Wall	Recommended Wall Opening — Wall Collar, Wall Collar & Guard, or Wall Housing
QUIET-DESIGN AND COMMERCIAL (See Figure 1)									
10E039	12"	1/2"	16"	4½"	3"	12¼"	3	14½ x 14½"	17¼ x 17¼"
10D971	12	1/2	16	4½	3	12¼	4	14½ x 14½	17¼ x 17¼
10E040, 10E041	16	1/2	20	7	3¼	16½	3	18½ x 18½	21¼ x 21¼
10D972	16	1/2	20	7	3¼	16½	4	18½ x 18½	21¼ x 21¼
10D973, 10D974	18	1/2	22	7	3⅛	18½	3	20½ x 20½	23¼ x 23¼
10E042	18	1/2	22	7	3⅛	18½	4	20½ x 20½	23¼ x 23¼
10E043	18	1/2	22	6	3⅛	18½	4	20½ x 20½	23¼ x 23¼
10D975, 10E045	20	1/2	24	7	3¾	20½	3	22½ x 22½	25⅝ x 25⅝
10D976, 10D977, 10E044	20	1/2	24	7½	3¾	20½	3	22½ x 22½	25⅝ x 25⅝
10E046	24	1/2	28	9½	3⅞	24½	3	26½ x 26½	29⅝ x 29⅝
10E047	24	5/8	28	8	3⅞	20½	3	26½ x 26½	29⅝ x 29⅝
10D978, 10D979, 10D980	24	1/2	28	8¾	3⅞	24½	3	26½ x 26½	29⅝ x 29⅝
10E048	24	5/8	28	9	3⅞	24½	3	26½ x 26½	29⅝ x 29⅝
10D981, 10D982	30	5/8	34	8¾	4¾	30½	3	32½ x 32½	35⅝ x 35⅝
10E049	30	5/8	34	9	4¾	30⅜	3	32½ x 32½	35⅝ x 35⅝

Form 5S7028

Printed in U.S.A.
04632
Version 0

474905
Rev. 1, November 2011

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ENGLISH

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Dayton® Direct-Drive Exhaust Fans

ENGLISH

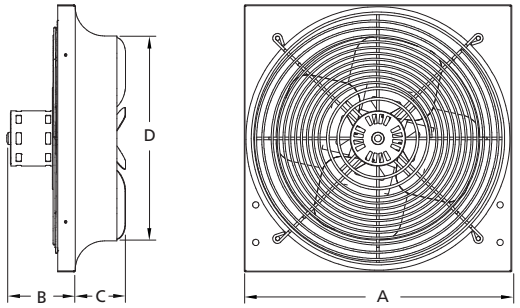


Figure 2 — Commercial With Intake Guard 8-18 Dimensions

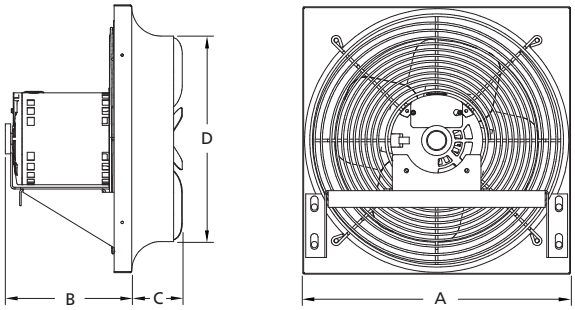


Figure 3 — Commercial With Intake Guard 20-24 Dimensions

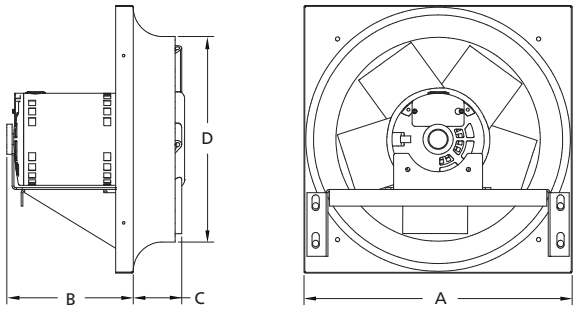


Figure 4 — Industrial Dimensions

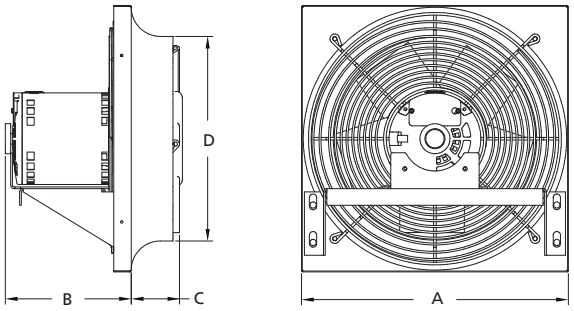


Figure 5 — Industrial With Intake Guard Dimensions

Dimensions and Specifications (Continued)

Model	Prop. Dia.	Shaft Dia.	A	B	C	D	Blades	Recommended Wall Opening: Direct to Wall	Recommended Wall Opening: Wall Collar, Wall Collar & Guard, or Wall Housing
COMMERCIAL WITH INTAKE GUARD 8-18 (See Figure 2)									
10D952	8"	5/16"	12"	4"	3"	8¼"	5	10½ x 10½"	13¼ x 13¼"
10D953	10	5/16	14	4	3½	10¼	5	12½ x 12½	15¼ x 15¼
10D954	12	5/16	16	4½	3	12¼	3	14½ x 14½	17¼ x 17¼
10D955	14	5/16	18	4	3¼	14¼	3	16½ x 16½	19¼ x 19¼
10D956	16	5/16	20	4	3¼	16½	3	18½ x 18½	21¼ x 21¼
10D957	18	1/2	22	7	3⅛	18½	3	20½ x 20½	23¼ x 23¼
10D960	18	1/2	22	7½	3⅛	18½	3	20½ x 20½	23¼ x 23¼
COMMERCIAL WITH INTAKE GUARD 20-24 (See Figure 3)									
10D958, 10D961	20	1/2	24	7	3¾	20½	3	22½ x 22½	25⅝ x 25⅝
10D959, 10D962	24	1/2	28	7	7⅞	24½	3	26½ x 26½	29⅝ x 29⅝

Models 10D952 thru 10D994, 10E039 thru 10E049

Dimensions and Specifications (Continued)

Model	Prop. Dia.	Shaft Dia.	A	B	C	D	Blades	Recommended Wall Opening: Direct to Wall	Recommended Wall Opening: Wall Collar, Wall Collar & Guard, or Wall Housing
INDUSTRIAL (See Figure 4)									
10D983, 10D984	16"	1/2"	20"	7"	3¼"	16½"	3	18½ x 18½"	21¼ x 21¼"
10D985, 10D986	18	1/2	22	7	3⅛	18½	3	20½ x 20½	23¼ x 23¼
10D987, 10D988	20	5/8	24	7	3¾	20½	4	22½ x 22½	25⅝ x 25⅝
10D989	24	1/2	28	8¾	3⅞	24½	6	26½ x 26½	29⅝ x 29⅝
10D990, 10D991	24	5/8	28	8¾	3⅞	24½	3	26½ x 26½	29⅝ x 29⅝
10D992, 10D993	30	5/8	34	9	4¾	30⅜	3	32½ x 32½	35⅝ x 35⅝
10D994	36	5/8	40	9	5¼	36⅛	3	38½ x 38½	41⅝ x 41⅝
INDUSTRIAL WITH INTAKE GUARD (See Figure 5)									
10D963	12"	1/2	16"	4½"	3"	12¼"	5	14½ x 14½"	17¼ x 17¼"
10D964	16	1/2	20	7	3¼	16½	3	18½ x 18½	21¼ x 21¼
10D965	18	1/2	22	7	3⅛	18½	3	20½ x 20½	23¼ x 23¼
10D966, 10D967	20	1/2	24	7	3¾	20½	3	22½ x 22½	25⅝ x 25⅝
10D968	20	5/8	24	7½	3¾	20½	3	22½ x 22½	25⅝ x 25⅝
10D969	24	1/2	28	7	7⅞	24½	3	26½ x 26½	29⅝ x 29⅝
10D970	24	1/2	28	7½	3⅞	24½	6	26½ x 26½	29⅝ x 29⅝

Performance

Model: 1-Phase 115/230V	Model: 3-Phase 208-230/460V	Prop. Dia.	HP	Fan RPM	Sones @ 0.000" SP @ 5Ft.	CFM Air Delivery @ Static Pressure Shown: 0.000"	0.125"	0.250"	0.375"	0.500"
QUIET-DESIGN										
10E039	—	12	1/4	1750	9.8	1311	1167	—	—	—
10E040	**10E041**	16	1/4	1750	14.8	2432	2212	1945	—	—
10E042	**10E043**	18	1/3	1750	19.4	2979	2810	2608	2374	—
10E044	**10E045**	20	1/2	1140	13.9	4509	4112	3590	2888	—
10E046	—	24	1/2	1140	17.9	5703	5293	4833	4287	—
10E047	**10E048**	24	3/4	1140	19.0	6236	5854	5390	4818	—
—	**10E049**	30	3/4	1140	24	8865	8358	7708	6970	—
COMMERCIAL										
10D971	—	12	1/4	1750	12.0	1590	1432	1220	1007	—
10D972	—	16	1/4	1725	16.6	2483	2335	2147	1913	—
10D973	**10D974**	18	1/3	1725	22	3194	3007	2805	2561	—
10D975	—	20	1/3	1140	14.6	3717	3319	2803	1959	—
10D976	**10D977**	20	1/2	1140	13.9	4509	4112	3590	2888	—
10D978	—	24	1/3	1140	16.5	4632	4196	3664	2835	—
10D979	**10D980**	24	1/2	1140	17.0	4686	4363	3953	3394	—
10D981	**10D982**	30	3/4	1140	27	9203	8505	7742	6879	—

Performance certified is for installation type A: Free inlet, Free outlet. Performance ratings do not include the effects of appurtenances (accessories). Speed (RPM) shown is nominal. Performance is based on actual speed of test. The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per AMCA Standard 301. Values shown are for installation type A: Free inlet hemispherical sone levels.

Dayton® Direct-Drive Exhaust Fans

Performance (Continued)

Model 1-Phase 115/230V	Model 3-Phase 208-230/460V	Prop. Dia.	HP	Fan RPM	Sones @ 0.000" SP @ 5Ft.	CFM Air Delivery @ Static Pressure Shown 0.000"	0.125"	0.250"	0.375"	0.500"
COMMERCIAL, WITH INTAKE GUARD († 115V, * Speed Controllable)										
10D952†*	**—**	8	1/30	1725	6.9	454	319	170	—	—
10D953†*	**—**	10	1/30	1600	8.8	730	624	381	—	—
10D954†*	**—**	12	1/30	1600	6.4	889	733	509	—	—
10D955†*	**—**	14	1/20	1550	13.5	1066	878	601	—	—
10D956†*	**—**	16	1/20	1550	12.0	1201	934	594	—	—
10D957†*	**—**	18	1/4	1140	11.1	2627	2290	1818	1022	—
10D960	**—**	18	1/3	1725	19.6	3126	2953	2746	2503	—
10D958†*	**—**	20	1/4	1140	12.2	3491	3060	2502	1394	—
10D961†	**—**	20	1/4	1140	12.2	3491	3060	2502	1394	—
10D959†*	**—**	24	1/4	1160	15.8	3533	3023	2403	1722	—
10D962	**—**	24	1/3	1140	16.3	4430	3974	3417	2499	—
INDUSTRIAL										
10D983	**10D984**	16	1/4	1750	14.1	2476	2288	2061	1769	1350
10D985	**10D986**	18	1/3	1750	18.5	3354	3097	2805	2468	2003
10D987	**10D988**	20	3/4	1750	23	4557	4254	3919	3542	3101
10D989	**—**	24	1/2	1140	23	5892	5471	4961	4315	3593
10D990	**10D991**	24	3/4	1725	31	6978	6499	5905	5184	4412
10D992	**10D993**	30	3/4	1140	25	9308	8461	7556	6428	4998
—	**10D994**	36	3/4	1140	33	12,363	10,425	8453	6207	2895
INDUSTRIAL, WITH INTAKE GUARD										
10D963	**—**	12	1/4	1750	11.2	1286	1192	1022	902	666
10D964	**—**	16	1/4	1725	15.6	2847	2591	2314	1951	1265
10D965	**—**	18	1/4	1725	14.5	2989	2751	2469	2108	1555
10D966	**—**	20	1/4	1750	18.6	3198	2847	2495	2091	1579
10D967	**—**	20	1/3	1750	19.6	3745	3449	3109	2716	2195
10D968	**—**	20	3/4	1750	22	4590	4240	3843	3381	2675
10D969	**—**	24	1/3	1750	30	3984	3400	2867	2296	1706
10D970	**—**	24	1/2	1140	17.0	5438	5049	4573	3922	3242

Performance certified is for installation type A: Free inlet, Free outlet. Performance ratings do not include the effects of appurtenances (accessories). Speed (RPM) shown is nominal. Performance is based on actual speed of test. The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per AMCA Standard 301. Values shown are for installation type A: Free inlet hemispherical sone levels.

Models 10D952 thru 10D994, 10E039 thru 10E049

Unpacking

1. Inspect for any damage that may have occurred during transit.
2. Shipping damage claim must be filed with carrier.
3. Check all bolts, screws, set-screws, etc. for looseness that may have occurred during transit. Retighten as required. Rotate propeller by hand to be sure it turns freely.

General Safety Information

⚠ DANGER ***Do not depend on any switch as the sole means of disconnecting power when installing or servicing the fan. Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury. Motor will restart without warning after thermal protector trips. Do not touch operating motor, it may be hot enough to cause injury.***

⚠ DANGER ***Do not place any body parts or objects in fan, motor openings or drives while motor is connected to power source.***

⚠ WARNING ***Do not use this equipment in explosive atmospheres!***

1. Read and follow all instructions and cautionary markings. Make sure electrical power source conforms to requirements of equipment and local codes.
2. Fans should be assembled, installed and serviced by a qualified technician. Have all electrical work performed by a qualified electrician.
3. Follow all local electrical and safety codes in the United States and Canada, as well as the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA) in the United States. Ground motor in accordance with NEC Article 250 (grounding). Follow the Canadian Electric Code (CEC) in Canada.

⚠ CAUTION ***To reduce the risk of injury to persons, observe the following:***

OSHA requires OSHA complying guards when fan is installed within 7 feet of floor or working level.

UL/cUL Standards require OSHA complying guards when fan is installed within 8 feet of floor or working level.

4. All moving parts should be guarded.
5. Do not kink power cable or allow it to come in contact with sharp objects, oil, grease, hot surfaces or chemicals. Replace damaged cords immediately.
6. Make certain that the power source conforms to the requirements for the equipment.
7. Motor must be securely and adequately grounded. This can be accomplished by wiring with a grounded, metal-clad race way system by using a separate ground wire connected to the bare metal of the motor frame, or other suitable means.

Installation

⚠ WARNING ***Installation, troubleshooting and parts replacement is to be performed only by qualified personnel.***

WALL MOUNTING

1. Move fan to the desired location and determine the method by which the fan is to be mounted as shown in Figures 6, 7, 8 and 9. Optional wall collar (Figure 7), wall collar and guard (Figure 8) or wall housing (Figure 9) provide a convenient means of mounting sidewall fans.

NOTE: Wall shutter must be motorized to open during fan operation in either direction.

2. Cut an appropriate sized hole in the wall using the Dimensions table.

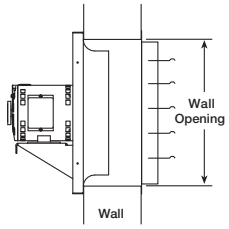


Figure 6 — Direct to Wall Installation

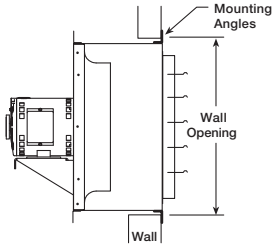


Figure 7 — Wall Collar Installation

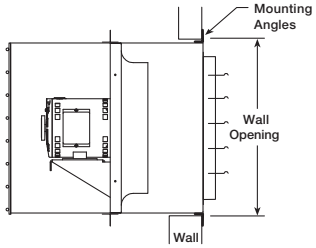


Figure 8 — Wall Collar & Guard Installation

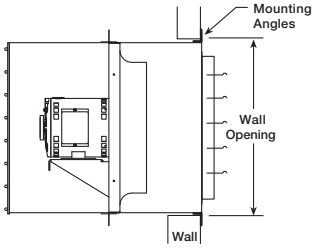


Figure 9 — Wall Housing Installation

Dayton® Direct-Drive Exhaust Fans

ENGLISH

Installation (Continued)

NOTE: Fans mounted to the wall require a different opening size than those mounted in collars or housings.

NOTE: Wall opening size and propeller-to-shutter distance are two important dimensions for fan installation.

3. The fan should be securely mounted within a rigid framework to prevent flexing or movement of the fan frame during operation. The fan frame should be equally supported on all sides within the framework and caution should be taken to avoid twisting of the fan frame during installation.

NOTE: Allowing the fan frame to flex or move during operation will create harmful vibrations which may damage the unit.

4. Fans should be mounted in opening with 1/4" clearance around perimeter. Framing should be secured to building structure utilizing corrosion resistant fasteners (by others). Fasteners should be used in all pre-punched mounting holes in the fan panel.
5. Install remaining components (shutter, intake guard, etc.).
6. Check all fasteners and set screws for tightness.
7. Rotation direction of the propeller should be checked by momentarily turning the unit on. Rotation should be in the same direction as the rotation decal affixed to the unit. For 3-phase installations, fan rotation can be reversed by interchanging any two of the three electrical leads. For single phase installations follow the wiring diagram located on the motor.

ELECTRICAL CONNECTION

NOTE: Refer to motor nameplate for wiring procedures.

1. Motor and fan must be securely grounded (bare metal) to a suitable electric ground, such as a grounded water pipe or ground wire system.

⚠ WARNING ***Comply with all local and national safety codes including the National Electrical Code (NEC) and National Fire Protection Act (NFPA).***

2. Wire motor for desired voltage per wiring diagram on motor.
3. Wire control switches at ground level.
4. Before activating fan, inspect to be sure that there are no obstructions or debris that would interfere with the propeller.

Operation

1. Before starting up or operating your new Dayton fan, check all fasteners for tightness. In particular, check set screws in propeller hub. While in the OFF position, or before connecting the fan to power, turn the fan propeller by hand to be sure it is not striking the orifice or any obstacle.
2. Start the fan up and shut it off immediately to check rotation of the propeller with directional arrow on the fan panel.
3. When the fan is started, observe the operation and check for any unusual noises.
4. Motor amperage should be checked to avoid overloading of the motor. With the system in full operation measure current input to the motor and compare with the nameplate rating to determine if the BHP is operating under safe load conditions.
5. Keep inlets and approaches to fan clean and free from obstruction.

Maintenance

⚠ WARNING ***Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.***

⚠ CAUTION ***Uneven cleaning of the propeller will produce an out of balance condition that will cause vibration in the fan.***

1. Depending on the usage and severity of the contaminated air, a regularly scheduled inspection for cleaning the fan propeller, housing and surrounding areas should be established.
2. Check for unusual noises when fan is running.
3. Periodically inspect and tighten set-screws.
4. Follow motor manufacturer's instructions for motor lubrication.
5. For disassembly refer to the parts illustration.
6. For critical applications, a spare motor should be available.

Models 10D952 thru 10D994, 10E039 thru 10E049

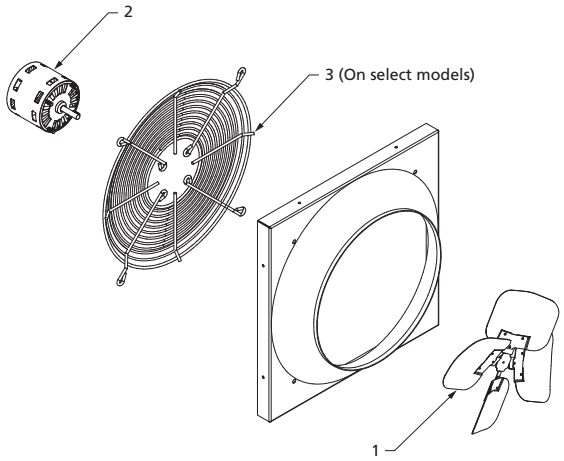


Figure 10 — Repair Parts Illustration for Quiet-Design and Commercial Fans

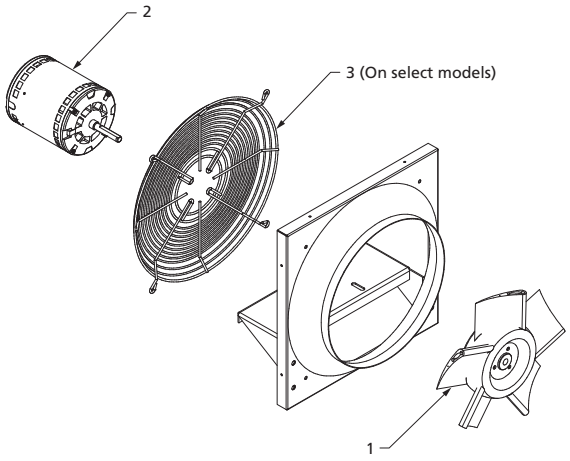


Figure 11 — Repair Parts Illustration for Industrial Fans

Repair Parts List for Direct-Drive Exhaust Fans

Reference Number	Description	Part Number For Models: 10D952	10D953	10D954	10D955	10D956	10D957	10D958	10D959	10D960	Qty.
1	Propeller	52J327	52J331	52J332	52J333	52J334	52J335	51D529	52J336	52J337	1
2	Motor	52J370	52J370	52J370	52J374	52J374	52J371	52J371	52J371	52J382	1
3	Guard	52J395	52J396	52J397	52J398	52J399	52J400	52J400	52J401	52J400	1

Reference Number	Description	Part Number For Models: 10D961	10D962	10D963	10D964	10D965	10D966	10D967	10D968	10D969	Qty.
1	Propeller	51D529	53A457	52J354	52J356	52J358	52J360	52J361	52J362	52J369	1
2	Motor	52J371	52J375	52J372	52J372	52J372	52J372	52J382	52J381	52J382	1
3	Guard	52J400	52J401	52J397	52J399	52J400	52J400	52J400	52J400	52J401	1

Reference Number	Description	Part Number For Models: 10D970	10D971	10D972	10D973	10D974	10D975	10D976	10D977	10D978	Qty.
1	Propeller	52J363	52J339	52J328	52J337	52J337	51D529	52J340	52J340	51N719	1
2	Motor	52J377	52J372	52J372	52J382	52J383	52J375	52J377	52J376	52J375	1
3	Guard	52J401	—	—	—	—	—	—	—	—	1

Reference Number	Description	Part Number For Models: 10D979	10D980	10D981	10D982	10D983	10D984	10D985	10D986	10D987	Qty.
1	Propeller	52J329	52J329	53H245	53H245	52J355	52J355	52J359	52J359	53A457	1
2	Motor	52J377	52J376	52J379	52J378	52J372	52J373	52J382	52J383	52J381	1

Reference Number	Description	Part Number For Models: 10D988	10D989	10D990	10D991	10D992	10D993	10D994	10E039	10E040	Qty.
1	Propeller	52J362	52J367	52J367	52J367	52J364	52J364	52J365	52J353	52J330	1
2	Motor	52J380	52J377	52J381	52J380	52J378	52J378	52J378	52J372	52J372	1

Reference Number	Description	Part Number For Models: 10E041	10E042	10E043	10E044	10E045	10E046	10E047	10E048	10E049	Qty.
1	Propeller	52J330	52J338	52J338	52J340	52J340	52J341	52J343	52J343	52J342	1
2	Motor	52J373	52J382	52J383	52J377	52J376	52J377	52J379	52J378	52J378	1

Dayton® Direct-Drive Exhaust Fans

ENGLISH

Troubleshooting Chart

Symptom	Possible Cause(s)	Corrective Action
Fan inoperative	1. Blown fuse or breaker	1. Replace or repair
	2. Defective motor	2. Replace or repair
	3. Incorrectly wired	3. Shut power OFF and check wiring for proper connections
	4. Electricity turned off	4. Contact local power company
Airflow - Insufficient	1. Damper (shutter) stuck shut	1. Inspect/repair damper
Airflow - Reversed air	3. Propeller rotation reversed	3. Reverse motor rotation, rewire motor
Airflow - Too much air	4. Insufficient static pressure	4. Check static pressure calculation
Excessive noise or vibration	1. Foreign material inside bearing	1. Replace bearing
	2. Loose propeller	2. Tighten set screws or taper bushing screws
	3. Crooked or damaged propeller	3. Replace propeller
	4. Fan not securely anchored	4. Secure properly
	5. Fan propeller out of balance	5. Replace propeller
Motor overloads or overheats	1. Shorted motor winding	1. Replace motor
	2. Incorrect propeller rotation	2. Check motor wiring
	3. Over/Under line voltage	3. Contact Power Company

LIMITED WARRANTY

DAYTON ONE-YEAR LIMITED WARRANTY. *DAYTON® DIRECT-DRIVE EXHAUST FANS, MODELS COVERED IN THIS MANUAL, ARE WARRANTED BY DAYTON ELECTRIC MFG. CO. (DAYTON) TO THE ORIGINAL USER AGAINST DEFECTS IN WORKMANSHIP OR MATERIALS UNDER NORMAL USE FOR ONE YEAR AFTER DATE OF PURCHASE. ANY PART WHICH IS DETERMINED TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP AND RETURNED TO AN AUTHORIZED SERVICE LOCATION, AS DAYTON DESIGNATES, SHIPPING COSTS PREPAID, WILL BE, AS THE EXCLUSIVE REMEDY, REPAIRED OR REPLACED AT DAYTON'S OPTION. FOR LIMITED WARRANTY CLAIM PROCEDURES, SEE "PROMPT DISPOSITION" BELOW. THIS LIMITED WARRANTY GIVES PURCHASERS SPECIFIC LEGAL RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION.*

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Certain aspects of disclaimers are not applicable to consumer products; e.g., (a) some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you; (b) also, some jurisdictions do not allow a limitation on how long an implied warranty lasts, consequently the above limitation may not apply to you; and (c) by law, during the period of this Limited Warranty, any implied warranties of implied merchantability or fitness for a particular purpose applicable to consumer products purchased by consumers, may not be excluded or otherwise disclaimed.

Prompt Disposition. *A good faith effort will be made for prompt correction or other adjustment with respect to any product which proves to be defective within limited warranty. For any product believed to be defective within limited warranty, first write or call dealer from whom the product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to Dayton at address below, giving dealer's name, address, date, and number of dealer's invoice, and describing the nature of the defect. Title and risk of loss pass to buyer on delivery to common carrier. If product was damaged in transit to you, file claim with carrier.*

Manufactured for Dayton Electric Mfg. Co.

Dayton®

WHITE-RODGERS

TEMPERATURE CONTROL
SPDT Remote Bulb
INSTALLATION INSTRUCTIONS

Operator: Save these instructions for future use!

FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR OPERATING THIS CONTROL COULD CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

DESCRIPTION

This control is designed for use on equipment that requires a closed circuit for both rise and fall in temperature. The single pole, double throw switch action offers both open-on-rise terminals as well as close-on-rise terminals.

This control has capillary tubing between the temperature sensitive bulb and the switch mechanism, permitting the switch mechanism to be mounted at any convenient location while the temperature sensitive bulb is located in the fluid or medium being controlled.

PRECAUTIONS

THIS CONTROL MUST BE INSTALLED BY A QUALIFIED INSTALLER.

All wiring must conform to local and national electrical codes and ordinances.

This control is a precision instrument, and should be handled carefully. Rough handling or distorting components could cause the control to malfunction.

This control has been accurately calibrated at the factory. Any attempt to calibrate this control will void the White-Rodgers warranty.

⚠ WARNING

Do not use on circuits exceeding specified voltages. Higher voltages will damage control and could cause shock or fire hazard.

If in doubt about whether your wiring is millivolt, low or line voltage, have it inspected by a qualified heating and air conditioning contractor or a licensed electrician.

⚠ CAUTION

To prevent electrical shock and/or equipment damage, disconnect electric power to system at main fuse or circuit breaker box until installation is complete.

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

Following installation or replacement, follow appliance manufacturers' recommended installation/service instructions to insure proper operation.

INSTALLATION

The switch mechanism of this control may be mounted in any location, provided that the temperature and humidity of the air in which it is located do not cause a condensation on the switch parts.

The sensitive element, or "bulb", should be located in the **average temperature** of the controlled area.

Capillary tubing should be led over a path that protects it from damage from blows, cuts, etc., and should be installed without kinking or twisting. The tubing should be attached to some surface at frequent intervals along its length, and should not hang loosely. Excess tubing should be coiled and secured at a convenient protected location close to the switch mechanism.

The bulb should be handled with reasonable care, as a dent or sharp bend may change the calibration and cause the control to cycle at a temperature different from the dial setting.

EMERSON

WHITE-RODGERS DIVISION
EMERSON ELECTRIC CO.
9797 REAVIS RD., ST. LOUIS, MO. 63123-5398
(314) 577-1300, FAX (314) 577-1517
9999 HWY. 48, MARKHAM, ONT. L3P 3J3
(905) 475-4653, FAX (905) 475-4625

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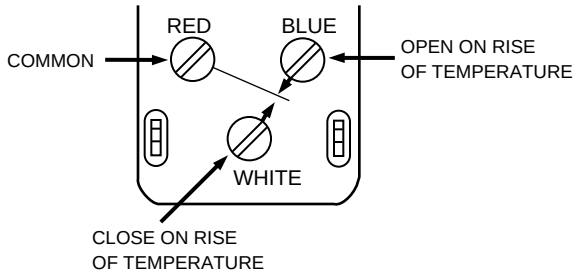
PART NO. 37-1637C
Replaces 37-1637B
9722

Wiring

All wiring must conform to local and national electrical codes and ordinances.

Connect in accordance with the wiring diagrams provided by the equipment manufacturer.

This control has a single-pole, double-throw, snap-action switch. The top left-hand terminal (red) is the common terminal. The top right-hand terminal (blue) has an open-on-rise switch action. The bottom center terminal (white) has close-on-rise switch action.

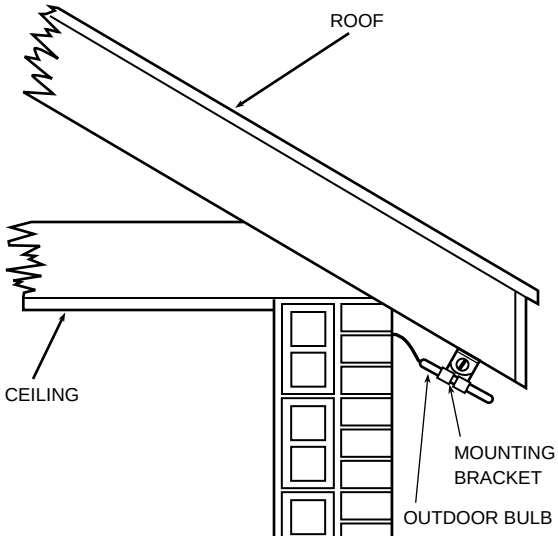


INSTALLATION AS AN OUTDOOR BULB

When used as a changeover control or outdoor thermostat, the bulb of this control should be located to measure the actual outdoor air temperature. A mounting bracket is provided for mounting the bulb.

The mounting bracket should be fastened to some convenient outside part of the building that is shielded from the direct rays of the sun, the direct fall of rain and snow, and sufficiently above ground to keep it out of snow and ice.

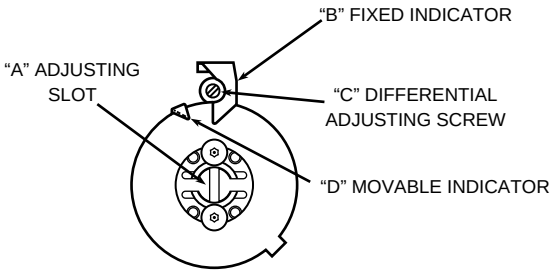
The underside of the eaves or overhang of a NORTH or NORTHEAST roof is a good location. It should be exposed to the circulation of air and wind.



SETTING THE DIAL

The fixed indicator (B) points to temperature at which the "R-B" contacts close and the "R-W" contacts open. Follow these instructions to set the dial.

1. Insert a screwdriver in the adjusting slot (A) and turn the dial until the fixed indicator (B) points to the lowest temperature of the cycle.
2. Turn the differential adjusting screw (C) until the moveable indicator (D) points to the highest temperature of the cycle.



SECTION 4 - PROCESS EQUIPMENT

REGENERATIVE BLOWER (675 SCFM @ 30"W.C. MANIFOLD INLET) - FPZ SCL K09-TS-25-3

MOISTURE SEPARATOR, TANK STYLE, 120 GALLONS - NES 120 GAL

VACUUM RELIEF VALVE, 3" FNPT, ADJUSTABLE - FPZ VRL8

INLINE FILTER, T-STYLE, 6" - SOLBERG CT-275P-600C

DILUTION FILTER SILENCER, 3" - SOLBERG FS-235P-300

FPZ BLOWER TECHNOLOGY

REGENERATIVE BLOWERS - VACUUM

SCL K07 / K08 / K09 / K10 / K11 / K12

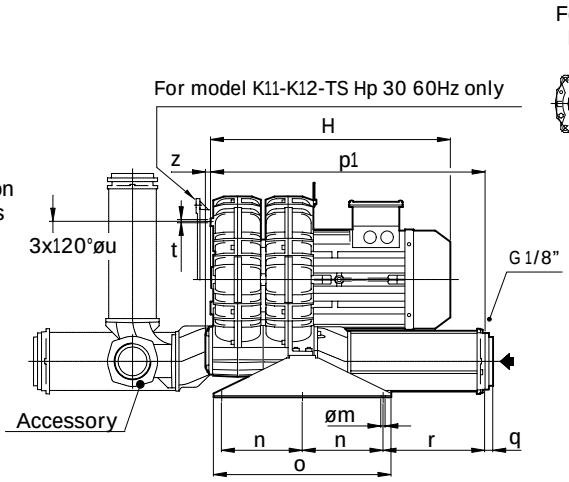
TS SERIES

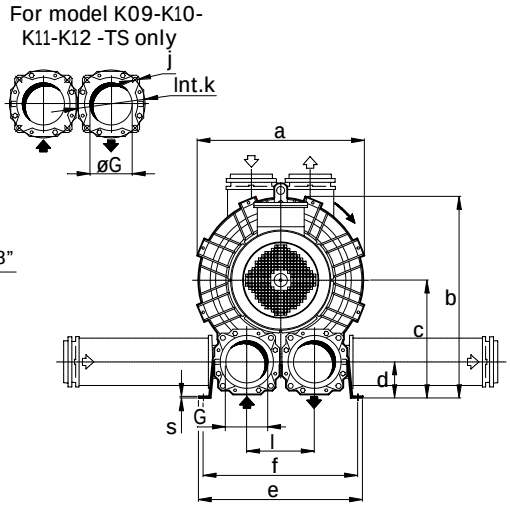
SN 1826-12

TECHNICAL CHARACTERISTICS
- Aluminium alloy construction
- Smooth operation
- High efficiency impeller
- Maintenance free
- Mountable in any position
- Recognized TEFC - cURus motor
- G1/8" female thread on both suction and discharge silencer port flanges

OPTIONS
- Special voltages (IEC 38)
- Surface treatments

ACCESSORIES
- Inlet and/or inline filters
- Additional inlet/outlet silencers
- Safety valves
- Flow converting device
- Optional connectors





Dimensions in inches.
Dimension for reference only.

Model	a	b	c	d	e	f	G	l	j	k	m	n	o	p1	q	r	s	t	u	z
K07-TS	16.69	20.91	12.56	3.86	18.43	17.24	4"NPT	7.17	-	-	0.51	984	21.65	31.57	0.98	11.77	0.20	M8	11.61	0.63
K08-TS	18.03	21.57	12.56	3.86	18.82	17.64	4"NPT	7.17	-	-	0.51	9.84	21.65	31.57	0.98	11.77	0.20	M8	12.20	0.63
K09-TS	19.37	24.02	14.37	4.4	20.00	18.82	5.12	8.27	M16	8.27	0.51	9.84	21.65	33.46	-	12.40	0.20	M8	14.17	0.63
K10-TS	20.31	24.53	14.37	4.41	20.00	18.82	5.12	8.27	M16	8.27	0.51	9.84	21.65	33.46	-	12.40	0.20	M8	14.17	0.63
K11-TS	21.26	25.59	14.96	4.17	21.26	20.08	5.12	8.98	M16	8.27	0.51	9.84	21.65	34.25	-	12.60	0.20	M8	15.35	0.63
K12-TS	21.57	25.66	14.96	4.17	21.26	20.08	5.12	8.98	M16	8.27	0.51	9.84	21.65	34.37	-	12.60	0.20	M8	15.35	0.63

Model	Maximum flow cfm		Installed power Hp		Maximum differential pressure Δp (In Hg)		Noise level Lp dB (A) (1)		Overall dimensions H	Weight
	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	Inches	Lbs
K07-TS	588	487	7 ½	7 ½	2.6	3.5	84.5	82.5	23.76	197.31
			10	10	4.4	5.2	84.8	82.8	23.76	206.13
			15	15	8.1	8.9	85.4	83.4	24.55	223.77
K08-TS	715	592	7 ½	7 ½	1.3	2.2	80.9	78.9	23.76	205.47
			10	10	2.7	3.7	81.2	79.2	23.76	214.29
			15	15	5.5	6.4	82.9	80.9	24.55	231.92
K09-TS	941	780	20	20	5.9	6.6	84.1	82.1	29.92	350.53
			25	25	8.1	8.8	86.1	84.1	30.79	383.60
K10-TS	1093	906	20	20	4.8	5.5	89.4	87.4	29.92	354.94
			25	25	5.9	7.0	89.7	87.7	30.79	388.01
K11-TS	1254	1039	25	25	3.7	5.0	90.7	88.7	31.38	429.02
			30 (2)	30 (2)	5.1	6.6	91.3	89.3	31.38	434.53
K12-TS	1410	1168	30 (2)	30 (2)	3.3	5.9	91.9	89.9	31.50	436.75

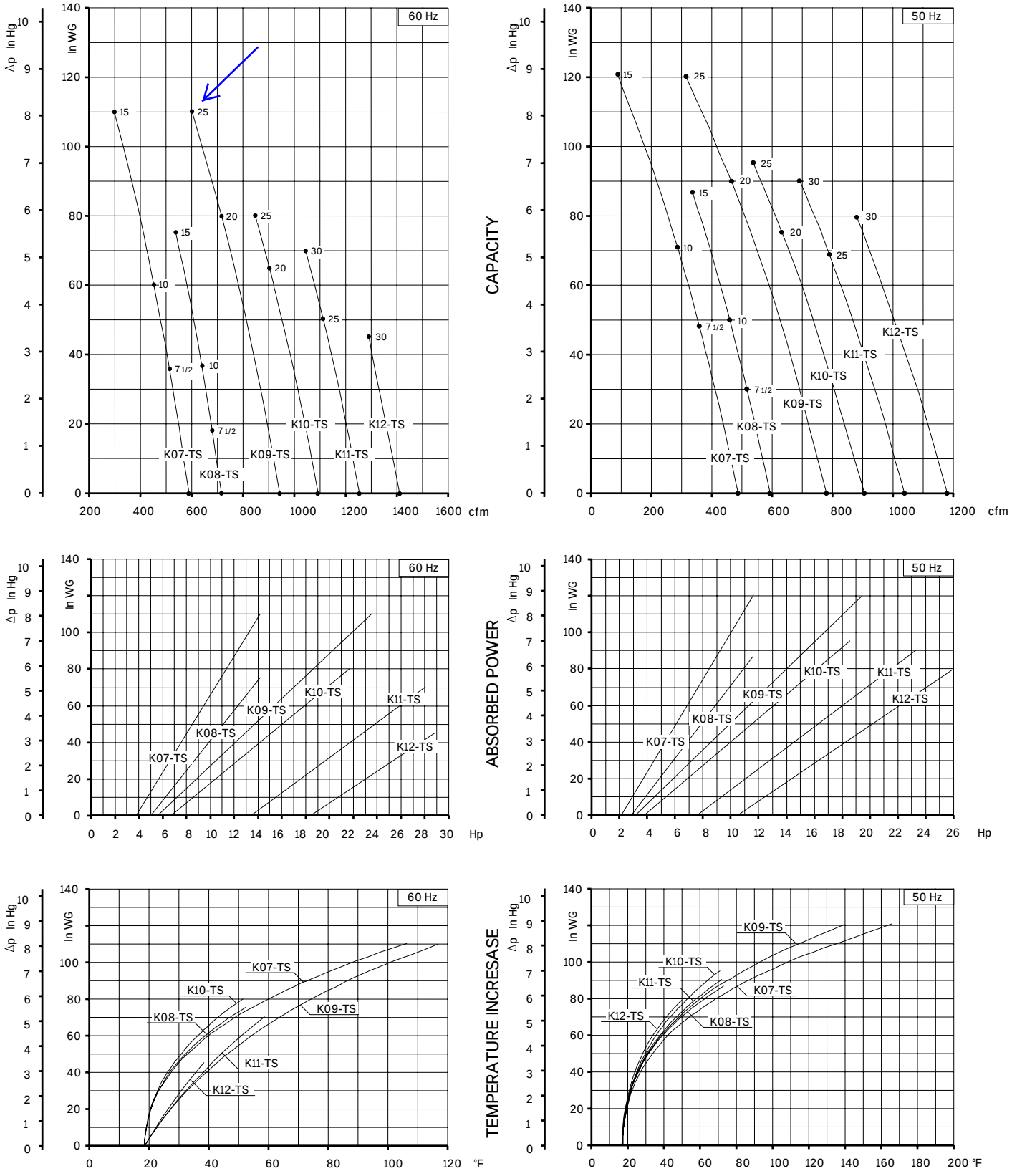
(1) Noise measured at 1 m distance with inlet and outlet ports piped, in accordance to ISO 3744.
(2) K11-K12-TS Hp 30 vertical assembly only.

- For proper use, the blower should be equipped with inlet filter and safety valve; other accessories available on request.
- Ambient temperature from +5° to +104°F.
- Specifications subject to change without notice.

SCL K07 / K08 / K09 / K10 / K11 / K12

TS SERIES

SN 1826-12



Curves refer to air at 68° F temperature, measured at inlet port and 29.92 In Hg atmospheric backpressure (abs).
Values for flow, power consumption and temperature rise: +/-10% tolerance.
Data subject to change without notice.

FPZ S.p.A.
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www.fpz.com

CE

COMPRESSORI - ASPIRATORI A CANALE LATERALE — **ISTRUZIONI I**
LATERAL CHANNEL BLOWERS – EXHAUSTERS — **INSTRUCTIONS GB**
COMPRESSEURS - ASPIRATEURS A CANAL LATERAL — **INSTRUCTIONS F**
SEITENKANALVERDICHTER - VAKUUMPUMPEN BAUREIHE — **BETRIEBSANLEITUNG D**
COMPRESORES - ASPIRADORES DE CANAL LATERAL — **INSTRUCCIONES E**

LEGGERE ATTENTAMENTE TUTTE LE ISTRUZIONI E CONSERVARLE I
PLEASE READ CAREFULLY ALL INSTRUCTIONS AND KEEP THEM FOR FUTURE REFERENCE GB
LIRE ATTENTIVEMENT TOUTES LES INSTRUCTIONS ET LES CONSERVER F
ALLE ANLEITUNGEN SIND SORGFÄLTIG ZU LESEN UND AUFZUBEWAHREN! D
SIRVASE LEER CUIDADOSAMENTE TODAS LAS INSTRUCCIONES Y CONSERVARLAS PARA FUTURA REFERENCIA E

SN 1975-3

SCL K07 / K08 / K09 / K10 / K11 / K12
TS - MOR



AZIENDA CON SISTEMA DI GESTIONE PER LA QUALITÀ CERTIFICATO DA DNV
=UNI EN ISO 9001:2000=

DICHIARAZIONE DI CONFORMITÁ ALLA DIRETTIVA MACCHINE
DECLARATION OF CONFORMITY TO THE MACHINERY DIRECTIVE

Unità tipo - *Unit type*

SCL K07-TS MOR	**SCL K09-TS MOR**	**SCL K11-TS MOR**
SCL K08-TS MOR	**SCL K10-TS MOR**	**SCL K12-TS MOR**

1. L'unità è in conformità con:
   - DIRETTIVA MACCHINE CE 2006/42;
   - DIRETTIVA COMPATIBILITA' ELETTROMAGNETICA (EMC) CE 2004/108;
   - DIRETTIVA BASSA TENSIONE 2006/95/CE;

   È tuttavia vietata la messa in servizio prima che la macchina in cui sarà incorporata sia dichiarata conforme con le citate Direttive.
2. Sottoposta a collaudo funzionale è risultata conforme alle caratteristiche richieste.
3. Il Fascicolo tecnico elaborato secondo Allegato VII della direttiva CE 2006/42 viene conservato presso la sede della società FPZ SpA a Concorezzo (MB), via F.lli Cervi 16.

1. *The unit conforms to the:*
   - *MACHINERY DIRECTIVE CE 2006/42;*
   - *ELECTROMAGNETIC COMPATIBILITY (EMC) DIRECTIVE CE 2004/108;*
   - *LOW VOLTAGE DIRECTIVE 2006/95/CE;*

   Nevertheless it is forbidden to put the unit in service before the machine in which will be incorporated is declared in conformity with the above Directives.
2. *The unit has been tested and meets its operating performances.*
3. *FPZ SpA in Concorezzo (ITALY), Via F.lli Cervi 16, store the Technical Files developed according Annex VII of Machinery Directive CE 2006/42*

Concorezzo (MB), *data 19.04.2010*

Amministratore Delegato
Managing Director

Sergio Ferigo

Direttore Tecnico
Technical Manager

Luis Sagastegui

DATI CARATTERISTICI I
PERFORMANCE TABLE GB
CARACTÉRISTIQUES TECHNIQUES F
LEISTUNGDATEN D
DATOS CARACTERISTICOS E

SI - Unità / Units / Unités / Einheiten / Unidades

Modello Model Modèle Modell Modelo	Potenza installata Installed power Puissance installé Installierte Motorleistung Potencia instalada		Pressione massima differenziale Maximum differential pressure Pression différentielle maxi Druckdifferenz Presión diferencial máxima		Rumorosità massima Max noise level Max niveau sonore Max Schalldruckpegel Rumorosidad máxima		Pressione massima assoluta Maximum absolute pressure Pression absolute maxi Maximal absoluter druck Presión absoluta máxima	Massa Weight Masse Gewicht Peso
	kW		**hPa** (mbar)		**Lp / Lw** (1) **dB (A)**		**Ps** max A	**M**
	50 Hz *2900 min^{-1}*	*60 Hz* *3500 min^{-1}*	*50 Hz* *2900 min^{-1}*	*60 Hz* *3500 min^{-1}*	*50 Hz* *2900 min^{-1}*	*60 Hz* *3500 min^{-1}*	**MPa** (bar)	**kg**
SCL K07-TS	**5.5**	**6.3**	**- 150 / + 150**	**- 110 / + 110**	**81.9**	**83.9**	**0.28 (2.8)**	**88.0**
	7.5	**8.7**	**- 225 / + 225**	**- 200 / + 200**	**82.2**	**84.2**	**0.28 (2.8)**	**93.0**
	9.2	**10.6**	**- 275 / + 275**	**- 250 / + 250**	**82.5**	**84.5**	**0.28 (2.8)**	**102.5**
	11.0	**12.7**	**- 300 / + 350**	**- 300 / + 300**	**82.8**	**84.8**	**0.28 (2.8)**	**103.5**
	-	**17.4**	**- / -**	**- 350 / + 450**	**-**	**85.1**	**0.28 (2.8)**	**109.5**
SCL K08-TS	**5.5**	**6.3**	**- 100 / + 100**	**- 60 / + 60**	**78.8**	**80.8**	**0.28 (2.8)**	**91.5**
	7.5	**8.7**	**- 160 / + 160**	**- 120 / + 120**	**78.9**	**80.9**	**0.28 (2.8)**	**96.5**
	9.2	**10.6**	**- 210 / + 210**	**- 170 / + 170**	**80.1**	**82.1**	**0.28 (2.8)**	**106.0**
	11.0	**12.7**	**- 260 / + 260**	**- 220 / + 220**	**81.3**	**83.3**	**0.28 (2.8)**	**107.0**
	15.0	**17.4**	**- 325 / + 380**	**- 325 / + 325**	**82.5**	**84.5**	**0.28 (2.8)**	**113.0**
SCL K09-TS	**9.2**	**10.6**	**- 145 / + 145**	**- 110 / + 110**	**79.0**	**81.0**	**0.28 (2.8)**	**116.0**
	11.0	**12.7**	**- 190 / + 190**	**- 150 / + 150**	**81.0**	**83.0**	**0.28 (2.8)**	**117.0**
	15.0	**17.4**	**- 270 / + 270**	**- 240 / + 240**	**83.0**	**85.0**	**0.28 (2.8)**	**128.0**
	18.5	**21.5**	**- 325 / + 360**	**- 275 / + 275**	**85.0**	**87.0**	**0.28 (2.8)**	**158.0**
SCL K10-TS	**11.0**	**12.7**	**- 160 / + 160**	**- 125 / + 125**	**85.8**	**87.8**	**0.28 (2.8)**	**122.0**
	15.0	**17.4**	**- 225 / + 225**	**- 180 / + 180**	**86.1**	**88.1**	**0.28 (2.8)**	**133.0**
	18.5	**21.5**	**- 275 / + 275**	**- 260 / + 260**	**86.4**	**88.4**	**0.28 (2.8)**	**163.0**
SCL K11-TS	**11.0**	**-**	**- 100 / + 100**	**- / -**	**86.0**	**-**	**0.28 (2.8)**	**135.0**
	15.0	**17.4**	**- 160 / + 160**	**- 105 / + 105**	**86.7**	**88.7**	**0.28 (2.8)**	**146.0**
	18.5	**21.5**	**- 220 / + 220**	**- 165 / + 165**	**87.4**	**89.4**	**0.28 (2.8)**	**176.0**
	22.0	**25.5**	**- 275 / + 275**	**- 220 / + 220**	**88.0**	**90.0**	**0.28 (2.8)**	**186.5**
SCL K12-TS	**18.5**	**-**	**- 150 / + 150**	**-**	**88.0**	**-**	**0.28 (2.8)**	**175.0**
	22.0	**25.5**	**- 200 / + 200**	**- 140 / + 140**	**88.6**	**90.6**	**0.28 (2.8)**	**185.5**

(1) Rumorosità misurata alla distanza di 1 m con aspirazione e mandata canalizzate, secondo la Normativa ISO 3744.
(1) Noise measured at 1 m distance with inlet and outlet ports piped, in accordance to ISO 3744.
(1) Niveau de bruit mesuré a 1 m de distance, conduits d'aspiration et refoulement raccordés selon la norme ISO 3744.
(1) Schalldruckpegel, mit angeschlossener Schlauchleitung am Ein- und Auslass, im Abstand von 1 m gemäß ISO 3744 gemessen.
(1) Rumorosidad medida a la distancia de 1 m con vías de acceso de aspiración e impulsión canalizadas, según la Normativa ISO 3744.

DATI CARATTERISTICI I
PERFORMANCE TABLE GB
CARACTÉRISTIQUES TECHNIQUES F
LEISTUNGDATEN D
DATOS CARACTERISTICOS E

US - Unità / Units / Unités / Einheiten / Unidades

Modello Model Modèle Modell Modelo	Potenza installata Installed power Puissance installé Installierte Motorleistung Potencia instalada		Pressione massima differenziale Maximum differential pressure Pression différentielle maxi Druckdifferenz Presión diferencial máxima		Rumorosità massima Max noise level Max niveau sonore Max Schalldruckpegel Rumorosidad máxima		Pressione massima assoluta Maximum absolute pressure Pression absolute maxi Maximal absoluter druck Presión absoluta máxima	Massa Weight Masse Gewicht Peso
	Hp		**In Hg / In WG**		**Lp / Lw** (1) **dB (A)**		**Ps** max	**M**
	60 Hz *3500 rpm*	*50 Hz* *2900 rpm*	*60 Hz* *3500 rpm*	*50 Hz* *2900 rpm*	*60 Hz* *3500 rpm*	*50 Hz* *2900 rpm*	**In Hg**	**Lbs**
SCL K07- TS	**7 ½**	**7 ½**	**- 2.6 / + 36**	**- 3.5 / + 48**	**84.5**	**82.5**	**82.7**	**197.31**
	10	**10**	**- 4.4 / + 60**	**- 5.2 / + 71**	**84.8**	**82.8**	**82.7**	**206.13**
	15	**15**	**- 8.1 / + 110**	**- 8.9 / + 121**	**85.4**	**83.4**	**82.7**	**223.77**
SCL K08-TS	**7 ½**	**7 ½**	**- 1.3 / + 18**	**- 2.2 / + 30**	**80.9**	**78.9**	**82.7**	**205.47**
	10	**10**	**- 2.7 / + 37**	**- 3.7 / + 50**	**81.2**	**79.2**	**82.7**	**214.29**
	15	**15**	**- 5.5 / + 75**	**- 6.4 / + 87**	**83.3**	**81.3**	**82.7**	**231.92**
SCL K09-TS	**15**	**15**	**- 3.8 / + 52**	**- 4.5 / + 62**	**83.0**	**81.0**	**82.7**	**270.06**
	20	**20**	**- 5.9 / + 80**	**- 6.6 / + 90**	**85.0**	**83.0**	**82.7**	**350.53**
	25	**25**	**- 8.1 / + 110**	**- 8.8 / + 120**	**87.0**	**85.0**	**82.7**	**383.60**
SCL K10-TS	**15**	**15**	**- 3.0 / + 41**	**- 3.6 / + 51**	**89.1**	**87.1**	**82.7**	**274.47**
	20	**20**	**- 4.8 / + 65**	**- 5.5 / + 75**	**89.4**	**87.4**	**82.7**	**354.94**
	25	**25**	**- 5.9 / + 80**	**- 7.0 / + 95**	**89.7**	**87.7**	**82.7**	**388.01**
SCL K11-TS	**25**	**25**	**- 3.7 / + 50**	**- 5.0 / + 69**	**90.7**	**88.7**	**82.7**	**429.02**
	30	**30**	**- 5.1 / + 70**	**- 6.6 / + 90**	**91.3**	**89.3**	**82.7**	**434.53**
SCL K12-TS	**30**	**30**	**- 3.3 / + 45**	**- 5.9 / + 80**	**91.9**	**89.9**	**82.7**	**436.75**

(1) Rumorosità misurata alla distanza di 1 m con aspirazione e mandata canalizzate, secondo la Normativa ISO 3744.
(1) Noise measured at 1 m distance with inlet and outlet ports piped, in accordance to ISO 3744.
(1) Niveau de bruit mesuré a 1 m de distance, conduits d'aspiration et refoulement raccordés selon la norme ISO 3744.
(1) Schalldruckpegel, mit angeschlossener Schlauchleitung am Ein- und Auslass, im Abstand von 1 m gemäß ISO 3744 gemessen.
(1) Rumorosidad medida a la distancia de 1 m con vías de acceso de aspiración e impulsión canalizadas, seg+ún la Normativa ISO 3744.

1 SAFETY STANDARDS

This operating manual:

- Applies to “K” series side channel compressors/suction pumps in an “MOR” single block version.
- Contains instructions for transporting, installation, commissioning, operating, storing, and maintenance of “K” series side channel compressors/suction pumps in an “MOR” format.
- Must be read carefully and understood fully before doing any work using the unit.
- Must be complied with fully.
- Must be to hand at all times at the workstation at which the unit is used.

Failure to comply with the safety standards may result in serious injury to people – even with fatal consequences – as well as damage to materials and the environment.

1.1 NOTES FOR THE USER’S SAFETY

The safety standards referred to in this operating manual are marked by a danger symbol. Next to this symbol there is wording indicating the seriousness of the danger. You are kindly requested to fully comply with the procedures described in order to avoid any danger to people or property!



This **Danger** symbol indicates dangers that may result in **injury to people** with consequences including **death or serious injury** if the necessary precautions are not taken.

The term “**WARNING**” indicates dangers that may result in **damage to property**.

“**USER’S NOTES**” are intended to allow the unit to be used in the best way to achieve best performance, in safety and respecting the environment.

1.2 GENERAL SAFETY WARNINGS

WARNING!

The “K” series of side channel compressors / suction pumps in an “MOR” format are designed and built for use in industrial plants are fitted with three-phase electric motors of an asynchronous bipolar type, in compliance with IEC 34-1.



Any use other than the intended use of the unit may cause serious injury and even death!

- The unit may only be started:
  In conformity with the use, transport, and handling purposes indicated in “INTENDED USE”.
  According to the values indicated in the “CHARACTERISTIC DATA” table on page 3/4.
- All transportation, assembly, installation, starting up, and maintenance operations are only to be carried out by qualified personnel, that is, personnel whose training, instruction, experience, knowledge of standards, regulations, accident prevention procedures, and operating and service conditions, makes them capable of carrying out all the works necessary, while being aware of and avoiding any possible danger and/or damage.



When the unit us working there is a danger of injury due to shearing, crushing, entanglement, and burns!

Transportation, assembly, installation, starting up, and maintenance operations are to be carried out wearing adequate **personal protective clothing** (protective gloves and safety glasses, safety shoes, and a hardhat).

Do not wear loose-fitting garments, long laces, or other items that may get entangled in the machine.

Long hair must be gathered up.



Electrical danger!

Inappropriate behaviour may result in serious injury and even death!

Work on electrical equipment (installation and maintenance) is only to be done by qualified, authorised electricians!

Before starting to work on the unit or plant, the following precautions must be taken:

Switch off the mains power supply.

Adopt measures to prevent it being switched on again.

Only open the terminal board box after checking that the power is off altogether!



Danger due to rotating components (cooling fan for the electric motor, impeller, and shaft): Cutting or shearing of limbs, entanglement or trapping of hair or clothing.

Danger due to excess pressure and vacuum: Sudden ejection of process fluids (injury to the skin and eyes), and sudden sucking in of hair and clothing!

Danger due to process fluids that come out and cause burns!

- The unit may only be started and operated under the following conditions:

  The unit must be fully assembled and whole (not damaged).

  Piping must be connected to the silencers using fixings, connections, pipes, pipe fittings, and tanks that are watertight and sufficiently strong to withstand the pressures that develop.

  Connections to the suction and delivery silencers must not be closed, clogged, or dirty.

  Regularly check that the seatings for fixings, connections, piping, pipe fittings, and tanks are firmly secured!
- Before starting maintenance work on the unit, the following safety precautions must be taken:

  Put the unit out of order and ensure that it cannot be switched on again.

  Put a sign on the plant’s controls and on the control units that reads: “DANGER! Maintenance work on the compressor / suction pump in progress! Do not switch on!”

  Wait until the unit has stopped completely, that is, until the impeller has stopped rotating.

  Allow the unit to cool down!

  Make sure that there is no pressure or vacuum in the unit or in the piping to be disconnected.

  Make sure that no fluid can flow out of the unit and/or plant!



Danger due to rotating impeller: Cutting or shearing of limbs!

The impeller can be accessed while it is rotating by opening the suction and delivery silencers!

Never put your hands or any item into these openings.

Fit the suction and/or delivery silencers with additional silencers or additional pipes sufficiently long to prevent access to the impeller.

Danger due to burns caused by contact with hot surfaces on the unit!

When operating in compliance with the values indicated in the “CHARACTERISTIC DATA” table on page 3/4 the compressors / suction pumps can reach high surface temperatures of up to 160°C (+320°F).

Fit the unit with adequate protection against the risks of involuntary contact with hot surfaces.

Do not touch the unit’s surfaces on purpose when it is running!

Before doing any work after having switched off the unit, allow it to cool!

Danger resulting from the impeller seizing due to the performance values being exceeded: Vacuum and/or pressure exceeding the declared values!

Do not allow the unit to operate with the suction and/or delivery openings obscured for any reason.

Install a safety valve that can prevent excessive vacuum and/or pressure, and that makes it possible to comply with the values indicated among the “CHARACTERISTIC DATA” given on page 3/4 of this manual.

In order to limit the formation of layers of dust on the surfaces, which may compromise natural exchanging of heat between the unit and the environment, regularly clean and remove all dust using suitable equipment.

Suction and/or delivery piping must not be dirty or clogged!

If any anomalous noises are heard, which may be a warning that the impeller is about to seize, switch off the unit and move away from it immediately.

Danger due to the impeller seizing due to use in an unsuitable place and/or due to conveying fluids that are not suitable: Unsuitable ambient and suction temperatures!

Check that the ambient and suction temperatures for the gas conveyed are between: -15°C (+5°F) and +40°C (+104 °F).

Check that good ventilation is provided for the unit.

Use a filter on the suction side with a maximum filtration of 25 µm, which will make it possible to limit the entry of any solids into the unit, thereby avoiding possible breakage of the impeller blades, making the fragments projected out of the delivery opening dangerous!

During installation and when the unit is running, check for load losses due to the use of this filter: The maximum load loss allowed is 30 mbar. This value must be subtracted from the maximum admissible pressure indicated in the “CHARACTERISTIC DATA” table on page 3/4 of this manual.

If any anomalous noises are heard, which may be a warning that the impeller is about to seize, switch off the unit and move away from it immediately.

1.3 RESIDUAL RISKS

Danger due to rotating components: Cooling fan for the electric motor!

There is an immediate danger of hair and clothing becoming entangled in the cooling fan in the electric motor’s cowling via the cowling itself!

Protective steps to be taken:

Do not wear loose-fitting garments, long laces, or other items that may get entangled in the machine.

Long hair must be gathered up.

Danger due to hot surfaces – up to 160°C (+320°F)!

Under operating conditions there is a possibility of burns due to contact with the unit’s surfaces.

Protective steps to be taken:

Fit the unit with adequate protection against the risks of involuntary contact with hot surfaces.

Do not touch the unit’s surfaces on purpose when it is running!

Before starting with any work, wait for the unit to cool down after switching it off!

Danger due to noise emitted by the unit!

When the compressors / suction pumps are running they emit noise that may exceed 80 dB(A)!

Protective steps to be taken:

Mark the area around the unit using warning signs.

Wear personal protective equipment for hearing.

If necessary, fit additional silencers on the suction and/or delivery silencers.

From time to time use noise tests to check the efficiency of the soundproofing panels in the suction and delivery silencers. The reference values are indicated in the “CHARACTERISTIC DATA” table on page 3/4 of this manual.

2 INTENDED USE

The “K” series of side channel compressors / suction pumps in an “MOR” format are made to generate vacuums and pressures, and for conveying air and gas that is not explosive, not inflammable, not poisonous, and not aggressive, for continuous operation in a non-explosive environment.

The “K” series of side channel compressors / suction pumps in an “MOR” format are designed and built for use in industrial plants are fitted with three-phase electric motors of an asynchronous bipolar type, in compliance with IEC 34-1.

2.1 REASONABLY FORESEEABLE INCORRECT USE

Any use other than the intended use of the unit may cause serious injury and even death!

Failure to comply with the prohibitions / obligations indicated may result in technical faults, damage to the plant, or injury!

Danger of very serious injury!

THE FOLLOWING ARE STRICTLY FORBIDDEN:

- Using the unit in non-industrial installations, unless all the necessary precautions or protective measures have been taken (e.g. protection against contact to safeguard children).
- Using the unit in places in which there are explosive dust and/or gas or where these may form.
- Sucking up and conveying explosive, inflammable, aggressive, corrosive, and/or harmful fluids.
- Using the unit under conditions that differ from those indicated in the “CHARACTERISTIC DATA” table on page 3/4.
- Using the unit without having installed a suction filter.
- Operating with the suction and/or delivery openings closed.

- Making modifications to the unit or transforming it, or making repairs or doing maintenance based on your own initiative. Maintenance works are only to be carried out as described in this operating manual by qualified personnel, that is, personnel whose training, instruction, experience, knowledge of standards, regulations, accident prevention procedures, and operating and service conditions, makes them capable of carrying out all the works necessary, while being aware of and avoiding any possible danger and/or damage.
- Starting the unit up again after a fault, unless it has been repaired by qualified personnel.

THE FOLLOWING ARE OBLIGATORY:

- Doing maintenance work as indicated in chapter 6.
- Carrying out preliminary and periodic checks as indicated in the "STARTING UP" chapter.

3 STORAGE AND TRANSPORT



Danger due to loads that fall over or fall down!

Heavy loads that fall over or down may cause crushing, resulting in injuries to people and even death!

Do not put loads on top of the packing.



Danger due to lifting heavy loads!

Heavy loads that fall over or down may cause crushing, resulting in injuries to people and even death!

Before undertaking handling operations (lifting, moving, transporting, and putting down) look at the unit's mass (M) shown in the "CHARACTERISTIC DATA" table on page 3/4 and determine the best way to work in maximum safety.

In this regard all the prevention measures must be applied, including any local and/or specific regulations that make it possible to carry out the handling operations:

Using qualified personnel that have specific skills and adequate training.

With the help of suitable equipment.

Organising the work in such a way that it poses the least risk possible and is done under safe, healthy, conditions.

Using safe, stable support surfaces.

Use of suitable working clothes and adequate personal protective equipment (protective gloves and safety glasses, safety shoes and a hardhat).

Working in an area with sufficient space, even floors, no obstructions.

Avoiding impacts, jolting, and shaking.

Units with a mass that exceeds 25 kg (55 lbs) are fitted with lugs to be used for handling.

WARNING!

Lifting the unit is any way other than that indicated is strictly forbidden. Use the lug provided on the blower unit or motor.

Store in a dry place, keeping the packing if possible. Do not remove the covers over the openings.

4 INSTALLATION

4.1 SCL K COMPRESSOR – SUCTION PUMP



Any use other than the intended use of the unit may cause serious injury and even death!

- This operating manual:

  MUST be read carefully and understood fully before doing any work using the unit.

  MUST be complied with fully.

  MUST be to hand at all times at the workstation at which the unit is used.

- Remember that installation operations are only to be carried out by qualified personnel, that is, personnel whose training, instruction, experience, knowledge of standards, regulations, accident prevention procedures, and operating and service conditions, makes them capable of carrying out all the works necessary, while being aware of and avoiding any possible danger and/or damage.



Danger due to a lack of a clear view of the place in which the unit is installed!

Make sure that the unit installed is always under control when doing anything in the installation area.

The controls must be positioned in such a way as to be able to see the unit installed.

Danger of very serious injury!

WARNING!

If the flow rate has to be reduced, use a draw-off valve rather than throttling back the suction or delivery lines.

4.1.1 WORKING CONDITIONS

The "K" series of side channel compressors / suction pumps in an "MOR" format are made to generate vacuums and pressures, and for conveying air and gas that is not explosive, not inflammable, not poisonous, and not aggressive, for continuous operation in a non-explosive environment.

If installed outdoors, protect the unit against exposure to sunlight.

The maximum pressure differentials allowed are indicated in the "CHARACTERISTIC DATA" table on page 3 of this manual and must never be exceeded. Only the following conditions are valid:

As a compressor:
Gas intake temperature 20°C (+68°F) and atmospheric pressure 1013 mbar (abs) (29,92 in Hg) measured at the suction opening.

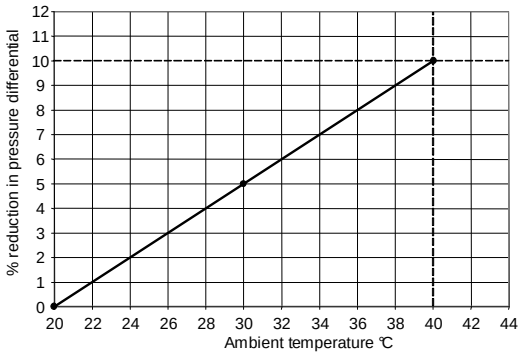
As a suction pump:
Gas intake temperature 20°C (+68°F) measured at the suction opening and atmospheric back pressure 1013 mbar (abs) (29,92 in Hg).

The ambient temperature and the intake temperature of the gas conveyed is allowed within the -15°C (+5°F) to + 40 °C (+104°F) range, with the following provisions:

- If the ambient temperature is +30°C (+86°F) **reduce** the maximum pressure differentials indicated in the "CHARACTERISTIC DATA" table on page 3/4 by 5%.

- If the ambient temperature is +40°C (+104°F) **reduce** the maximum pressure differentials indicated in the "CHARACTERISTIC DATA" table on page 3/4 by 10%.

The graph to be used to reduce the maximum pressure differentials when the ambient temperature is between +21°C (+70°F) and +40°C (+104°F) is given below.



4.1.2 INSTALLATION CONDITIONS

It is important that this unit be installed at an altitude not exceeding 1000 m above sea level. For installations at higher altitudes, contact FPZ for assistance.

The support surfaces for the unit must be flat, strong, stable, and as level as possible.

It is important that the unit be installed on a structure that does not transmit significant vibrations to the same.

Under all conditions, do not install units on structures that can transmit or amplify noise (tanks, steel plating, etc.).

The unit must always be installed using anti-vibration supports.

Danger due to vibrations!

Regularly check that the points at which the unit is fixed to the support structure are tight.

Excess vibration of the unit can cause damage to balance, resulting in injury to people and even death!

The unit must be installed in such a way that the motor's ventilation is not impeded by obstacles put in the immediate vicinity.
To this end a minimum gap must be kept between the motor's fan guard and any other structure of at least 50 mm.

WARNING!

To guarantee that the unit is well ventilated after installation, proceed as follows:
The air intake on the motor's fan guard must be kept free.

Air affected by other systems must NOT be sucked in again!

If the unit is installed in a closed space, guarantee a good flow of cooling air by using an extractor / fan and correct air intake for cooling the motor.

Any use other than the intended use of the unit may cause serious injury and even death!

To avoid overloading due to pressure fluctuations, fit a safety valve on the suction pipe if used as a suction pump and on the delivery pipe if used as a compressor.

Danger due to foreign bodies and dirt getting into the unit!

Any foreign bodies, even very small in size, getting into the unit causes serious damage and probable breakage of the impeller, and a danger that broken bits may be projected outwards!

Foreign bodies include: Dust, sand, lime scale, impurities in the pipes, cutting or threading burrs, welding drops or slag, metal burrs or residue of sealing products used when connecting up the pipework.

Protect the suction pipe using a suitable filter with a maximum degree if filtration of 25µm and a maximum load loss of ΔP=20mbar.

Replace filters regularly!

WARNING!

Size piping and choose accessories that cause the minimum load losses, and so:

Do not fit pipes of a diameter smaller than that of the machine's openings.

When installing a number of machines in parallel, size the manifold and main line accordingly.

Do not use elbows, but large radius bends.

Do not fit valves with a passage smaller than the nominal size and non-return valves with a spring-loaded shutter (the non-return valve that causes the smallest load loss is one with a lightened shutter).

When using for oxygenation, choose diffusers with a low passage resistance (low load loss) and do not forget that the spark plugs and porous sieves increase load losses over time due to gradual clogging.

WARNING!

Avoid the possibility of water stagnating, especially when installing the unit with its axis vertical.

See the INSTALLATION DIAGRAMS in chapter 8.

4.1.3 HORIZONTAL INSTALLATION

The unit is ready for installation in a horizontal position, suitably fixed to the foot/feet.

The foot has fixing holes. Use all the holes and suitable bolt types.

See point 4.1.2 for the INSTALLATION CONDITIONS.

Remove the covers over the openings before checking the direction of rotation and before final connection.

WARNING!

Check the direction of rotation in the motor.

(See point 4.2.3 ROTATION DIRECTION)

When connecting the unit cabin to the ducting, do so using the flanges on the silencer housings and form suitable connections using flexible hoses. Avoid rigid connections that may impose loads and give rise to harmful vibrations.

Fit the flanges on the silencer housings complete with gaskets again, and tighten.

4.1.4 INSTRUCTIONS FOR REPOSITIONING THE SILENCER HOUSINGS

Danger due to rotating components: Impeller!

There may be a danger of shearing due to the impeller rotating even when the machine is switched off, if it is started manually.

Suitable working clothes and personal protective equipment must therefore be used.

The SCL K-TS series is designed to provide maximum flexibility in positioning the silencer housings, to allow for various installation configurations.

The blower comes with the silencers positioned as shown in fig.1.

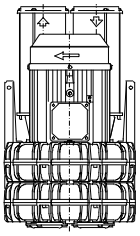


fig. 1

If this layout has to be modified, proceed to identify the layout of the silencer housings required.
The possible solutions are shown in fig 2, fig 3, and fig 4 below.

fig 2

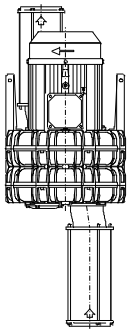
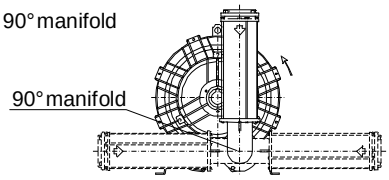


fig 2 with 90° manifold



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fig 3

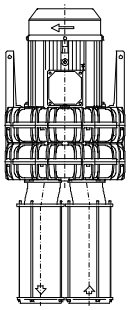


fig 3 with 90° manifolds

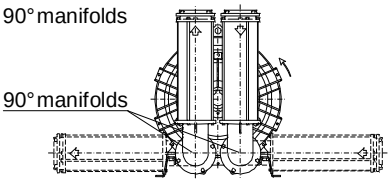


fig 4

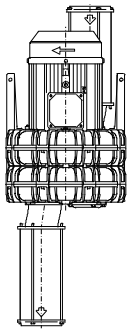
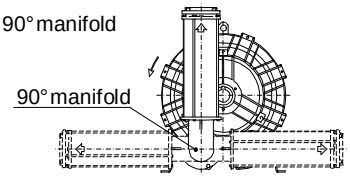


fig 4 with 90° manifold



Position the unit in a horizontal position with the feet on a flat, stable surface.

4.1.4.1 INSTRUCTIONS FOR SCL K07-TS / K08-TS

Disassembling the silencer housing: (see figure below)

- Remove the (904) screws, taking away the (706) manifold and the (424) gasket.

Fitting the blank (730) flange: (see figure below)

- Remove the (909) screws and the (730) flange with the (427) O-Ring.

Reassemble by proceeding in reverse order-do not forget the (424) and (427) gaskets.

4.1.4.2 INSTRUCTIONS FOR SCL K09-TS / K10-TS / K11-TS

Disassembling the silencer housing: (see figure below)

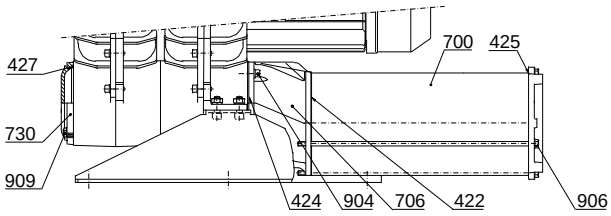
- Remove the (906) bolts
- Take away the silencer housing from the unit, along with (422) gasket
- Remove the (904) screws, taking away the (706) manifold and the (424) gasket

Fitting the blank (730) flange: (see figure below)

- Remove the (909) screws and the (730) flange with the (427) O-Ring.

Reassemble by proceeding in reverse order-do not forget the (422), (424) and (427) gaskets

If needed, reconstruct (425) seal using Loctite 5970 or similar, after cleaning the sealing surfaces of any existing sealant.



4.1.4.3 USING THE (accessory) CK TYPE 90° MANIFOLD KIT

The CK type 90° manifold kit comprises:

N°1 manifold
N°1 (422) gasket and
N°4 M8x25 UNI 5739 screws

To assemble the 90° manifold proceed as follows:

- Remove the silencer housing as described before.
- Put the gasket between the manifold (706) and the 90° manifold, and tighten the M8x25 UNI 5739 bolts.
- Assemble the silencer housing, following the instructions in reverse order and not forgetting (424) and (427) gasket.

4.1.5 VERTICAL INSTALLATION ON THE COVER

For installing in a vertical position, fit the anti-vibration supports supplied with the unit on the cover, and then fix the whole structure to the support.

See point 4.1.2 for the INSTALLATION CONDITIONS.

Any use other than the intended use of the unit may cause serious injury and even death!

When installing vertically DO NOT use the foot supplied with the unit as this is only suitable for horizontal installations.

Remove the covers over the openings before checking the direction of rotation and before final connection.

NOTE FOR THE USER

A foot for fitting the unit in a vertical position on the cover is available as an accessory.

The foot has fixing holes. Use all the holes and suitable bolt types.

WARNING!

Check the direction of rotation in the motor.

(See point 4.2.1 ROTATION DIRECTION)

When connecting the unit cabin to the ducting, do so using the flanges on the silencer housings and form suitable connections using flexible hoses. Avoid rigid connections that may impose loads and give rise to harmful vibrations.

Fit the flanges on the silencer housings complete with gaskets again, and tighten.

4.2 ELECTRIC MOTOR

Electrical danger!

- Inappropriate behaviour may result in serious injury and even death!
- Work on electrical equipment (installation and maintenance) is only to be done by qualified, authorised electricians!
- Before starting to work on the unit or plant, the following precautions must be taken:

  Make sure that the line is NOT switched on.

  Adopt measures to prevent it being switched on again.

  Only open the terminal board box after checking that the power is off altogether!
- The terminal board box must not contain:

  Foreign bodies

  Impurities

  Moisture.

Close the cover on the terminal board box and seal the openings in the cable glands in order to prevent dust, water, and moisture to penetrate.

Check the seals periodically.

- Should you touch a defective unit there may be a danger of electric shock!

  Fit a motor trip-switch.

  Have the unit's electrical system checked by an electrician on a regular basis.

The electric motor is sized to work at an ambient temperature between -15°C (+5°F) and +40°C (+104°F), and a maximum altitude of 1000 m above sea level.

Under other conditions the motor cannot be used at full load and so difficulties may arise for starting.

WARNING!

A maximum of n° 6 evenly distributed starts per hour, is allowed.

Failure to comply with this may seriously damage the unit.

4.2.1 CONNECTION

WARNING!

Connecting the motor incorrectly may seriously damage the unit.

The power supply for the motor and any auxiliary equipment must be provided using cables of suitable section to avoid abnormal overheating and great voltage drops.

Check that the details on the nameplate are compatible with the line voltage and frequency.

A voltage tolerance of ±10% compared to the nominal value is admissible.

Connect the motor's earth cable to the relevant terminal marked with this symbol ⏚ always before connecting to the mains supply and check the dispersion capacity.

The earth cable can be recognised by its colour (yellow/green).

This connection to the main supply must be formed as shown in the wiring diagram contained in the terminal board box.

Use the cable gland openings to allow power supply cables to pass into the terminal board box.

Proceed to tighten the power supply cables, taking the section of the electrical cables into account each time.

The terminal boards for the electrical connections must be tightened properly to avoid high contact resistances and resulting overheating.

Check that the insulation gaps between the various conductors are kept in the air and between surfaces, as indicated in the standards.

All the screws used to close the terminal board must be tightened properly. Damaged screws must be replaced immediately, using screws of the same or better quality.

The connection must guarantee:

- Long-lasting safety.
- That no wire ends are sticking out.

Fuses do not constitute protection for the motor, but merely protect against short-circuits.

Size the fuses according to the peak currents, especially when using direct starting.

Protection with a (thermal or amperometric) trip switches is essential to deal with risks of overloading, a loss of one phase in the mains supply, excessive voltage fluctuations, or the rotor getting stuck.

Set the motor trip switch using the current value shown on the nameplate as a maximum.

4.2.2 INVERTER POWERED ELECTRIC MOTOR

WARNING!

A maximum of n° 6 evenly distributed starts per hour, is allowed.

Failure to comply with this may seriously damage the unit.

WARNING!

The unit's nominal pressure or vacuum characteristics for service at mains frequency cannot be maintained if the unit is powered via an inverter.

If an inverter is used for the power supply the installer is responsible for the checks and any steps necessary to comply with the immunity and emission limits laid down by the standards.

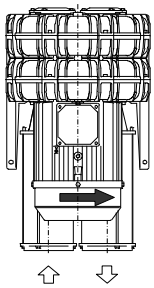
When using the unit with a motor powered via an inverter, follow the wiring instructions supplied by the inverter manufacturer carefully.

WARNING!

The performance of the unit powered via an inverter is shown in the relevant tables that can be requested from FPZ's assistance service.

4.2.3 ROTATION DIRECTION

The SCL K compressors – suction pumps must be used with the rotation direction shown by the arrow on the fan guard for the electric motor (see figure below).



To check the direction of rotation, switch on the motor very briefly. If the rotation direction is incorrect, switch the position of two of the three power supply conductors on the terminals.

5 STARTING UP

Any use other than the intended use of the unit may cause serious injury and even death!

The unit may only be started:

After having carefully read, fully understood, and complied with this operating manual ("SAFETY STANDARDS" and "INSTALLATION").

In conformity with the purposes laid down under "INTENDED USE".

According to the values indicated in the "CHARACTERISTIC DATA" table on page 3/4.

Danger due to rotating components (electric motor fan, impeller, and shaft): Cutting or shearing of limbs, entanglement or trapping of hair or clothing!

Danger due to excess pressure or vacuum: Sudden ejection of process fluids (injury to the skin and eyes), and sudden sucking in of hair and clothing!

Danger due to process fluids that come out and cause burns!

Danger due to burns caused by contact with hot surfaces on the unit!

Electrical danger!

Danger due to the impeller seizing due to use in an unsuitable place and/or due to conveying fluids that are not suitable: Unsuitable ambient and suction temperatures!

Danger resulting from the impeller seizing due to the performance values being exceeded: Vacuum and/or pressure exceeding the declared values and/or openings closed!

Danger due to noise emitted by the unit!

- CHECK THAT ALL THE SAFETY GUARDS HAVE BEEN FITTED CORRECTLY.

WARNING!

A maximum of n° 6 evenly distributed starts per hour, is allowed.

Failure to comply with this may seriously damage the unit.

5.1 PRELIMINARY CHECKS

Before finally starting up, carry out the following preliminary checks:

- If a lot of time has passed since the unit was last started up, check its condition and check for and if necessary remove dust deposited on the external surfaces.
- Deactivate/open any closing elements on the piping (closing valves, solenoid valves, etc.) before starting the unit.

  Do not allow the unit to be started and operate with the suction and/or delivery openings obscured for any reason!
- Check that the ambient and suction temperatures for the gas conveyed are between: -15°C (+5°F) and +40°C (+104°F).
- Check the rotation direction as indicated previously in the "INSTALLATION" chapter.
- Check that the setting for the motor trip switch corresponds to the motor's nominal current shown on the nameplate.
- Check that the safety valve is working correctly.

5.2 OPERATION

Having carried out all the preliminary checks, you can start with final starting of the unit.

Start the unit by switching on the power supply to the electric motor.

Check the operating pressure or vacuum and compare them to the values indicated in the "CHARACTERISTIC DATA" table on page 3/4. Load losses on the pipes are often underestimated but are determining factors for the operating pressure differential.

Measure the motor's absorption and check against the nameplate value.

Any use other than the intended use of the unit may cause serious injury and even death!

The unit may only be used:

- After having carefully read, fully understood, and complied with this operating manual ("SAFETY STANDARDS" and "INSTALLATION").
- In conformity with the purposes laid down under "INTENDED USE".
- According to the values indicated in the "CHARACTERISTIC DATA" table on page 3/4.

5.2.1 ROUTINE CHECKS

It is important that the units be checked routinely while running by qualified personnel, using inspections to avoid faults that may cause damage directly or indirectly.

When the unit is running, routinely carry out the following checks:

- Delivery temperature
- Operating pressure and/or vacuum
- Electric motor current absorption
- Vibrations
- State of the filter and related load loss.

Variations in normal working conditions (increases in power absorbed, anomalous noise, vibrations, excess overheating of the service fluid) indicate that the unit is not working correctly.

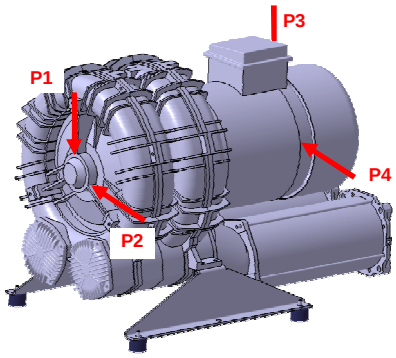
Also compare the values measured with those indicated in the "CHARACTERISTIC DATA" table on page 3/4.

See chapter 9 "TROUBLESHOOTING" for preventing possible breakage or faults.

Measuring vibrations

Measurements to determine vibration speed [mm/s] must be carried out using an electronic vibration meter at the points indicated below (see the figure below).

- **Points P1** and **P2 (front bearing):** The vibration meter must be put on the cover near the bearing seating, and the highest value must be recorded.
- **Points P3** and **P4 (back bearing):** The vibration meter must be put on the electric motor casing near the bearing seating (not on the fan guard), and the highest value must be recorded.



The results must be evaluated by comparing the maximum speed value measured with the limits laid down for the zones (A, B) shown in the table below, in compliance with ISO 14694.

Effective vibration speed value [mm/s]	***Class I*** (≤ 15kW)
1.8	***A***
4.5	***B***

Effective vibration speed value [mm/s]	***Class II*** (> 15kW)
2.8	***A***
7.1	***B***

Legend:

Machine classification:

Class I = SCL with electric motor power ≤ 15 kW
Class II = SCL with electric motor power > 15 kW

Evaluation zones:

Zone A = SCL with vibrations within this zone are considered acceptable for long-term service.

Zone B = SCL with vibrations within this zone are considered unsuitable for continuous long-term service. Under these conditions the machine can be operated for a limited period, until the opportunity arises for suitable corrective work to be done.

Danger resulting from the impeller seizing due to excessive vibrations!

Vibration values exceeding zone B (table of effective vibration speed values) are considered NOT admissible and may cause damage to the machine and resulting serious injury and even death!

- If any anomalous noises and/or vibrations are detected, these may be a warning that the impeller is about to seize, switch off the unit and move away from it immediately.

When the unit is stopped, routinely carry out the following checks:

- Dust deposits: Check and , if necessary, use suitable equipment to remove deposits on the external surfaces of the unit that may impede correct heat exchanging.
- Suction filter: Every 8-10 days check and if necessary clean or replace the filter cartridge. In very dusty environments, change the filter more frequently. A dirty cartridge creates extensive resistance at the suction, resulting in an increase in: the pressure differential, the power absorbed, and the operating temperature. The load loss must not exceed 30 mbar.

Electrical danger!

- Before doing anything else, make sure that the power supply is NOT switched on.

Danger due to burns caused by contact with hot surfaces on the unit!

When operating the compressors / suction pumps can reach high surface temperatures of up to 160°C (+320°F).

- Before starting with any work, wait for the unit to cool down after switching it off!

6 MAINTENANCE

Any use other than the intended use of the unit may cause serious injury and even death!

Maintenance may only be carried out on the unit:

If the maintenance instructions, parts list, and section/exploded view of the relevant unit are available.

After having carefully read, fully understood, and complied with this operating manual ("SAFETY STANDARDS" "STORAGE AND TRANSPORT" and "INSTALLATION").

In conformity with the purposes laid down under "INTENDED USE".

By qualified personnel, that is, personnel whose training, instruction, experience, knowledge of standards, regulations, accident prevention procedures, and operating and service conditions, makes them capable of carrying out all the works necessary, while being aware of and avoiding any possible danger and/or damage.

Danger due to burns caused by contact with hot surfaces on the unit!

When operating the compressors / suction pumps can reach high surface temperatures of up to 160°C (+320°F).

- Before starting with any work, wait for the unit to cool down after switching it off!

Electrical danger!

- Before doing anything else, make sure that the power supply is NOT switched on.

Any use other than the intended use of the unit may cause serious injury and even death!

The user is not authorised to make repairs or do maintenance work that involves restoring seized surfaces.

In these cases contact FPZ's assistance service or an authorised dealer.

After seizing the components involved may undergo deformation that makes the components unsuitable for being used again. Seized components must be analysed by FPZ before being reused or replaced.

- **Using unsuitable components may cause the impeller blades to break, giving rise to dangerous ejected fragments.**

Danger due to rotating components: Impeller!

There may be a danger of shearing due to the impeller rotating even when the machine is switched off, if it is started manually.

- **Suitable working clothes and personal protective equipment must therefore be used.**

6.1 INTERNAL CLEANING

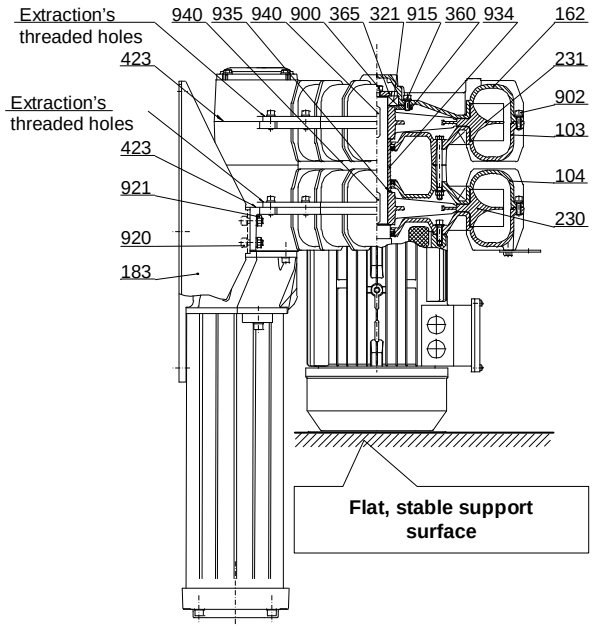
Should it be necessary to clean the inside of the unit, proceed as follows:

6.1.1 INSTRUCTIONS FOR K07-TS / K08-TS

1. Position the unit in a vertical position with the fan guard cowling on a flat, stable surface.
2. Remove the (183) mounting feet by removing (920) screws and (921) nuts.
3. Remove (915) and (902) screws in order from the (162) cover.
4. Remove the (162) cover by using the two threaded holes placed on cover itself.
5. Remove the (900) screw and (365) washer.
6. Remove the (321) bearing and (360) bearing cover working through the extractor.
7. Remove the (231) impeller through the extractor if necessary and (940) key.
8. Remove (902) screws from the (104) intermediate cover.
9. Remove components (103) and (104) and place them together, by using the two threaded holes placed on (104) intermediate cover.
10. Remove the (934) spacer.
11. Remove the (935) shims-be careful not to misplace.
12. Remove the (230) impeller through the extractor if necessary and (940) key.

Clean and reassemble following the instructions in reverse order, and forming the (423) seal using Loctite 5970 or a similar product after having carefully cleaned the surfaces previously sealed.

It's important not to reverse the position of the (230) and (231) impellers.

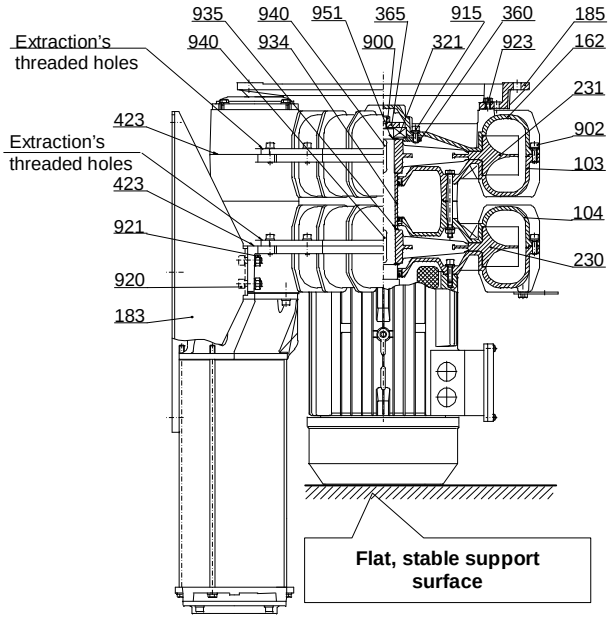


6.1.2 INSTRUCTIONS FOR K09-TS / K10-TS / K11-TS

1. Position the unit in a vertical position with the fan guard cowling on a flat, stable surface.
2. If present, remove the (185) mounting feet by removing (923) screws.
3. Remove the (183) mounting feet by removing (920) screws and (921) nuts.
4. Remove (915) and (902) screws in order from the (162) cover.
5. Remove the (162) cover by using the two threaded holes placed on cover itself.
6. Remove the (900) screw and (365) washer.
7. Remove the (321) bearing and (360) bearing cover working through the extractor.
8. Remove the (951) spacer ring.
9. Remove the (231) impeller through the extractor if necessary and (940) key.
10. Remove (902) screws from the (104) intermediate cover.
11. Remove components (103) and (104) and place them together, by using the two threaded holes placed on (104) intermediate cover.
12. Remove the (934) spacer.
13. Remove the (935) shims-be careful not to misplace.
14. Remove the (230) impeller through the extractor if necessary and (940) key.

Clean and reassemble following the instructions in reverse order, and forming the (423) seal using Loctite 5970 or a similar product after having carefully cleaned the surfaces previously sealed.

It's important not to reverse the position of the (230) and (231) impellers.

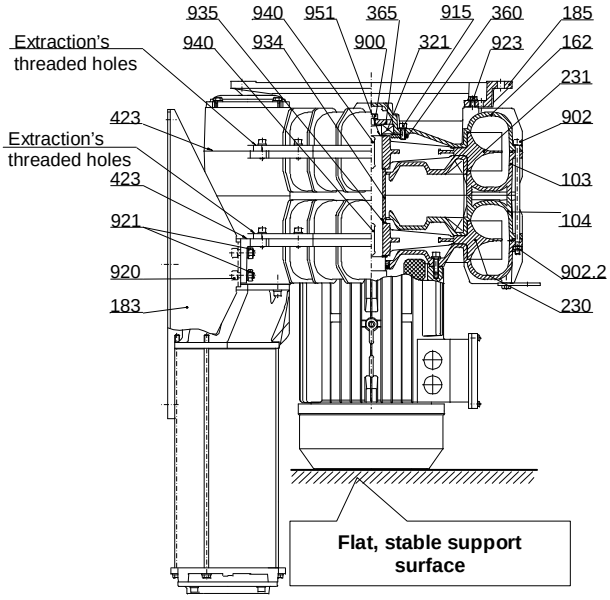


6.1.3 INSTRUCTIONS FOR K12-TS

1. Position the unit in a vertical position with the fan guard cowling on a flat, stable surface.
2. If present, remove the (185) mounting feet by removing (923) screws.
3. Remove the (183) mounting feet by removing (920) screws and (921) nuts.
4. Remove the (915) screws.
5. Remove the (902.2) nuts.
6. Remove (902) screws from the (162) cover.
7. Remove the (162) cover by using the two threaded holes placed on cover itself.
8. Remove the (900) screw and (365) washer.
9. Remove the (321) bearing and (360) bearing cover working through the extractor.
10. Remove the (951) spacer ring.
11. Remove the (231) impeller through the extractor if necessary and (940) key.
12. Remove components (103) and (104) and place them together, by using the two threaded holes placed on (104) intermediate cover.
13. Remove the (934) spacer.
14. Remove the (935) shims-be careful not to misplace.
15. Remove the (230) impeller through the extractor if necessary and (940) key.

Clean and reassemble following the instructions in reverse order, and forming the (423) seal using Loctite 5970 or a similar product after having carefully cleaned the surfaces previously sealed.

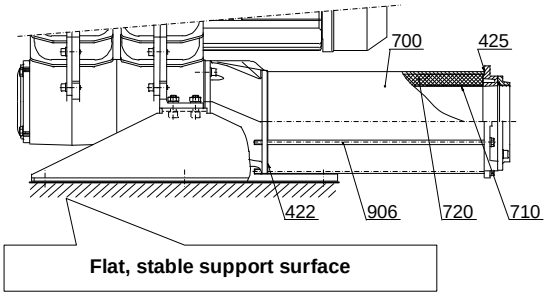
It's important not to reverse the position of the (230) and (231) impellers



6.2 REPLACEMENT SOUND-ABSORBING PANELS

If needed, replace the foam sound-absorbing panels, proceed as follows

1. Position the unit in a horizontal position with its foot on a flat, stable surface.
2. Remove the bolts (906).
3. Remove the silencers (700) from the unit, being careful not to lose the gaskets (422).
4. Remove the soundproofing (720) from the silencer housings.
5. Retrieve the support mesh (710).
6. Replace and reassemble-proceeding in reverse order, remembering to include the (422) gaskets.



6.3 LIFESPAN OF BEARINGS

Under normal operating conditions (values shown in CHARACTERISTIC DATA – page 3/4) the machine's bearings have to be replaced after a maximum of 25,000 working hours or not more than 4 years.

Any use other than the intended use of the unit may cause serious injury and even death!

The bearings may only be replaced:

If the instructions, parts list, and section/exploded view of the relevant unit are available.

After having carefully read, fully understood, and complied with this operating manual ("SAFETY STANDARDS" "STORAGE AND TRANSPORT" and "INSTALLATION").

In conformity with the purposes laid down under "INTENDED USE".

By qualified personnel, that is, personnel whose training, instruction, experience, knowledge of standards, regulations, accident prevention procedures, and operating and service conditions, makes them capable of carrying out all the works necessary, while being aware of and avoiding any possible danger and/or damage.

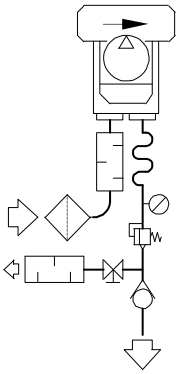
7 COMMERCIAL CONDITIONS

All undertakings, agreements, or legal relations are governed by the relevant sales contract. These are in no way limited by the contents of this manual.

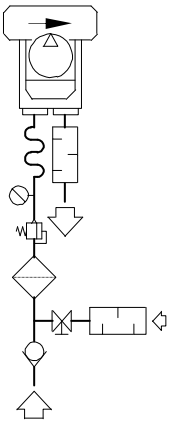
The quality of the materials and workmanship is guaranteed, as indicated in the general sales conditions. Guarantees are regulated by the general conditions of sale

8. INSTALLATION DIAGRAMS

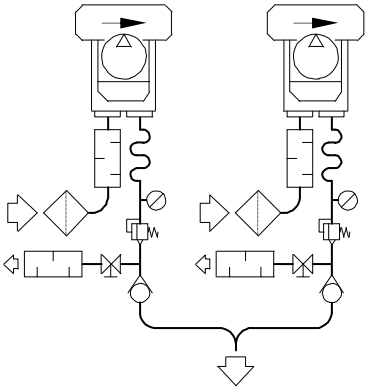
8.1 PRESSURE SERVICE



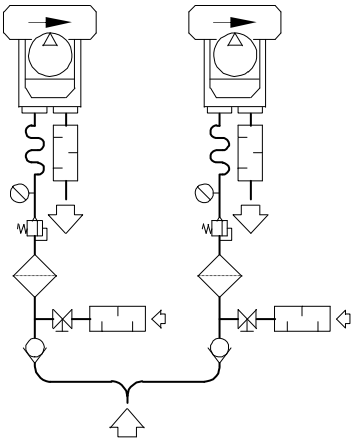
8.3 VACUUM SERVICE



8.2 PARALLEL PRESSURE SERVICE



8.4 PARALLEL VACUUM SERVICE



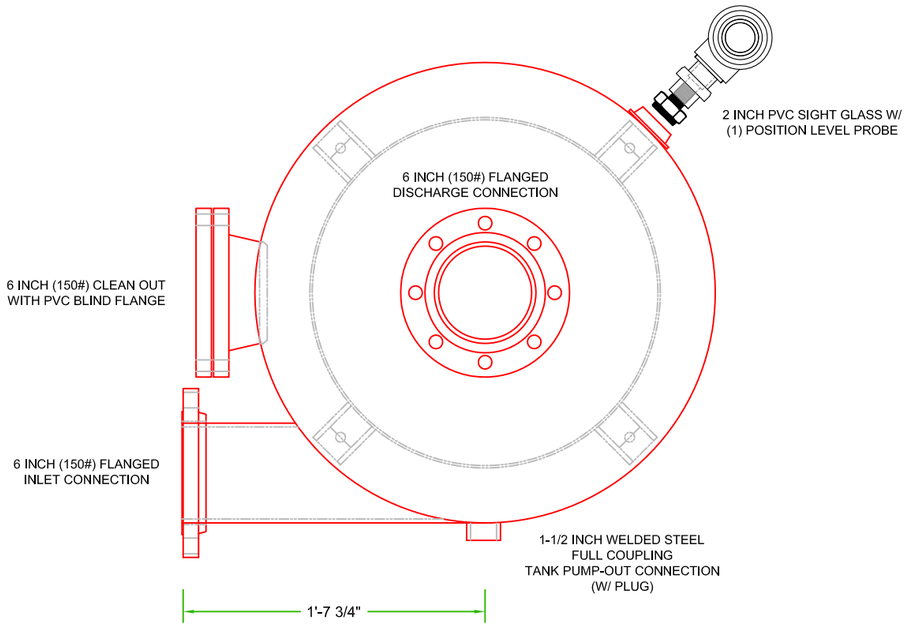
8.5 LIST ACCESSORIES

Item		Denomination	Item		Denomination
1		Filter – Inline filter	5		Safety valve
(2)		Silencer	6		Non return valve
3		Flexible coupling	7		Valve
4		Pressure – Vacuum gauge	(x) IF NECESSARY		

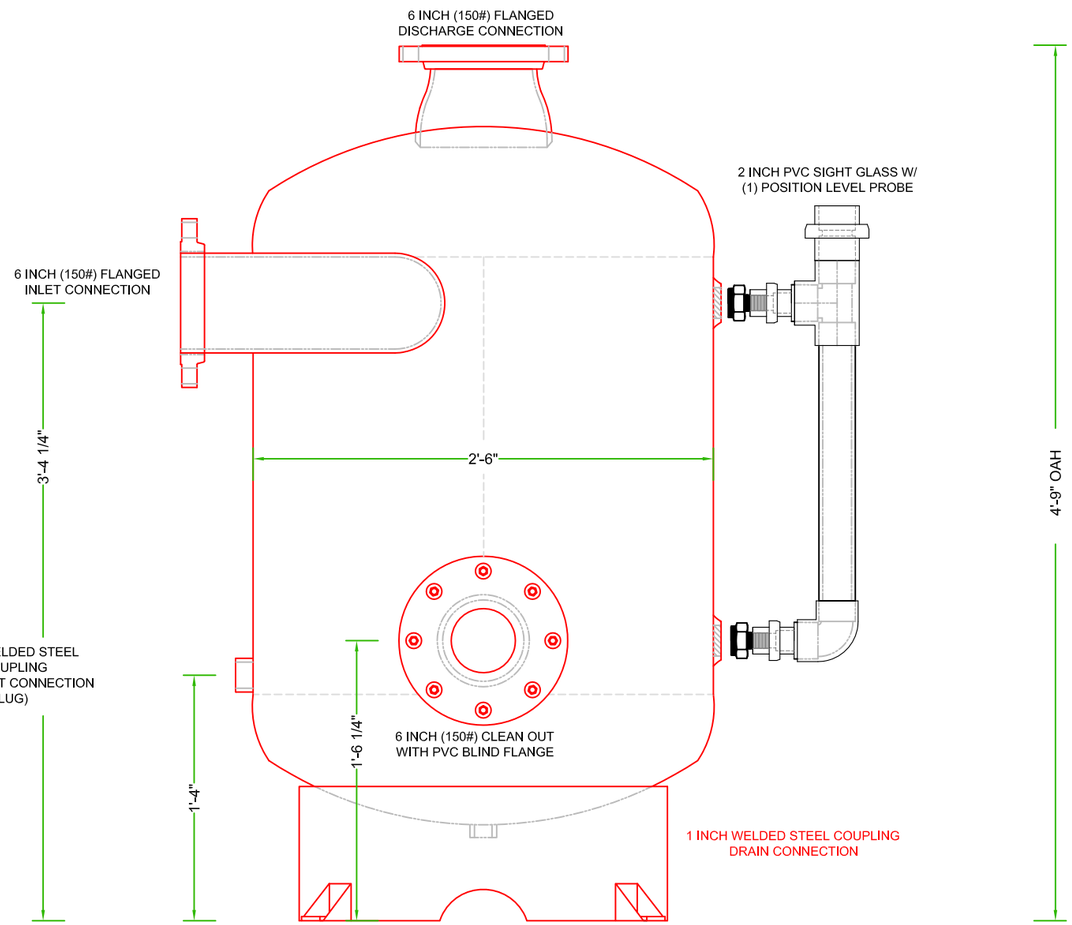
9 TROUBLESHOOTING

Problem	Cause	Solution
The unit does not start	Electrical wiring incorrect	Get the operator to check the electrical connection against the wiring diagram contained in the terminal board box.
	Power supply voltage unsuitable	Check that the power supply voltage, measured at the motor's terminals, is within +/- 10% of the nominal voltage.
	The impeller is stuck	Get the operator to repair the unit
No or insufficient air flow	The suction filter is clogged	Get the operator to clean or replace the cartridge
	Frequency wrong (for units powered via an inverter)	Correct the frequency
	Profile of the impeller blades modified (due to deposits on the profile)	Get the operator to clean the impeller, check if it is worn and, if necessary, replace it.
No or insufficient pressure differential	Incorrect rotation direction	Get the operator to invert the rotation direction by switching two of the electrical power supply conductors.
	Leaks in the plant	Identify the leak and seal
Current absorption exceeding the admissible value	Electrical wiring incorrect	Get the operator to check the electrical connection against the wiring diagram contained in the terminal board box.
	Drop in mains supply voltage	Get the operator to reinstate the power supply voltage at the terminals at the admissible values
	The suction filter is clogged	Get the operator to clean or replace the cartridge
	The unit has accumulated deposits inside	Get the operator to clean the inside of the unit
	The unit is operating at a pressure and/or vacuum that exceeds the admissible value	Adjust the system and/or the regulating valve to lower pressure differentials.
High delivery air temperature	The unit is operating at a pressure and/or vacuum that exceeds the admissible value	Adjust the system and/or the regulating valve to lower pressure differentials.
	The suction filter is clogged	Get the operator to clean or replace the cartridge
	The unit has accumulated deposits inside	Get the operator to clean the inside of the unit
	Suction and/or delivery piping obstructed.	Get the operator to remove any obstructions
	Suction air temperature exceeds 40°C (+104°F)	Use heat exchangers to reduce the suction air temperature
Anomalous noise	The soundproofing is damaged	Get the operator to replace the soundproofing
	The impeller scrapes against the casing. - The unit is operating at a pressure and/or vacuum that exceeds the admissible value	Reduce the pressure differentials in the plant
	- Reduction of assembly play due to internal deposits (dust, impurities in the pipes, process residues, etc.)	Get the operator to clean the inside of the plant
	Bearing worn	Get the operator to replace the bearing
	Unit's installation position unsuitable	Do not fit structures (tanks, steel plating, etc.) on the unit that can transmit or amplify noise
Abnormal vibrations	The impeller is damaged	Get the operator to replace the impeller
	The impeller has accumulated deposits	e uniGet the operator to clean the inside of th t
	Unit fixing without anti-vibration supports	Get the operator to fix the unit with anti-vibration supports
	Rigid connection to the plant	Get the operator to fit flexible hoses between the unit and the piping
	Bearing on the blower or motor side defective	Get the operator to replace the bearing
Leaks in the unit	Defective silencer gaskets	Get the operator to clean or replace the gaskets
	Defective cover gaskets	Get the operator to clean or replace the gaskets

The term "operator" means: A qualified person appointed to install, operate, set, clean, repair or move a unit or to carry out maintenance work on it.



(D-1) SEPARATOR TANK
PLAN VIEW



(D-1) SEPERATOR TANK
ELEVATIONAL VIEW

NOTES:
1. TANK CONSTRUCTION - CARBON STEEL. 200 PSI RATED VESSEL
2. EXTERIOR MECHANICALLY PRE-PARED, PRIMED AND PAINTED WITH INDUSTRIAL ENAMEL PAINT (RUSTOLEUM SERIES 7400 OR EQUAL)
3. ESTIMATED CONDENSATE LEVEL:
   LSHH-111 - 77 GALLONS

REV	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	10-08-15	JAD

REVISIONS

CONFIDENTIALITY NOTICE:
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DRWN BY	JAD
DATE	07-28-15
CHK BY	---
DATE	---
APPR BY	---
DATE	---

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NATIONAL ENVIRONMENTAL SYSTEMS
84 DUNHAM STREET / ATTLEBORO, MA 02703
508-226-1100 (Phone) / 508-226-1180 (Fax)
WWW.NES-INC.BIZ

TITLE: 120 GALLON VAPOR LIQUID SEPARATOR (D-1)

AECOM
FORMER OZONE INDUSTRIES SITE - QUEENS, NY

JOB NO. 15-152 (SVE)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	M-3	1 OF 1	A



Tank Style Moisture Separator

* 120 gallon total capacity
* Carbon Steel construction, exterior primed & painted
* 4" MNPT Tangential Inlet - Vapor
* Demister
* 4" FNPT Outlet - Vapor
* 2" Clear PVC Sight Glass
* Clean-out Man-way
* 1" Ball drain valve
* 2" MPT Pump Out - Liquid
* (3) Position High Level Switch

National Environmental Systems
Phone 508-226-1100 Fax 508-226)-1180 84 Dunham Street Attleboro, MA 02703
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Fax (262) 268-0415
E-mail usa@fpz.com

ACCESSORIES

Safety Valves

SS1006

The following table is a guide to select the appropriate safety valve. The selections in the table are based on blowers operating at **60 Hz -** for 50 hz applications refer to the safety valve data sheets. To select the appropriate safety valve, determine the blower model, horsepower, and whether it is to be used for vacuum or pressure service. If it is desirable to have the valve activate at lower pressures than the maximum rated pressure or vacuum of the blower, a different safety valve might be required (refer to safety valve data sheets). In some cases, two valves are required. ***FPZ valves are supplied uncalibrated.*** All safety valves included detailed instructions on how to calibrate and install the valve.

Single Stage Blowers

Model	HP	Safety Valve Vacuum	Safety Valve Pressure
K03-MS	3/4	**VRL6**	**VRL6**
K04-MS	ALL	**VRL6**	**VRL6**
K05-MS	ALL	**VRL6**	**VRL6**
K06-MS	3	**VRL6**	**VRL8**
K06-MS	4	**VRL6**	**VRL6**
K06-MS	5 1/2	**VRL6**	**VRL6**
K06-MS	6 1/5	**VRL6**	**VRL6**
K07-MS	4	**VRL8**	**VRL8**
K07-MS	5 1/2	**VRL6**	**VRL8**
K07-MS	7 1/2	**VRL6**	**VRL6**
K07-MS	10	**VRL6**	**VRL6**
K08-MS	5.5	**VRL8**	**VRL9**
K08-MS	7 1/2	**VRL8**	**VRL8**
K08-MS	10	**VRL6**	**VRL8**
K08-MS	15	**VRL6**	**VRL6**
K09-MS	7 1/2	**VRL9**	**VRL9**
K09-MS	10	**VRL8**	**VRL8**
K09-MS	15	**VRL6**	**VRL8**
K09-MS	20	**VRL6**	**VRL6**
K10-MS	7 1/2	**VRL9**	**VRL9**
K10-MS	10	**VRL9**	**VRL9**
K10-MS	15	**VRL8**	**VRL8**
K10-MS	20	**VRL6**	**VRL8**
K10-MS	25	**-**	**VRL6**
K11-MS	10	**VRL9**	**VRL9**
K11-MS	15	**VRL9**	**VRL9**
K11-MS	20	**VRL8**	**VRL8**
K11-MS	25	**VRL6**	**VRL8**
K12-MS	15	**VRL9**	**VRL9**
K12-MS	20	**VRL9**	**VRL9**
K12-MS	25	**VRL8**	**VRL8**
K03-TS	ALL	**VRL6**	**VRL6**
K04-TS	ALL	**VRL6**	**VRL6**
K05-TS	ALL	**VRL8**	**VRL8**
K06-TS	5 1/2	**VRL9**	**VRL9**
K06-TS	7 1/2	**VRL8**	**VRL8**
K06-TS	10	**VRL6**	**VRL8**
K07-TS	7 1/2	**VRL9**	**VRL9**
K07-TS	10	**VRL9**	**VRL9**
K07-TS	15	**VRL8**	**VRL8**
K08-TS	7 1/2	N.A	N.A.
K08-TS	10	**VRL9**	**(2) VRL9**
K08-TS	15	**VRL9**	**VRL9**
K09-TS	15	**(2) VRL9**	**(2) VRL9**
K09-TS	20	**VRL9**	**VRL9**
K09-TS	25	**VRL8**	**VRL9**
K10-TS	15	**(2) VRL9**	**(2) VRL9**
K10-TS	20	**(2) VRL9**	**(2) VRL9**
K10-TS	25	**VRL9**	**VRL9**
K11-TS	25	**(2) VRL9**	**(2) VRL9**
K11-TS	30	**(2) VRL9**	**(2) VRL9**
K12-TS	30	**(3) VRL9**	**(3) VRL9**
115SH	30	**(2) VRL9**	**(2) VRL9**
115SH	40	**VRL9**	**VRL9**
115SH	50	**VRL9**	**VRL9**

Two Stage Blowers

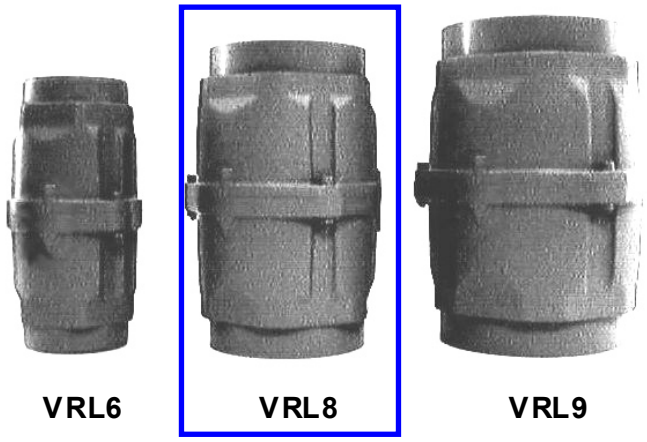
Model	HP	Safety Valve Vacuum	Safety Valve Pressure
15DH	ALL	**VRL6**	**VRL6**
20DH	ALL	**VRL6**	**VRL6**
30DH	ALL	**VRL6**	**VRL6**
40DH	ALL	**VRL6**	**VRL6**
K07-MD	3	**VRL6**	**VRL6**
K07-MD	4	**VRL6**	**VRL6**
K07-MD	5 1/2	**VRL6**	**VRL6**
K07-MD	7 1/2	**VRL6**	**VRL6-HP**
K08-MD	5 1/2	**VRL6**	**VRL6**
K08-MD	7 1/2	**VRL6**	**VRL6**
K08-MD	10	**VRL6**	**VRL6**
K08-MD	15	**-**	**VRL6-HP**
K09-MD	5 1/2	**VRL8**	**VRL8**
K09-MD	7 1/2	**VRL6**	**VRL6**
K09-MD	10	**VRL6**	**VRL6**
K09-MD	15	**-**	**VRL6-HP**
K10-MD	7 1/2	**VRL8**	**VRL8**
K10-MD	10	**VRL6**	**VRL6**
K10-MD	15	**VRL6**	**VRL6**
K10-MD	20	**-**	**VRL6-HP**
K11-MD	10	**VRL8**	**VRL8**
K11-MD	15	**VRL6**	**VRL8**
K11-MD	20	**VRL6**	**VRL6-HP**
K11-MD	25	**-**	**VRL6-HP**
K12-MD	15	**VRL8**	**VRL8**
K12-MD	20	**VRL6**	**VRL6**
K12-MD	25	**-**	**VRL6-HP**
K04-TD	2	**VRL6**	**VRL6**
K04-TD	3	**VRL6**	**VRL6**
K05-TD	3	**VRL6**	**VRL6**
K05-TD	4	**VRL6**	**VRL6**
K05-TD	5 1/2	**VRL6**	**VRL6**
K06-TD	5 1/2	**VRL6**	**VRL8**
K06-TD	7 1/2	**VRL6**	**VRL6**
K06-TD	10	**VRL6**	**VRL6**
K07-TD	7 1/2	**VRL8**	**VRL8**
K07-TD	10	**VRL6**	**VRL6**
K07-TD	15	**VRL6**	**VRL6**
K08-TD	7 1/2	**VRL8**	**VRL8**
K08-TD	10	**VRL8**	**VRL8**
K08-TD	15	**VRL6**	**VRL6**
K09-TD	15	**VRL8**	**VRL8**
K09-TD	20	**VRL6**	**VRL8**
K09-TD	25	**VRL6**	**VRL6**
K10-TD	15	**VRL9**	**VRL9**
K10-TD	20	**VRL8**	**VRL8**
K10-TD	25	**VRL6**	**VRL8**
K11-TD	20	**VRL9**	**VRL9**
K11-TD	25	**VRL8**	**VRL8**
K12-TD	25	**VRL8**	**VRL8**
K12-TD	30	**VRL9**	**VRL9**
115DH	25	**VRL8**	**VRL8**
115DH	30	**VRL6**	**VRL8**
115DH	40	**VRL6**	**VRL6**

Valve selections are based on 60 Hz operation and refer to air having a density equal to 0.075 lbs / cu. Ft and inlet temperature of 68 deg F. Data is subject to change without notice.

FPZ, Inc
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Saukville, WI, 53080 - **U.S.A.**
Tel. (262) 268-0180
Fax (262) 268-0415
E-mail usa@fpz.com

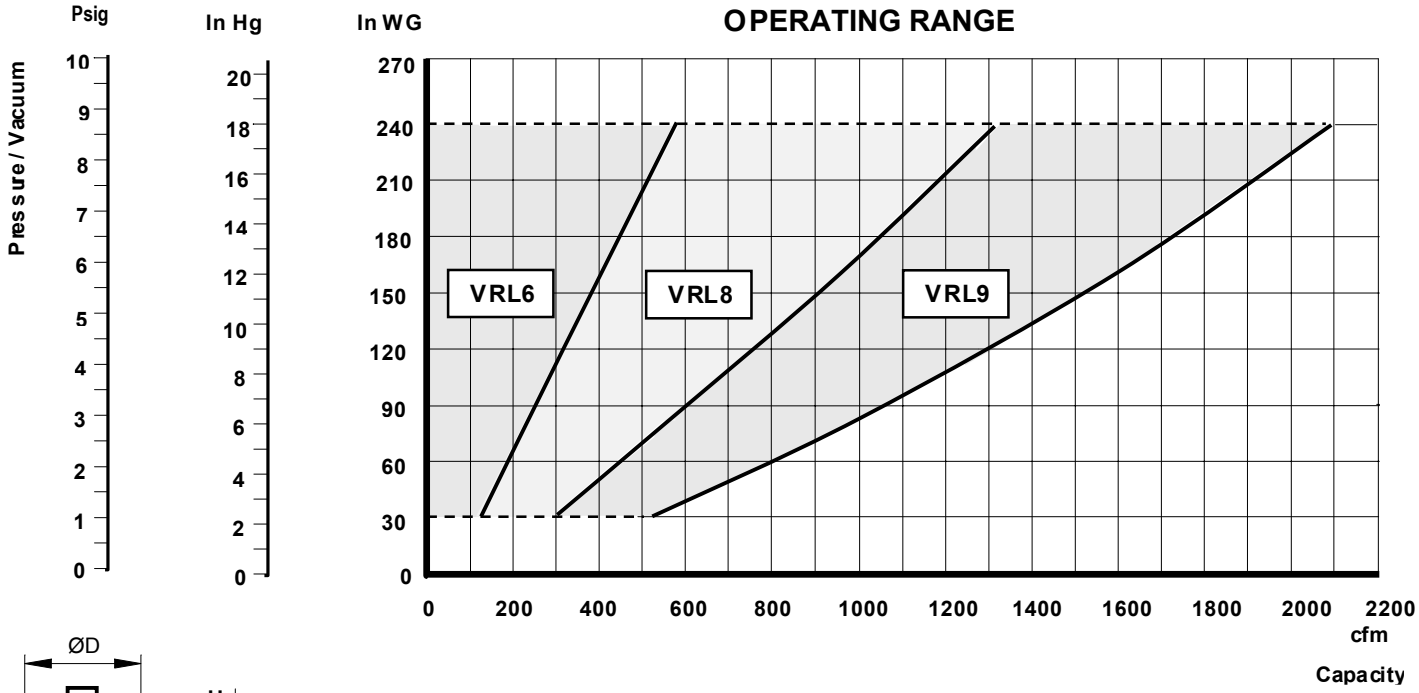
Safety Valves

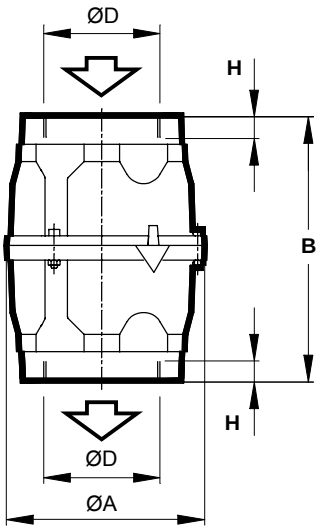
The VRL valves are designed to protect blowers and / or motors from over pressurization or excess vacuum. When there is over pressurization, the valve opens and discharges to the outside. When there is excess in vacuum, the valve opens and takes flow from outside.
The valve have been designed for low pressure / low vacuum, with minimal difference between the initial value at which the valve begins to open and its fully-opened position. The valves are supplied with 2 different springs to maximize its efficiency.
These compact valves, made of aluminum alloy, are both easy to install and calibrate. The valves are designed to operate in a wide range of capacities. The VRL can be plumbed to divert excess primary flow through a secondary external outlet when working in pressure conditions or to pipe-in a secondary flow when working in vacuum.
Maximum efficiency is achieved by keeping operating values (flow versus pressure or vacuum) within the operating range (shaded area on graph). Capacity refers to air having a density equal to 0.075 lbs./cu.ft .



VRL6 **VRL8** **VRL9**

OPERATING RANGE





OVERALL DIMENSIONS

TYPE	ND	D	A	B	H	WEIGHT (Lbs)
VRL6	2"	2" NPT	3.94	6.57	0.47	2.1
VRL8	3"	3" NPT	5.31	7.48	0.59	4.2
VRL9	4"	4" NPT	6.30	8.11	0.71	5.7

- Dimensions in inches.
- Specifications subject to change without prior notice.

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www.fpz.com

I – GB – F – D – E **SN 1701-7**

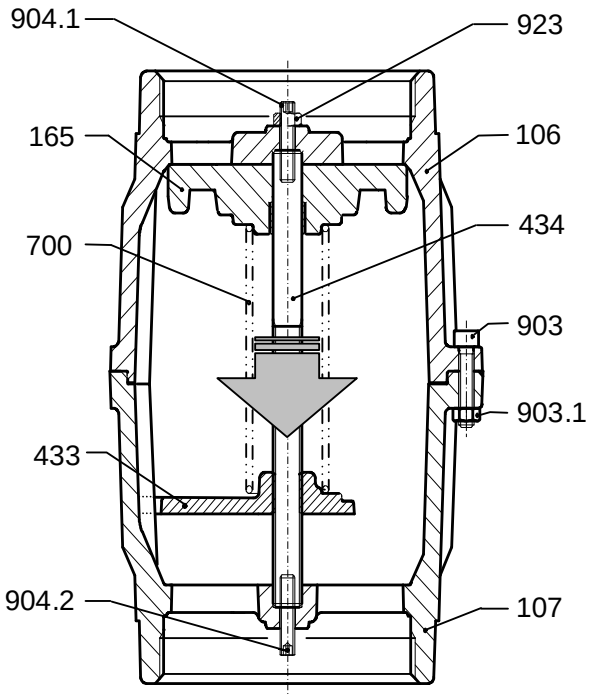
VALVOLA DI SICUREZZA VRL
SAFETY VALVE VRL
SOUPAPE DE SECURITE VRL
SICHERHEITSVENTIL VRL
VALVULA DE SEGURIDAD VRL

ISTRUZIONI D'USO
USE INSTRUCTIONS
INSTRUCTIONS D'UTILISATION
ANWENDUNGSHINWEISE
INSTRUCCIONES PARA EL USO

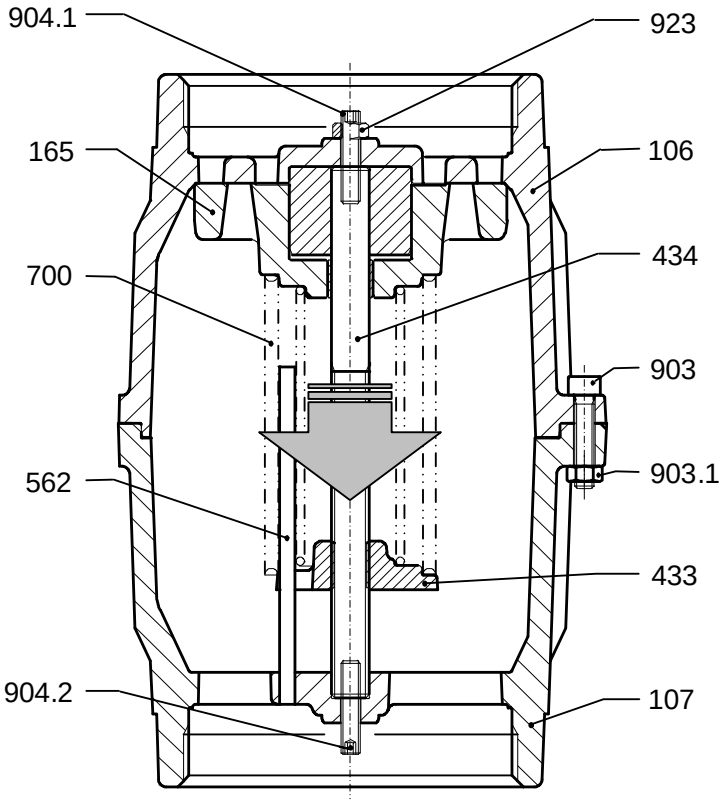
ATTENZIONE! LA VALVOLA E' FORNITA NON TARATA
CAUTION! THE VALVE IS SUPPLIED NOT CALIBRATED
ATTENTION ! LA SOUPAPE EST FOURNIE NON TAREE
ACHTUNG ! DAS VENTIL IST WERKSEITIG NICHT GEEICHT
ATENCION ! LA VALVULA NO ESTA GRADUADA



LEGGERE ATTENTAMENTE TUTTE LE ISTRUZIONI E CONSERVARLE
PLEASE READ CAREFULLY ALL INSTRUCTIONS AND KEEP THEM FOR FUTURE REFERENCE
LIRE ATTENTIVEMENT TOUTES LES INSTRUCTIONS ET LES CONSERVER
ALLE ANLEITUNGEN SIND SORGFÄLTIG ZU LESEN UND AUFZUBEWAHREN!
LEER ATENTAMENTE LAS INSTRUCCIONES Y CONSERVARLAS



VRL6
Fig. 1a



VRL8 - VRL9
Fig. 1b

ITEM	Denominazione - *Description* - Désignation - *Description* - Descripciòn
106	Corpo - *Housing* - Corps supérieur - *Gehäuse* - Cuerpo
107	Coperchio - *Cover* - Couvercle - *Abdeckung* - Cubierta
165	Otturatore - *Shutter* - Obturateur - *Verschluss* - Obturador
433	Piattello guida molla - *Spring guide disc* - Guide ressort - *Federführungsscheibe* - Disco guìa muelle
434	Asta - *Shutter guide* - Tige - *Schließführung* - Vastago
562	Spina cilindrica - Dowel pin -Goupille cylindrique - *Führungsstift* - Pin
700	Molla - *Spring* - Ressort - *Feder* - Muelle
903	Vite - *Screw* - Vis - *Schraube* - Tornillo
903.1	Dado - *Nut* - Ecrou - *Schraubenmutter* - Tuerca
904.1	Grano superiore - *Upper grub screw* - Tige de réglage supérieure – *Obere Einstellschraube* - Espàrrago superior
904.2	Grano inferiore - *Lower grub screw* - Tige de réglage inférieure - *Untere Einstellschraube* - Espàrrago inferior
923	Dado di fermo - *Nut* - Ecrou de blocage -*Schraubenmutter* - Contratuerca

I CONDIZIONI D'UTILIZZO

- **LE VALVOLE VRL SONO ADATTE AL CONVOGLIAMENTO DI ARIA E GAS NON ESPLOSIVI, NON INFIAMMABILI, NON AGGRESSIVI, IN ATMOSFERA NON ESPLOSIVA. LA TEMPERATURA DEL FLUIDO CONVOGLIATO È AMMESSA NEL CAMPO DI -15 A +160 °C.**
- **VALVOLE PROGETTATE E FABBRICATE PER LA LIMITAZIONE NEL CAMPO DELLE BASSE PRESSIONI / DEPRESSIONI, PER UN UTILIZZO SPECIFICO SU SOFFIANTI, ASPIRATORI E COMPRESSORI A BASSE PRESSIONI;**
- **NON SOPPORTANO PRESSIONI INTERNE ELEVATE, COMUNQUE NON SUPERIORI A 2.8 bar A;**
- **SONO SOGGETTE A PICCOLE PERDITE DEL FLUIDO CONVOGLIATO;**
- **CORPI SOLIDI ANCHE DI PICCOLE DIMENSIONI E SPORCIZIA POSSONO PROVOCARE GRAVI DANNI, VANNO QUINDI SEPARATI DAL FLUSSO MEDIANTE ADEGUATI FILTRI IN ASPIRAZIONE.**

GB *CONDITIONS OF USE*

- ***THE VRL VALVES ARE DESIGNED FOR THE HANDLING OF AIR OR NON-EXPLOSIVE, NON-HAZARDOUS AND NON-FLAMMABLE GASES IN NON-EXPLOSIVE ENVIRONMENTS. THE GAS INLET TEMPERATURE MUST BE IN THE RANGE OF -15 TO +160 °C.***
- ***RELIEF VALVES ARE DESIGNED AND MANUFACTURED TO LIMIT THE OPERATING PRESSURE IN LOW PRESSURE/VACUUM APPLICATIONS. THEY ARE FOR USE SPECIFICALLY ON LOW PRESSURE BLOWERS AND VACUUM PUMPS ONLY;***
- ***THE VALVE CANNOT WITHSTAND HIGH INTERNAL PRESSURE, DESIGN MAXIMUM OF 2.8 bar A;***
- ***THERE IS SMALL LOSS OF THE AIR/GAS BEING HANDLED;***
- ***SOLID PARTICULES, HOWEVER SMALL, INCLUDING DIRT CAN CAUSE SERIOUS DAMAGE; THEREFORE IT IS ESSENTIAL THAT SUCH SUBSTANCES SHOULD BE REMOVED FROM THE GAS BY SUITABLE FILTERS UPSTREAM OF THE INLET.***

F CONDITIONS D'UTILISATION

- **LES SOUPAPES VRL SONT ADAPTÉS À L'ACHEMINEMENT D'AIR ET DE GAZ NON EXPLOSIFS, ININFLAMMABLES, NON AGRESSIFS, DANS UNE ATMOSPHÈRE NON EXPLOSIVE. LA TEMPÉRATURE DU FLUIDE ACHEMINÉ EST ADMISE DANS UN ÉVENTAIL DE -15 À +160 °C.**
- **CES SOUPAPES ONT ETÉ DÉVELOPPÉES ET CONSTRUITES AFIN DE LIMITER LES VALEURS MAXIMALES VIDE/PRESSION ET LEUR UTILISATION EST SPÉCIFIQUEMENT RESERVÉE AUX ASPIRATEURS ET COMPRESSEURS BASSES PRESSION;**
- **NE SUPPORTENT PAS DES PRESSIONS INTERNES ÉLEVÉES, C'EST-À-DIRE DES PRESSIONS SUPÉRIEURES À 2.8 bar A;**
- **SONT SUJETTES À DE PETITES PERTES DU FLUIDE ACHEMINÉ;**
- **DES CORPS SOLIDES MÊME DE PETITES DIMENSIONS ET LÉGÈREMENT SALES PEUVENT PROVOQUER DE GRAVES DOMMAGES, ILS SONT PAR CONSÉQUENT SÉPARÉS DU FLUX PAR DES FILTRES ADÉQUANTS EN ASPIRATION.**

D *EINSATZBEDINGUNGEN*

- ***DIE VENTILE DER SERIE VRL SIND FÜR DEN DAUERBETRIEB IN NICHT-EXPLOSIVER UMGEBUNG ZUM ANSAUGEN UND VERDICHTEN VON LUFT ODER NICHT-EXPLOSIVEN, NICHT-BRENNBAREN UND NICHT-AGGRESSIVEN GASEN GEEIGNET. DIE ZULÄSSIGE ANSAUGTEMPERATUREN LIEGT ZWISCHEN -15 BIS +160 °C.***
- ***DIE SPEZIELL FÜR DEN NIEDERDRUCK- BZW. NIEDERVAKUUMBEREICH ENTWICKELTEN VENTILE SIND FÜR DIE SPEZIFISCHE ANWENDUNG IN VAKUUMPUMPEN UND KOMPRESSOREN GEEIGNET;***
- ***DIE GEHÄUSE WIDERSTEHEN KEINEN HOHEN INNENDRÜCKEN. UNTER KEINEN UMSTÄNDEN DARF DER MAX. BETRIEBSDRUCK VON 2.8 bar A ÜBERSCHRITTEN WERDEN;***
- ***DIE VENTILE SIND NICHT VOLLSTÄNDIG GASDICHT;***
- ***FREMDKÖRPER, AUCH GERINGER GRÖßE, UND VERUNREINIGUNGER KÖNNEN SCHWERE SCHÄDEN VERURSACHEN. SIE MÜSSEN DAHER AUS DEM FÖRDERMEDIUM MIT GEEIGNETEN ANSAUGFILTERN ENTFERNT WERDEN.***

E CONDICONES DE USO

- **LAS VALVULAS VRL SON ADAPTAS PARA EL MOVIMIENO DE AIRE O GASES NO EXPLOSIVOS, NO PELIGROSOS Y NO INFLAMABLES Y PARA SERVICIO EN AMBIENTES NO EXPLOSIVOS. LA TEMPERATURA DE ENTRADA DEL GAS DEBE ESTAR ENTRE LOS –15 Y +160 °C.**
- **VALVULAS PROYECTADAS Y FABRICADAS PARA LA LIMITACION EN EL SECTOR DE LAS BAJAS PRESIONES / VACIOS, PARA UN UTILIZO SOBRE ASPIRADORES, COMPRESORES A BAJAS PRESIONES.**
- **LA VALVULA NO PUEDE CONTENER PRESIONES INTERNAS ALTAS, NO MAYORES QUE 2.8 bar A;**
- **HAY UNA PECHEÑA PERDIDA DE FLUIDO MANEJADO;**
- **LAS PARTICULAS SOLIDAS, AUNQUE PEQUEÑAS, INCLUIDO EL POLVO, PUEDEN CAUSAR SERIOS DAÑOS. POR LO TANTO ES ESENCIAL QUE DICHAS SUSTANCIAS SEAN ELIMINADAS DEL GAS MEDIANTE FILTROS APROPIADOS ANTES DE LA ENTRADA.**

DIAGRAMMA DI SELEZIONE - *SELECTION DIAGRAM*
SCHÉMA DE SÉLECTION – AUSWAHLDIAGRAMM
DIAGRAMA DE SELECCION

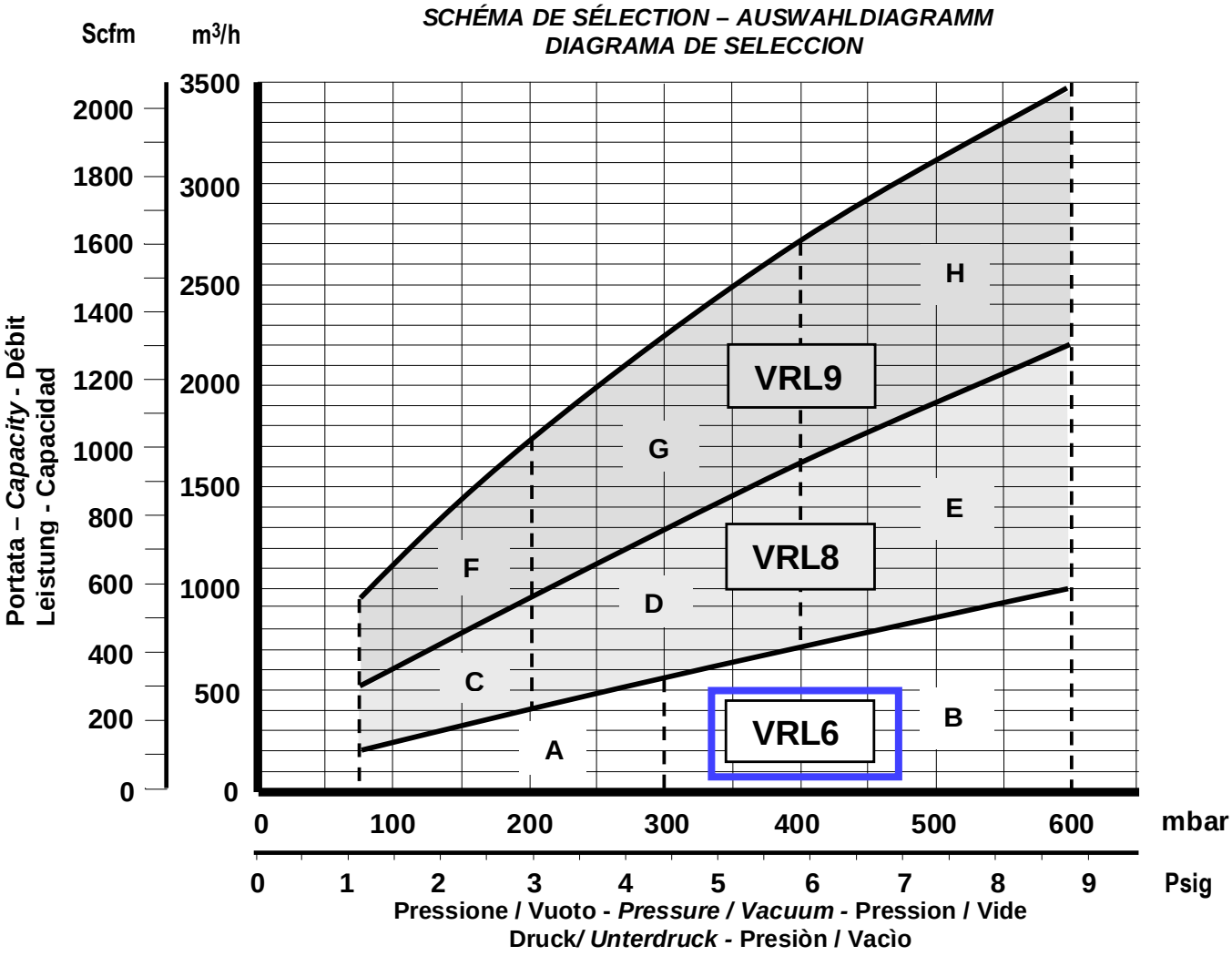


TABELLA DI SELEZIONE MOLLA - *SPRING SELECTION CHART* - TABLEAU DE SÉLECTION RESSORT
***UEBERSICHTSTABELLE FEDERN* - TABLA DE SELECCION MUELLE**

RANGE	MOLLA *SPRING* RESSORT *FEDER* MUELLE N°	Pressione / Vuoto *Pressure / Vacuum* Pression / Vide *Druck / Underdruck* Presiòn / Vacìo MIN [mbar]	MIN [psig]	Pressione / Vuoto *Pressure / Vacuum* Pression / Vide *Druck / Underdruck* Presiòn / Vacìo MAX [mbar]	MAX [psig]	Colore di identificazione *Colour of identification* Couleur d' identification *Farbidentifizierung* Color de identificaciòn
VRL6						
A	I	75	1.102	300	4.408	-
B	II	300	4.408	600	8,820	VERDE - *GREEN* - VERT - *GRÜN* - VERDE
VRL8						
C	I	75	1.102	200	2.940	-
D	II	200	2.940	400	5.880	VERDE – *GREEN* VERT - *GRÜN* - VERDE
E	I + II	400	5.880	600	8,820	-
VRL9						
F	I	75	1.102	200	2.940	VERDE - *GREEN* - VERT - *GRÜN* - VERDE
G	II	200	2.940	400	5.880	-
H	I + II	400	5.880	600	8,820	-

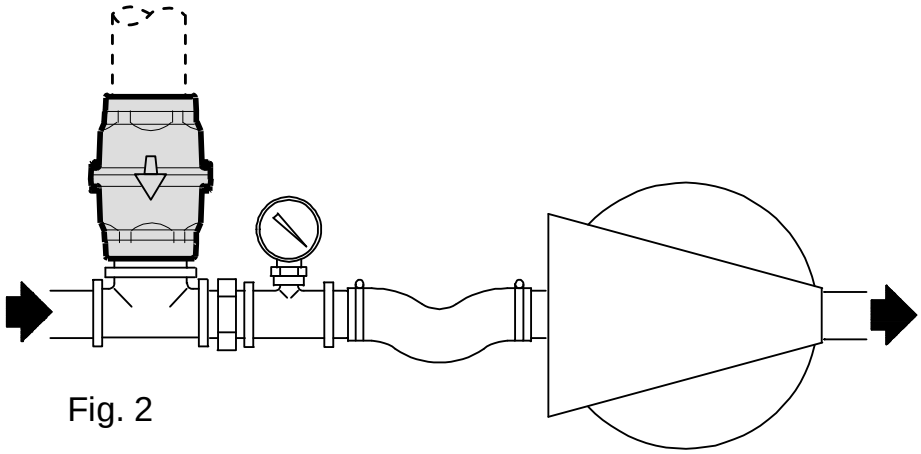


Fig. 2

SCHEMA DI INSTALLAZIONE – VALVOLA LIMITATRICE DI VUOTO
INSTALLATION SKETCH – VACUUM RELIEF VALVE
INSTALLATIONSSCHEMA – VAKUUMVENTIL
SCHÉMA DE INSTALLATION – SOUPAPE CASSE VIDE
ESQUEMA DE INSTALATIÒN – VALVULA LIMITADORA DE VACIO

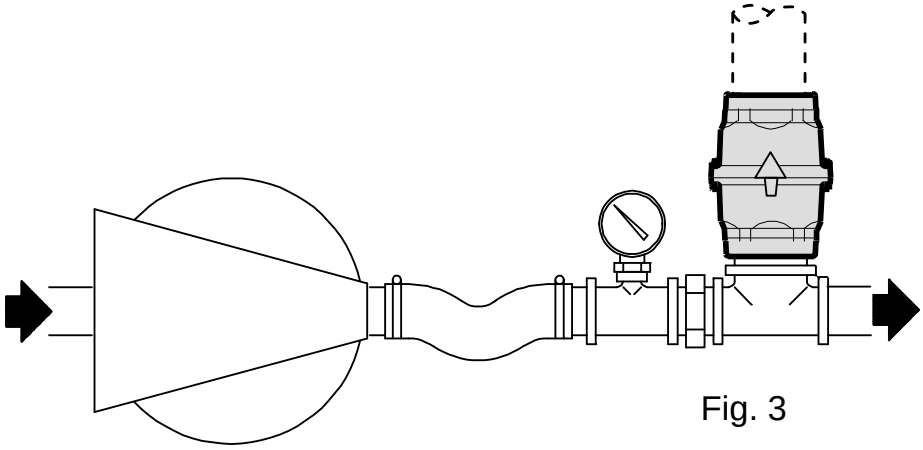


Fig. 3

SCHEMA DI INSTALLAZIONE – VALVOLA LIMITATRICE DI PRESSIONE
INSTALLATION SKETCH – PRESSURE RELIEF VALVE
INSTALLATIONSSCHEMA – DRUCKVENTIL
SCHÉMA DE INSTALLATION – SOUPAPE DE SÉCURITÉ
ESQUEMA DE INSTALATIÒN – VALVULA LIMITADORA DE PRESION

1. CHOICE OF SPRING

The valve is supplied with 2 different springs; each spring is to be used within a specific pressure-vacuum operating range. For the VRL8 and VRL9 there is the possibility to use both springs working in parallel.
Referring to the SELECTION DIAGRAM, check that the valve is correctly sized and depending where the operating point (area A, B,…H) is located, choose one or two springs according to SPRING SELECTION CHART.
The valve is supplied with spring # I installed. If spring needs to be replaced or a supplementary spring is needed to be added (for VRL8 / VRL9), proceed to point # 2 otherwise, adjust valve as per point #3.

2. INSTRUCTIONS FOR SPRING REPLACEMENT (OR MOUNTING ADITIONAL SPRING FOR VRL8 / VRL9)

- Remove the two plastic caps on valve.
- **Ensure stop-nut 923 is locked on the upper housing 106.**
- Unscrew screw 903 from nut 903.1.
- Remove cover 107 from housing 106.
- Unscrew spring guide disc 433 taking it out from shutter guide 434.
- Remove spring 700 (only in case of replacement).
- Install the appropriate spring into shutter 165.
- Compress spring and screw spring guide disc 433 on shutter guide 434 for at least 20 full thread terms.
- Check that both ends of the spring are properly positioned within their seats.
- Install the cover 107 on the housing 106 inserting:
  - for VRL6: the sliding guide on the slot in spring guide disc 433.
  - for VRL8 and VRL9: dowel pin 562 on the slot in spring guide disc 433.
- Tighten screw 903 on nut 903.1.

3. VALVE SETTING

A) Setting-up at allowed vacuum level

- Remove the two plastic caps on valve, if any.
- Position valve on the suction by-pass and connect a vacuum gage as close as possible to the exhauster inlet (Fig. 2).
- Unscrew nut 923.
- Relieve spring tension by backing off upper grub screw 904.1 with the fit key.
- Turn on exhauster. Induce highest attainable vacuum by throttling air intake upstream relief valve (normally reducing throttle to fully-closed).
- Adjust upper grub screw 904.1 until maximum allowable vacuum level is reached.
- Tighten nut 923 keeping blocked upper grub screw 904.1.
- Open suction line.

Double-check vacuum gauge to ensure no additional losses are induced by pipes or filters installed upstream relief valve.

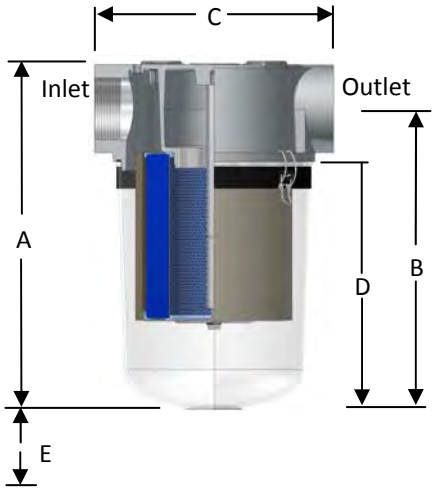
B) Setting-up at allowed pressure level

- Remove the two plastic caps on valve, if any.
- Remove nut 923 from upper grub screw 904.1 and place it on to the lower grub screw 904.2. Do not tighten.
- Position valve on the discharge by-pass and connect a pressure gage as close as possible to the blower outlet (Fig. 3).
- Relieve spring tension by backing on lower grub screw 904.2 with the fit key.
- Turn on blower. Induce highest attainable pressure by throttling air discharge downstream of the valve (normally reducing throttle to fully-closed).
- Unscrew lower grub screw 904.2 until maximum allowable pressure level is reached.
- Tighten nut 923 keeping blocked lower grub screw 904.2.
- Open discharge line.

Double-check pressure gauge to ensure no additional losses are induced by pipes or filters installed downstream the valve

"T" Style Vacuum Filters
ST/CT Series 1" – 6" FPT





General Features

- Compact design for space restrictions; min. service area
- Inlet above element for extended element life & maintenance intervals
- Cast, corrosion resistant aluminum top with machined connections: - Integrated baffle design
  - 4 M12 taps for mounting brackets: 2" to 6"
- "T" style design minimizes piping requirements
- 1/4" differential gauge ports: 2" to 6"

ST Series Specifications

- See-through bucket made from polycarbonate material
- Bucket has a high tensile strength for dimensional stability
- Temp ratings: - Complete assembly max: 220°F (104°C)
  - See-through bucket only max: 257°F (125°C)
- Increased holding capacity

Technical Specifications

- Vacuum Rating: Gas tight seal
- Temp (continuous): min -15°F (-26°C) max 220°F (104°C)
- Filter change out differential: 15-20" H2O over initial Δ P
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron

Options

- Swing bolts for heavy duty environments
- 1" to 1-1/2" housings have dimples for optional gauge ports & mounting bracket taps
- Epoxy coated housings
- Drain ports
- Spool piece extender on select models
- ISO flange connections: NW25, NW40 (select models)

FPT Inlet & Outlet	Assembly SCFM Rating	Assembly Part Number		Dimensions - inches				Suggested Service HT.	Approx. Weight	Replacement Element Part No.		Element SCFM Rating
		Polyester	Paper	A	B	C	D	E	lbs.	Polyester	Paper	
1"	40	ST-897-100C	ST-896-100C	13 3/8	11 15/16	7	10 3/8	9	11	897	896	115
1-1/4"	60	ST-897-125C	ST-896-125C	13 3/8	11 15/16	7	10 3/8	9	11	897	896	115
1-1/2"	80	ST-897-150C	ST-896-150C	13 3/8	11 15/16	7	10 3/8	9	10	897	896	115
2"	175	ST-851/1-200C	ST-850/1-200C	16 1/4	14 1/4	9	12 1/2	9	15	851/1	850/1	290
2-1/2"	210	ST-851/1-250C	ST-850/1-250C	16 1/4	14 1/4	9	12 1/2	9	14	851/1	850/1	290
3"	300	ST-235P-300C	ST-234P-300C	19 3/4	17	13 1/2	14	9	29	235P	234P	570
4"	520	ST-235P-400C	ST-234P-400C	19 3/4	17	13 1/2	14	9	25	235P	234P	570

Dimension tolerance ± 1/4"

CT Series Specifications

- Carbon steel black enamel drop down bucket
- Swing bolts standard on 6" housings

FPT Inlet & Outlet	Assembly SCFM Rating	Assembly Part Number		Dimensions - inches				Suggested Service HT.	Approx. Weight	Replacement Element Part No.		Element SCFM Rating
		Polyester	Paper	A	B	C	D	E	lbs.	Polyester	Paper	
1"	40	CT-897-100C	CT-896-100C	13 3/8	11 13/16	7	10 3/8	9	12	897	896	115
1-1/4"	60	CT-897-125C	CT-896-125C	13 3/8	11 13/16	7	10 3/8	9	12	897	896	115
1-1/2"	80	CT-897-150C	CT-896-150C	13 3/8	11 13/16	7	10 3/8	9	11	897	896	115
2"	175	CT-851-200C	CT-850-200C	13	10 7/8	9	9	9	16	851	850	290
2-1/2"	210	CT-851-250C	CT-850-250C	13	10 7/8	9	9	9	15	851	850	290
3"	300	CT-235P-300C	CT-234P-300C	18 5/8	16 1/8	13 1/2	13	9	30	235P	234P	570
4"	520	CT-235P-400C	CT-234P-400C	18 5/8	16 1/8	13 1/2	13	9	26	235P	234P	570
6"	1100	CT-275P-600C	CT-274P-600C	18 1/4	14 1/2	19	9 7/8	10	45	275P	274P	1100

Note CT 2" & 2-1/2" models: Element seals on the base of the housing.

See Vacuum Filter Technical Data section for sizing guidelines.

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.

SOLBERG



Inlet Vacuum Filters
Maintenance Manual

www.solbergmfg.com

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Rev: MMVF-910

Note: Please read the maintenance instructions given by the OEM for the machinery first. The OEM's manual should be adhered to in order to protect the equipment. Solberg Manufacturing, Inc has made every effort to make sure that these instructions are accurate but is not responsible for any typos, slight variations or for human errors that may occur.

Maintenance Manual

SOLBERG Inlet Vacuum Filters

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**For Further Information Please Call: 630-773-1363*

Solberg Manufacturing, Inc., 1151 Ardmore Itasca, IL 60143 USA
Ph: 630.773.1363 Fax: 630.773.0727 Email: sales@solbergmfg.com Web: www.solbergmfg.com

Section A

INTRODUCTION

The purpose of this manual is instruction on the proper assembly and care of Solberg inlet vacuum filters.

WARNING

This manual must be read and thoroughly understood before using and caring for this air filter. Failure to comply could result in explosion, product/system contamination or personal injury.

This manual should be used as a supplement to the user's understanding of the proper care needed to maintain a safe and dependable air filter. It is the responsibility of the user to interpret and explain all instructions to persons who do not read or understand English BEFORE they are allowed to maintain and use this filter.

This manual should be readily available to all operators responsible for operation and maintenance of the vacuum inlet filters.

We thank you for selecting products from Solberg Manufacturing, Inc. We are confident that our superior filter designs will exceed your application requirements.

Section B

GENERAL INFORMATION

1. Identification of Solberg Vacuum Inlet Filters.

All Solberg inlet vacuum air filters should have an identification label/nameplate that gives the following information:

Assembly Model #
Replacement Element #

(The exception is OEM supplied units. In this case please enter the OEM part numbers below.)

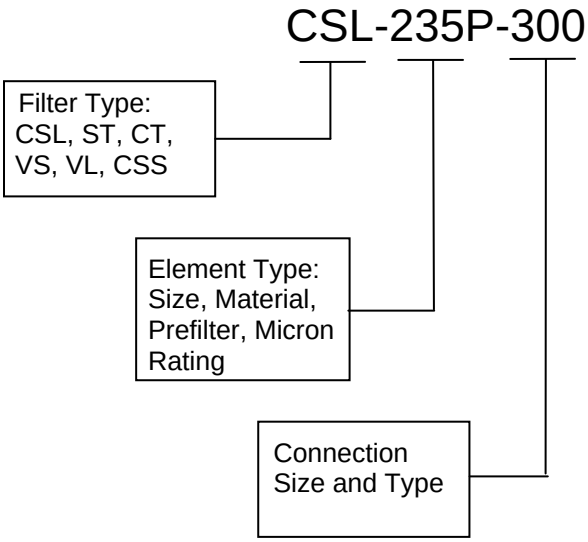
Solberg Manufacturing, Inc., 1151 Ardmore Itasca, IL 60143 USA
Ph: 630.773.1363 Fax: 630.773.0727 Email: sales@solbergmfg.com Web: www.solbergmfg.com

Fill in the actual nameplate data from your new Solberg inlet filter(s):

No.	Filter Model Number	Replacement Element
1		
2		
3		
4		
5		

Table 1

The model number designates the filter type, the original element configuration and housing connection size. For example, the following part number identifies the filter as being a 'CSL' design filter with a 235 element with prefilter and 3" MPT connection size:



2. Filtration Rules of Thumb

General: For peak output performance from a compressor, blower, vacuum pump, engine, or any other machine that consumes air, one must have clean, unrestricted air. Proper filtration can help stabilize the working environment within rotating equipment even when the external conditions may be quite severe. A critical component in creating the right working conditions is filter sizing. With the properly sized filter, equipment will run smoothly over its entire expected operating life.

A major factor in filtration and filter sizing is air velocity through the filter media. Generally, the slower the velocity of air through a media the higher the filter efficiency and, conversely, the lower the pressure drop. Therefore, the primary

goal in filter sizing is to optimize the velocity of air through the media (sometimes called face velocity).

Rule of Thumb #1: Always begin with the filter cartridge requirements when sizing a filter. Once the appropriate element has been selected then move on to the housing requirements.

Rule of Thumb #2: Always ask or specify a filter based on a micron rating **with** filtration efficiencies. As an example, stating a requirement for a 1-micron filter is misleading because no efficiency rating has been specified. A 1-micron filter at 95-% efficiency may be less efficient than a 5-micron filter at 99% efficiency. For proper air system performance in light and industrial duty environments, a filter with a minimum of 99% filtration efficiency at 5 microns is required.

Rule of Thumb #3: Size your filter correctly by understanding the impact air velocity through a media has on efficiency and pressure drop. Maintain the suggested Air-to-Media ratios listed below based on the external environment listings and Filtration efficiency needs.

Filtration Efficiency Requirements (99+% efficiency)	**Environmental Conditions**	**Air to Media Ratio**	
Industrial Grade 2-micron **Paper**	Industrial Duty (clean, office/warehouse-like)	30 CFM/ft^2	$(51m^3/h)/cm^2$
	Severe Duty (workshop, factory-like)	15 CFM/ft^2	$(25.5m^3/h)/cm^2$
	Extreme Duty (Foundry, Construction-like)	10 CFM/ft^2	$(17m^3/h)/cm^2$
Industrial Grade 5-micron **Polyester**	Industrial Duty (clean, office/warehouse-like)	50 CFM/ft^2	$(85m^3/h)/cm^2$
	Severe Duty (workshop, factory-like)	40 CFM/ft^2	$(68m^3/h)/cm^2$
	Extreme Duty (Foundry, Construction-like)	25 CFM/ft^2	$(42.5m^3/h)/cm^2$
Industrial Grade 1-micron **Polyester**	Severe Duty (Foundry, Construction-like)	10 CFM/ft^2	$(17m^3/h)/cm^2$
Industrial Grade 0.3-micron **HEPA** Glass @ 99.97% efficiency	Industrial Duty (clean office/warehouse-like)	10 CFM/ft^2	$(17m^3/h)/cm^2$
	Severe Duty (workshop, factory-like)	7 CFM/ft^2	$(12m^3/h)/cm^2$
	Extreme Duty (Foundry, Construction-like)	5 CFM/ft^2	$(8.5m^3/h)/cm^2$

Table 2

Solberg Manufacturing, Inc., 1151 Ardmore Itasca, IL 60143 USA
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Rule of Thumb #4: Pressure drop is also caused by the dirt holding capacity of the element. As the element fills up with dirt, the pressure drop increases. It is important to document the pressure drop across a given filter when it is new and then clean or replace it when the pressure drop increases by 10” to 15” / 250-380mm H_2O from the original reading.

Rule of Thumb #5: The inlet connection greatly influences the overall pressure drop of the filter system. To minimize the restriction contributed by an inlet filter, a velocity of 6,000 ft/min (10200m^3/h) or less is suggested through the outlet pipe. The table below lists the suggested flows based on pipe size:

Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Airflow	
1/4"	6 CFM	10m^3/h	1 ¼"	60 CFM	102m^3/h	6"	1,100 CFM	1870m^3/h
3/8"	8 CFM	14m^3/h	1 ½"	80 CFM	136m^3/h	8"	1,800 CFM	3060m^3/h
1/2"	10 CFM	17m^3/h	2"	135 CFM	230m^3/h	10"	3,300 CFM	5610m^3/h
3/4"	20 CFM	34m^3/h	2 ½"	195 CFM	332m^3/h	12"	4,700 CFM	7990m^3/h
1"	35 CFM	60m^3/h	3"	300 CFM	510m^3/h	14"	6,000 CFM	10200m^3/h
			4"	520 CFM	884m^3/h			
			5"	800 CFM	1360m^3/h			

Table 3 **Note: This information is for general use only. A qualified engineer must properly design each system.*

3. Element Specifications

Temperature Range: -15° to 220°F / -26° to 105°C
Filter Change-Out Differential: 10” to 15” / 250-380mm H_2O Over Initial Delta P

Media	Micron Rating
Standard Paper	99+% @ 2 micron
Standard Polyester	99+% @ 5 micron
“S” Series Wire Mesh	Epoxy Coated Wire Mesh
“Z” Series Polyester	99+% @ 1 micron
“HE” Series HEPA	99.97% @ 0.3 microns
“U” Series Polyester	99+% @ 25 micron
“W” Series Polyester	99+% @ 100 micron
“S2” Series	Stainless Steel Wire Mesh
“AC” & “ACP” Series	N/A
“Y” Series Polypropylene	99+% @ 5 micron

Table 4

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Temperature Range: -15° to 385°F / -26° to 196°C
Filter Change-Out Differential: 10” to 15” / 250-380mm H_2O Over Initial Delta P

Media	Micron Rating
“MX” & “MXD” Series – Nomex Cloth	99+% @ 5 micron

Table 5

4. **Element Cleaning - Inlet Filtration**

Solberg elements should be cleaned or replaced, once the pressure drop reaches 15 to 20-inches water column (380 - 500mm WC) above the initial pressure drop of the installation.

The decision to clean the element rather than replace it is left to the discretion of the operator. Any damage which results from by-pass or additional pressure drop created by element cleaning is the sole responsibility of the operator.

WARNING

The overall performance of a filter element is altered once cleaned.

The initial pressure drop after cleaning will be greater than the original, clean pressure drop of the element.

After each subsequent cleaning, the initial pressure drop will continue to increase.

Under all circumstances, the initial pressure drop of the element needs to be maintained at less than 20-inches water column (500mm WC).

Cleaned elements that exceed 20-inches water column (500mm WC) at start-up should be replaced with new elements.

With many types of equipment, the maximum pressure drop allowed will be dictated by the ability of the equipment to perform to its rated capacity. Under all

circumstances, the operator should avoid exceeding the manufacturer's recommended maximum pressure drop for their specific equipment.

A. ***Polyester Element***: The polyester element may be washed in warm soapy water, vacuumed, gently blown out or replaced. The element should be dry before reinstallation. The element should be replaced after a maximum of three cleanings.
B. ***Paper Element***: The paper element may be lightly blown with low pressure air. It is disposable and in most cases should be replaced with a new element.
C. ***Polyurethane Prefilter***: The prefilter may be washed as a sponge or replaced to give the element a longer service life.
D. ***Epoxy Coated Wire Mesh and Stainless Steel Wire Mesh Elements***: Cleaning instructions similar to polyester, except mild solvents may be used.
E. ***Activated Carbon Element***: Not cleanable
F. ***Polypropylene Element***: Cleaning instructions similar to polyester
G. ***Nomex Cloth Element***: Cleaning instructions similar to polyester

If you are not confident that the integrity of the element was maintained during cleaning, it is recommended that a new element be installed. Also, spare parts such as gaskets, wing nuts and washers can be supplied upon request.

Section C

PROCEDURES

1. Installation.

A. Maximum inlet gas stream temperature for most Solberg inlet vacuum filter products is 220°F / 105°C. Temperatures in excess of this could cause damage to elements, media and elastomers.

B. Direction of flow is typically from the outside of the element to the inside of the element. Most products have arrows indicating direction of flow on inlet and outlet ports.

C. Ensure that pipe/flange connections are adequately sealed so the potential for leaks is reduced to a minimum.

2. Disconnecting canister top from canister base.

A. ST/CT/Small CSL: Release wire-form clips or loosen wing nut on "claw" bolts.

B. Large CSL: Loosen wing nut or hex head on T-bolts.

C. CSS: Twist upper housing to release.

D. VS/VL: Remove V-clamp by loosening Hex Nut or T-bolt and releasing.

E. Lift off canister top.

3. Removing element for service/maintenance.

A. Remove retaining hex head/wing-nut and washer carefully, and then remove element. Some elements will have a top plate that should also be removed.

B. Clean sealing surfaces of housing, top & base plates, and element endcaps so that they are free of dirt or any other particulate.

WARNING

Failure to comply with these instructions may result in system or pump contamination.

4. Securing Element.

A. Place new or cleaned element evenly on base plate. Be sure element seats properly on base and there is no dirt or particulate present on sealing surfaces.

B. Place top plate (if necessary) on element by centering on tap bolt.

C. Secure washer and wing nut to end cap (or top plate) and tap bolt. Element must be tightly secured. Note: DO NOT over tighten!

WARNING

Defective installation may cause system or pump contamination. Use only genuine Solberg replacement parts.

5. Securing canister top to canister base.

A. Make sure all surfaces are free from dust and other particulate.

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B. Hemisphere o-ring must rest evenly along canister/casting base o-ring groove.

C. ST/CT/Small CSL: Hold canister housing against o-ring or sealing ring on main filter head. Re-fasten wire-form clips or “claw” bolts.

D. Large CSL: Replace housing top plate. Feed T-bolts into corresponding slots and tighten evenly around perimeter. Note: Do NOT over tighten!

E. VS/VL: Secure V-clamp by disconnecting hex nut or T-bolt portion and placing V-clamp along the diameter of canister o-ring groove. Fasten T-bolt and secure tightly. V-CLAMP LEGS MUST REST UNIFORMLY ALONG ENTIRE O-RING GROOVE.

F. CSS: Reassemble top housing to bottom housing by aligning tabs and turning into place.

Section D

MAINTENANCE RECOMMENDATIONS

1. Pressure drop readings are recommended to have an effective air filter. Always document initial pressure drop during start-up when element is clean. Replacement cartridge is needed when system experiences 10” to 15” / 250-380mm H_2O higher pressure drop above the initial reading. Refer to page 4 for instructions.

2. Always check replacement cartridge gaskets to insure they are adhered uniformly along the end caps during handling. If not, contact Solberg Manufacturing, Inc. immediately. Do not modify or change from Solberg specified parts!

3. Always check inlets/outlets, element base and its components when replacing element to insure cleanliness. Wipe clean if necessary.

4. Operate only when a proper seal exists.

5. VS/VL: Never operate without absolute assurance that V-clamp is secured correctly along entire diameter of canisters. Check along V-clamp for wear. Replace if any distortion occurs due to handling and usage.

SPARE PARTS

Contact your Solberg Representative for spare part model numbers.

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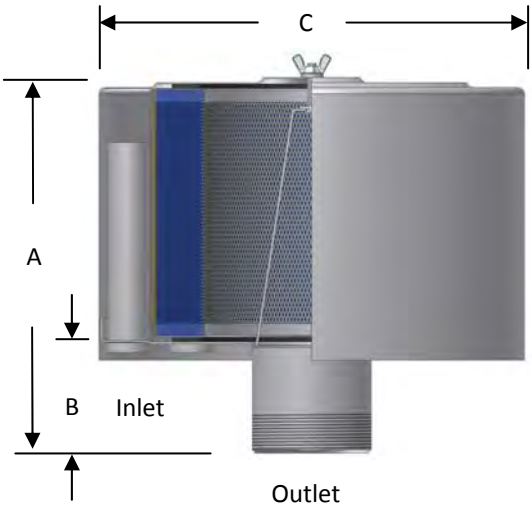
Compact Filter Silencers
FS Series 1/2” - 6” MPT, Flange





Features

- Fully drawn weatherhood - no welds to rust or vibrate apart
- Tubular silencing design - tubes are positioned to maximize attenuation and air flow while minimizing pressure drop
- Durable carbon steel construction with baked enamel finish & powder coated weatherhood



Technical Specifications

- Temp (continuous): min -15°F (-26°C) max 220°F (104°C)
- Filter change out differential: 15-20” H2O over initial Δ P
- Pressure drop graphs available upon request
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron

Options

- 1/8” tap holes available for 3” and larger connections
- Pressure drop indicator (See page 3-11)
- Various media for different environments
- Stainless steel construction
- Epoxy coated finish
- Special connections
- Side Access Silencer Filters (LQB Series) for space restricted enclosures (select models)

Tidbit: Charlie Solberg Sr. “Senior” designed our first filter silencer in 1966. The FS-15 size filter was created for small air compressors.

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Outlet Connections

MPT Outlet	Assembly SCFM Rating	Assembly Part Number Polyester	Assembly Part Number Paper	Dimensions - inches A	B	C	No. of Silencing Tubes	Approx. Wt. lbs	Replacement Element Part No. Polyester	Replacement Element Part No. Paper	Element SCFM Rating
1/2"	10	FS-15-050	FS-14-050	4	1 1/2	6	1	2	15	14	35
3/4"	25	FS-15-075	FS-14-075	4	1 1/2	6	2	2	15	14	35
1"	35	FS-15-100	FS-14-100	4	1 1/2	6	3	2	15	14	35
1"	55	FS-19P-100	FS-18P-100	6 5/8	1 5/8	6	3	3	19P	18P	100
1 1/4"	70	FS-19P-125	FS-18P-125	6 5/8	1 5/8	6	5	3	19P	18P	100
1 1/2"	85	FS-19P-150	FS-18P-150	6 5/8	1 5/8	6	5	4	19P	18P	100
2"	135	FS-31P-200	FS-30P-200	7 1/4	2 1/4	10	5	8	31P	30P	195
2"	135	FS-231P-200	FS-230P-200	12 1/4	2 1/4	10	5	14	231P	230P	300
2 1/2"	195	FS-31P-250	FS-30P-250	7 1/2	2 1/2	10	5	8	31P	31P	195
2 1/2"	195	FS-231P-250	FS-230P-250	12 1/2	2 1/2	10	9	15	231P	230P	300
3"	300	FS-231P-300	FS-230P-300	13	3	10	9	15	231P	230P	300
3"	300	FS-235P-300	FS-234P-300	13	3	16	9	29	235P	234P	570
3"	300	FS-275P-300	FS-274P-300	13	3	16	9	33	275P	274P	1100
4"	520	FS-235P-400	FS-234P-400	14	4	16	9	30	235P	234P	570
4"	520	FS-275P-400	FS-274P-400	14	4	16	9	34	275P	274P	1100
5"	800	FS-245P-500	FS-244P-500	14	4	16	14	33	245P	244P	880
5"	800	FS-275P-500	FS-274P-500	14	4	16	14	36	275P	274P	1100
6"	1100	FS-275P-600	FS-274P-600	15	5	16	18	38	275P	274P	1100

See Filter Silencer Technical Data section for sizing guidelines.

Dimension tolerance ± 1/4”

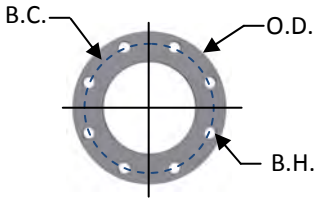
Flange Outlet Connections

Flange Outlet	Assembly SCFM Rating	Assembly Part Number Polyester	Assembly Part Number Paper	Dimensions - inches A	B	C	No. of Silencing Tubes	Approx. Wt. lbs	Replacement Element Part No. Polyester	Replacement Element Part No. Paper	Element SCFM Rating
4"	520	FS-235P-400F	FS-234P-400F	14	4	16	9	33	235P	234P	570
4"	520	FS-275P-400F	FS-274P-400F	14	4	16	9	39	275P	274P	1100
5"	800	FS-245P-500F	FS-244P-500F	14	4	16	14	38	245P	244P	880
5"	800	FS-275P-500F	FS-274P-500F	14	4	16	14	41	275P	274P	1100
6"	1100	FS-275P-600F	FS-274P-600F	15	5	16	18	42	275P	274P	1100

See Filter Silencer Technical Data section for sizing guidelines.

Dimension tolerance ± 1/4”

125/150# Pattern Flg	Dimensions - inches O.D.	B.C.	B.H.	No. of Holes	Flange Thickness
4"	9	7 1/2	0.75	8	0.38
5"	10	8 1/2	0.88	8	0.38
6"	11	9 1/2	0.88	8	0.38



O.D.: Outside Dimension
B.C.: Bolt Circle
B.H.: Bolt Hole

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.

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Filter Silencers and Inlet Filters Maintenance Manual

www.solbergmfg.com

Note: Please read the maintenance instructions given by the OEM for the machinery first. The OEM's manual should be adhered to in order to protect the equipment. Solberg Manufacturing, Inc has made every effort to make sure that these instructions are accurate but is not responsible for any typos, slight variations or for human errors that may occur.

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Maintenance Manual

Solberg Air Inlet Filters and Filter Silencers

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**For Further Information Please Call: 630-773-1363*

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Section A

INTRODUCTION

The purpose of this manual is instruction on the proper assembly and care of Solberg inlet air filters.

WARNING

This manual must be read and thoroughly understood before using and caring for this air filter. Failure to comply could result in explosion, product/system contamination or personal injury.

This manual should be used as a supplement to the user's understanding of the proper care needed to maintain a safe and dependable air filter. It is the responsibility of the user to interpret and explain all instructions to persons who do not read or understand English BEFORE they are allowed to maintain and use this filter.

This manual should be readily available to all operators responsible for operation and maintenance of the inlet air filters.

We thank you for selecting products from Solberg Manufacturing, Inc. We are confident that our superior filter designs will meet your application requirements.

Section B

GENERAL INFORMATION

1. Identification of Solberg Inlet Air Filters.

All Solberg inlet air filters should have an identification label/nameplate that gives the following information:

Assembly Model #
Replacement Element #

(The exception is OEM supplied units. In this case, please enter the OEM part numbers below.)
Fill in the actual nameplate data from your new Solberg inlet filter(s):

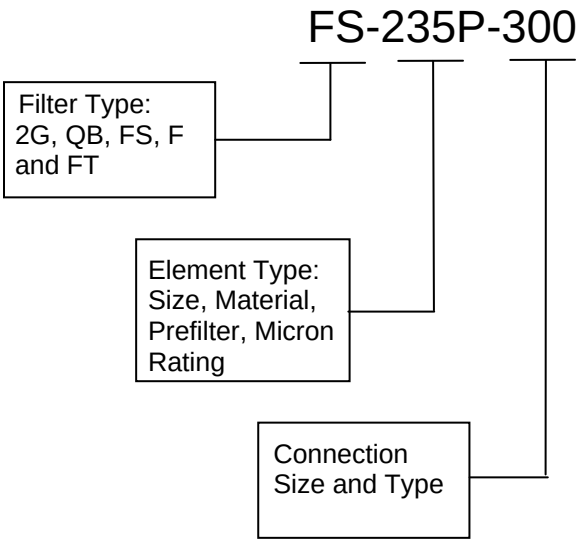
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No.	Filter Model Number	Replacement Element	Initial Delta P Readings
1			
2			
3			
4			
5			

Table 1

The model number designates the filter type, the original element configuration and housing connection size. For example, the following part number identifies the filter as being a 'FS' design filter with a 235 element with prefilter and 3" MPT connection size:



2. Filtration Rules of Thumb

General: For peak output performance from a compressor, blower, vacuum pump, engine, or any other machine that consumes air, one must have clean, unrestricted air. Proper filtration can help stabilize the working environment within rotating equipment even when the external conditions may be quite severe. A critical component in creating the right working conditions is filter sizing. With the properly sized filter, equipment will run smoothly over its entire expected operating life.

A major factor in filtration and filter sizing is air velocity through the filter media. Generally, the slower the velocity of air through a media the higher the filter efficiency and, conversely, the lower the pressure drop. Therefore, the primary

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goal in filter sizing is to optimize the velocity of air through the media (sometimes called face velocity).

Rule of Thumb #1: Always begin with the filter cartridge requirements when sizing a filter. Once the appropriate element has been selected then move on to the housing requirements.

Rule of Thumb #2: Always ask or specify a filter based on a micron rating ***with filtration efficiencies***. As an example, stating a requirement for a 1-micron filter is misleading because no efficiency rating has been specified. A 1-micron filter at 95% efficiency may be less efficient than a 5-micron filter at 99% efficiency. For proper air system performance in light and industrial duty environments, a filter with a minimum of 99% filtration efficiency at 5 microns is required.

Rule of Thumb #3: Size your filter correctly by understanding the impact air velocity through a media has on efficiency and pressure drop. Maintain the suggested Air-to-Media ratios listed below based on the external environment listings and Filtration efficiency needs.

Filtration Efficiency Requirements (99%+ efficiency)	**Environmental Conditions**	**Air to Media Ratio**	
Industrial Grade 2-micron **Paper**	Industrial Duty (clean, office/warehouse-like)	30 CFM/ft^2	(51m^3/h)/cm^2
	Severe Duty (workshop, factory-like)	15 CFM/ft^2	(25.5m^3/h)/cm^2
	Extreme Duty (Foundry, Construction-like)	10 CFM/ft^2	(17m^3/h)/cm^2
Industrial Grade 5-micron **Polyester**	Industrial Duty (clean, office/warehouse-like)	50 CFM/ft^2	(85m^3/h)/cm^2
	Severe Duty (workshop, factory-like)	40 CFM/ft^2	(68m^3/h)/cm^2
	Extreme Duty (Foundry, Construction-like)	25 CFM/ft^2	(42.5m^3/h)/cm^2
Industrial Grade 1-micron **Polyester**	Severe Duty (Foundry, Construction-like)	10 CFM/ft^2	(17m^3/h)/cm^2
Industrial Grade 0.3-micron **HEPA** Glass @ 99.97% Efficiency	Industrial Duty (Pre-filtered Applications)	10 CFM/ft^2	(17m^3/h)/cm^2
	Severe Duty (workshop, factory-like)	7 CFM/ft^2	(12m^3/h)/cm^2
	Extreme Duty (Foundry, Construction-like)	5 CFM/ft^2	(8.5m^3/h)/cm^2

Table 2

Rule of Thumb #4: Pressure drop is also caused by the dirt holding capacity of the element. As the element fills up with dirt, the pressure drop increases. It is

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important to document the pressure drop across a given filter when it is new and then clean or replace it when the pressure drop increases by 10” to 15” / 250-280mm H_2O over the original reading.

Rule of Thumb #5: The inlet connection greatly influences the overall pressure drop of the filter system. To minimize the restriction contributed by an inlet filter, a velocity of 6,000 ft/min (10200m^3/h) or less is suggested through the outlet pipe. The table below lists the suggested flows based on pipe size:

Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Airflow	
1/4"	6 CFM	10m^3/h	1 ¼"	60 CFM	102m^3/h	6"	1,100 CFM	1870m^3/h
3/8"	8 CFM	14m^3/h	1 ½"	80 CFM	136m^3/h	8"	1,800 CFM	3060m^3/h
1/2"	10 CFM	17m^3/h	2"	135 CFM	230m^3/h	10"	3,300 CFM	5610m^3/h
3/4"	20 CFM	34m^3/h	2 ½"	195 CFM	332m^3/h	12"	4,700 CFM	7990m^3/h
1"	35 CFM	60m^3/h	3"	300 CFM	510m^3/h	14"	6,000 CFM	10200m^3/h
			4"	520 CFM	884m^3/h			
			5"	800 CFM	1360m^3/h			

Table 3 **Note: This information is for general use only. A qualified engineer must properly design each system.*

3. Element Specifications

Temperature Range: -15° to 220°F / -26° to 105°C
Filter Change-Out Differential: 10” to 15” / 250-380mm H_2O Over Initial Delta P

Media	Micron Rating
Standard Paper	99+% @ 2 micron
Standard Polyester	99+% @ 5 micron
“S” Series Wire Mesh	Epoxy Coated Wire Mesh
“Z” Series Polyester	99+% @ 1 micron
“HE” Series HEPA	99.97% @ 0.3 microns
“U” Series Polyester	99+% @ 25 micron
“W” Series Polyester	99+% @ 100 micron
“S2” Series	Stainless Steel Wire Mesh
“AC” & “ACP” Series	N/A
“Y” Series Polypropylene	99+% @ 5 micron

Table 4

Temperature Range: -15° to 385°F / -26° to 196°C
Filter Change-Out Differential**:** 10” to 15”/ 250-380mm H_2O Over Initial Delta P

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Media	Micron Rating
“MX” & “MXD” Series – Nomex Cloth	99+% @ 5 micron

Table 5

4. **Element Cleaning - Inlet Filtration**

Solberg elements should be cleaned or replaced, once the pressure drop reaches 15 to 20-inches water column (380 - 500mm WC) above the initial pressure drop of the installation.

The decision to clean the element rather than replace it is left to the discretion of the operator. Any damage which results from by-pass or additional pressure drop created by element cleaning is the sole responsibility of the operator.

WARNING

The overall performance of a filter element is altered once cleaned.

The initial pressure drop after cleaning will be greater than the original, clean pressure drop of the element.

After each subsequent cleaning, the initial pressure drop will continue to increase.

Under all circumstances, the initial pressure drop of the element needs to be maintained at less than 20-inches water column (500mm WC).

Cleaned elements that exceed 20-inches water column (500mm WC) at start-up should be replaced with new elements.

With many types of equipment, the maximum pressure drop allowed will be dictated by the ability of the equipment to perform to its rated capacity. Under all circumstances, the operator should avoid exceeding the manufacturer’s recommended maximum pressure drop for their specific equipment.

A. ***Polyester Element***: The polyester element may be washed in warm soapy water, vacuumed, gently blown out or replaced. The element

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should be dry before reinstallation. The element should be replaced after a maximum of three cleanings.

B. ***Paper Element***: The paper element may be lightly blown with low pressure air. It is disposable and in most cases should be replaced with a new element.
C. ***Polyurethane Prefilter***: The prefilter may be washed as a sponge or replaced to give the element a longer service life.
D. ***Epoxy Coated Wire Mesh and Stainless Steel Wire Mesh Elements***: Cleaning instructions similar to polyester, except mild solvents may be used.
E. ***Activated Carbon Element***: Not cleanable
F. ***Polypropylene Element***: Cleaning instructions similar to polyester
G. ***Nomex Cloth Element***: Cleaning instructions similar to polyester

If you are not confident that the integrity of the element was maintained during cleaning, it is recommended that a new element be installed. Also, spare parts such as gaskets, wing nuts and washers can be supplied upon request.

Section C

PROCEDURES

1. Installation.

A. Maximum operating temperature for most Solberg inlet air filter products is 220°F / 105°C. Temperatures in excess of this could cause damage to elements, media and elastomers. High temperature products are available.

B. Direction of flow is typically from the outside of the element to the inside of the element. Most products have arrows indicating direction of flow on the inlet and outlet ports.

C. Ensure that pipe/flange connections are adequately sealed so the potential for leaks is reduced to a minimum.

2. Disconnecting canister top from canister base.

A. FS-04-06-10 *(or 05-07-11):* Twist top housing to open. Use care to support bottom housing while removing top housing. Fitting damage can occur if fitting is torqued in the wrong direction.

B. Small QB/FS/F/FT*:* Remove weather hood or top plate by loosening hex nut or wing nut and lifting off.

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C. Large 2Q/QB/FS/F/FT: Remove cover by loosening hex nut or wing nut and lifting off.

3. Removing element for service/maintenance.

A. Carefully remove retaining hex head/wing-nut and washer over top plate, and then remove element. Note: Model “04-06-10” elements should be free when housing tops are removed.

B. Clean sealing surfaces of housing, top plates and element endcaps so that they are free of dirt or any other particulate.

WARNING

Failure to comply with these instructions may result in system or equipment contamination.

4. Securing Element.

A. Place new or cleaned element evenly on base plate. Be sure element seats properly on base and there is no dirt or particulate present on sealing surfaces. With multiple element stacks place elements in line with base element and ensure elements seat properly.

B. Place top plate (if necessary) on element by centering on tap bolt.

C. Secure washer and wing nut to end cap (or top plate) and tap bolt. Element must be tightly secured. Note: Do NOT over tighten!

WARNING

Defective installation may cause system or pump contamination. Use only genuine Solberg replacement parts.

Solberg Manufacturing, Inc., 1151 Ardmore Itasca, IL 60143 USA
Ph: 630.773.1363 Fax: 630.773.0727 Email: sales@solbergmfg.com Web: www.solbergmfg.com
Rev: MMIFS-1146

5. **Securing canister top to canister base.**

   A. Make sure all surfaces are free from dust and other particulate.

   B. Small QB/FS/F/FT: Replace top plate and/or weather hood if necessary. Feed threaded rod into corresponding bolthole and tighten. Note: Do NOT over tighten!

   C. Large 2G/QB/FS/F/FT: Replace cover. Feed threaded rod into corresponding bolt hole(s) and tighten. Note: Do NOT over tighten!

   D. FS-04-06-10 (or 05-07-11): Reassemble top housing to bottom housing by aligning tabs and turning into place.

6. **Equipment Startup.**

   A. Be sure to read the instructions on installation or element replacement as listed above before starting equipment.

WARNING

If at any time the operator is unable to verify the integrity of the element or any housing feature, the factory or a regional representative should be contacted prior to start-up.

   B. Please check the listed steps prior to startup.

      1. Check element to make sure it is seated properly on element base or sealing surface.

WARNING

Failure to seat the element properly may result in contaminant by-pass resulting in damage to equipment.

      2. Check element top plate or cover to make sure it is seated properly on element.

      3. Check housing cover (if applicable) that it is installed correctly onto housing.

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Rev: MMIFS-1146

4. Be sure all fasteners and hardware (if applicable) have been tightened.

WARNING

If the air flow is reversed through a Solberg filter unit, be sure to check the element and housing internals for damage. Failure to do so may result in damage to equipment.

Section D

MAINTENANCE RECOMMENDATIONS

1. Pressure drop readings are recommended to have an effective air filter. Always document initial pressure drop during start-up when element is clean. Replacement cartridge is needed when system experiences 10" to 15" / 250-380mm H^2O above drop above the initial reading. Refer to page 4 for initial values.

2. Always check replacement cartridge gaskets to insure they are adhered uniformly along the end caps during handling. If not, contact Solberg Manufacturing, Inc. immediately. Do not modify or change!

3. Always check inlets/outlets, element base and its components when replacing element to insure cleanliness. Wipe clean if necessary.

4. Operate only when a proper seal exists.

SPARE PARTS LIST:

Contact your Solberg Representative for spare part model numbers.

Solberg Manufacturing, Inc., 1151 Ardmore Itasca, IL 60143 USA
Ph: 630.773.1363 Fax: 630.773.0727 Email: sales@solbergmfg.com Web: www.solbergmfg.com
Rev: MMIFS-1146

SECTION 5 - PROCESS INSTRUMENTATION

MS HIGH LEVEL SWITCH, 1-FLOAT STYLE, SS FLOATS, 0.6 SG - FPI L500-1POS

MANIFOLD VACUUM GAUGES, (-)100-0" WC VAC. - DWYER LPG4-D7722N

INLET VACUUM GAUGES, (-)100-0" WC VAC. - DWYER LPG4-D7722N

INLET PRESSURE TRANSMITTER, 0-15 PSIA - DWYER 626-00-GH-P1-E3-S1

VACUUM SWITCH, 4 - 20 IWC - DWYER 1950-20-2F

INLET FLOWSENSOR PITOT TUBE, 6" - DWYER DS-300-6

PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP - DWYER 605-10

INLINE FILTER DIFFERENTIAL PRESSURE GAUGE, 0-10" WC DP - DWYER 2010

DISCHARGE FLOWSENSOR PITOT TUBE, 6" - DWYER DS-300-6

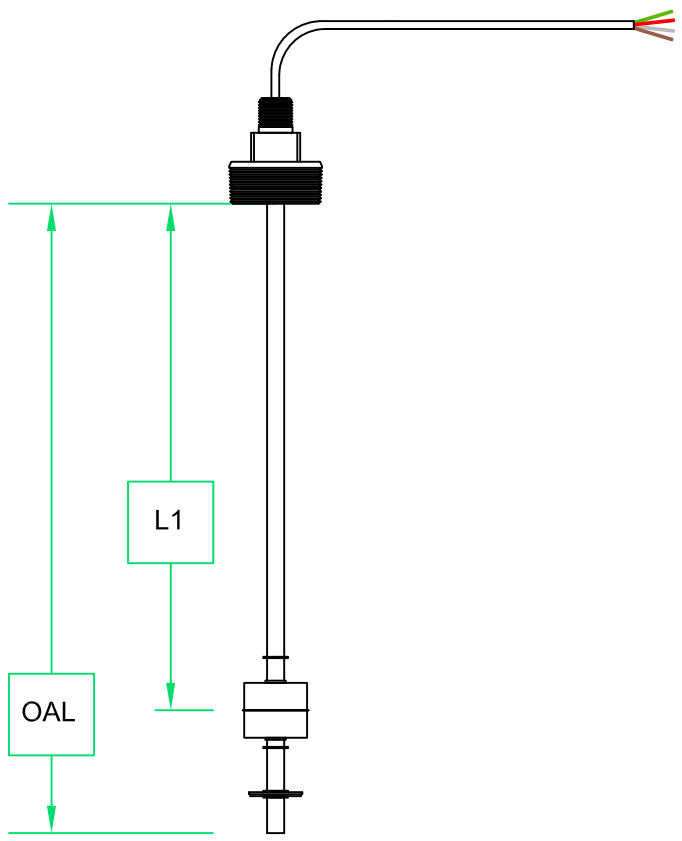
PITOT TUBE INDICATING TRANSMITTER, 0-10" WC DP - DWYER 605-10

TEMPERATURE INDICATORS, 0-250 DEGF - AV 1NFY4

DISCHARGE PRESSURE GAUGES, 0-100" WC PRESS. - DWYER LPG4-D8622N

DISCHARGE TEMPERATURE SWITCH, 0-225 DEGF ADJUSTABLE - UNITED ELECTRIC B54-103

L1	RED BLACK	NORMALLY CLOSED	HIGH-HIGH (1) COMMON



UL LISTED

HOUSING	N/A
CONDUIT CONNECTION	$\frac{1}{2}$ NPT
FITTING AND STEM MATERIAL	STAINLESS STEEL
STEM DIAMETER	$\frac{1}{2}$ INCH
FITTING SIZE	2 INCH NPT
FLOAT STOP	SNAP RING
FLOAT MATERIAL	STAINLESS STEEL
SWITCH TYPE	SPST
SWITCH RATING	100 WATT
SPECIFIC GRAVITY	0.6
CENTERING DISC	STAINLESS STEEL

OAL - 14 INCHES
L1 - 12 INCHES
CABLE LENGTH - 120 INCHES
U.L. LISTED

GENERAL NOTES:

1. FOR TERMINAL BLOCK LOCATION SEE DRAWING (I-1)
2. FOR WIRING TERMINAL DESIGNATION SEE DRAWING (I-2)

REV	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	10-08-15	JAD

REVISIONS

CONFIDENTIALITY NOTICE:
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DRWN BY	JAD
DATE	07-29-15
CHK BY	
DATE	
APPR BY	
DATE	

NATIONAL ENVIRONMENTAL SYSTEMS
84 DUNHAM STREET / ATTLEBORO, MA 02703
508-226-1100 (Phone) / 508-226-1180 (Fax)
WWW.NES-INC.BIZ

TITLE: 1 POSITION LEVEL SENSOR
LSHH-111

AECOM
FORMER OZONE INDUSTRIES SITE - QUEENS, NY

JOB NO. 15-152 (SVE)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	M-4	1 OF 1	A

FPI SENSORS INTERNATIONAL

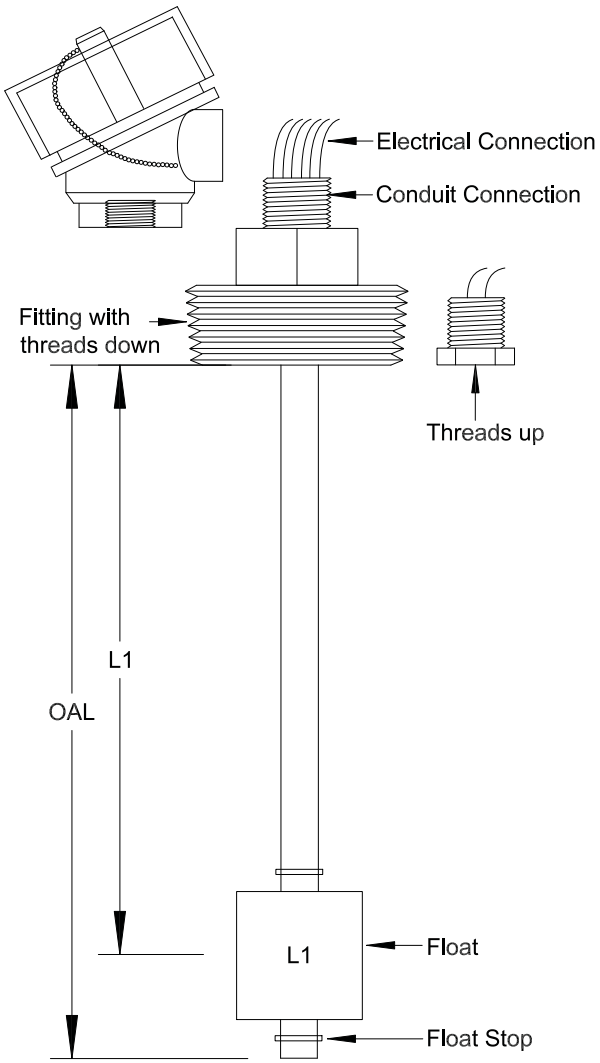
A HIGHER LEVEL OF SATISFACTION

Single Level Configurator – Build to Order

We excel in LOW COST » HIGH QUALITY » 72 HOUR MFG TIME

WE SHIP IN 72 HOURS — FPI SENSORS INTERNATIONAL — CUSTOM ORDERS

MANY OTHER VARIATIONS AND OPTIONS ARE AVAILABLE



HOUSING:
❑ Nema 4X Explosion Proof ☑ Watertight ❑ NA

ELECTRICAL CONNECTION:
❑ Wire ☑ Cable ❑ Connector (specify) _____

CONDUIT CONNECTION:
☑ ½" NPT ❑ Other _____ ❑ NA

FITTING AND STEM MATERIAL:
☑ SS ❑ Brass ❑ PVC ❑ Poly ❑ Teflon

FITTING SIZE (NPT):
❑ ¼" ❑ ½" ❑ ¾" ❑ 1" ❑ 1¼" ❑ 1½" ☑ 2"
❑ Flange _____ ❑ Other _____

THREAD ORIENTATION:
☑ Threads down *(threads from outside of the tank)*
❑ Threads up *(threads from inside of the tank)*

LEAD LENGTH: _____"

FLOAT STOPS:
❑ Retaining ring ☑ Set collar

FLOAT MATERIAL:
☑ SS ❑ Buna ❑ Poly ❑ Teflon ❑ PVC

SWITCH TYPE:
❑ SPST ☑ SPDT

SWITCH RATING:
❑ 10 watt (500ma) ☑ 50 watt (1 amp) ❑ 100 watt (3 amp)

ACTUATION:
L1 SEE DRAWING M3"

OPERATION:
❑ N.O. ☑ N.C.

SPECIFIC GRAVITY:
☑ .60sg ❑ .93sg

Minimum actuation is 1" Maximum actuation is 235"

OPTIONS:
❑ Shroud
❑ Field Adjustable Length
❑ Thermocouple _____
❑ Temp Switch ❑ N.O. or ❑ N.C. _____ °F set point
☑ Centering Disk
❑ Compression Union
❑ Thermistor _____

1.800.852.9984

www.FPIsensors.com

info@FPIsensors.com

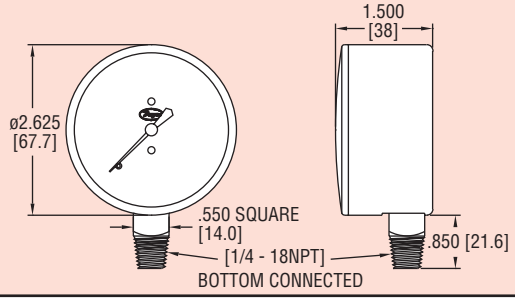
Fax 651.681.1888

Series LPG4

2.5″ Low Pressure Gage

1.5% Full-Scale Accuracy in a 2-1/2″ Gage





Our **Series LPG4** gages offer top of the line performance and accuracy for pressure and vacuum applications up to and including 160 in w.c. The LPG4 is constructed from a single beryllium-copper diaphragm affixed to a precision-machined brass plate. This innovative design, together with a high-precision, milled-teeth brass movement and nickel-silver pinion and bearing surface, provide the user with a top of the line low pressure instrument.

SPECIFICATIONS
Service: Compatible gases & liquids.
Wetted Materials: Brass and beryllium copper.
Housing: Drawn steel, black finish.
Lens: Polycarbonate (removable).
Accuracy: ±1.5% full-scale.

Pressure Limit: 100% of range scale.
Temperature Limits:
Process: -40 to 160°F (-40 to 70°C);
Ambient: -40 to 140°F (-40 to 60°C).
Size: 2.5″ (63 mm).
Process Connections: 1/4″ male NPT.
Enclosure Rating: NEMA 3 (IP54).
Weight: 7.3 oz (0.21 kg).

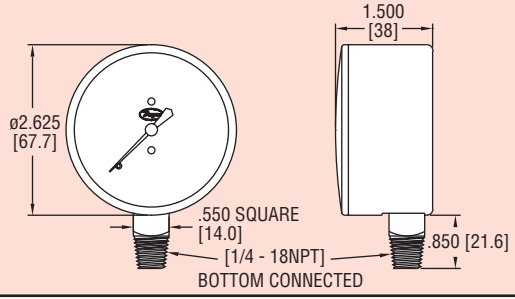
Model	Range	Model	Range
LPG4-D7122N	-10 to 0 in w.c. (-2.5 to 0 kPa)	LPG4-D8322N	0 to 40 in w.c. (0 to 10 kPa)
LPG4-D7222N	-15 to 0 in w.c. (-4 to 0 kPa)	LPG4-D8422N	0 to 60 in w.c. (0 to 15 kPa)
LPG4-D7322N	-25 to 0 in w.c. (-6 to 0 kPa)	LPG4-D8522N	0 to 80 in w.c. (0 to 20 kPa)
LPG4-D7422N	-40 to 0 in w.c. (-10 to 0 kPa)	LPG4-D8622N	0 to 100 in w.c. (0 to 25 kPa)
LPG4-D7522N	-60 to 0 in w.c. (-15 to 0 kPa)	LPG4-D8722N	0 to 160 in w.c. (0 to 40 kPa)
LPG4-D7622N	-80 to 0 in w.c. (-20 to 0 kPa)	LPG4-D8922N	-4 to 0 to 6 in w.c. (-1 to 0 to 1.5 kPa)
LPG4-D7722N	-100 to 0 in w.c. (-25 to 0 kPa)	LPG4-D9022N	-6 to 0 to 10 in w.c. (-1.5 to 0 to 2.5 kPa)
LPG4-D7822N	-160 to 0 in w.c. (-40 to 0 kPa)	LPG4-D9122N	-8 to 0 to 16 in w.c. (-2 to 0 to 4 kPa)
LPG4-D7922N	-235 to 0 in w.c. (-60 to 0 kPa)	LPG4-D9222N	-16 to 0 to 24 in w.c. (-4 to 0 to 6 kPa)
LPG4-D8022N	0 to 10 in w.c. (0 to 2.5 kPa)	LPG4-D9322N	-24 to 0 to 40 in w.c. (-6 to 0 to 10 kPa)
LPG4-D8122N	0 to 15 in w.c. (0 to 3.75 kPa)	LPG4-D9422N	-30 to 0 to 50 in w.c. (-7.5 to 0 to 14.5 kPa)
LPG4-D8222N	0 to 25 in w.c. (0 to 6 kPa)	LPG4-D9522N	-40 to 0 to 60 in w.c. (-10 to 0 to 0.15 kPa)

OPTION
For NIST traceable calibration certificate, use order code NISTCAL-PG1.

Series LPG4 2.5″ Low Pressure Gage

1.5% Full-Scale Accuracy in a 2-1/2″ Gage





Our **Series LPG4** gages offer top of the line performance and accuracy for pressure and vacuum applications up to and including 160 in w.c. The LPG4 is constructed from a single beryllium-copper diaphragm affixed to a precision-machined brass plate. This innovative design, together with a high-precision, milled-teeth brass movement and nickel-silver pinion and bearing surface, provide the user with a top of the line low pressure instrument.

SPECIFICATIONS
Service: Compatible gases & liquids.
Wetted Materials: Brass and beryllium copper.
Housing: Drawn steel, black finish.
Lens: Polycarbonate (removable).
Accuracy: ±1.5% full-scale.

Pressure Limit: 100% of range scale.
Temperature Limits:
Process: -40 to 160°F (-40 to 70°C);
Ambient: -40 to 140°F (-40 to 60°C).
Size: 2.5″ (63 mm).
Process Connections: 1/4″ male NPT.
Enclosure Rating: NEMA 3 (IP54).
Weight: 7.3 oz (0.21 kg).

Model	Range	Model	Range
LPG4-D7122N	-10 to 0 in w.c. (-2.5 to 0 kPa)	LPG4-D8322N	0 to 40 in w.c. (0 to 10 kPa)
LPG4-D7222N	-15 to 0 in w.c. (-4 to 0 kPa)	LPG4-D8422N	0 to 60 in w.c. (0 to 15 kPa)
LPG4-D7322N	-25 to 0 in w.c. (-6 to 0 kPa)	LPG4-D8522N	0 to 80 in w.c. (0 to 20 kPa)
LPG4-D7422N	-40 to 0 in w.c. (-10 to 0 kPa)	LPG4-D8622N	0 to 100 in w.c. (0 to 25 kPa)
LPG4-D7522N	-60 to 0 in w.c. (-15 to 0 kPa)	LPG4-D8722N	0 to 160 in w.c. (0 to 40 kPa)
LPG4-D7622N	-80 to 0 in w.c. (-20 to 0 kPa)	LPG4-D8922N	-4 to 0 to 6 in w.c. (-1 to 0 to 1.5 kPa)
LPG4-D7722N	-100 to 0 in w.c. (-25 to 0 kPa)	LPG4-D9022N	-6 to 0 to 10 in w.c. (-1.5 to 0 to 2.5 kPa)
LPG4-D7822N	-160 to 0 in w.c. (-40 to 0 kPa)	LPG4-D9122N	-8 to 0 to 16 in w.c. (-2 to 0 to 4 kPa)
LPG4-D7922N	-235 to 0 in w.c. (-60 to 0 kPa)	LPG4-D9222N	-16 to 0 to 24 in w.c. (-4 to 0 to 6 kPa)
LPG4-D8022N	0 to 10 in w.c. (0 to 2.5 kPa)	LPG4-D9322N	-24 to 0 to 40 in w.c. (-6 to 0 to 10 kPa)
LPG4-D8122N	0 to 15 in w.c. (0 to 3.75 kPa)	LPG4-D9422N	-30 to 0 to 50 in w.c. (-7.5 to 0 to 14.5 kPa)
LPG4-D8222N	0 to 25 in w.c. (0 to 6 kPa)	LPG4-D9522N	-40 to 0 to 60 in w.c. (-10 to 0 to 0.15 kPa)

OPTION
For NIST traceable calibration certificate, use order code NISTCAL-PG1.

Series 626 & 628

Industrial Pressure Transmitter

Complete Offering of Ranges, Connections and Outputs



General Purpose Housing (-GH)



General Purpose Housing (-GH) with DIN C



626 with LED Display (CH housing only)



Conduit Housing (-CH)

***Please see our website for dimensional drawings.**

The Series 626 Pressure Transmitters possess a highly precise 0.25% full scale accuracy piezo-resistive sensor contained in a compact, rugged, NEMA 4X (IP66) stainless steel general purpose housing or cast aluminum conduit housing.

The Series 628 Pressure Transmitters are ideal for OEMs with 1% full scale accuracy sensors. The transmitter is also available in the general purpose stainless steel housing and the cast aluminum conduit housing.
The corrosion resistant 316L stainless steel wetted parts allow the Series 626 and 628 transmitters to measure the pressure in a multitude of processes from hydraulic oils to chemicals. The Series 626 and 628 are available in absolute and pressure ranges with a variety of optional outputs, process connections and electrical terminations to allow you to select the right transmitter for your application.

APPLICATIONS

- Compressors
- Pumping systems
- Irrigation equipment
- Hydraulic
- Industrial process monitoring

FEATURES

- Metal conduit housing option
- Robust 316 SS oil filled sensor
- Compact design

SPECIFICATIONS

Service: Compatible gases and liquids.
Wetted Materials: Type 316L SS.
Accuracy:
626: 0.25% F.S.;
: 0.20% RSS;
628: 1.0% F.S.;
: 0.5% RSS;
626 Absolute Ranges: 0.5% F.S.;
: 0.30% RSS.
(Includes linearity, hysteresis, and repeatability.)
Temperature Limit: 0 to 200°F (-18 to 93°C).
Compensated Temperature Range: 0 to 175°F (-18 to 79°C).
Thermal Effect: ±0.02% FS/°F (includes zero and span).
Pressure Limits: See table.
Power Requirements: 10-30 VDC (for 4-20 mA, 0-5, 1-5, 1-6 VDC outputs); 13-30 VDC (for 0-10, 2-10 VDC outputs); 5 VDC ±0.5 VDC (for 0.5-4.5 VDC ratio-metric output).
Output Signal: 4-20 mA, 0-5 VDC,1-5 VDC, 0-10 VDC, or 0.5-4.5 VDC.
Response Time: 50 ms.
Loop Resistance: 0-1000 Ohms max. R max = 50 (Vps-10) Ohms (4-20 mA output), 5K Ohms (0-5, 1-5, 1-6, 0-10, 2-10, 0.5-4.5 VDC output).
Stability: 1.0% FS/year (Typ.).
Current Consumption: 38 mA maximum (for 4-20 mA output); 10 mA maximum (for 0-5, 1-5, 1-6, 0-10, 2-10, 0.5-4.5 VDC output); 140 mA maximum (for all 626/628/629-CH with optional LED).
Electrical Connections: Conduit Housing (-CH): terminal block, 1/2″ female NPT conduit; General Purpose Housing (-GH): cable DIN EN 175801-803-C.
Process Connection: 1/4″ male or female NPT and BSPT.
Enclosure Rating: NEMA 4X (IP66).
Mounting Orientation: Mount in any position.
Weight: 10 oz (283 g).
Agency Approvals: CE.

Pressure Limits

Range Number	Pressure Range	Maximum Pressure (psig)	Over Pressure (psig)	Range Number	Pressure Range (psig)	Maximum Pressure (psig)	Over Pressure (psig)
00	0-15 psia	30	45	12	0-200	400	1000
30	15-0 psia	30	45	13	0-300	600	1500
06	0-5 psig	10	50	14	0-500	1000	2500
07	0-15 psig	30	150	15	0-1000	2000	5000
08	0-30 psig	60	300	16	0-1500	3000	5000
09	0-50 psig	100	300	18	0-3000	6000	7500
10	0-100 psig	200	500	19	0-5000	7500	10000
11	0-150	300	750	26	0-8000	10000	12000

Ordering Chart

Accuracy								
	626							0.25% Full-Scale Accuracy
	628							1.0% Full-Scale Accuracy
Range		-00						0-15 psia
		-01						0-30 psia
		-02						0-50 psia
		-03						0-100 psia
		-04						0-200 psia
		-05						0-300 psia
		-06						0-5 psi
		-07						0-15 psi
		-08						0-30 psi
		-09						0-50 psi
		-10						0-100 psi
		-11						0-150 psi
		-12						0-200 psi
		-13						0-300 psi
		-14						0-500 psi
		-22						0-600 psi
		-15						0-1000 psi
		-16						0-1500 psi
		-18						0-3000 psi
		-19						0-5000 psi
		-26						0-8000 psi
		-67						0-0.5 bar
		-71						0-2.5 bar
		-75						0-10 bar
		-81						0-40 bar
Housing			-CH					Conduit Housing
			GH					General Purpose Housing
Process Connection				-P1				1/4″ male NPT
				-P2				1/4″ female NPT
				-P3				1/4″ male BSPT
				-P5				1/4″ female SAE with Refrigerant Valve Depressor ①
				-P9				1/2″ male NPT ①
Electrical Connection					-E1			Cable Gland with 3' of Prewired Cable
					-E3			Cable Gland with 9' of Prewired Cable
					-E4			DIN EN 175801-803-C ①
					-E5			1/2″ female NPT Conduit ②
					-E6			M-12 4 Pin Connector
Signal Output						-S1		4-20 mA
						-S2		1-5 VDC
						-S4		0-5 VDC
						-S5		0-10 VDC
						-S7		0.5-4.5 VDC ①
Options							-AT	Aluminum Tag
							-NIST	NIST Traceable Certificate
							-LED	Bright Red LED display ②③

① Available with -GH Housing only
② Available with -CH Housing only
③ LED option is not NEMA 4X (IP66)
④ Power Requirement: 5 VDC ±10%

Series 626 & 628 Pressure Transmitters

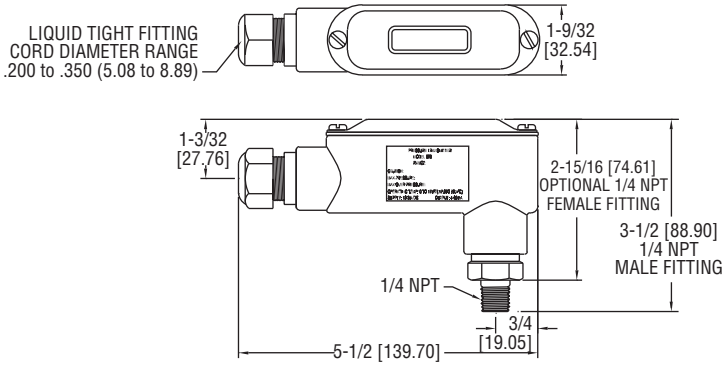
Specifications - Installation and Operating Instructions

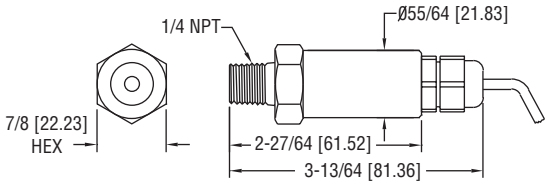


-CH Conduit Housing



-GH General Purpose Housing





The Series 626 and 628 Pressure Transmitters converts a single positive pressure into a standard 4-20 mA output signal. The Series 626 and 628 can be used to accurately measure compatible gases and liquids; Series 626 full scale accuracy is 0.25%; Series 628 full scale accuracy is 1.0% (see specifications). Designed for industrial environments with a NEMA 4X (IP66) housing, this transmitter resists most effects of shock and vibration.

CAUTION: Do not exceed specified supply voltage ratings. Permanent damage not covered by warranty will result. This device is not designed for 120 or 240 volt AC operation. Use only on 13 to 30 VDC.

Pressure Ranges		
Pressure Range	**Maximum Pressure**	**Over Pressure**
0-15 psia	30 psia	45 psia
15-0 psia	30 psia	45 psia
0-30 psia	60 psia	90 psia
0-50 psia	100 psia	150 psia
0-100 psia	200 psia	300 psia
0-200 psia	400 psia	600 psia
0-300 psia	600 psia	900 psia
0-5 psig	10 psig	50 psig
0-15 psig	30 psig	150 psig
0-30 psig	60 psig	300 psig
0-50 psig	100 psig	300 psig
0-100 psig	200 psig	500 psig
0-150 psig	300 psig	750 psig
0-200 psig	400 psig	1000 psig
0-300 psig	600 psig	1500 psig
0-500 psig	1000 psig	2500 psig
0-1000 psig	2000 psig	5000 psig
0-1500 psig	3000 psig	5000 psig
0-2000 psig	4000 psig	5000 psig
0-3000 psig	6000 psig	7500 psig
0-5000 psig	7500 psig	10000 psig
0-8000 psig	10000 psig	12000 psig

SPECIFICATIONS

Service: Compatible gases and liquids.
Wetted Materials: Type 316 SS.
Accuracy: 626: 0.25% FS, 0.20% RSS; 628: 1.0% FS, 0.5% RSS; 626 absolute ranges: 0.5% FS, 0.35% RSS. (Includes linearity, hysteresis, and repeatability).
Temperature Limit: 0 to 200°F (-18 to 93°C).
Compensation Temperature Range: 0 to 175° (-18 to 79°C).
Thermal Effect: 626: ±0.02% FS/°F. 628: ±0.04% FS/°F (includes zero and span).
Pressure Limits: See table.
Power Requirements: 10-30 VDC (for 4-20 mA, 0-5, 1-5, 1-6 VDC outpus); 13-30 VDC (for 0-10, 2-10 VDC outputs); 5 VDC ±0.5 VDC (for 0.5-4.5 VDC ratio-metric output).
Output Signal: 4-20 mA, 0-5 VDC,1-5 VDC, 0-10 VDC, or 0.5-4.5 VDC.
Response Time: 300 ms.
Loop Resistance: 0-1000 Ohms max. R max = 50 (Vps-10) Ohms (4-20 mA output), 5K Ohms (0-5, 1-5, 1-6, 0-10, 2-10, 0.5-4.5 VDC output).
Current Consumption: 38 mA maximum (for 4-20 mA output); 10 mA maximum (for 0-5, 1-5, 1-6, 0-10, 2-10, 0.5-4.5 VDC output); 140 mA maxumum (for all 626/628/629-CH with optional LED).
Electrical Connections: Conduit Housing (-CH): terminal block, 1/2″ female NPT conduit; General Purpose Housing (-GH): cable DIN EN 175801-803-C.
Process Connection: 1/4″ male or female NPT and BSPT.
Enclosure Rating: NEMA 4X (IP66).
Mounting Orientation: Mount in any position.
Weight: 10 oz (283 g).
Agency Approvals: CE.

INSTALLATION

1. Location: Select a location where the temperature of the transmitter will be between 0 and 175°F (-18 to 79°C). Distance from the receiver is limited only by total loop resistance. The tubing or piping supplying pressure to the unit can be practically any length required but long lengths will increase response time slightly.

2. Position: The transmitter is not position sensitive. However all standard models are originally calibrated with the unit in a position with the pressure connection downward. Although they can be used at other angles, for best accuracy it is recommended that units be installed in the position calibrated at the factory.

3. Pressure Connection: Use a small amount of plumber's tape or other suitable sealants to prevent leaks. Be sure the pressure passage inside the port is not blocked.

4. Electrical Connections

Wire Length -The maximum length of wire connecting the transmitter and receiver is a function of wire size and receiver resistance. Wiring should not contribute more than 10% of the receiver resistance to total loop resistance. For extremely long runs (over 1000 feet), choose receivers with higher resistance to minimize the size and cost of connecting leads. Where wiring length is under 100 feet, wire as small as 22 AWG can be used.

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CURRENT (4-20 mA) OUTPUT OPERATION

An external power supply delivering 10-30 VDC with minimum current capability of 40 mA DC (per transmitter) is required to power the control loop. See Fig. A for connection of the power supply, transmitter and receiver. The range of appropriate receiver load resistance (R_L) for the DC power supply voltage available is expressed by the formula:

$$R_L \text{ Max} = \frac{Vps - 10}{20 \text{ mA DC}}$$

Shielded cable is recommended for control loop wiring.

Current Output

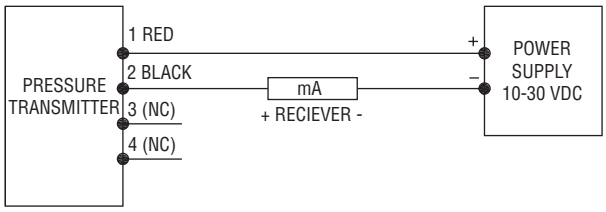
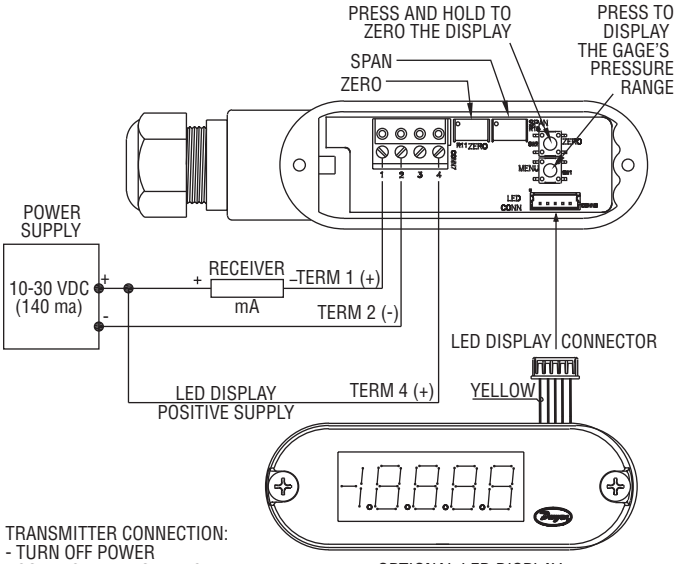


Fig. A: Current output connection

Conduit Housing with 4-20 mA Output (-CH) Electrical connections to the pressure transmitters are made to the terminal block located inside the housing. Remove the screws and lift off the cover. Wire as shown in Fig. A, B or C. Use Fig. A for current output connection. Use Fig. B for current output with optional LED display. Use Fig. C for current output with optional LED display using two power supplies.

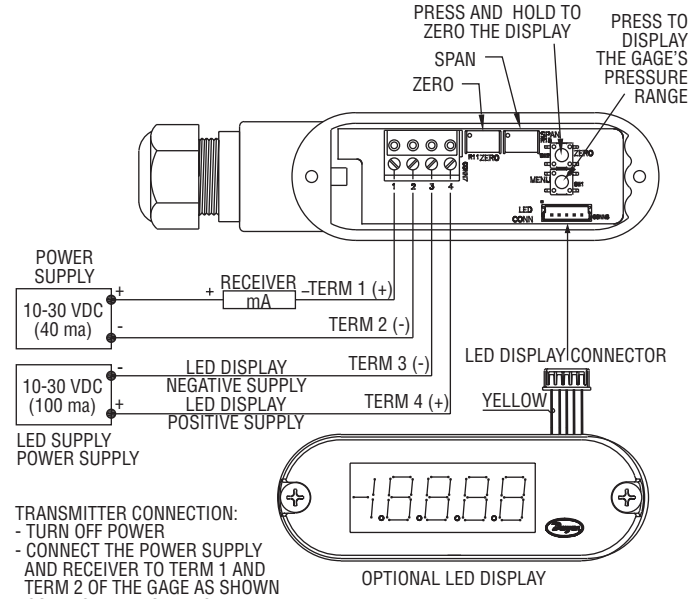
If ordering optional pre-wired cable, black wire is negative (-) and red wire is positive (+).



TRANSMITTER CONNECTION:
- TURN OFF POWER
- CONNECT THE POWER SUPPLY AND RECEIVER TO TERM 1 AND TERM 2 OF THE GAGE AS SHOWN
- CONNECT POWER SUPPLY (+) TO TERMINAL 4 (REQUIRED FOR THE OPTIONAL DISPLAY ONLY)
- INSTALL THE DISPLAY'S CONNECTOR
- TURN ON POWER

BE SURE TO TURN OFF POWER WHEN CONNECTING OR REMOVING THE DISPLAY'S CONNECTOR. FAILURE TO DO SO CAN RESULT IN THE GAGE DAMAGE.

Fig. B: Current output with optional LED display connection



TRANSMITTER CONNECTION:
- TURN OFF POWER
- CONNECT THE POWER SUPPLY AND RECEIVER TO TERM 1 AND TERM 2 OF THE GAGE AS SHOWN
- CONNECT LED POWER SUPPLY (-) TO TERMINAL 3
- CONNECT LED POWER SUPPLY (+) TO TERMINAL 4
- INSTALL THE DISPLAY'S CONNECTOR
- TURN ON POWER

BE SURE TO TURN OFF POWER WHEN CONNECTING OR REMOVING THE DISPLAY'S CONNECTOR. FAILURE TO DO SO CAN RESULT IN THE GAGE DAMAGE.

Fig. C: Current output with optional LED display using two power supplies

Hirschman DIN Connector with 4-20 mA When using cable version of -GH General Purpose Housing, black wire is negative (-) and red wire is positive (+). When using optional Hirschman DIN Plug, remove top-center screw and lift off the terminal block assembly. Wire to terminals shown below in Fig. D. For optional 4-pin M-12 connector, wire to pins as shown in Fig. E.

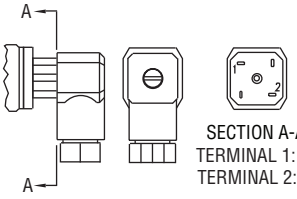


Fig. D

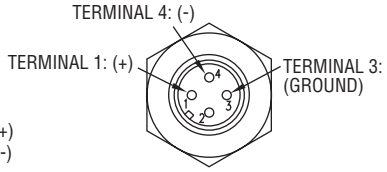


Fig. E

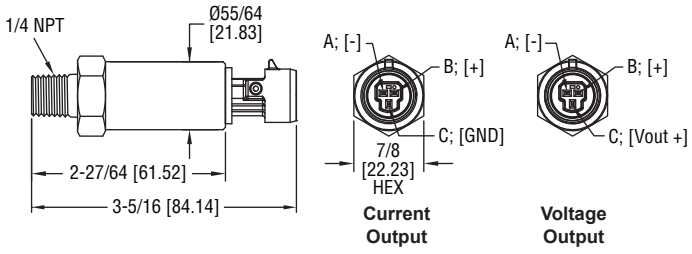


Fig. F: Packard Connection

VOLTAGE (0-5, 1-5, 0-10, 1-6 or 2-10 VDC) OUTPUT OPERATION
(Other outputs contact the factory) See Fig. G for connection of the power supply, transmitter and receiver.

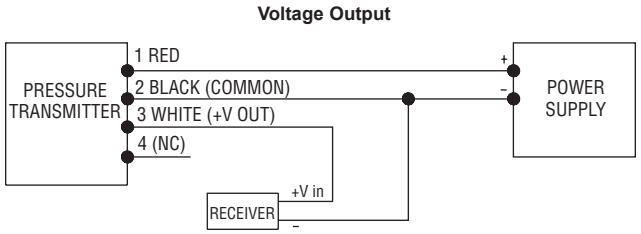


Fig. G: Voltage output connection

Conduit Housing (-CH) Electrical connections to the pressure transmitters are made to the terminal block located inside the housing. Remove the screws and lift off the cover. Wire as shown in Fig. G or Fig. H. Use Fig. G for voltage output connection. Use Fig. H for voltage output with optional LED display connection. If ordering optional pre-wired cable, black wire is negative (-), red wire is positive (+) and white wire is +Vout.

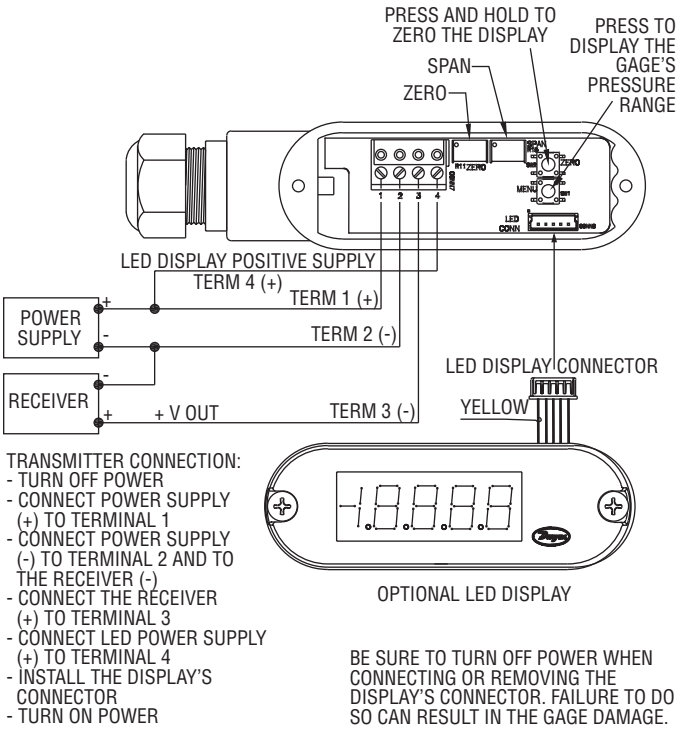


Fig. H: Voltage output with optional LED display connection

Hirschman DIN Connector with Voltage Output When using cable version of -GH General Purpose Housing, black wire is negative (-), red wire is positive (+) and white wire is output. When using optional Hirschman DIN Plug, remove top-center screw and lift off the terminal block assembly. Wire to terminals shown below in Fig. I. For optional 4-pin M-12 connector, wire to pins as shown in Fig. J. If utilizing optional A-164 cable for M-12 connection, brown wire corresponds to pin #1, white #2, blue #3, and black #4.

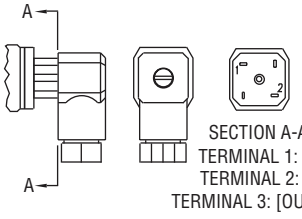


Fig. I

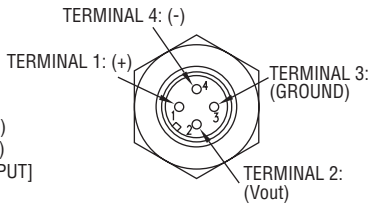


Fig. J

RATIOMETRIC (0.5-4.5 VDC) OUTPUT OPERATION
(Other outputs contact the factory) See Fig. K for connection of the power supply, transmitter and receiver.

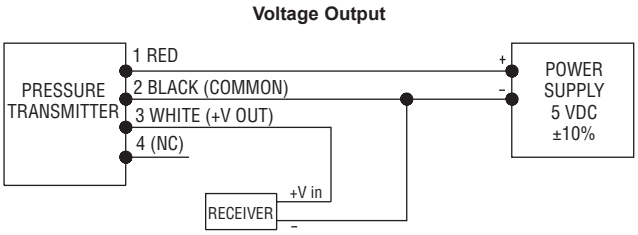


Fig. K: Voltage output connection

General Purpose Housing with Ratiometric Output When using cable version of -GH General Purpose Housing, black wire is negative (-), red wire is positive (+) and white wire is output. When using optional Hirschman DIN Plug, remove top-center screw and lift off the terminal block assembly. Wire to terminals shown below in Fig. L. For optional 4-pin M-12 connector, wire to pins as shown in Fig. M. If utilizing optional A-164 cable for M-12 connection, brown wire corresponds to pin #1, white #2, blue #3, and black #4.

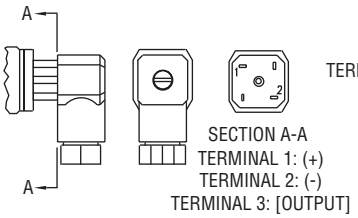


Fig. L

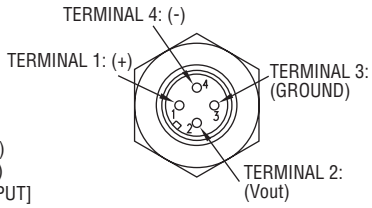


Fig. M

MAINTENANCE
After final installation of the pressure transmitter and its companion receiver, no routine maintenance is required. A periodic check of system calibration is suggested. The Series 626 and 628 transmitters are not field repairable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

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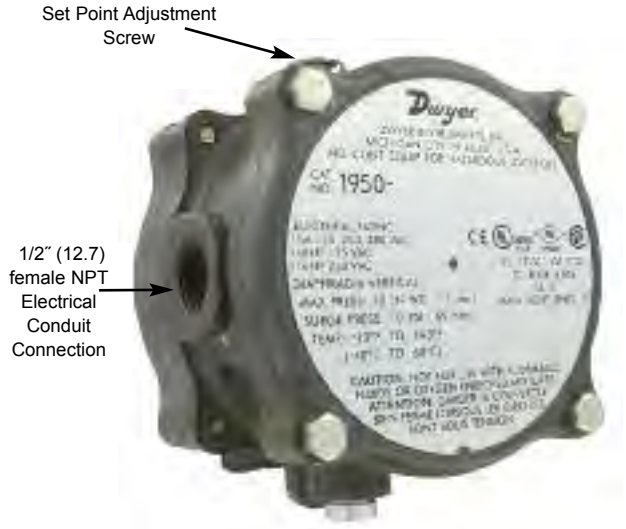
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Series 1950 Explosion-Proof Differential Pressure Switches

Specifications - Installation and Operating Instructions



Series 1950 Explosion-Proof Differential Pressure Switches combine the best features of the Series 1900 Pressure Switch with an integral explosion-proof and weather-proof housing. Each unit is UL & CSA listed; FM approved for use in Class I, Groups C & D; Class II, Groups E, F, & G; and Class III atmospheres (NEMA 7 & 9). They are totally rain-tight for outdoor installations. Twelve models allow set-points from .03 to 20 inches w.c. and from .5 to 50 psi (3.4 to 345 kPa).

Easy access to the SPDT switch for electrical hook-up is provided by removing the top plate of the three-part aluminum housing. Adjustment to the set point of the switch can be made without disassembling the housing. The unit is very compact, about half the weight and bulk of equivalent conventional explosion-proof switches.

CAUTION
For use only with air or compatible gases. Use of the Model 1950 switch with explosive media connected to the Low pressure port (including differential pressure applications in such media) is not recommended. Switch contact arcing can cause an explosion inside the switch housing which, while contained, may render the switch inoperative. If switch is being used to sense a single positive pressure relative to atmosphere, run a line from the low pressure port to a non-hazardous area free of combustible gases. This may increase response time on -0 and -00 models.

Note: The last number-letter combination in the model number identifies the switch's electrical rating (number) and diaphragm material (letter). The 2F combination is standard as described in the physical data above. In case of special models, a number 1 rating is the same as 2; a number 3 or 4 rating is 10A 125, 250, 480 VAC; 1/8 H.P. 125 VAC; 1/4 H.P. 250 VAC; a number 5 or 6 rating is 1A 125 VAC. Letter B indicates a Buna-N diaphragm; N = Neoprene; S = Silicone; and V = Viton®.

UL and CSA Listed, FM Approved For
CL. I GR. C, D - CL. II GR. E, F, G - CL. III

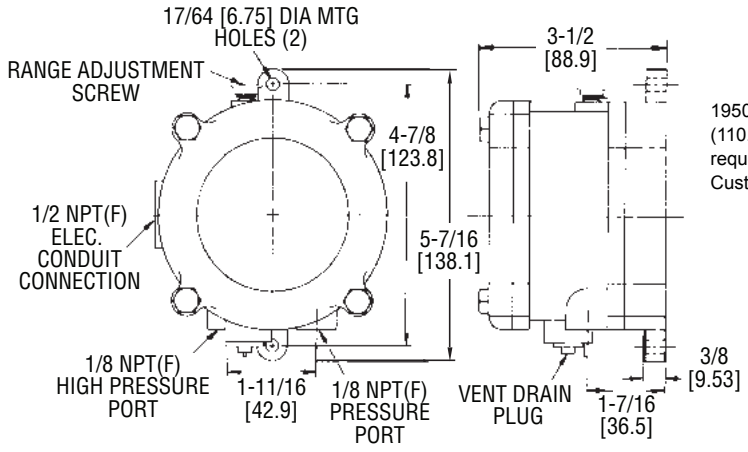
Series 1950 Switches
Operating ranges and deadbands

To order specify Model Number	Operating Range: Inches, W.C.	Approximate Dead Band	
		At Min. Set Point	At Max. Set Point
1950-02-2S	0.03 to 0.10	0.025	0.05
1950-00-2F	0.07 to 0.15	0.04	0.05
1950-0-2F	0.15 to 0.5	0.10	0.15
1950-1-2F	0.4 to 1.6	0.15	0.20
1950-5-2F	1.4 to 5.5	0.3	0.4
1950-10-2F	3.0 to 11.0	0.4	0.5
1950-20-2F	4.0 to 20.0	0.4	0.6
Model Number	Operating Range: PSI	Approximate Dead Band	
		Min. Set Point	Max. Set Point
1950P-2-2F	0.5 to 2.0	0.3 psi	0.3 psi
1950P-8-2F	1.5 to 8.0	1.0 psi	1.0 psi
1950P-15-2F	3.0 to 15.0	0.9 psi	0.9 psi
1950P-25-2F	4.0 to 25.0	0.7 psi	0.7 psi
1950P-50-2F	15.0 to 50	1.0 psi	1.5 psi

SPECIFICATIONS
Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Temperature Limits: -40 to 140°F (-40 to 60°C); 0 to 140°F (-17.8 to 60°C) for 1950P-8, 15, 25, and 50. -30 to 130°F (-34.4 to 54.4°C) for 1950-02.
Pressure Limits:
Continuous: 1950's - 45″ w.c. (0.11 bar);
1950P's - 35 psi (2.41 bar); 1950P-50 only - 70 psi (4.83 bar).
Surge: 1950's - 10 psi (0.69 bar), 1950P's - 50 psi (3.45 bar), 1950P-50 only - 90 psi (6.21 bar).
Enclosure Rating: IP54, NEMA 3, 7 and 9.
Switch Type: Single-pole double-throw (SPDT).
Electrical Rating: 15 A @, 125, 250, 480 VAC, 60 Hz. Resistive 1/8 HP @ 125 VAC, 1/4 HP @ 250 VAC, 60 Hz.
Electrical Connections: 3 screw type, common, normally open and normally closed.
Process Connections: 1/8″ female NPT.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Set Point Adjustment: Screw type on top of housing.
Weight: 3.25 lb (1.5 kg); 1950-02 model, 4.4 lb (2 kg).
Agency Approvals: CE, UL, CSA, FM.

RESPONSE TIME: Because of restrictive effect of flame arrestors, switch response time may be as much as 10-25 seconds where applied pressures are near set point.

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1950-02: 7-3/4″ (196.9) dia. x 4-11/32″ (110.3) depth. For complete dimensions request drawing 28-700175-00 from our Customer Service Department

1950 Switch Outline Dimensions

INSTALLATION

1. Select a location free from excess vibration and corrosive atmospheres where temperatures will be within the limits noted under Specifications on reverse. Switch may be installed outdoors or in areas where the hazard of explosion exists. See reverse for specific types of hazardous service.

2. Mount standard switches with the diaphragm in a vertical plane and with switch lettering and nameplate in an upright position. Some switches are position sensitive and may not reset properly unless they are mounted with the diaphragm vertical.

3. Connect switch to source of pressure, vacuum or differential pressure. Metal tubing with 1/4″ O.D. is recommended, but any tubing which will not restrict the air flow can be used. Connect to the two 1/8″ female NPT pressure ports as noted below:

A. Differential pressures - connect pipes or tubes from source of greater pressure to high pressure port marked HIGH PRESS, and from source of lower pressure to low pressure port marked LOW PRESS.

B. Pressure only (above atmospheric pressure) - connect tube from source of pressure to high pressure port. The low pressure port is left open to atmosphere.

C. Vacuum only (below atmospheric pressure) - connect tube from source of vacuum to low pressure port. The high pressure port is left open to atmosphere.

4. To make electrical connections, remove the three hex head screws from the cover and after loosening the fourth captive screw, swing the cover aside. Electrical connections to the standard single pole, double throw snap switch are provided by means of terminals marked “COM” (common), “NO” (norm open), “NC” (norm closed). The normally open contacts close and the normally closed contacts open when pressure increases beyond the set point. Switch loads for standard models should not exceed the maximum specified current rating of 15 amps resistive. Switch capabilities decrease with an increase in ambient temperature, load inductance, or cycling rate. Whenever an application involves one or more of these factors, the user may find it desirable to limit the switched current to 10 amps or less in the interest of prolonging switch life.

ADJUSTMENT: To Change the Set point

1. Remove the plastic cap and turn the slotted Adjust-ment Screw at the top of the housing clockwise to raise the set point pressure and counterclockwise to lower the set point. After calibration, replace the plastic cap and re-check the set point.

2. The recommended procedure for calibrating or checking calibration is to use a “T” assembly with three rubber tubing leads, all as short as possible and the entire assembly offering minimum flow restriction. Run one lead to the pressure switch, another to a manometer of known accuracy and appropriate range, and apply pressure through the third tube. Make final approach to the set point very slowly. Note that manometer and pressure switch will have different response times due to different internal volumes, lengths of tubing, fluid drainage, etc. Be certain the switch is checked in the position it will assume in use, i.e. with diaphragm in a vertical plane and switch lettering and Dwyer nameplate in an upright position.

3. For highly critical applications check the set point adjustment and if necessary, reset it as noted in step A.

MAINTENANCE

The moving parts of these switches need no maintenance or lubrication. The only adjustment is that of the set point. Care should be taken to keep the switch reasonably clean. Periodically the vent drain plug should be rotated, then returned to its original position. This will dislodge deposits which could accumulate in applications where there is excessive condensation within the switch. The Series 1950 Explosion-Proof Differential Pressure Switch is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

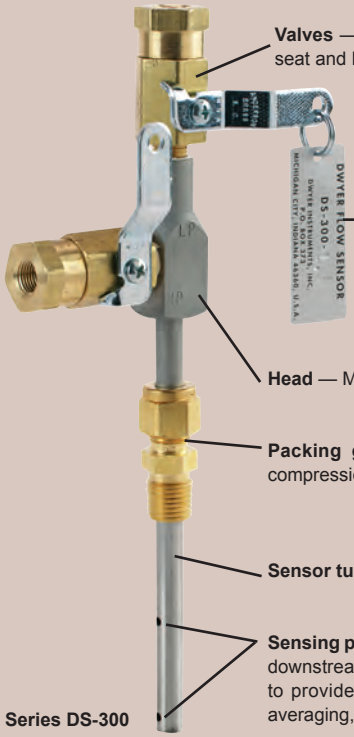
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Series DS

In-Line Flow Sensors

Use with the Dwyer® Differential Pressure Gages or Transmitters



Valves — Standard, brass with TFE seat and Buna-N O-ring

Nameplate — Stainless steel permanently attached with split ring. Includes complete size and model information.

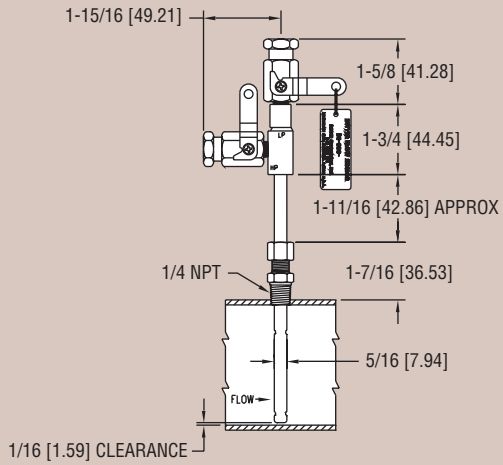
Head — Machined stainless steel.

Packing gland — Parker CPI brass compression fitting.

Sensor tube — 304 SS.

Sensing ports — Multiple upstream and downstream ports sized and positioned to provide effective accurate pressure averaging, even at lower velocities.

Series DS-300



In-Line Flow Sensors are averaging Pitot tubes that provide accurate and convenient flow rate sensing for schedule 40 pipe. When purchased with a Dwyer® Capsuhelic® differential pressure gage of appropriate range, the result is a flow indicating system delivered off the shelf at an economical price.

Pitot tubes have been used in flow measurement for years. Conventional pitot tubes sense velocity pressure at only one point in the flowing stream. Therefore, a series of measurements must be taken across the stream to obtain a meaningful average flow rate. The Dwyer® flow sensor eliminates the need for "traversing" the flowing stream because of its multiple sensing points and built-in averaging capability.

The Series DS-300 flow sensors are designed to be inserted in the pipeline through a compression fitting. They are furnished with instrument shut-off valves on both pressure connections. Valves are fitted with 1/8″ female NPT connections. Accessories include adapters with 1/4″ SAE 45° flared ends compatible with hoses supplied with the Model A-471 Portable Capsuhelic® gage kit. Standard valves are rated at 200 psig (13.7 bar) and 200°F (93.3°C). Where valves are not required, they can be omitted at reduced cost. Series DS-300 flow sensors are available for pipe sizes from 1″ to 10″.

DS-400 Averaging Flow Sensors are quality constructed from extra strong 3/4″ dia. stainless steel to resist increased forces encountered at higher flow rates with both air and water. This extra strength also allows them to be made in longer insertion lengths up to 24 inches (61 cm). All models include convenient and quick-acting quarter-turn ball valves to isolate the sensor for zeroing. Process connections to the valve assembly are 1/8″ female NPT. A pair of 1/8″ NPT X 1/4″ SAE 45° flared adapters are included, compatible with hoses used in the Model A-471 Portable Capsuhelic® Gage Kit. Supplied solid brass mounting adapter has a 3/4″ dia. compression fitting to lock in required insertion length and a 3/4″ male NPT thread for mounting in a Threaded Branch Connection.

Series DS-300

Model	Description
DS-300-1″	1″ pipe size
DS-300-1-1/4″	1-1/4″ pipe size
DS-300-1-1/2″	1-1/2″ pipe size
DS-300-2″	2″ pipe size
DS-300-2-1/2″	2-1/2″ pipe size
DS-300-3″	3″ pipe size
DS-300-4″	4″ pipe size
DS-300-6″	6″ pipe size
DS-300-8″	8″ pipe size
DS-300-10″	10″ pipe size

Series DS-400

Model	Description
DS-400-6″	6″ pipe size
DS-400-8″	8″ pipe size
DS-400-10″	10″ pipe size
DS-400-12″	12″ pipe size
DS-400-14″	14″ pipe size
DS-400-16″	16″ pipe size
DS-400-18″	18″ pipe size
DS-400-20″	20″ pipe size
DS-400-24″	24″ pipe size

OPTIONS & ACCESSORIES

DS-300 or DS-400 Less Valves. To order, add suffix **-LV**

A-160, Threaded Branch Connection, 3/8″ NPT, forged steel, 3000 psi

A-161, Brass Bushing, 1/4″ x 3/8″

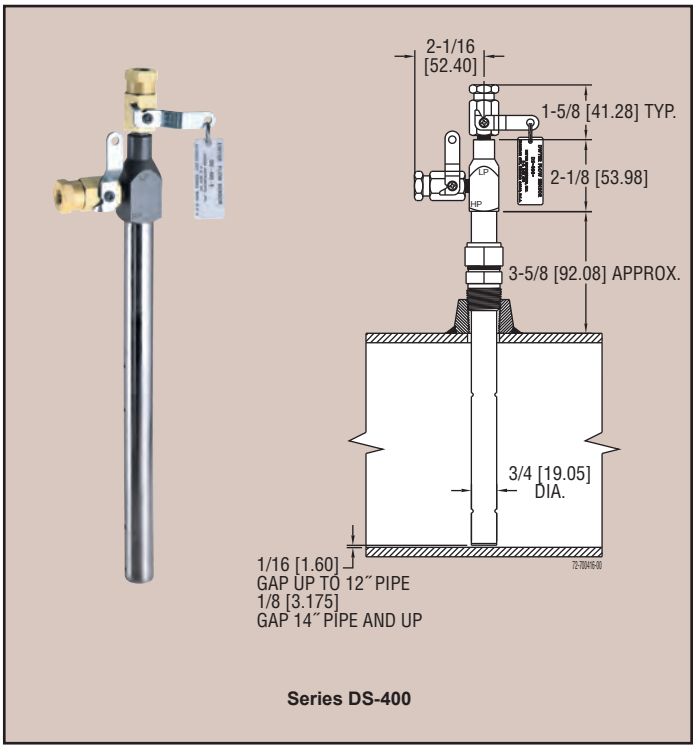
How To Order

Merely determine the pipe size into which the flow sensor will be mounted and designate the size as a suffix to Model DS-300. For example, a flow sensor to be mounted in a 2″ pipe would be a Model No. DS-300-2″.

For non-critical water and air flow monitoring applications, the chart below can be utilized for ordering a stock Capsuhelic® differential pressure gage for use with the DS-300 flow sensor. Simply locate the maximum flow rate for the media being measured under the appropriate pipe size and read the Capsuhelic® gage range in inches of water column to the left. The DS-300 sensor is supplied with installation and operating instructions, Bulletin F-50. It also includes complete flow conversion information for the three media conditions shown in the chart below. This information enables the user to create a complete differential pressure to flow rate conversion table for the sensor and differential pressure gage employed. Both the Dwyer® Capsuhelic® gage and flow sensor feature excellent repeatability so, once the desired flow rate is determined, deviation from that flow in quantitative measure can be easily determined. You may wish to order the adjustable signal flag option for the Capsuhelic® gage to provide an easily identified reference point for the proper flow.

Capsuhelic® gages with special ranges and/or direct reading scales in appropriate flow units are available on special order for more critical applications. Customer supplied data for the full scale flow (quantity and units) is required along with the differential pressure reading at that full flow figure. Prior to ordering a special Capsuhelic® differential pressure gage for flow read-out, we recommend you request Bulletin F-50 to obtain complete data on converting flow rates of various media to the sensor differential pressure output. With this bulletin and after making a few simple calculations, the exact range gage required can easily be determined.

Large 3/4 Inch Diameter for Extra Strength in Lengths to 24 Inches



Series DS-400

Gage Range (in w.c.)	Media @ 70°F	Full Range Flows by Pipe Size (Approximate)									
		1″	1-1/4″	1-1/2″	2″	2-1/2″	3″	4″	6″	8″	10″
2	Water (GPM)	4.8	8.3	11.5	20.5	30	49	86	205	350	560
	Air @ 14.7 PSIA (SCFM)	19.0	33.0	42.0	65.0	113	183	330	760	1340	2130
	Air @ 100 PSIG (SCFM)	50.0	90.5	120.0	210.0	325	510	920	2050	3600	6000
5	Water (GPM)	7.7	14.0	18.0	34.0	47	78	138	320	560	890
	Air @ 14.7 PSIA (SCFM)	30.0	51.0	66.0	118.0	178	289	510	1200	2150	3400
	Air @ 100 PSIG (SCFM)	83.0	142.0	190.0	340.0	610	820	1600	3300	5700	10000
10	Water (GPM)	11.0	19.0	25.5	45.5	67	110	195	450	800	1260
	Air @ 14.7 PSIA (SCFM)	41.0	72.0	93.0	163.0	250	410	725	1690	3040	4860
	Air @ 100 PSIG (SCFM)	120.0	205.0	275.0	470.0	740	1100	2000	4600	8100	15000
25	Water (GPM)	18.0	32.0	40.5	72.0	108	173	310	720	1250	2000
	Air @ 14.7 PSIA (SCFM)	63.0	112.0	155.0	255.0	390	640	1130	2630	4860	7700
	Air @ 100 PSIG (SCFM)	185.0	325.0	430.0	760.0	1200	1800	3300	7200	13000	22000
50	Water (GPM)	25.0	44.0	57.5	100.0	152	247	435	1000	1800	
	Air @ 14.7 PSIA (SCFM)	90.0	161.0	205.0	360.0	560	900	1600	3700	6400	
	Air @ 100 PSIG (SCFM)	260.0	460.0	620.0	1050.0	1700	2600	4600	10000	18500	
100	Water (GPM)	36.5	62.0	82.0	142.0	220	350	620	1500		
	Air @ 14.7 PSIA (SCFM)	135.0	230.0	300.0	505.0	800	1290	2290	5000		
	Air @ 100 PSIG (SCFM)	370.0	660.0	870.0	1500.0	2300	3600	6500	15000		

Model A-471 Portable Kit

For portable operation, the A-471 Capsuhelic® Portable Gage Kit is available complete with tough polypropylene carrying case, mounting bracket, 3-way manifold valve, two 10' high pressure hoses, and all necessary fittings.

See page 15 for complete information on the Capsuhelic® gage



Capsuhelic® Gage Shown Installed In A-471 Portable Kit

Series 631B Capsuhelic® Wet/Wet Differential Pressure Transmitter

Low pressure transmitter for use with DS-300/400 flow sensors. Use Series 631B Capsuhelic® Wet/Wet Differential Pressure Transmitter.

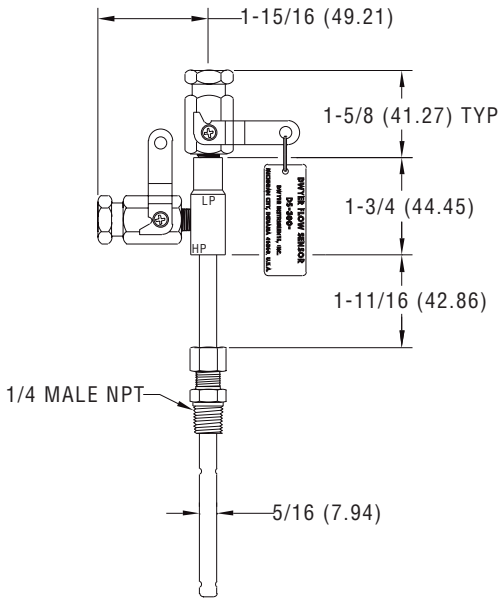
See page 65 for additional details.



Series DS-300 Flow Sensors

Installation and Operating Instructions Flow Calculations





Series DS-300 Flow Sensors are averaging pitot tubes that provide accurate, convenient flow rate sensing. When purchased with a Dwyer Capsuhelic® for liquid flow or Magnehelic® for air flow, differential pressure gage of appropriate range, the result is a flow-indicating system delivered off the shelf at an economical price. Series DS-300 Flow Sensors are designed to be inserted in the pipeline through a compression fitting and are furnished with instrument shut-off valves on both pressure connections. Valves are fitted with 1/8″ female NPT connections. Accessories include adapters with 1/4″ SAE 45° flared ends compatible with hoses supplied with the Model A-471 Portable Capsuhelic® kit. Standard valves are rated at 200°F (93.3°C). Where valves are not required, they can be omitted at reduced cost. Series DS-300 Flow Sensors are available for pipe sizes from 1″ to 10″.

INSPECTION

Inspect sensor upon receipt of shipment to be certain it is as ordered and not damaged. If damaged, contact carrier.

INSTALLATION

General - The sensing ports of the flow sensor must be correctly positioned for measurement accuracy. The instrument connections on the sensor indicate correct positioning. The side connection is for total or high pressure and should be pointed upstream. The top connection is for static or low pressure.

Location - The sensor should be installed in the flowing line with as much straight run of pipe upstream as possible. A rule of thumb is to allow 10 - 15 pipe diameters upstream and 5 downstream. The table below lists recommended up and down piping.

PRESSURE AND TEMPERATURE

Maximum: 200 psig (13.78 bar) at 200°F (93.3°C).

Upstream and Downstream Dimensions in Terms of Internal Diameter of Pipe*

Upstream Condition	Minimum Diameter of Straight Pipe		
	Upstream		Downstream
	In-Plane	Out of Plane	
One Elbow or Tee	7	9	5
Two 90° Bends in Same Plane	8	12	5
Two 90° Bends in Different Plane	18	24	5
Reducers or Expanders	8	8	5
All Valves**	24	24	5

* Values shown are recommended spacing, in terms of internal diameter for normal industrial metering requirements. For laboratory or high accuracy work, add 25% to values.

** Includes gate, globe, plug and other throttling valves that are only partially opened. If valve is to be fully open, use values for pipe size change. **CONTROL VALVES SHOULD BE LOCATED AFTER THE FLOW SENSOR.**

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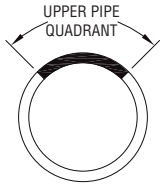
POSITION

Be certain there is sufficient clearance between the mounting position and other pipes, walls, structures, etc, so that the sensor can be inserted through the mounting unit once the mounting unit has been installed onto the pipe.

Flow sensors should be positioned to keep air out of the instrument connecting lines on liquid flows and condensate out of the lines on gas flows. The easiest way to assure this is to install the sensor into the pipe so that air will bleed into, or condensate will drain back to, the pipe.

For Air or Gas Flow

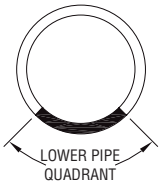
Install in upper quadrant of pipe



Condensate drains back to pipe

For Liquid or Steam Flow

Install in lower quadrant of pipe



Air bleeds back to pipe

INSTALLATION

1. When using an A-160 thred-o-let, weld it to the pipe wall. If replacing a DS-200 unit, an A-161 bushing (1/4˝ x 3/8˝) will be needed.

2. Drill through center of the thred-o-let into the pipe with a drill that is slightly larger than the flow sensor diameter.

3. Install the packing gland using proper pipe sealant. If the packing gland is disassembled, note that the tapered end of the ferrule goes into the fitting body.

4. Insert sensor until it bottoms against opposite wall of the pipe, then withdraw 1/16˝ to allow for thermal expansion.

5. Tighten packing gland nut finger tight. Then tighten nut with a wrench an additional 1-1/4 turns. Be sure to hold the sensor body with a second wrench to prevent the sensor from turning.

INSTRUMENT CONNECTION

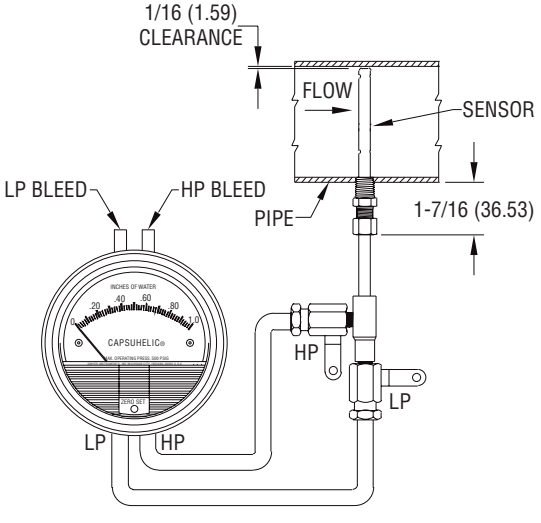
Connect the slide pressure tap to the high pressure port of the Magnehelic® (air only) or Capsuhelic® gage or transmitting instrument and the top connection to the low pressure port.

See the connection schematics below.

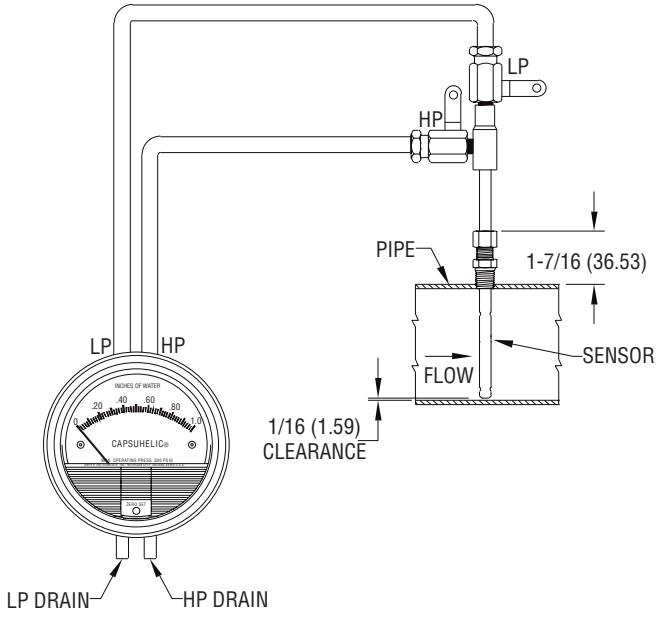
Bleed air from instrument piping on liquid flows. Drain any condensate from the instrument piping on air and gas flows.

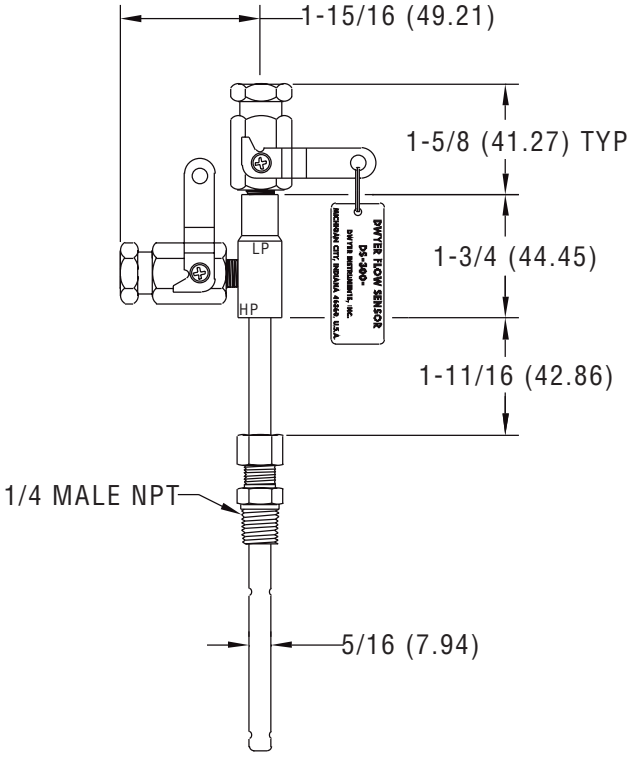
Open valves to instrument to place flow meter into service. For permanent installations, a 3-valve manifold is recommended to allow the gage to be zero checked without interrupting the flow. The Dwyer A-471 Portable Test Kit includes such a device.

Water Flow



Air or Gas Flow





Flow Calculations and Charts

The following information contains tables and equations for determining the differential pressure developed by the DS-300 Flow Sensor for various flow rates of water, steam, air or other gases in different pipe sizes.

This information can be used to prepare conversion charts to translate the differential pressure readings being sensed into the equivalent flow rate. When direct readout of flow is required, use this information to calculate the full flow differential pressure in order to specify the exact range of Dwyer Magnehelic® or Capsuhelic® gage required. Special ranges and calculations are available for these gages at minimal extra cost. See bulletins A-30 and F-41 for additional information on Magnehelic® and Capsuhelic® gages and DS-300 flow sensors.

For additional useful information on making flow calculations, the following service is recommended: Crane Valve Co. Technical Paper No. 410 “Flow of Fluids Through Valves, Fittings and Pipe.” It is available from Crane Valve Company, www.cranevalve.com.

Using the appropriate differential pressure equation from Page 4 of this bulletin,calculate the differential pressure generated by the sensor under normal operating conditions of the system. Check the chart below to determine if this value is within the recommended operating range for the sensor. Note that the data in this chart is limited to standard conditions of air at 60°F (15.6°C) and 14.7 psia static line pressure or water at 70°F (21.1°C). To determine recommended operating ranges of other gases, liquids an/or operating conditions, consult factory.

Note: the column on the right side of the chart which defines velocity ranges to avoid. Continuous operation within these ranges can result in damage to the flow sensor caused by excess vibration.

Pipe Size (Schedule 40)	Flow Coefficient “K”	Operating Ranges Air @ 60°F & 14.7 psia (D/P in. W.C.)	Operating Ranges Water @ 70°F (D/P in. W.C.)	Velocity Ranges Not Recommended (Feet per Second)
1	0.52	1.10 to 186	4.00 to 675	146 to 220
1-1/4	0.58	1.15 to 157	4.18 to 568	113 to 170
1-1/2	0.58	0.38 to 115	1.36 to 417	96 to 144
2	0.64	0.75 to 75	2.72 to 271	71 to 108
2-1/2	0.62	1.72 to 53	6.22 to 193	56 to 85
3	0.67	0.39 to 35	1.43 to 127	42 to 64
4	0.67	0.28 to 34	1.02 to 123	28 to 43
6	0.71	0.64 to 11	2.31 to 40	15 to 23
8	0.67	0.10 to 10	0.37 to 37	9.5 to 15
10	0.70	0.17 to 22	0.60 to 79	6.4 to 10

FLOW EQUATIONS

1. Any Liquid

$$Q\ (GPM) = 5.668 \times K \times D^2 \times \sqrt{\Delta P / S_f}$$

2. Steam or Any Gas

$$Q\ (lb/Hr) = 359.1 \times K \times D^2 \times \sqrt{p \times \Delta P}$$

3. Any Gas

$$Q\ (SCFM) = 128.8 \times K \times D^2 \times \sqrt{\frac{P \times \Delta P}{(T + 460) \times S_s}}$$

DIFFERENTIAL PRESSURE EQUATIONS

1. Any Liquid

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_f}{K^2 \times D^4 \times 32.14}$$

2. Steam or Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2}{K^2 \times D^4 \times p \times 128{,}900}$$

3. Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_s \times (T + 460)}{K^2 \times D^4 \times P \times 16{,}590}$$

Technical Notations

The following notations apply:

ΔP = Differential pressure expressed in inches of water column
Q = Flow expressed in GPM, SCFM, or PPH as shown in equation
K = Flow coefficient— See values tabulated on Pg. 3.
D = Inside diameter of line size expressed in inches.

For square or rectangular ducts, use: $D = \sqrt{\frac{4 \times \text{Height} \times \text{Width}}{\pi}}$

P = Static Line pressure (psia)
T = Temperature in degrees Fahrenheit (plus 460 = °Rankine)
p = Density of medium in pounds per square foot
S_f = Sp Gr at flowing conditions
S_s = Sp Gr at 60°F (15.6°C)

SCFM TO ACFM EQUATION

$$SCFM = ACFM \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

$$ACFM = SCFM \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520}\right)$$

$$\text{POUNDS PER CUBIC FOOT STD.} = \text{POUNDS PER CUBIC FOOT ACT.} \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520^*}\right)$$

$$\text{POUNDS PER CUBIC FOOT ACT.} = \text{POUNDS PER CUBIC FOOT STD.} \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

1 Cubic foot of air = 0.076 pounds per cubic foot at 60° F (15.6°C) and 14.7 psia.
* (520°= 460 + 60°) Std. Temp. Rankine

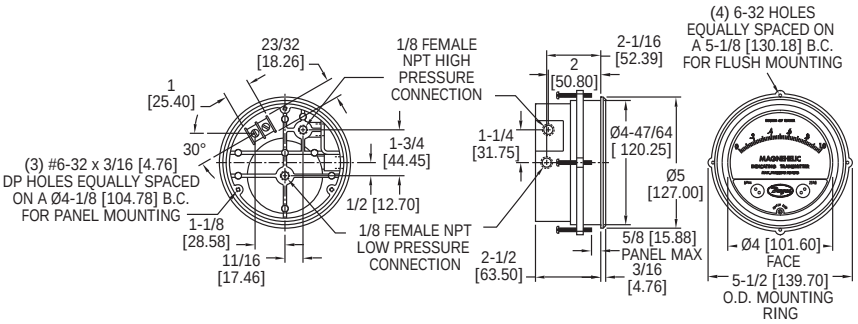
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Series 605 Magnehelic® Differential Pressure Indicating Transmitter

Specifications - Installation and Operating Instructions





The Series 605 Magnehelic® Indicating Transmitter simultaneously provides local indication on a large, easily read analog scale while also converting that pressure into a standard two-wire, 4-20 mA signal for ranges from 0-0.5 to 0-50″ w.c. Positive, negative or differential air and compatible gas pressure can be measured with accuracies as low as ±.5% of full scale. The basic mechanical components of the Series 605 Magnehelic® indicating transmitter are similar to those used in the popular, time-proven Magnehelic® differential pressure gage.

STANDARD ACCESSORIES

Mounting ring
Snap ring
(4) 6-32 x 1-1/4 screws (panel mtg.)
(3) 6-32 x 5/16 screws (surface mtg.)
(2) Tubing to 1/8″ NPT adapters
(2) 1/8″ NPT plugs
Adjustment key

SPECIFICATIONS

GAGE SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Accuracy: See chart.
Stability: ±1% F.S./yr.
Pressure Limits: See chart.
Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).
Process Connections: 1/8″ female NPT.
Size: 4″ (101.6 mm) dial face, 5″ (127 mm) O.D. x 2-11/16″ (68.3 mm).
Weight: 1 lb, 12.6 oz (811 g).
Agency Approvals: CE.

TRANSMITTER SPECIFICATIONS

Accuracy: See chart (includes linearity, hysteresis, repeatability).
Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).
Compensated Temperature Range: 32 to 120°F (0 to 48.9°C).
Thermal Effect: ±0.025% F.S./°F (0.045% F.S./°C).
Power Requirements: 10-35 VDC (2-wire).
Output Signal: 4 to 20 mA.
Zero and Span Adjustments: Protected potentiometers.
Loop Resistance: DC; 0-1250 ohms maximum.
Current Consumption: DC; 38 mA maximum.
Electrical Connections: Screw terminal block.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.

Model	Range in w.c.	Maximum Pressure	Electrical Accuracy +/-%	Mechanical Accuracy +/-%
605-00N	.05-0-.20	25 psi (1.7 bar)	2	4
605-11	.25-0-.25	25 psi (1.7 bar)	2	3
605-0	0-.50	25 psi (1.7 bar)	2	3
605-1	0-1.0	25 psi (1.7 bar)	2	2
605-2	0-2.0	2 psi (13.79 kPa)	0.5	2
605-3	0-3.0	2 psi (13.79 kPa)	0.5	2
605-6	0-6.0	2 psi (13.79 kPa)	0.5	2
605-10	0-10	2 psi (13.79 kPa)	0.5	2

Model	Range in w.c.	Maximum Pressure	Electrical Accuracy +/-%	Mechanical Accuracy +/-%
605-20	0-20.0	11 psi (75.8 kPa)	0.5	2
605-30	0-30	11 psi (75.8 kPa)	0.5	2
605-50	0-50	11 psi (75.8 kPa)	0.5	2
	Range in Pa			
605-60PA	0-60	25 psi (1.7 bar)	2	4
605-125PA	0-125	25 psi (1.7 bar)	2	3
605-250PA	0-250	25 psi (1.7 bar)	2	2
605-500PA	0-500	2 psi (13.79 kPa)	0.5	2

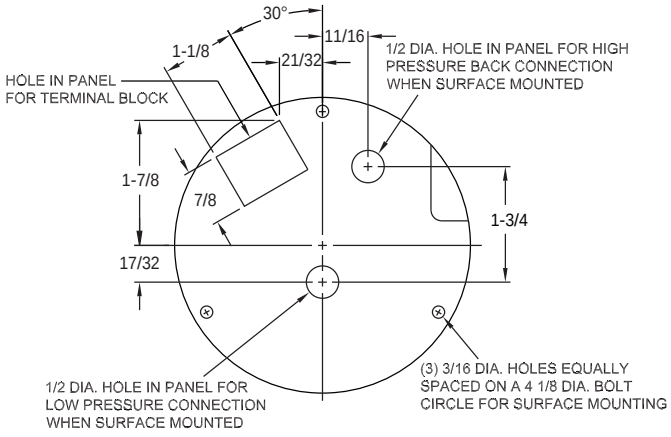
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INSTALLATION

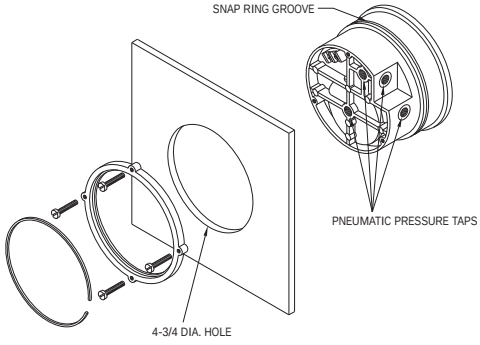
1. **LOCATION**: Select a location where the temperature of the unit will be between 20°F and 120°F. Distance from the receiver is limited only by total loop resistance. See “Electrical Connections”. The tubing feeding pressure to the instrument can be run practically any length required but long lengths will increase response time slightly. Avoid surfaces with excessive vibration.

2. **POSITION:** All standard models are calibrated with the diaphragm vertical and should be used in that position for maximum accuracy. If your application requires mounting in other than a vertical position, be sure to specify this when ordering.

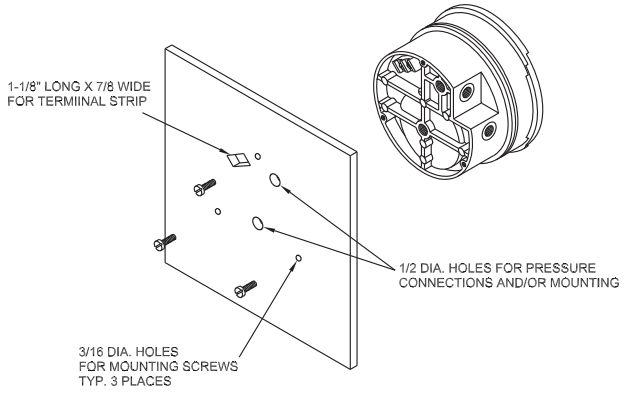
3. **PRESSURE CONNECTIONS:** For convenience, two sets of 1/8″ female NPT ports are available. Plug the unused set with pipe plugs provided. Attach tubing from positive pressure source to port marked “HI” or from negative (Vacuum) source to port marked “LOW”. In either case, opposite port must be vented to atmosphere. In dusty environments, we recommend use of an A-331 Filter Vent Plug to keep interior of instrument clean. For differential pressures the higher source is connected to the “HI” port and lower to the ”LOW” port.



4. **MOUNTING:** The Series 605 Transmitter may be either panel mounted or surface mounted.



A. PANEL MOUNTING: Cut a 4-3/4″ or 120mm dia. hole in panel and insert the complete unit from the front. Slip on the mounting ring and install the split snap ring in the groove on the bezel. Seat the mounting ring against the snap ring and thread the four screws through the tapped holes. Tighten screws against rear of panel.



B. SURFACE MOUNTING: Drill (3) 3/16″ dia. holes for mounting screws and cut (1) 7/8″ x 1-1/8″ hole for access to terminal strip as shown in hole location drawing. Insert screws from rear of panel and thread into tapped holes on back of transmitter case. If rear pressure connections are to be used, make 1/2″ dia. holes located as shown in hole location drawing in left column.

5. **ZEROING:** Once gage/transmitter is mounted in its final position, check to be sure pointer aligns with zero on scale, when no pressure is applied and both low and high pressure ports are vented to atmosphere. To adjust, turn small slotted screw at center-bottom of gage face. **Do not** move the larger black knobs labeled SPAN and ZERO. These are for use only if a calibration check shows the 4-20 mA output signal to need adjustment. See page 3 under heading OUTPUT RANGING.

ELECTRICAL CONNECTIONS

CAUTION: DO NOT EXCEED SPECIFIED SUPPLY VOLTAGE RATINGS. PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT. THIS UNIT IS NOT DESIGNED FOR AC VOLTAGE OPERATION.

Electrical connections to the Series 605 Transmitter are made to the two-screw terminal strip on the rear of the case. Polarity is indicated by + and – signs stamped on side. The schematic diagram of the Series 605 transmitter is illustrated in Figure B.

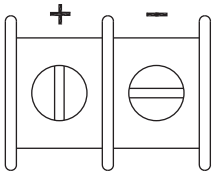


Figure A

An external power supply delivering 10.0 to 35 VDC with a minimum current capability of 40 milliamps must be used to power the control loop in which the Series 605 transmitter is connected. Refer to Fig. B for connection of the power supply, transmitter and receiver. The range of appropriate receiver load resistances (R_L) for the power supply voltage available is given by the formula and graph in Fig. C. Shielded two wire cable is recommended for control loop wiring and the negative side of the loop may be grounded if desired. Note also that the receiver may be connected in either the negative or positive side of the loop, whichever is most convenient. Should polarity of the transmitter or receiver be inadvertently reversed, the loop will not function properly but no damage will be done to the transmitter.

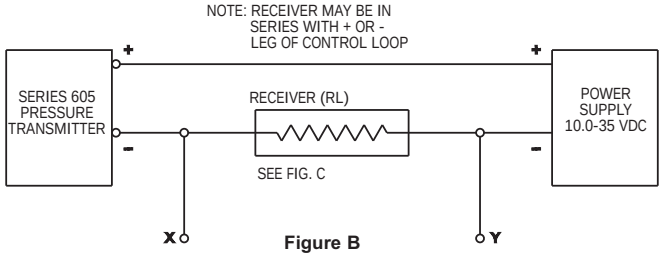


Figure B

The maximum length of connecting wire between the transmitter and the receiver is a function of wire size and receiver resistance. That portion of the total current loop resistance represented by the resistance of the connecting wires themselves should not exceed 10% of the receiver resistance. For extremely long runs (over 1,000 feet), it is desirable to select receivers with higher resistances in order to keep the size and cost of the connecting leads as low as possible. In installations where the connecting run is no more than 100 feet, connecting lead wire as small as No. 22 Ga. can be used.

The Series 605 transmitters can be used with receivers requiring 1-5 volt input rather than 4-20 mA. If the receiver requires a 1-5 volt input, insert a 250 ohm, 1/2 watt resistor in series with the current loop but in parallel with the receiver input. Referring to Figure B, R_L becomes the 250 ohm resistor and point X and Y are connected to the receiver input, point X being positive (+) and point Y negative (–) or ground. The resistor should be connected at the panel end of the transmitter current loop close to the receiver input to take advantage of the immunity of the current loop to electrical noise pickup. Most electronic component distributors stock a 249 r, 1/2 watt, ±1% tolerance metal film resistor which is adequate for this application.

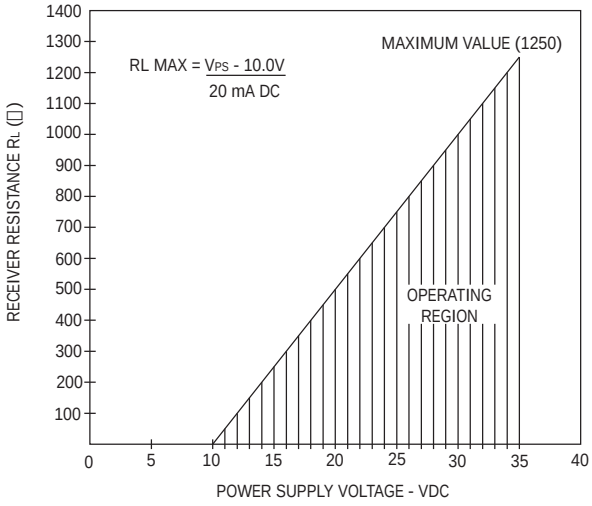


Figure C

OUTPUT RANGING

Each Series 605 Magnehelic® indicating transmitter is factory calibrated to produce 4 mA at zero scale reading and 20 mA at full scale reading. The following procedure should be used if the pressure versus output signal relationship needs to be checked.

1. With unit connected to the companion receiver per preceding instructions, insert an accurate milliammeter with a full scale reading of approximately 30 mA in series with the current loop.

2. Vent both pressure ports to atmosphere and, if necessary, adjust pointer zero screw to align pointer with zero on scale. A controllable pressure source capable of reaching the full scale range should be connected to either high pressure port. Plug the other high pressure port and vent one or both low pressure ports to atmosphere. The instrument must be ranged in the same position in which it will be used. Standard factory calibration and ranging is done with unit vertical.

3. Apply electrical power to the system and check for proper operation by slowly increasing pressure and observing whether the loop current increases above the 4 mA zero pressure reading.

4. A spanner type key is supplied to adjust span and zero. This helps to reduce unauthorized tampering. Apply pressure until pointer aligns with full scale reading and adjust the SPAN knob for a 20 mA reading.

5. Relieve all pressure, allow a few seconds for setting and adjust the ZERO knob for a 4 mA current loop reading.

6. The SPAN and ZERO controls are slightly interactive so steps 4 & 5 should be repeated a few times until readings of 4 and 20 mA are obtained consistently.

7. Remove the milliammeter from the current loop and proceed with final installation of the transmitter and receiver.

MULTIPLE UNITS WITH COMMON POWER SUPPLY

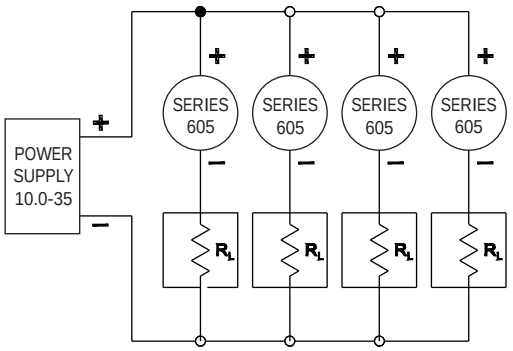


Figure D

Several Series 605 transmitters can be operated with a single power supply as depicted above in Figure D. Be careful to specify a supply with sufficient capacity. The minimum current requirement at a given voltage can be calculated by multiplying the number of units x 20 mA. In the example shown this would be 4 x 20 or 80 mA minimum.

MAINTENANCE

Upon final installation of the Series 605 Transmitter and the companion receiver, including the A-701 Digital Readout, no routine maintenance is required. A periodic check of system calibration is recommended. The Series 605 Differential Pressure Transmitter is not field repairable and should be returned, freight prepaid, to the factory if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization (RGA) number before shipping.

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P.O. BOX 373 • MICHIGAN CITY, IN 46361, U.S.A.

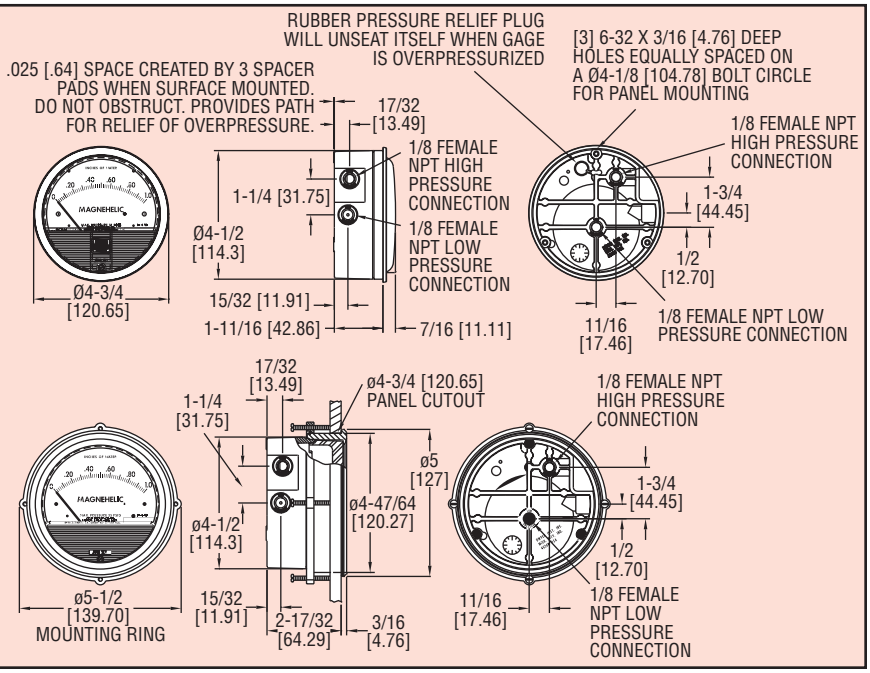
Phone: 219/879-8000 **www.dwyer-inst.com**
Fax: 219/872-9057 **e-mail: info@dwyer-inst.com**

Series 2000

Magnehelic® Differential Pressure Gages

Indicate Positive, Negative or Differential, Accurate within 2%





Scan here to watch product video

Select the Dwyer® Magnehelic® gage for high accuracy – guaranteed within 2% of full-scale – and for the wide choice of 81 models available to suit your needs precisely. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates low air or non-corrosive gas pressures – either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures. No manometer fluid to evaporate, freeze or cause toxic or leveling problems. It's inexpensive, too.

The Magnehelic® gage is the industry standard to measure fan and blower pressures, filter resistance, air velocity, furnace draft, pressure drop across orifice plates, liquid levels with bubbler systems and pressures in fluid amplifier or fluidic systems. It also checks gas-air ratio controls and automatic valves, and monitors blood and respiratory pressures in medical care equipment.

MOUNTING

A single case size is used for most models of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. Although calibrated for vertical position, many ranges above 1″ may be used at any angle by simply re-zeroing. However, for maximum accuracy, they must be calibrated in the same position in which they are used. These characteristics make Magnehelic® gages ideal for both stationary and portable applications. A 4-9/16″ hole is required for flush panel mounting. Complete mounting and connection fittings, plus instructions, are furnished with each instrument.❶

SPECIFICATIONS

Service: Air and non-combustible, compatible gases (natural gas option available). **Note:** May be used with hydrogen. Order a Buna-N diaphragm. Pressures must be less than 35 psi.
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.
Accuracy: ±2% of FS (±3% on - 0, -100 Pa, -125 Pa, 10MM and ±4% on - 00, -60 Pa, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: -20 in Hg to 15 psig† (-0.677 to 1.034 bar); MP option: 35 psig (2.41 bar); HP option: 80 psig (5.52 bar).
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only.❷
Temperature Limits: 20 to 140°F* (-6.67 to 60°C). -20°F (-28°C) with low temperature option.
Size: 4″ (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
Standard Accessories: Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adapter, and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for three adapters in MP & HP gage accessories.)
Agency Approval: RoHS. **Note:** -SP models not RoHS approved.

†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options.

ACCESSORIES



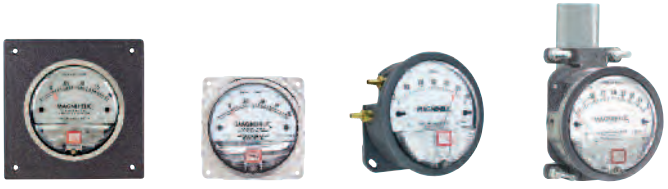
Model A-432 Portable Kit
Combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft (2.7 m) of 3/16″ ID rubber tubing, standhang bracket and terminal tube with holder.



Model A-605 Air Filter Gage Accessory Kit
Adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft (1.5 m) lengths of 1/4″ aluminum tubing two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves.

A-605B Air Filter Gage Accessory Kit, Air filter kit with two plastic open/close valves, two 4″ steel static tips, plastic tubing and mounting flange

A-605C Air Filter Gage Accessory Kit, Air filter kit with two plastic open/close valves, two plastic static tips, plastic tubing and mounting flange



Flush, Surface, Integrated Plate or Pipe Mounted

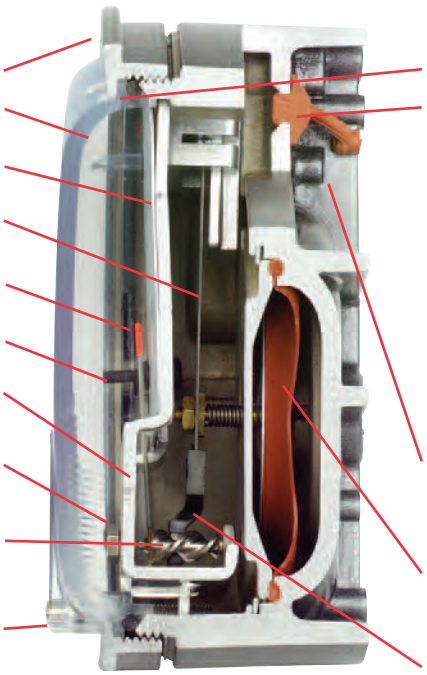


Enclosure Mounted

❶See page 7 (Magnehelic® Gage Mounting Accessories)
❷Over Protection Note: See page 5 (Series 2000)

Series 2000

Magnehelic® Gage Models & Ranges



Bezel provides flange for flush mounting in panel.

Clear plastic face is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

Precision litho-printed scale is accurate and easy to read.

Calibrated range spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

Red tipped pointer of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

Pointer stops of molded rubber prevent pointer over-travel without damage.

"Wishbone" assembly provides mounting for helix, helix bearings and pointer shaft.

Jeweled bearings are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

Helix is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.

Zero adjustment screw is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.

O-ring seal for cover assures pressure integrity of case.

OVERPRESSURE PROTECTION
Blowout plug is comprised of a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (1.7 bar). To provide a free path for pressure relief, there are four spacer pads which maintain 0.023″ clearance when gage is surface mounted. Do not obstruct the gap created by these pads.
The blowout plug is not used on models above 180″ of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.
The blowout plug should not be used as a system overpressure control. High supply pressures may still cause the gage to fail due to over pressurization, resulting in property damage or serious injury. Good engineering practices should be utilized to prevent your system from exceeding the ratings or any component.

Die cast aluminum case is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

Silicone rubber diaphragm with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

Samarium Cobalt magnet mounted at one end of range spring rotates helix without mechanical linkages.

Model	Range Inches of Water
2000-00N†••	.05-0-.2
2000-00†••	0-.25
2000-0†•	0-.50
2001	0-1.0
2002	0-2.0
2003	0-3.0
2004	0-4.0
2005	0-5.0
2006	0-6.0
2008	0-8.0
2010	0-10
2012	0-12
2015	0-15
2020	0-20
2025	0-25
2030	0-30
2040	0-40
2050	0-50
2060	0-60
2080	0-80
2100	0-100
2120	0-120
2150	0-150
2160	0-160
2180*	0-180
2250*	0-250
Zero Center Ranges	
2300-00†••	0.125-0-0.125
2300-0†•	.25-0-.25
2301	.5-0-.5
2302	1-0-1
2304	2-0-2
2310	5-0-5
2320	10-0-10
2330	15-0-15

Model	Range PSI
2201	0-1
2202	0-2
2203	0-3
2204	0-4
2205	0-5
2210*	0-10
2215*	0-15
2220*	0-20
2230**	0-30
Model	**Range, CM of Water**
2000-15CM	0-15
2000-20CM	0-20
2000-25CM	0-25
2000-50CM	0-50
2000-80CM	0-80
2000-100CM	0-100
2000-150CM	0-150
2000-200CM	0-200
2000-250CM	0-250
2000-300CM	0-300
Zero Center Ranges	
2300-4CM	2-0-2
2300-10CM	5-0-5
2300-30CM	15-0-15

†These ranges calibrated for vertical scale position.
• Accuracy +/-3%
• • Accuracy +/-4%
*MP option standard
**HP option standard

Model	Range MM of Water
2000-6MM†••	0-6
2000-10MM†•	0-10
2000-15MM	0-15
2000-25MM	0-25
2000-30MM	0-30
2000-50MM	0-50
2000-80MM	0-80
2000-100MM	0-100
2000-125MM	0-125
2000-150MM	0-150
2000-200MM	0-200
2000-250MM	0-250
2000-300MM	0-300
Zero Center Ranges	
2300-6MM†••	3-0-3
2300-10MM†•	5-0-5
2300-20MM†•	10-0-10
Model	**Range, Pa**
2000-60NPA†••	10-0-50
2000-60PA†••	0-60
2000-100PA†•	0-100
2000-125PA†•	0-125
2000-250PA	0-250
2000-300PA	0-300
2000-500PA	0-500
2000-750PA	0-750
2000-1000PA	0-1000
Zero Center Ranges	
Model	**Range, Pa**
2300-60PA†••	30-0-30
2300-100PA†•	50-0-50
2300-120PA	60-0-60
2300-200PA	100-0-100
2300-250PA	125-0-125
2300-300PA	150-0-150
2300-500PA	250-0-250
2300-1000PA	500-0-500

Model	Range, kPa
2000-0.5KPA	0-0.5
2000-1KPA	0-1
2000-1.5KPA	0-1.5
2000-2KPA	0-2
2000-2.5KPA	0-2.5
2000-3KPA	0-3
2000-4KPA	0-4
2000-5KPA	0-5
2000-8KPA	0-8
2000-10KPA	0-10
2000-15KPA	0-15
2000-20KPA	0-20
2000-25KPA	0-25
2000-30KPA	0-30
Zero Center Ranges	
2300-1KPA	.5-0-.5
2300-2KPA	1-0-1
2300-2.5KPA	1.25-0-1.25
2300-3KPA	1.5-0-1.5

Dual Scale Air Velocity Units
For use with pitot tube

Model	Range in W.C./ Velocity F.P.M.
2000-00AV†••	0-.25/ 300-2000
2000-0AV†•	0-.50/ 500-2800
2001AV	0-1.0/ 500-4000
2002AV	0-2.0/ 1000-5600
2005AV	0-5.0/ 2000-8800
2010AV	0-10/ 2000-12500

Dual Scale English/Metric Models

Model	Range, in w.c.	Range, Pa or kPa
2000-00D†••	0-.25	0-62 Pa
2000-0D†•	0-0.5	0-125 Pa
2001D	0-1.0	0-250 Pa
2002D	0-2.0	0-500 Pa
2003D	0-3.0	0-750 Pa
2004D	0-4.0	0-1.0 kPa
2005D	0-5.0	0-1.25 kPa
2006D	0-6.0	0-1.5 kPa
2008D	0-8.0	0-2.0 kPa
2010D	0-10	0-2.5 kPa
2015D	0-15	0-3.7 kPa
2020D	0-20	0-5 kPa
2025D	0-25	0-6.2 kPa
2050D	0-50	0-12.4 kPa
2060D	0-60	0-15 kPa

VELOCITY AND VOLUMETRIC FLOW UNITS
Scales are available on the Magnehelic® that read in velocity units (FPM, m/s) or volumetric flow units (SCFM, m^3/s, m^3/h). Stocked velocity units with dual range scales in inches w.c. and feet per minute are shown above. For other ranges contact the factory.
When ordering volumetric flow scales please specify the maximum flow rate and its corresponding pressure. Example: 0.5 in w.c. = 16,000 CFM.

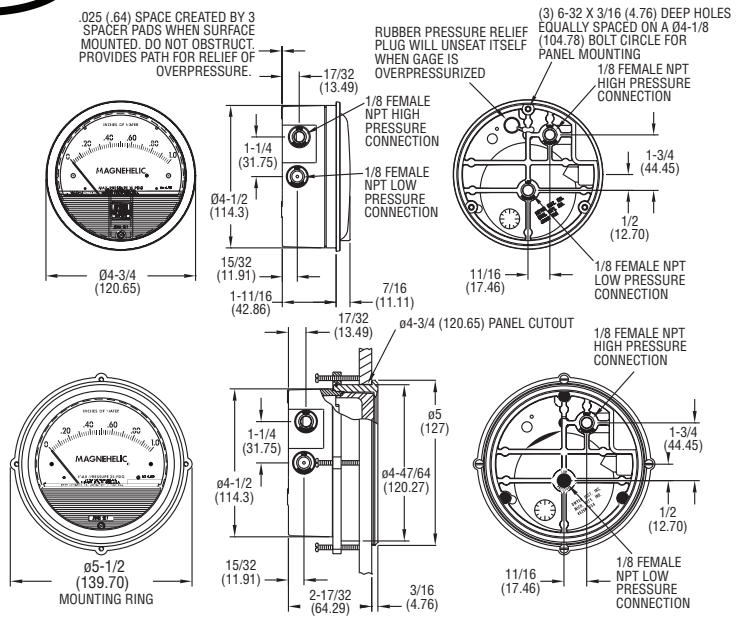
ACCESSORIES
A-321, Safety Relief Valve
A-448, 3-piece magnet kit for mounting Magnehelic® gage directly to magnetic surface
A-135, Rubber gasket for panel mounting
A-401, Plastic Carry Case



A-310A 3-Way Vent Valves
In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage.

Bulletin A-27

Magnehelic® Differential Pressure Gage



**The blowout plug is not used on models above 180 inches of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.*

STANDARD GAGE ACCESSORIES: Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adapters and three flush mounting adapters with screws.

MP AND HP GAGE ACCESSORIES: Mounting ring and snap ring retainer substituted for 3 adaptors, 1/4" compression fittings replace 1/8" pipe thread to rubber tubing adaptors.

OVERPRESSURE PROTECTION: Standard Magnehelic® Differential Pressure Gages are rated for a maximum pressure of 15 psig and should not be used where that limit could be exceeded. Models employ a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (excludes MP and HP models). To provide a free path for pressure relief, there are four spacer pads which maintain .023″ clearance when gage is surface mounted. Do not obstruct the gap created by these pads.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases. (Natural Gas option available.)
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. (MP model has polycarbonate cover).
Accuracy: ±2% of full scale (±3% on - 0, -100 Pa, -125 Pa, 10MM and ±4% on -00, - 00N, -60 Pa, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: -20″ Hg to 15 psig.† (-0.677 bar to 1.034 bar); MP option: 35 psig (2.41 bar), HP option: 80 psig (5.52 bar).
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only. The blowout plug is not used on models above 180 inches of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.
Temperature Limits: 20 to 140°F (-6.67 to 60°C). *Low temperature models available as special option.
Size: 4″ (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
Agency Approvals: RoHS.

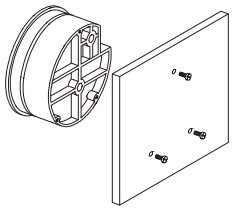
†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options.

Note: May be used with hydrogen when ordering Buna-N diaphragm. Pressure must be less than 35 psi.

INSTALLATION

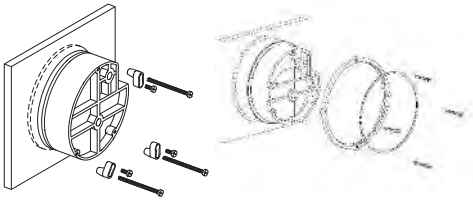
Select a location free from excessive vibration and where the ambient temperature will not exceed 140°F (60°C). Also, avoid direct sunlight which accelerates discoloration of the clear plastic cover. Sensing lines may be run any necessary distance. Long tubing lengths will not affect accuracy but will increase response time slightly. Do not restrict lines. If pulsating pressures or vibration cause excessive pointer oscillation, consult the factory for ways to provide additional damping.
All standard Magnehelic® Differential Pressure Gages are calibrated with the diaphragm vertical and should be used in that position for maximum accuracy. If gages are to be used in other than vertical position, this should be specified on the order. Many higher range gages will perform within tolerance in other positions with only rezeroing. Low range models of 0.5" w.c. plus 0.25" w.c. and metric equivalents must be used in the vertical position only.

SURFACE MOUNTING



Locate mounting holes, 120° apart on a 4-1/8" dia. circle. Use No. 6-32 machine screws of appropriate length.

FLUSH MOUNTING



Provide a 4-9/16" dia. (116 mm) opening in panel. Provide a 4-3/4" dia. (120 mm) opening for MP and HP models. Insert gage and secure in place with No. 6-32 machine screws of appropriate length, with adapters, firmly secured in place.

PIPE MOUNTING

To mount gage on 1-1/4" - 2" pipe, order optional A-610 pipe mounting kit.

TO ZERO GAGE AFTER INSTALLATION

Set the indicating pointer exactly on the zero mark, using the external zero adjust screw on the cover at the bottom. Note that the zero check or adjustment can only be made with the high and low pressure taps both open to atmosphere.

OPERATION

Positive Pressure: Connect tubing from source of pressure to either of the two high pressure ports. Plug the port not used. Vent one or both low pressure ports to atmosphere.
Negative Pressure: Connect tubing from source of vacuum or negative pressure to either of the two low pressure ports. Plug the port not used. Vent one or both high pressure ports to atmosphere.
Differential Pressure: Connect tubing from the greater of two pressure sources to either high pressure port and the lower to either low pressure port. Plug both unused ports.
When one side of the gage is vented in dirty, dusty atmosphere, we suggest an A-331 Filter Vent Plug be installed in the open port to keep inside of gage clean.

A. For portable use of temporary installation use 1/8" pipe thread to rubber tubing adapter and connect to source of pressure with flexible rubber or vinyl tubing.
B. For permanent installation, 1/4" O.D., or larger, copper or aluminum tubing is recommended.

MAINTENANCE

No lubrication or periodic servicing is required. Keep case exterior and cover clean. Occasionally disconnect pressure lines to vent both sides of gage to atmosphere and re-zero. Optional vent valves should be used in permanent installations. The Series 2000 is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

WARNING

Attempted field repair may void your warranty. Recalibration or repair by the user is not recommended.

TROUBLE SHOOTING TIPS

Gage won't indicate or is sluggish.

1. Duplicate pressure port not plugged.
2. Diaphragm ruptured due to overpressure.
3. Fittings or sensing lines blocked, pinched, or leaking.
4. Cover loose or "O"ring damaged, missing.
5. Pressure sensor, (static tips, Pitot tube, etc.) improperly located.
6. Ambient temperature too low. For operation below 20°F (-7°C), order gage with low temperature, (LT) option.

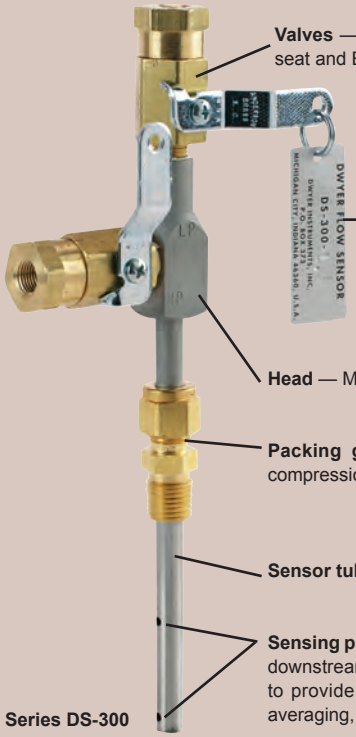
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Series DS

In-Line Flow Sensors

Use with the Dwyer® Differential Pressure Gages or Transmitters



Valves — Standard, brass with TFE seat and Buna-N O-ring

Nameplate — Stainless steel permanently attached with split ring. Includes complete size and model information.

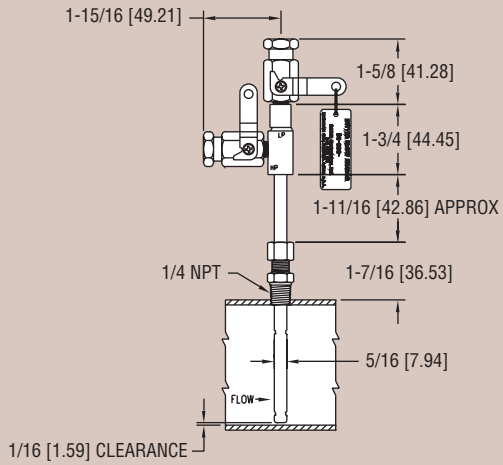
Head — Machined stainless steel.

Packing gland — Parker CPI brass compression fitting.

Sensor tube — 304 SS.

Sensing ports — Multiple upstream and downstream ports sized and positioned to provide effective accurate pressure averaging, even at lower velocities.

Series DS-300



In-Line Flow Sensors are averaging Pitot tubes that provide accurate and convenient flow rate sensing for schedule 40 pipe. When purchased with a Dwyer® Capsuhelic® differential pressure gage of appropriate range, the result is a flow indicating system delivered off the shelf at an economical price.

Pitot tubes have been used in flow measurement for years. Conventional pitot tubes sense velocity pressure at only one point in the flowing stream. Therefore, a series of measurements must be taken across the stream to obtain a meaningful average flow rate. The Dwyer® flow sensor eliminates the need for "traversing" the flowing stream because of its multiple sensing points and built-in averaging capability.

The Series DS-300 flow sensors are designed to be inserted in the pipeline through a compression fitting. They are furnished with instrument shut-off valves on both pressure connections. Valves are fitted with 1/8″ female NPT connections. Accessories include adapters with 1/4″ SAE 45° flared ends compatible with hoses supplied with the Model A-471 Portable Capsuhelic® gage kit. Standard valves are rated at 200 psig (13.7 bar) and 200°F (93.3°C). Where valves are not required, they can be omitted at reduced cost. Series DS-300 flow sensors are available for pipe sizes from 1″ to 10″.

DS-400 Averaging Flow Sensors are quality constructed from extra strong 3/4″ dia. stainless steel to resist increased forces encountered at higher flow rates with both air and water. This extra strength also allows them to be made in longer insertion lengths up to 24 inches (61 cm). All models include convenient and quick-acting quarter-turn ball valves to isolate the sensor for zeroing. Process connections to the valve assembly are 1/8″ female NPT. A pair of 1/8″ NPT X 1/4″ SAE 45° flared adapters are included, compatible with hoses used in the Model A-471 Portable Capsuhelic® Gage Kit. Supplied solid brass mounting adapter has a 3/4″ dia. compression fitting to lock in required insertion length and a 3/4″ male NPT thread for mounting in a Threaded Branch Connection.

Series DS-300

Model	Description
DS-300-1″	1″ pipe size
DS-300-1-1/4″	1-1/4″ pipe size
DS-300-1-1/2″	1-1/2″ pipe size
DS-300-2″	2″ pipe size
DS-300-2-1/2″	2-1/2″ pipe size
DS-300-3″	3″ pipe size
DS-300-4″	4″ pipe size
DS-300-6″	6″ pipe size
DS-300-8″	8″ pipe size
DS-300-10″	10″ pipe size

Series DS-400

Model	Description
DS-400-6″	6″ pipe size
DS-400-8″	8″ pipe size
DS-400-10″	10″ pipe size
DS-400-12″	12″ pipe size
DS-400-14″	14″ pipe size
DS-400-16″	16″ pipe size
DS-400-18″	18″ pipe size
DS-400-20″	20″ pipe size
DS-400-24″	24″ pipe size

OPTIONS & ACCESSORIES

DS-300 or DS-400 Less Valves. To order, add suffix **-LV**

A-160, Threaded Branch Connection, 3/8″ NPT, forged steel, 3000 psi

A-161, Brass Bushing, 1/4″ x 3/8″

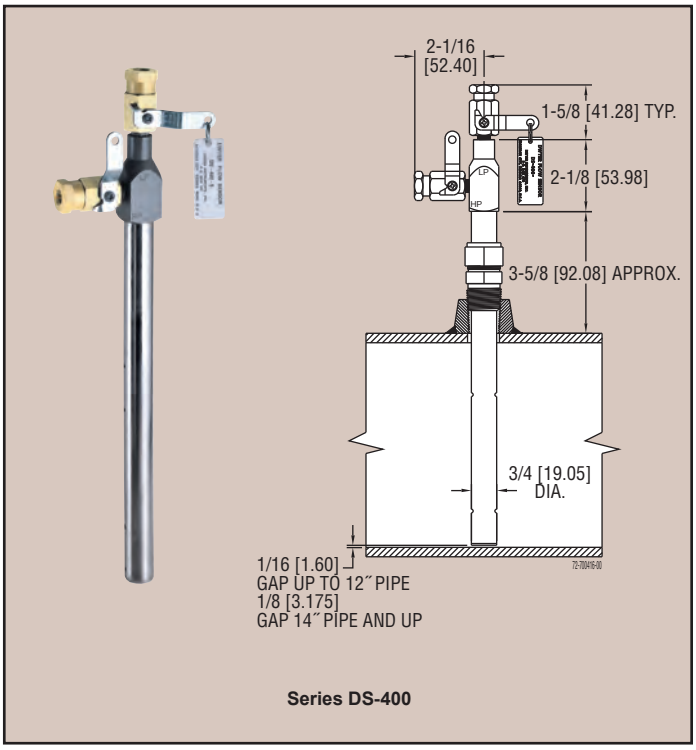
How To Order

Merely determine the pipe size into which the flow sensor will be mounted and designate the size as a suffix to Model DS-300. For example, a flow sensor to be mounted in a 2″ pipe would be a Model No. DS-300-2″.

For non-critical water and air flow monitoring applications, the chart below can be utilized for ordering a stock Capsuhelic® differential pressure gage for use with the DS-300 flow sensor. Simply locate the maximum flow rate for the media being measured under the appropriate pipe size and read the Capsuhelic® gage range in inches of water column to the left. The DS-300 sensor is supplied with installation and operating instructions, Bulletin F-50. It also includes complete flow conversion information for the three media conditions shown in the chart below. This information enables the user to create a complete differential pressure to flow rate conversion table for the sensor and differential pressure gage employed. Both the Dwyer® Capsuhelic® gage and flow sensor feature excellent repeatability so, once the desired flow rate is determined, deviation from that flow in quantitative measure can be easily determined. You may wish to order the adjustable signal flag option for the Capsuhelic® gage to provide an easily identified reference point for the proper flow.

Capsuhelic® gages with special ranges and/or direct reading scales in appropriate flow units are available on special order for more critical applications. Customer supplied data for the full scale flow (quantity and units) is required along with the differential pressure reading at that full flow figure. Prior to ordering a special Capsuhelic® differential pressure gage for flow read-out, we recommend you request Bulletin F-50 to obtain complete data on converting flow rates of various media to the sensor differential pressure output. With this bulletin and after making a few simple calculations, the exact range gage required can easily be determined.

Large 3/4 Inch Diameter for Extra Strength in Lengths to 24 Inches



Series DS-400

Gage Range (in w.c.)	Media @ 70°F	Full Range Flows by Pipe Size (Approximate)									
		1″	1-1/4″	1-1/2″	2″	2-1/2″	3″	4″	6″	8″	10″
2	Water (GPM)	4.8	8.3	11.5	20.5	30	49	86	205	350	560
	Air @ 14.7 PSIA (SCFM)	19.0	33.0	42.0	65.0	113	183	330	760	1340	2130
	Air @ 100 PSIG (SCFM)	50.0	90.5	120.0	210.0	325	510	920	2050	3600	6000
5	Water (GPM)	7.7	14.0	18.0	34.0	47	78	138	320	560	890
	Air @ 14.7 PSIA (SCFM)	30.0	51.0	66.0	118.0	178	289	510	1200	2150	3400
	Air @ 100 PSIG (SCFM)	83.0	142.0	190.0	340.0	610	820	1600	3300	5700	10000
10	Water (GPM)	11.0	19.0	25.5	45.5	67	110	195	450	800	1260
	Air @ 14.7 PSIA (SCFM)	41.0	72.0	93.0	163.0	250	410	725	1690	3040	4860
	Air @ 100 PSIG (SCFM)	120.0	205.0	275.0	470.0	740	1100	2000	4600	8100	15000
25	Water (GPM)	18.0	32.0	40.5	72.0	108	173	310	720	1250	2000
	Air @ 14.7 PSIA (SCFM)	63.0	112.0	155.0	255.0	390	640	1130	2630	4860	7700
	Air @ 100 PSIG (SCFM)	185.0	325.0	430.0	760.0	1200	1800	3300	7200	13000	22000
50	Water (GPM)	25.0	44.0	57.5	100.0	152	247	435	1000	1800	
	Air @ 14.7 PSIA (SCFM)	90.0	161.0	205.0	360.0	560	900	1600	3700	6400	
	Air @ 100 PSIG (SCFM)	260.0	460.0	620.0	1050.0	1700	2600	4600	10000	18500	
100	Water (GPM)	36.5	62.0	82.0	142.0	220	350	620	1500		
	Air @ 14.7 PSIA (SCFM)	135.0	230.0	300.0	505.0	800	1290	2290	5000		
	Air @ 100 PSIG (SCFM)	370.0	660.0	870.0	1500.0	2300	3600	6500	15000		

Model A-471 Portable Kit

For portable operation, the A-471 Capsuhelic® Portable Gage Kit is available complete with tough polypropylene carrying case, mounting bracket, 3-way manifold valve, two 10' high pressure hoses, and all necessary fittings.

See page 15 for complete information on the Capsuhelic® gage



Capsuhelic® Gage Shown Installed In A-471 Portable Kit

Series 631B Capsuhelic® Wet/Wet Differential Pressure Transmitter

Low pressure transmitter for use with DS-300/400 flow sensors. Use Series 631B Capsuhelic® Wet/Wet Differential Pressure Transmitter.

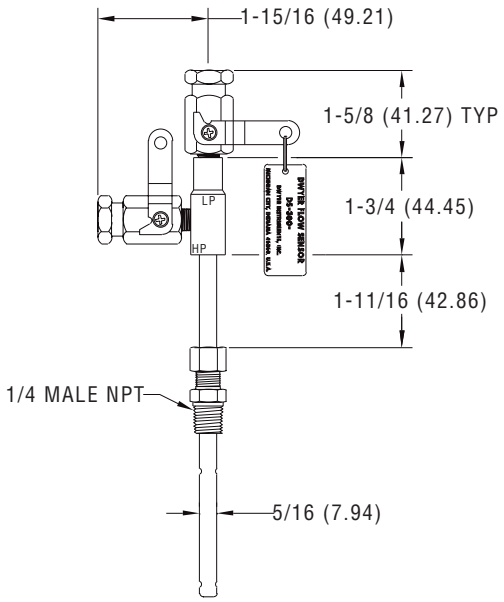
See page 65 for additional details.



Series DS-300 Flow Sensors

Installation and Operating Instructions Flow Calculations





Series DS-300 Flow Sensors are averaging pitot tubes that provide accurate, convenient flow rate sensing. When purchased with a Dwyer Capsuhelic® for liquid flow or Magnehelic® for air flow, differential pressure gage of appropriate range, the result is a flow-indicating system delivered off the shelf at an economical price. Series DS-300 Flow Sensors are designed to be inserted in the pipeline through a compression fitting and are furnished with instrument shut-off valves on both pressure connections. Valves are fitted with 1/8″ female NPT connections. Accessories include adapters with 1/4″ SAE 45° flared ends compatible with hoses supplied with the Model A-471 Portable Capsuhelic® kit. Standard valves are rated at 200°F (93.3°C). Where valves are not required, they can be omitted at reduced cost. Series DS-300 Flow Sensors are available for pipe sizes from 1″ to 10″.

INSPECTION

Inspect sensor upon receipt of shipment to be certain it is as ordered and not damaged. If damaged, contact carrier.

INSTALLATION

General - The sensing ports of the flow sensor must be correctly positioned for measurement accuracy. The instrument connections on the sensor indicate correct positioning. The side connection is for total or high pressure and should be pointed upstream. The top connection is for static or low pressure.

Location - The sensor should be installed in the flowing line with as much straight run of pipe upstream as possible. A rule of thumb is to allow 10 - 15 pipe diameters upstream and 5 downstream. The table below lists recommended up and down piping.

PRESSURE AND TEMPERATURE

Maximum: 200 psig (13.78 bar) at 200°F (93.3°C).

Upstream and Downstream Dimensions in Terms of Internal Diameter of Pipe*

Upstream Condition	Minimum Diameter of Straight Pipe		
	Upstream		Downstream
	In-Plane	Out of Plane	
One Elbow or Tee	7	9	5
Two 90° Bends in Same Plane	8	12	5
Two 90° Bends in Different Plane	18	24	5
Reducers or Expanders	8	8	5
All Valves**	24	24	5

* Values shown are recommended spacing, in terms of internal diameter for normal industrial metering requirements. For laboratory or high accuracy work, add 25% to values.

** Includes gate, globe, plug and other throttling valves that are only partially opened. If valve is to be fully open, use values for pipe size change. **CONTROL VALVES SHOULD BE LOCATED AFTER THE FLOW SENSOR.**

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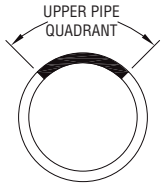
POSITION

Be certain there is sufficient clearance between the mounting position and other pipes, walls, structures, etc, so that the sensor can be inserted through the mounting unit once the mounting unit has been installed onto the pipe.

Flow sensors should be positioned to keep air out of the instrument connecting lines on liquid flows and condensate out of the lines on gas flows. The easiest way to assure this is to install the sensor into the pipe so that air will bleed into, or condensate will drain back to, the pipe.

For Air or Gas Flow

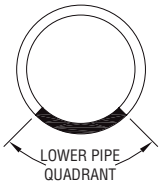
Install in upper quadrant of pipe



Condensate drains back to pipe

For Liquid or Steam Flow

Install in lower quadrant of pipe



Air bleeds back to pipe

INSTALLATION

1. When using an A-160 thred-o-let, weld it to the pipe wall. If replacing a DS-200 unit, an A-161 bushing (1/4˝ x 3/8˝) will be needed.

2. Drill through center of the thred-o-let into the pipe with a drill that is slightly larger than the flow sensor diameter.

3. Install the packing gland using proper pipe sealant. If the packing gland is disassembled, note that the tapered end of the ferrule goes into the fitting body.

4. Insert sensor until it bottoms against opposite wall of the pipe, then withdraw 1/16˝ to allow for thermal expansion.

5. Tighten packing gland nut finger tight. Then tighten nut with a wrench an additional 1-1/4 turns. Be sure to hold the sensor body with a second wrench to prevent the sensor from turning.

INSTRUMENT CONNECTION

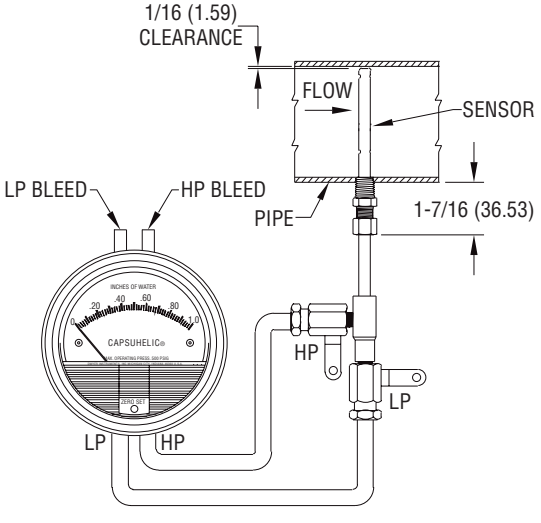
Connect the slide pressure tap to the high pressure port of the Magnehelic® (air only) or Capsuhelic® gage or transmitting instrument and the top connection to the low pressure port.

See the connection schematics below.

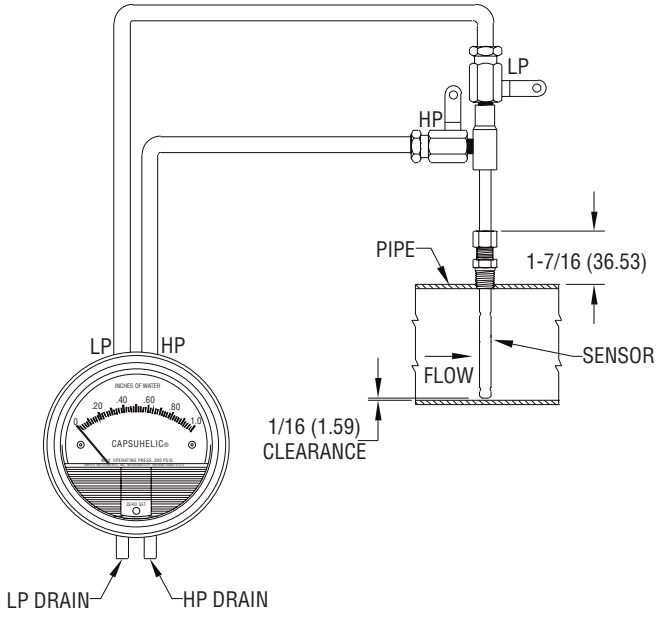
Bleed air from instrument piping on liquid flows. Drain any condensate from the instrument piping on air and gas flows.

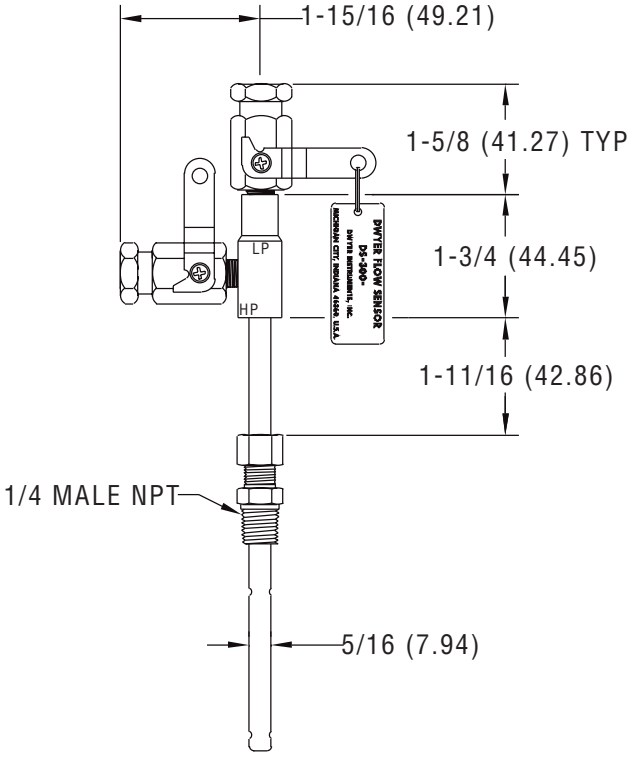
Open valves to instrument to place flow meter into service. For permanent installations, a 3-valve manifold is recommended to allow the gage to be zero checked without interrupting the flow. The Dwyer A-471 Portable Test Kit includes such a device.

Water Flow



Air or Gas Flow





Flow Calculations and Charts

The following information contains tables and equations for determining the differential pressure developed by the DS-300 Flow Sensor for various flow rates of water, steam, air or other gases in different pipe sizes.

This information can be used to prepare conversion charts to translate the differential pressure readings being sensed into the equivalent flow rate. When direct readout of flow is required, use this information to calculate the full flow differential pressure in order to specify the exact range of Dwyer Magnehelic® or Capsuhelic® gage required. Special ranges and calculations are available for these gages at minimal extra cost. See bulletins A-30 and F-41 for additional information on Magnehelic® and Capsuhelic® gages and DS-300 flow sensors.

For additional useful information on making flow calculations, the following service is recommended: Crane Valve Co. Technical Paper No. 410 "Flow of Fluids Through Valves, Fittings and Pipe." It is available from Crane Valve Company, www.cranevalve.com.

Using the appropriate differential pressure equation from Page 4 of this bulletin,calculate the differential pressure generated by the sensor under normal operating conditions of the system. Check the chart below to determine if this value is within the recommended operating range for the sensor. Note that the data in this chart is limited to standard conditions of air at 60°F (15.6°C) and 14.7 psia static line pressure or water at 70°F (21.1°C). To determine recommended operating ranges of other gases, liquids an/or operating conditions, consult factory.

Note: the column on the right side of the chart which defines velocity ranges to avoid. Continuous operation within these ranges can result in damage to the flow sensor caused by excess vibration.

Pipe Size (Schedule 40)	Flow Coefficient "K"	Operating Ranges Air @ 60°F & 14.7 psia (D/P in. W.C.)	Operating Ranges Water @ 70°F (D/P in. W.C.)	Velocity Ranges Not Recommended (Feet per Second)
1	0.52	1.10 to 186	4.00 to 675	146 to 220
1-1/4	0.58	1.15 to 157	4.18 to 568	113 to 170
1-1/2	0.58	0.38 to 115	1.36 to 417	96 to 144
2	0.64	0.75 to 75	2.72 to 271	71 to 108
2-1/2	0.62	1.72 to 53	6.22 to 193	56 to 85
3	0.67	0.39 to 35	1.43 to 127	42 to 64
4	0.67	0.28 to 34	1.02 to 123	28 to 43
6	0.71	0.64 to 11	2.31 to 40	15 to 23
8	0.67	0.10 to 10	0.37 to 37	9.5 to 15
10	0.70	0.17 to 22	0.60 to 79	6.4 to 10

FLOW EQUATIONS

1. Any Liquid

$$Q\ (GPM) = 5.668 \times K \times D^2 \times \sqrt{\Delta P / S_f}$$

2. Steam or Any Gas

$$Q\ (lb/Hr) = 359.1 \times K \times D^2 \times \sqrt{p \times \Delta P}$$

3. Any Gas

$$Q\ (SCFM) = 128.8 \times K \times D^2 \times \sqrt{\frac{P \times \Delta P}{(T + 460) \times S_s}}$$

DIFFERENTIAL PRESSURE EQUATIONS

1. Any Liquid

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_f}{K^2 \times D^4 \times 32.14}$$

2. Steam or Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2}{K^2 \times D^4 \times p \times 128{,}900}$$

3. Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_s \times (T + 460)}{K^2 \times D^4 \times P \times 16{,}590}$$

Technical Notations

The following notations apply:

ΔP = Differential pressure expressed in inches of water column
Q = Flow expressed in GPM, SCFM, or PPH as shown in equation
K = Flow coefficient— See values tabulated on Pg. 3.
D = Inside diameter of line size expressed in inches.

For square or rectangular ducts, use: $D = \sqrt{\frac{4 \times \text{Height} \times \text{Width}}{\pi}}$

P = Static Line pressure (psia)
T = Temperature in degrees Fahrenheit (plus 460 = °Rankine)
p = Density of medium in pounds per square foot
S_f = Sp Gr at flowing conditions
S_s = Sp Gr at 60°F (15.6°C)

SCFM TO ACFM EQUATION

$$SCFM = ACFM \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

$$ACFM = SCFM \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520}\right)$$

$$\text{POUNDS PER CUBIC FOOT STD.} = \text{POUNDS PER CUBIC FOOT ACT.} \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520^*}\right)$$

$$\text{POUNDS PER CUBIC FOOT ACT.} = \text{POUNDS PER CUBIC FOOT STD.} \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

1 Cubic foot of air = 0.076 pounds per cubic foot at 60° F (15.6°C) and 14.7 psia.
* (520°= 460 + 60°) Std. Temp. Rankine

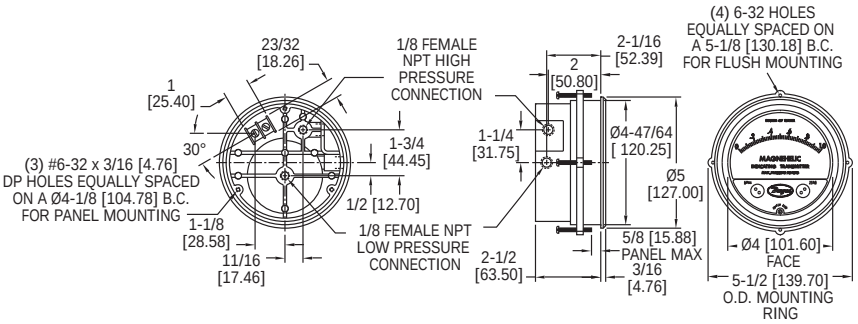
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Series 605 Magnehelic® Differential Pressure Indicating Transmitter

Specifications - Installation and Operating Instructions





The Series 605 Magnehelic® Indicating Transmitter simultaneously provides local indication on a large, easily read analog scale while also converting that pressure into a standard two-wire, 4-20 mA signal for ranges from 0-0.5 to 0-50″ w.c. Positive, negative or differential air and compatible gas pressure can be measured with accuracies as low as ±.5% of full scale. The basic mechanical components of the Series 605 Magnehelic® indicating transmitter are similar to those used in the popular, time-proven Magnehelic® differential pressure gage.

STANDARD ACCESSORIES

Mounting ring
Snap ring
(4) 6-32 x 1-1/4 screws (panel mtg.)
(3) 6-32 x 5/16 screws (surface mtg.)
(2) Tubing to 1/8″ NPT adapters
(2) 1/8″ NPT plugs
Adjustment key

SPECIFICATIONS

GAGE SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Accuracy: See chart.
Stability: ±1% F.S./yr.
Pressure Limits: See chart.
Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).
Process Connections: 1/8″ female NPT.
Size: 4″ (101.6 mm) dial face, 5″ (127 mm) O.D. x 2-11/16″ (68.3 mm).
Weight: 1 lb, 12.6 oz (811 g).
Agency Approvals: CE.

TRANSMITTER SPECIFICATIONS

Accuracy: See chart (includes linearity, hysteresis, repeatability).
Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).
Compensated Temperature Range: 32 to 120°F (0 to 48.9°C).
Thermal Effect: ±0.025% F.S./°F (0.045% F.S./°C).
Power Requirements: 10-35 VDC (2-wire).
Output Signal: 4 to 20 mA.
Zero and Span Adjustments: Protected potentiometers.
Loop Resistance: DC; 0-1250 ohms maximum.
Current Consumption: DC; 38 mA maximum.
Electrical Connections: Screw terminal block.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.

Model	Range in w.c.	Maximum Pressure	Electrical Accuracy +/-%	Mechanical Accuracy +/-%
605-00N	.05-0-.20	25 psi (1.7 bar)	2	4
605-11	.25-0-.25	25 psi (1.7 bar)	2	3
605-0	0-.50	25 psi (1.7 bar)	2	3
605-1	0-1.0	25 psi (1.7 bar)	2	2
605-2	0-2.0	2 psi (13.79 kPa)	0.5	2
605-3	0-3.0	2 psi (13.79 kPa)	0.5	2
605-6	0-6.0	2 psi (13.79 kPa)	0.5	2
605-10	0-10	2 psi (13.79 kPa)	0.5	2

Model	Range in w.c.	Maximum Pressure	Electrical Accuracy +/-%	Mechanical Accuracy +/-%
605-20	0-20.0	11 psi (75.8 kPa)	0.5	2
605-30	0-30	11 psi (75.8 kPa)	0.5	2
605-50	0-50	11 psi (75.8 kPa)	0.5	2
	Range in Pa			
605-60PA	0-60	25 psi (1.7 bar)	2	4
605-125PA	0-125	25 psi (1.7 bar)	2	3
605-250PA	0-250	25 psi (1.7 bar)	2	2
605-500PA	0-500	2 psi (13.79 kPa)	0.5	2

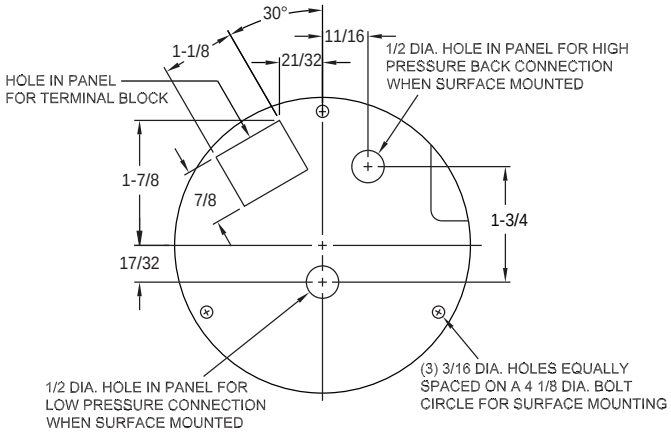
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INSTALLATION

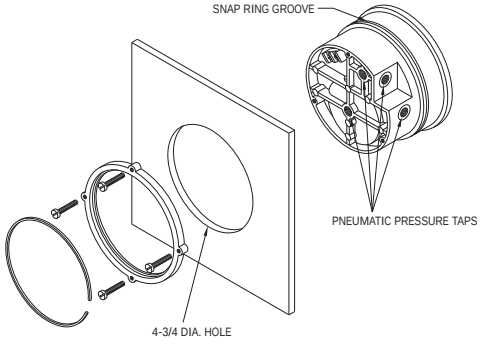
1. **LOCATION**: Select a location where the temperature of the unit will be between 20°F and 120°F. Distance from the receiver is limited only by total loop resistance. See “Electrical Connections”. The tubing feeding pressure to the instrument can be run practically any length required but long lengths will increase response time slightly. Avoid surfaces with excessive vibration.

2. **POSITION:** All standard models are calibrated with the diaphragm vertical and should be used in that position for maximum accuracy. If your application requires mounting in other than a vertical position, be sure to specify this when ordering.

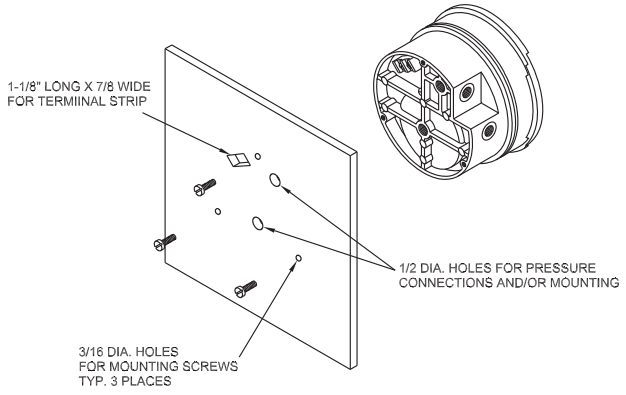
3. **PRESSURE CONNECTIONS:** For convenience, two sets of 1/8″ female NPT ports are available. Plug the unused set with pipe plugs provided. Attach tubing from positive pressure source to port marked “HI” or from negative (Vacuum) source to port marked “LOW”. In either case, opposite port must be vented to atmosphere. In dusty environments, we recommend use of an A-331 Filter Vent Plug to keep interior of instrument clean. For differential pressures the higher source is connected to the “HI” port and lower to the ”LOW” port.



4. **MOUNTING:** The Series 605 Transmitter may be either panel mounted or surface mounted.



A. PANEL MOUNTING: Cut a 4-3/4″ or 120mm dia. hole in panel and insert the complete unit from the front. Slip on the mounting ring and install the split snap ring in the groove on the bezel. Seat the mounting ring against the snap ring and thread the four screws through the tapped holes. Tighten screws against rear of panel.



B. SURFACE MOUNTING: Drill (3) 3/16″ dia. holes for mounting screws and cut (1) 7/8″ x 1-1/8″ hole for access to terminal strip as shown in hole location drawing. Insert screws from rear of panel and thread into tapped holes on back of transmitter case. If rear pressure connections are to be used, make 1/2″ dia. holes located as shown in hole location drawing in left column.

5. **ZEROING:** Once gage/transmitter is mounted in its final position, check to be sure pointer aligns with zero on scale, when no pressure is applied and both low and high pressure ports are vented to atmosphere. To adjust, turn small slotted screw at center-bottom of gage face. **Do not** move the larger black knobs labeled SPAN and ZERO. These are for use only if a calibration check shows the 4-20 mA output signal to need adjustment. See page 3 under heading OUTPUT RANGING.

ELECTRICAL CONNECTIONS

CAUTION: DO NOT EXCEED SPECIFIED SUPPLY VOLTAGE RATINGS. PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT. THIS UNIT IS NOT DESIGNED FOR AC VOLTAGE OPERATION.

Electrical connections to the Series 605 Transmitter are made to the two-screw terminal strip on the rear of the case. Polarity is indicated by + and – signs stamped on side. The schematic diagram of the Series 605 transmitter is illustrated in Figure B.

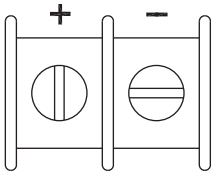


Figure A

An external power supply delivering 10.0 to 35 VDC with a minimum current capability of 40 milliamps must be used to power the control loop in which the Series 605 transmitter is connected. Refer to Fig. B for connection of the power supply, transmitter and receiver. The range of appropriate receiver load resistances (R_L) for the power supply voltage available is given by the formula and graph in Fig. C. Shielded two wire cable is recommended for control loop wiring and the negative side of the loop may be grounded if desired. Note also that the receiver may be connected in either the negative or positive side of the loop, whichever is most convenient. Should polarity of the transmitter or receiver be inadvertently reversed, the loop will not function properly but no damage will be done to the transmitter.

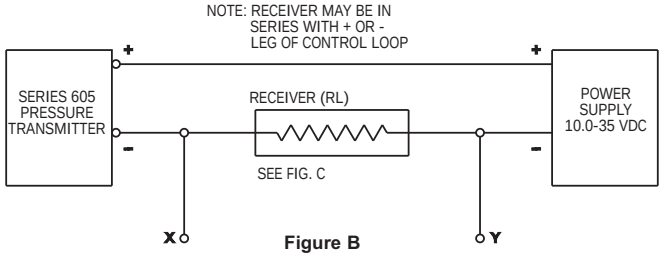


Figure B

The maximum length of connecting wire between the transmitter and the receiver is a function of wire size and receiver resistance. That portion of the total current loop resistance represented by the resistance of the connecting wires themselves should not exceed 10% of the receiver resistance. For extremely long runs (over 1,000 feet), it is desirable to select receivers with higher resistances in order to keep the size and cost of the connecting leads as low as possible. In installations where the connecting run is no more than 100 feet, connecting lead wire as small as No. 22 Ga. can be used.

The Series 605 transmitters can be used with receivers requiring 1-5 volt input rather than 4-20 mA. If the receiver requires a 1-5 volt input, insert a 250 ohm, 1/2 watt resistor in series with the current loop but in parallel with the receiver input. Referring to Figure B, R_L becomes the 250 ohm resistor and point X and Y are connected to the receiver input, point X being positive (+) and point Y negative (–) or ground. The resistor should be connected at the panel end of the transmitter current loop close to the receiver input to take advantage of the immunity of the current loop to electrical noise pickup. Most electronic component distributors stock a 249 r, 1/2 watt, ±1% tolerance metal film resistor which is adequate for this application.

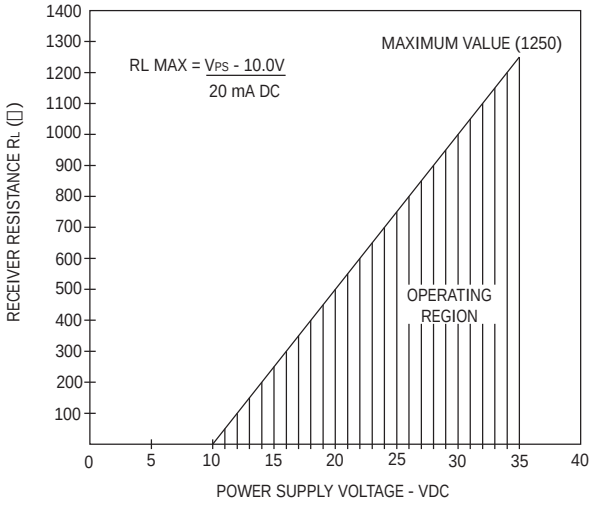


Figure C

OUTPUT RANGING

Each Series 605 Magnehelic® indicating transmitter is factory calibrated to produce 4 mA at zero scale reading and 20 mA at full scale reading. The following procedure should be used if the pressure versus output signal relationship needs to be checked.

1. With unit connected to the companion receiver per preceding instructions, insert an accurate milliammeter with a full scale reading of approximately 30 mA in series with the current loop.

2. Vent both pressure ports to atmosphere and, if necessary, adjust pointer zero screw to align pointer with zero on scale. A controllable pressure source capable of reaching the full scale range should be connected to either high pressure port. Plug the other high pressure port and vent one or both low pressure ports to atmosphere. The instrument must be ranged in the same position in which it will be used. Standard factory calibration and ranging is done with unit vertical.

3. Apply electrical power to the system and check for proper operation by slowly increasing pressure and observing whether the loop current increases above the 4 mA zero pressure reading.

4. A spanner type key is supplied to adjust span and zero. This helps to reduce unauthorized tampering. Apply pressure until pointer aligns with full scale reading and adjust the SPAN knob for a 20 mA reading.

5. Relieve all pressure, allow a few seconds for setting and adjust the ZERO knob for a 4 mA current loop reading.

6. The SPAN and ZERO controls are slightly interactive so steps 4 & 5 should be repeated a few times until readings of 4 and 20 mA are obtained consistently.

7. Remove the milliammeter from the current loop and proceed with final installation of the transmitter and receiver.

MULTIPLE UNITS WITH COMMON POWER SUPPLY

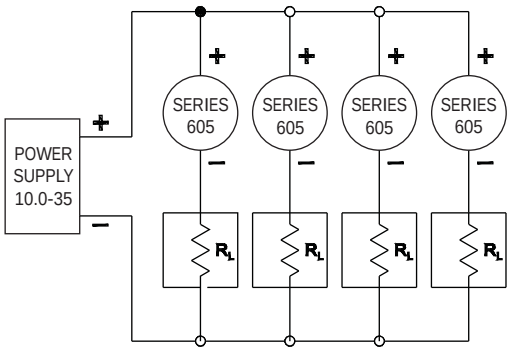


Figure D

Several Series 605 transmitters can be operated with a single power supply as depicted above in Figure D. Be careful to specify a supply with sufficient capacity. The minimum current requirement at a given voltage can be calculated by multiplying the number of units x 20 mA. In the example shown this would be 4 x 20 or 80 mA minimum.

MAINTENANCE

Upon final installation of the Series 605 Transmitter and the companion receiver, including the A-701 Digital Readout, no routine maintenance is required. A periodic check of system calibration is recommended. The Series 605 Differential Pressure Transmitter is not field repairable and should be returned, freight prepaid, to the factory if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization (RGA) number before shipping.

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FR# 01-440559-00 Rev. 6

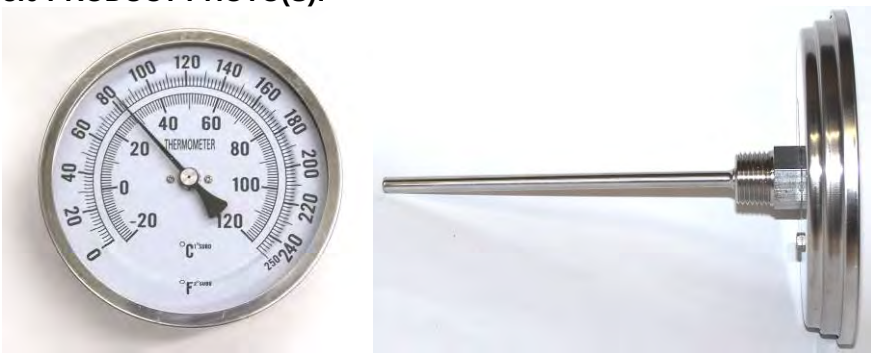
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GRAINGER® FOR THE ONES WHO GET IT DONE GRAINGER INTERNATIONAL, INC. GLOBAL SOURCING DIVISION	-- GGS TECHNICAL SPECIFICATION --			
	SPECIFICATION NUMBER: 1NFY4_TSRev1.doc	AUTHOR: Hoskinson	TITLE: ENG	REL. DATE: 5/25/07
	GGS MODEL NUMBER(s): 1NFY4	DESCRIPTION: Industrial thermometer	REVISION #: 1	REV. DATE: 8/10/07

1.0 BRAND:	No brand
2.0 PRODUCT DESCRIPTION:	Bimetal Industrial Thermometer

3.0 PRODUCT PHOTO(S):



4.0 PRODUCT REQUIREMENTS:

4.1 Features & Performance	Requirement
Temperature scale(s)	°F: 0 to 250 °C: -20 to 120
Connection location/type	Back; 1/2 inch NPT
Dial size (inches)	3
Stem length (inches)	2 1/2
Stem diameter (inches)	1/4 In
Rotated degrees	N/A
Angled degrees	N/A
Full scale accuracy	≤40°F: ±1.5% 41 to 200°F: ±1% ≥201°F: ±1.5%
Calibration	External Adjustment

4.2 Materials & Construction	Requirement
Case	Stainless Steel Hermetically Sealed to Prevent Icing/Fogging Inside
Stem	Stainless Steel
Coil dampening	Silicone for Superior Time Response and Vibration Dampening
Dial face	Glass

4.3 Finish / Color	Requirement
All Surface Finishes	a) Surface finishes must be uniform and continuous. The surface finish must not exhibit any visual defects such as blisters, rust, corrosion, scratches, peeling, bubbles, and/or cracking. b) All exposed surfaces must be free of burrs and sharp edges. c) All applied finishes must adhere to the surface and show no signs of delamination or peeling.
Finish	Stainless Steel

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This specification is based on the manufacturers design and is to be used as a Quality Control document.

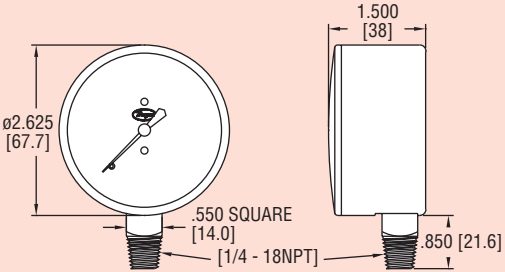
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Series LPG4

2.5″ Low Pressure Gage

1.5% Full-Scale Accuracy in a 2-1/2″ Gage





Our **Series LPG4** gages offer top of the line performance and accuracy for pressure and vacuum applications up to and including 160 in w.c. The LPG4 is constructed from a single beryllium-copper diaphragm affixed to a precision-machined brass plate. This innovative design, together with a high-precision, milled-teeth brass movement and nickel-silver pinion and bearing surface, provide the user with a top of the line low pressure instrument.

SPECIFICATIONS

Service: Compatible gases & liquids.
Wetted Materials: Brass and beryllium copper.
Housing: Drawn steel, black finish.
Lens: Polycarbonate (removable).
Accuracy: ±1.5% full-scale.
Pressure Limit: 100% of range scale.

Temperature Limits:
Process: -40 to 160°F (-40 to 70°C);
Ambient: -40 to 140°F (-40 to 60°C).
Size: 2.5″ (63 mm).
Process Connections: 1/4″ male NPT.
Enclosure Rating: NEMA 3 (IP54).
Weight: 7.3 oz (0.21 kg).

Model	Range
LPG4-D7122N	-10-0 in w.c. (-2.5-0 kPa)
LPG4-D7222N	-16-0 in w.c. (-4-0 kPa)
LPG4-D7322N	-25-0 in w.c. (-6-0 kPa)
LPG4-D7422N	-40-0 in w.c. (-10-0 kPa)
LPG4-D7522N	-60-0 in w.c. (-15-0 kPa)
LPG4-D7622N	-80-0 in w.c. (-20-0 kPa)
LPG4-D7722N	-100-0 in w.c. (-25-0 kPa)
LPG4-D7822N	-160-0 in w.c. (-40-0 kPa)
LPG4-D7922N	-235-0 in w.c. (-60-0 kPa)
LPG4-D8022N	0-10 in w.c. (0-2.5 kPa)
LPG4-D8122N	0-15 in w.c. (0-3.75 kPa)
LPG4-D8222N	0-25 in w.c. (0-6 kPa)

Model	Range
LPG4-D8322N	0-40 in w.c. (0-10 kPa)
LPG4-D8422N	0-60 in w.c. (0-15 kPa)
LPG4-D8522N	0-80 in w.c. (0-20 kPa)
LPG4-D8622N	0-100 in w.c. (0-25 kPa)
LPG4-D8722N	0-160 in w.c. (0-40 kPa)
LPG4-D8922N	-4-0-6 in w.c. (-1-0-1.5 kPa)
LPG4-D9022N	-6-0-10 in w.c. (-1.5-0-2.5 kPa)
LPG4-D9122N	-8-0-16 in w.c. (-2-0-4 kPa)
LPG4-D9222N	-16-0-24 in w.c. (-4-0-6 kPa)
LPG4-D9322N	-24-0-40 in w.c. (-6-0-10 kPa)
LPG4-D9422N	-30-0-50 in w.c. (-7.5-0-14.5 kPa)
LPG4-D9522N	-40-0-60 in w.c. (-10-0-0.15 kPa)

OPTION

For NIST traceable calibration certificate, use order code NISTCAL-PG1.



54 Series Temperature Switches

Types
B54, B54S, C54, C54S, C54A, C54AS, E54, E54S, F54, F54S

UNITED ELECTRIC CONTROLS

Installation and Maintenance Instructions

Please read all instructional literature carefully and thoroughly before starting. Refer to the final page for the listing of Recommended Practices, Liabilities and Warranties.

GENERAL

Type B54, B54S, C54, C54S, C54A, C54AS (Immersion Stem)
Temperature variations are sensed by a liquid filled sensor which expands or contracts against a bellows which actuates a snap-action switch at a predetermined set point.

Type E54, E54S, F54, F54S (Bulb & Capillary)
Temperature variations of a liquid filled sensing bulb are hydraulically transmitted to a diaphragm which actuates a snap-acting switch at a predetermined set point.

MAXIMUM TEMPERATURE* STATED IN LITERATURE AND ON NAMEPLATE MUST NEVER BE EXCEEDED, EVEN BY SURGES IN THE SYSTEM. OCCASIONAL OPERATION OF UNIT UP TO MAX. TEMPERATURE IS ACCEPTABLE (E.G., START-UP, TESTING). CONTINUOUS OPERATION SHOULD BE RESTRICTED TO THE DESIGNATED ADJUSTABLE RANGE.

*Maximum Temperature - the highest temperature to which a sensing element may be occasionally operated at, without adversely affecting set point calibration and repeatability.

THIS PRODUCT DOES NOT HAVE FIELD REPLACEABLE PARTS.

Please refer to product bulletin for product specifications. Product bulletins may be found at www.ueonline.com.

Part I - Installation

Tools Needed
Screwdriver
Adjustable wrench

MOUNTING

INSTALL UNIT WHERE SHOCK, VIBRATION AND TEMPERATURE FLUCTUATIONS ARE MINIMAL. DO NOT MOUNT UNIT IN AMBIENT TEMPERATURES EXCEEDING PUBLISHED LIMITS. 54 SERIES TEMPERATURE SWITCHES CAN BE MOUNTED IN ANY POSITION, PROVIDED THE ELECTRICAL CONDUIT IS NOT FACING UP. ORIENT UNIT SO THAT MOISTURE IS PREVENTED FROM ENTERING THE ENCLOSURE*.

Remove Cover (Enclosed version only). Cover is held on by one captive screw located on the front of the cover.

54 Series temperature switches can be mounted in any position by using either the Mounting Screw holes on the bracket or the NPT connector on the immersion stem (local mounted only). Optional union connectors or separable well kits are available for remote bulb types.

A 7/8" diameter hole has been provided in the bracket plate for mounting a standard conduit fitting.

FOR LOCAL MOUNTING, ALWAYS HOLD A WRENCH ON THE TEMPERATURE HOUSING HEX WHEN MOUNTING UNIT. DO NOT TIGHTEN BY TURNING ENCLOSURE. THIS WILL DAMAGE SENSOR AND WEAKEN SOLDERED OR WELDED JOINTS.

For remote mounting, fully immerse the bulb and 6" of capillary in the control zone. It is generally desirable to place the bulb close to the heating or cooling source in order to sense temperature fluctuations quickly. Be sure to locate the bulb so that it will not be exposed to temperatures beyond the instrument range limits.

WIRING

DISCONNECT ALL SUPPLY CIRCUITS BEFORE WIRING UNIT. ELECTRICAL RATINGS STATED IN LITERATURE AND ON NAMEPLATE MUST NOT BE EXCEEDED. OVERLOAD ON A SWITCH CAN CAUSE FAILURE ON THE FIRST CYCLE. WIRE UNITS ACCORDING TO NATIONAL AND LOCAL ELECTRICAL CODES. MAXIMUM RECOMMENDED WIRE SIZE IS #14 AWG.

Conduit Connection (Enclosed units only)

FOR ENCLOSED UNITS, CONNECT THE CONDUIT TO THE HOLE IN ACCORDANCE WITH NATIONAL AND LOCAL CODES. BRING WIRES UP TO THE TERMINALS FROM THE REAR. MAXIMUM RECOMMENDED WIRE SIZE - #14 AWG.

Part II - Adjustments

Tools Needed
1/4" Open-ended wrench
1/16" Allen wrench
(single switch calibrated units)

MAKE SURE THAT LIVE ELECTRICAL SUPPLIES TO THE TEMPERATURE SWITCH ARE DISCONNECTED BEFORE PERFORMING ANY DISASSEMBLY. THIS MAY REQUIRE DISCONNECTING MORE THAN ONE CIRCUIT.

Dual Switch Units (C54A, C54AS)

ON DUAL SWITCH UNITS, "LOW SET" SWITCH MUST ALWAYS BE SET EQUAL OR BELOW THE "HIGH SET" SWITCH.

* If applicable

High Set

Immerse the sensing portion of the unit in a calibrated temperature bath or other calibrated source at the desired "Hi Set" temperature. Allow 5 minutes for the thermal system to stabilize. Using a 1/4" open end wrench, slowly turn the main adjustment screw towards the right (counter-clockwise) until the "Hi Set" switch transfers. If switch does not transfer, turn the main adjustment screw towards the left (clockwise) until the switch transfers, and then towards the right until it transfers again. The "Hi Set" switch should now transfer on "temperature rise" at the bath temperature. If it is desired that the switch transfer on "temperature fall" at the bath temperature, turn the main adjustment screw towards the left until the switch transfers again.

Low Set

Lower the temperature of the calibrated bath (or use another bath) to the desired "Low Set" temperature, and allow 5 minutes for the thermal system to stabilize. Using a 1/4" open end wrench, slowly turn the low set adjustment screw towards the left until the switch transfers. If switch does not transfer, turn the low set adjustment screw towards the right until the switch transfers, and then towards the left until it transfers again. The "Low Set" switch is now set to actuate at the bath temperature on "temperature fall". If it is desired that the "Low Set" switch transfer on "temperature rise" at the bath temperature, turn the low set adjustment screw towards the right until the switch transfers.

Fine Adjustment

If it is necessary to "fine adjust" the "High Set" setting, raise the bath temperature to a value slightly higher than the "High Set" temperature. Note the temperature at which the switch transfers (on rise). Lower the bath temperature and note when switch transfers again (on fall). Turn the main adjustment screw towards the left to raise or towards the right to lower the settings.

If necessary, perform the same "fine adjustment" procedure outlined above for the "Low Set" switch.

Single Switch Units

Uncalibrated (C54, C54S, F54, F54S)

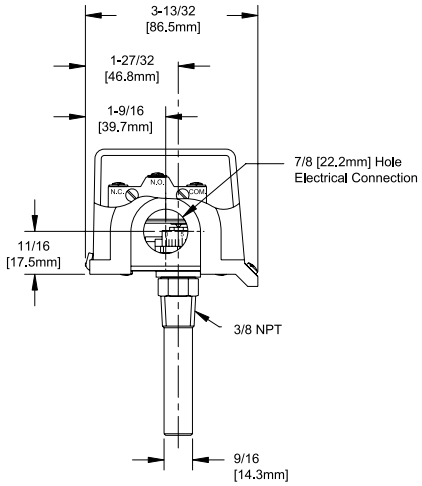
To adjust single switch units, follow "High Set" instructions. For "fine adjustment", follow Fine Adjustments above.

Calibrated (B54, B54S, E54, E54S)

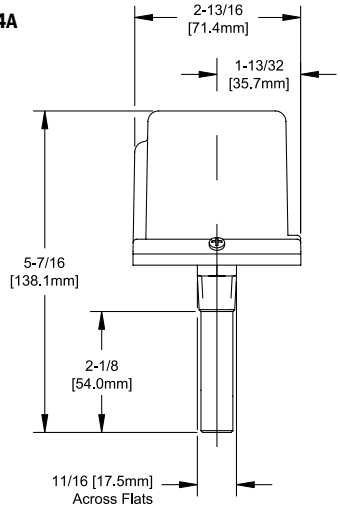
Turn the reference dial to desired set point by aligning setting on dial with dowel pin.

Dimensions

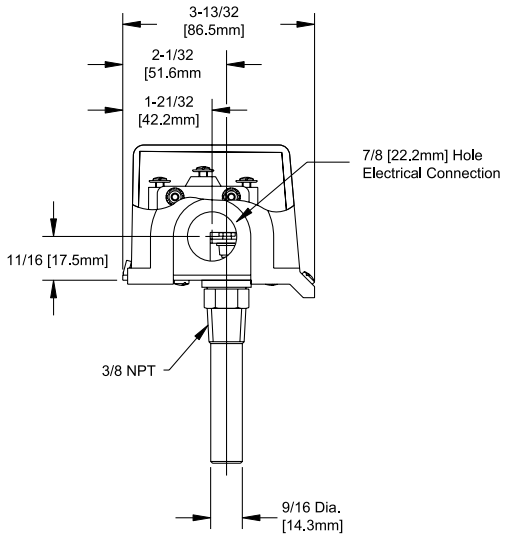
Types B54, C54



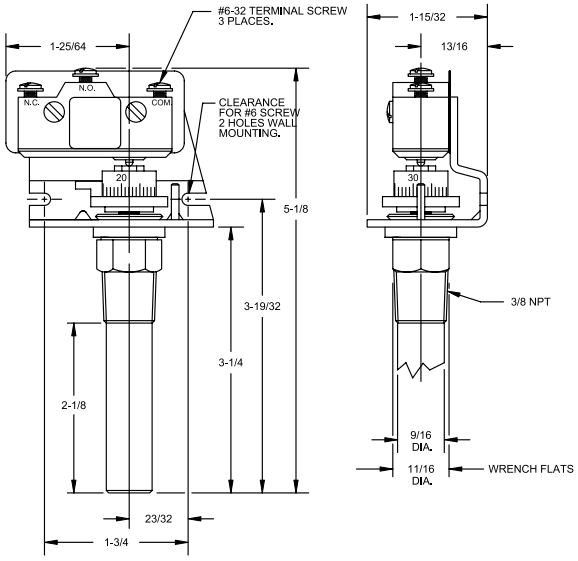
Types B54, C54, C54A



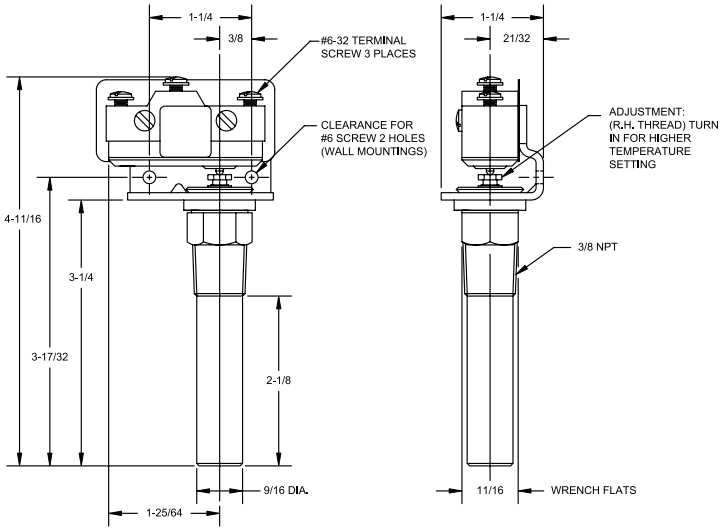
Type C54A



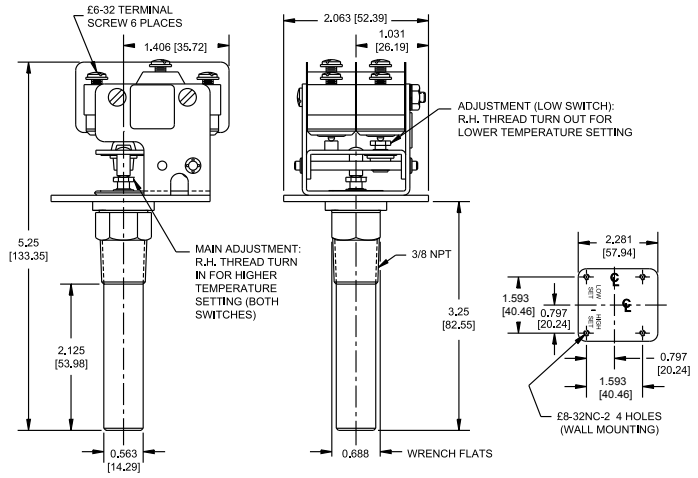
Type B54S



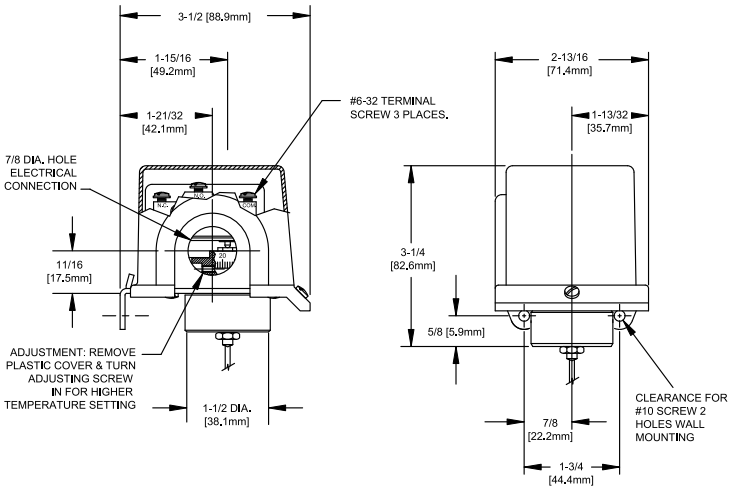
Type C54S



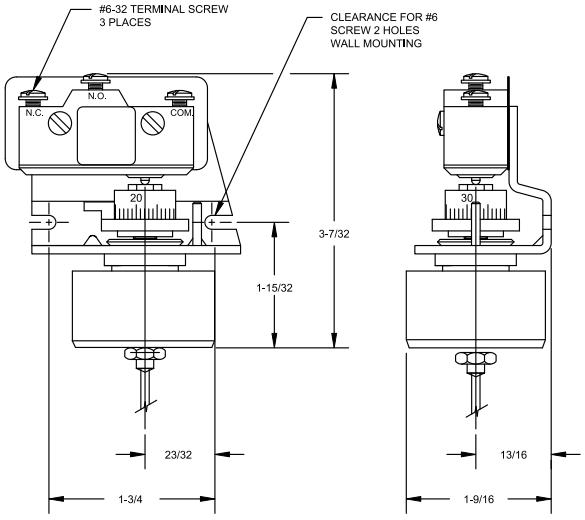
Type C54AS



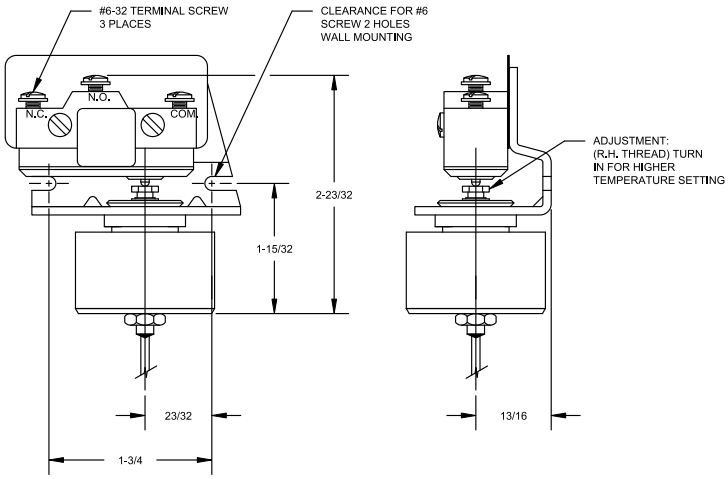
Types E54, F54



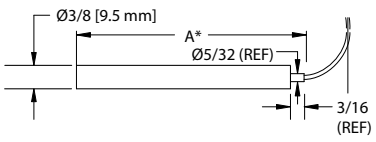
Type E54S



Type F54S



Remote Bulb



* USE DIMENSION "A" FOR SEPERABLE WELL INSTALLATIONS.

Bulb Size		
	Dimension "A"	
Models	Inches	mm
E54 & F54		
D20BC, D20BS, D22BC, D22BS	4.50	114.3
D21BC, D21BS	6.86	174.6
D23BC, D23BS	3.63	92.1
E54S & F54S		
D21BC, D21BS	6.86	174.6
D22BC, D22BS	4.50	114.3
D23BC, D23BS	3.63	92.1

RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF SELLER'S LIABILITY

Seller's liability to Buyer for any loss or claim, including liability incurred in connection with (i) breach of any warranty whatsoever, expressed or implied, (ii) a breach of contract, (iii) a negligent act or acts (or negligent failure to act) committed by Seller, or (iv) an act for which strict liability will be inputted to seller, is limited to the "limited warranty" of repair and/or replacement as so stated in our warranty of product. In no event shall the Seller be liable for any special, indirect, consequential or other damages of a like general nature, including, without limitation, loss of profits or production, or loss or expenses of any nature incurred by the buyer or any third party.

UE specifications subject to change without notice.

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SECTION 6 - ELECTRICAL DRAWINGS & TABLE(S)

T-2, INTERLOCK TABLE

I-1, CONTROL PANEL LAYOUT DRAWING

T-3, CONTROL PANEL BOM

I-2, WIRING DIAGRAMS & TERMINAL DETAILS

E-1, LINE DIAGRAM

T-4, VFD SETTINGS TABLE

TABLE 2

INTERLOCK SCHEDULE
NES 15-152, REVISION A (OCTOBER 2015) BY: EMB CHK: EJ
SVE SYSTEM
AECOM / FORMER OZONE INDUSTRIES SITE
QUEENS, NY

Interlock	Interlock ID	Interlock Description	B-1, SVE Blower	OPERATOR INTERFACE	Adjustable Set Point (EOS)	Alarm Notification (Local Panel Display)	Manual Reset (Warning / Alarm)	Remote Alarm Notification	Alarm Log	Data Log (10 Minutes)	INSTRUMENT TYPE	NES FACTORY TEST SET POINT
		Emergency Stop	O			Y		Y	Y			
1		No alarms present	I								L	
2	LSHH-111	Moisture Separator (D-1) High-High Level Switch	O			Y	Y	Y	Y		D	
3	PT-107	SVE (B-1) Inlet Vacuum								Y	A	
4	VSL-107	SVE (B-1) Low Vacuum				Y	Y	Y	Y		D	2.4" wc(V)
5	DPT-110	SVE (B-1) Inlet Flow								Y	A	
6	DPTL-110	SVE (B-1) Low Flow			Y	Y	Y	Y	Y		L	1" wc
7	DPT-119	SVE (B-1) Discharge Flow								Y	A	
8	TS-122	SVE (B-1) High Discharge Temperature	O			Y	Y	Y	Y		D	120 F
9	VFD Fault	VFD Fault Alarm	O			Y		Y	Y		D	
10		Main Power Failure	O			Y		Y	Y		D	

Note:

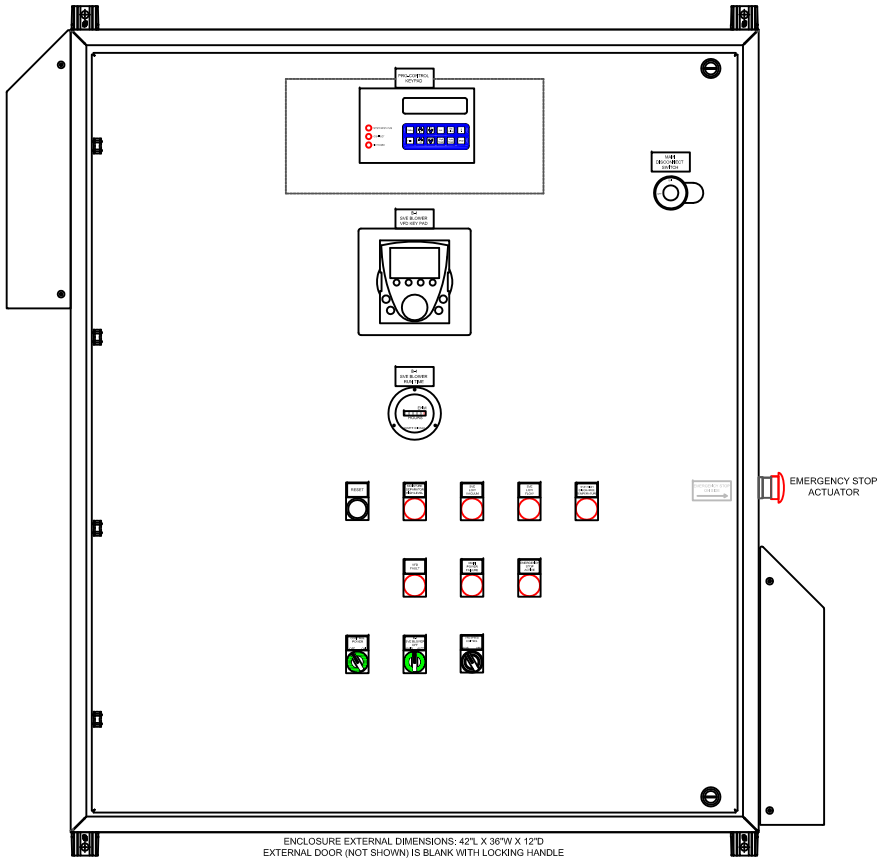
O - Off
I - On
I/O - On / Off Control
P- Proportional Control

Y - Yes

A - Analog
D - Digital
L - Internal Logic

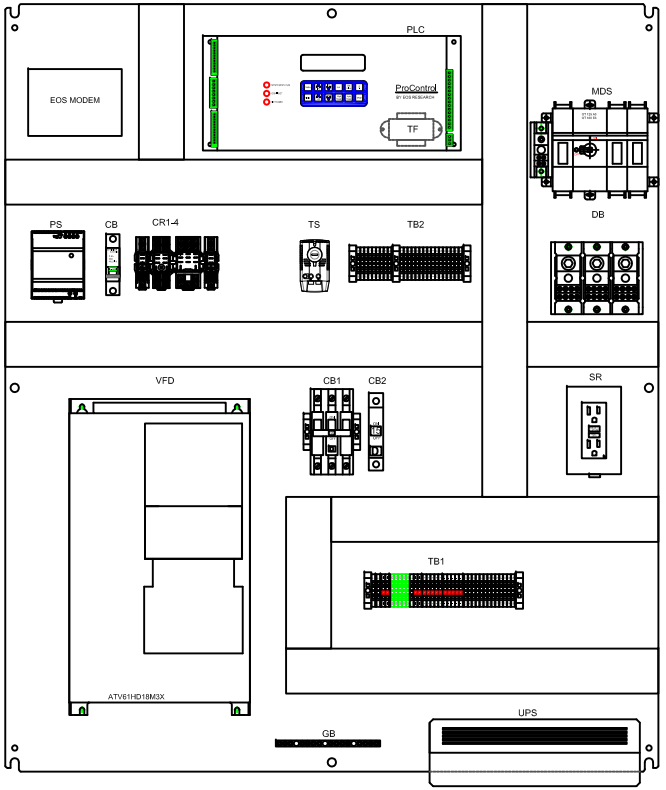
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PANEL EXTERIOR



ENCLOSURE EXTERNAL DIMENSIONS: 42"L X 36"W X 12"D
EXTERNAL DOOR (NOT SHOWN) IS BLANK WITH LOCKING HANDLE

PANEL INTERIOR



LEGEND

CB - CIRCUIT BREAKER
CR - CONTROL RELAY
DB - DISTRIBUTION BLOCK(S)
GB - GROUND BAR
MDS - MAIN DISCONNECT SWITCH
PLC - PROGRAMABLE LOGIC CONTROLLER
PS - POWER SUPPLY
SR - SERVICE RECEPTACLE
TB - TERMINAL BLOCK
TS - TEMPERATURE SWITCH
UPS - UNINTERRUPT. POWER SUPPLY
VFD - VARIABLE FREQUENCY DRIVE

NOTES

1) REFER TO TABLE 3 FOR BILL OF MATERIALS.
2) LOCAL CONTROL PANEL HAS AN EMERGENCY STOP BUTTON INSTALLED ON ENCLOSURE
3) DEAD FRONT ENCLOSURE DOOR NOT SHOWN FOR DRAWING CLARITY
4) LOCAL CONTROL PANEL IS UL 508A LISTED.
5) EOS STOOD OF BACK PANEL FOR KEYPAD ACCESS THROUGH SWING PANEL.
6) OPERATOR DETAILS ON SHEET 2 OF 2
7) GROUND IN ACCORDANCE WITH N.E.C. ARTICLE 250.122 & LOCAL AUTHORITY HAVING JURISDICTION

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	10-08-15	EMB

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TITLE: CONTROL PANEL
INTERIOR / EXTERIOR LAYOUT DRAWING

AECOM - SVE
FORMER OZONE INDUSTRIES SITE QUEENS, NY

JOB NO. 15-152 (SVE)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	C	I-1	1 OF 2	A

OPERATOR DETAILS

RESET

MOISTURE SEPARATOR HIGH LEVEL

SVE LOW VACUUM

SVE LOW FLOW

SVE HIGH DISCHARGE TEMPERATURE

B-1
SVE BLOWER
RUN TIME

PRO-CONTROL
KEYPAD

VFD
FAULT

MAIN
POWER
FAILURE

EMERGENCY
STOP
ACTIVE

EMERGENCY STOP
ON SIDE

MAIN
DISCONNECT
SWITCH

EMERGENCY STOP
PUSH TO STOP
TWIST TO START

B-1
SVE BLOWER
VFD KEY PAD

CONTROL
POWER
OFF ON

B-1
SVE BLOWER
OFF
HAND AUTO

VFD SPEED
CONTROL
EOS VFD

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
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TITLE	OPERATOR DETAILS			
AECOM - SVE FORMER OZONE INDUSTRIES SITE QUEENS, NY			JOB NO. 15-152 (SVE)	
SCALE NTS	SIZE B	DWG NO. I-1	SHEET 2 OF 2	REV A

TABLE 3
PANEL BILL OF MATERIALS

REVISION A OCTOBER 2015

15-152 SVE SYSTEM - FORMER OZONE INDUSTRIES - OZONE PARK, NY

TAG	QUANTITY	ITEM	MODEL	MANUFACTURER
		SECTION 7 - CONTROL COMPONENTS		
ENCL	1	ENCLOSURE NEMA4 42 X 36 X 12 - MILD STEEL/GRAY W/ LOCKING HANDLE	EN4SD423612GY	HAMMOND
ENCL	1	BACK-PANEL 42 X 36 MILD STEEL/WHT	EP4236	HAMMOND
ENCL	1	SWING-PANEL 42 x 36 MILD STEEL/WHT	ESP4236	HAMMOND
VF	2	VENT FAN 6 IN RAIN HOOD NEMA 3R	RH40000GY	HAMMOND
ENCL	1	MOUNTING FEET SET OF 4 - ZINC PLATED	EZPMFHD	HAMMOND
VF	1	VENT FAN 210CFM 115VAC 6 IN	FAN150AC115	HAMMOND
VF	1	VENT FAN ADJ. 30-140F BI-METAL TEMP SWITCH N.O.	SKT011419NO	HAMMOND
VF	1	VENT FAN FINGER GUARD 6 IN	FAN150FG	HAMMOND
VF	2	VENT FAN 6 IN RAIN HOOD GRILL & SOLID COVER KIT	RHA40000G	HAMMOND
VF	1	VENT FAN POWER CORD 24 INCH	DNMFC	HAMMOND
MDS	1	NON-FUSED THROUGH DOOR DISCONNECT 3-PHASE 100 AMP	OT200U03	ABB
MDS	1	NON-FUSED THROUGH DOOR DISCONNECT SHAFT 13 IN	OXS6X330	ABB
MDS	1	NON-FUSED THROUGH DOOR DISCONNECT HANDLE NEMA3R	OHBS2AJ	ABB
PLC	1	PROCONTROL PLC 24DI,16AI,30DO,8A	A2	EOS
WM	1	PROCONTROL CELL MODEM W/ 80 FT ANTENNA CABLE	CELL MODEM	EOS
UPS	1	UPS, 350VA, 200W, 120V, 1PH, 3 UPS & SURGE OUTLET 3 SURGE ONLY	BE350G	APC
VFD	1	VFD 25 HP 208/230V 75 A 3-PHASE NEMA1	ATV61HD18M3X	SQUARE D
VFD	1	VFD KEYPAD REMOTE MOUNT KIT	VW3A1102	SQUARE D
VFD	1	RJ45-RJ45 CABLE FOR REMOTE LCD KYPD 3 Meters	VW3A1104R30	SQUARE D
HM	1	QUARTZ DRIVE ANALOG HOUR METER 2.8IN DIAMETER BEZEL 115VAC	T50B212	ENM
CR	2	RELAY 120V 1PDT W/LIGHT BLADE PARALLEL	RH1B-UL-AC120V	IDEC
CR	2	SOCKET DIN RAIL/SURFACE 5-BLADE FOR RH1B	SH1B-05	IDEC
CR	1	RELAY 120V 2PDT W/LIGHT BLADE PARALLEL	RH2B-UL-AC120V	IDEC
CR	1	SOCKET DIN RAIL/SURFACE 5-BLADE FOR RH2B	SH2B-05	IDEC
CR	1	RELAY 3PDT 120VAC W/INDICATOR LIGHT	RH3B-UL-AC120V	IDEC
CR	1	SOCKET DIN RAIL/SURFACE 11-BLADE FOR RH3B	SH3B-05	IDEC
PS	1	POWER SUPPLY 24VDC 2.5A	PSC-24-060	ADI
CB	1	CIRCUIT BREAKER 6A 1-POLE 120/240 VAC	MG24430	SQUARE D
CB	1	CIRCUIT BREAKER 100A 3-POLES 208/240 VAC	QOU3100	SQUARE D
CB	1	CIRCUIT BREAKER 15A 1-POLE 120/240VAC	QOU115	SQUARE D
RECP	1	DUPLEX GFCI RECEPTACLE 125 VAC 15 AMP 2-POLE NEMA 5-15R	1595-TRWRW	LEGRAND
RECP	1	1-GANG WEATHERPROOF RECEPT. BOX	IHD3- 1	RED DOT
ESTOP	1	MUSHROOM SWITCH NON-ILLUM RED TRIGGER ACTION - TURN TO RELEASE	ZB5AS844	SQUARE D
PB	1	PUSH BUTTON OPERATOR NON-ILLUM BLACK	ZB5AA2	SQUARE D
LT	7	PILOT LIGHT HEAD RED LED	ZB5AV043	SQUARE D
PB	4	CONTACT BLOCK 1-N.O. SCREW CLAMP	ZBE101	SQUARE D
PB	2	CONTACT BLOCK 1-N.C. SCREW CLAMP	ZBE102	SQUARE D
LT	6	RED LED W/LATCH MODULE 24 V	ZB5AVB4	SQUARE D
SW	1	MOUNTING BASE,120V RED PROTECTED LED	ZB5AVG4	SQUARE D
SW	1	2 POS SELECTOR SWITCH ILLUM. GREEN MAINTAINED	ZB5AK1233	SQUARE D
SW	1	2 POS SELECTOR SWITCH NON-ILLUM. BLACK MAINTAINED	ZB5AD2	SQUARE D
SW	1	3 POS SELECTOR SWITCH ILLUM. GREEN MOMENTARY	ZB5AK1733	SQUARE D
SW	2	MOUNTING BASE 120V GREEN PROTECTED LED	ZB5AVG3	SQUARE D
PB	3	MOUNTING COLLAR LATCH	ZB5AZ009	SQUARE D
TB	55	TERMINAL BLOCK SCREW CLAMP 20 AMP 600 V GRAY	NSYTRV22	SQUARE D
TB	9	TERMINAL BLOCK END BARRIERS GRAY	NSYTRAC22	SQUARE D
TB	6	TERMINAL BLOCK END ANCHORS	NSYTRAABV35	SQUARE D
TB	5	TERMINAL BLOCK GROUND SCREW CLAMP 20 AMP 600 V GREEN	NSYTRV22PE	SQUARE D
PB	11	LEGEND PLATE HOLDER	ZBZ33	SQUARE D
PB	11	LEGEND PLATE LARGE BLACK/RED	ZBY5101	SQUARE D
DB	1	POWER DISTRIBUTION BLOCK 335 AMP 3-POLE 600 VAC	9080-LBA363104	SQUARE D
DB	1	COVER DISTRIBUTION BLOCK 3-POLE	9080-LB33	SQUARE D
DB	1	DISTRIBUTION BLOCK 175 AMP 1-POLE 600 VAC	9080-LBA162104	SQUARE D
DB	1	COVER DISTRIBUTION BLOCK 1-POLE	9080-LB21	SQUARE D
GB	1	LOAD CENTER GROUND BAR 15 TERMINALS	PK15GTA	SQUARE D

EOS BOTTOM ROW

PROCONTROL
TYPE A2
16DI,16AI,22DO

RS232 SERIAL JACK RJ45

TELEPHONE JACK RJ11

RESET — 1 — 31 — 1
EMERGENCY STOP ACTIVE — CR3C 12/8 — 32 — 2
M/S TANK HIGH LEVEL SWITCH — LSHH-111 — 3 — 33 — 3
DISCHARGE HIGH TEMPERATURE SWITCH — TSH-122 — 4 — 34 — 4
VFD RUN SIGNAL — CR2B 12/8 — 35 — 5
VFD FAULT SIGNAL — VFD R1C/R1B — 6 — 36 — 6
MAIN POWER FAILURE SIGNAL — CR4A 9/5 — 37 — 7
INLET VACUUM SWITCH — VSL-107 — 8 — 38 — 8
SPARE — 9 — 39 — 9
SPARE — 10 — 40 — 10
SPARE — 11 — 41 — 11
SPARE — 12 — 42 — 12

DISCRETE INPUTS

DISCRETE OUTPUTS (RELAY)

CM2 — 39 — 15 — R X1/X2 — VFD FAULT
38 — 38 — 14 — R X1/X2 — MAIN POWER FAILURE
37 — 37 — 13 — R X1/X2 — SVE HIGH DISCHARGE TEMPERATURE
36 — 36 — 12 — R X1/X2 — SVE LOW FLOW
35 — 35 — 11 — R X1/X2 — SVE LOW VACUUM
34 — 34 — 10 — R X1/X2 — MOISTURE SEPARATOR HIGH SUMP LEVEL
33 — 33 — 9 — H/O/A — 9A — CR1 14/13 — B-1 SVE BLOWER
CM1 — CM1 — 23 — CR3A 9/5 — 28 (+A) — 29 (A-) — 24VDC PWR SUPPLY L/N

GND
(10 VAC) INPUT POWER — AC — AC — EOS PWR SUPPLY L/N

CR2A 9/5 — 7 — HM / G X1/X2 — B-1 SVE BLOWER RUNNING
CR3B 10/2 — 6 — R X1/X2 — EMERGENCY STOP ACTIVE
E-STOP ON PANEL — 5 — CR3 14/13 — EMERGENCY STOP RELAY
3 — G X1/X2 — CONTROL POWER
OFF / ON — 2 — 4 — FAN — COOLING FAN
L2 — UPS L/N — N2
RECEPTACLE
1 — CR4 14/13 — POWER FAILURE RELAY
CB 6 AMP — 120 VAC — L1 / N1

G — G — G — G — G — SIGNAL GROUNDS
29 — G — G — DP99

INLET VACUUM TRANSMITTER — PT-107 — 17 — 47 — 17
INLET FLOW TRANSMITTER — DPT-110 — 18 — 48 — 18
DISCHARGE FLOW TRANSMITTER — DPT-119 — 19 — 49 — 19
VFD HERTZ — VFD COM/AO1 — 20 — 50 — 20
SPARE — 21 — 51 — 21
SPARE — 22 — 52 — 22
SPARE — 23 — 53 — 23
SPARE — 24 — 54 — 24

ANALOG INPUTS

28 — +24V — +24V — +24V CELL — +9V — POWER SUPPLY (OUTPUT)

EOS MODEM POWER — EOS MODEM — 24 VDC

SERIAL #: 9844

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A	AS BUILT	10-08-15	EMB

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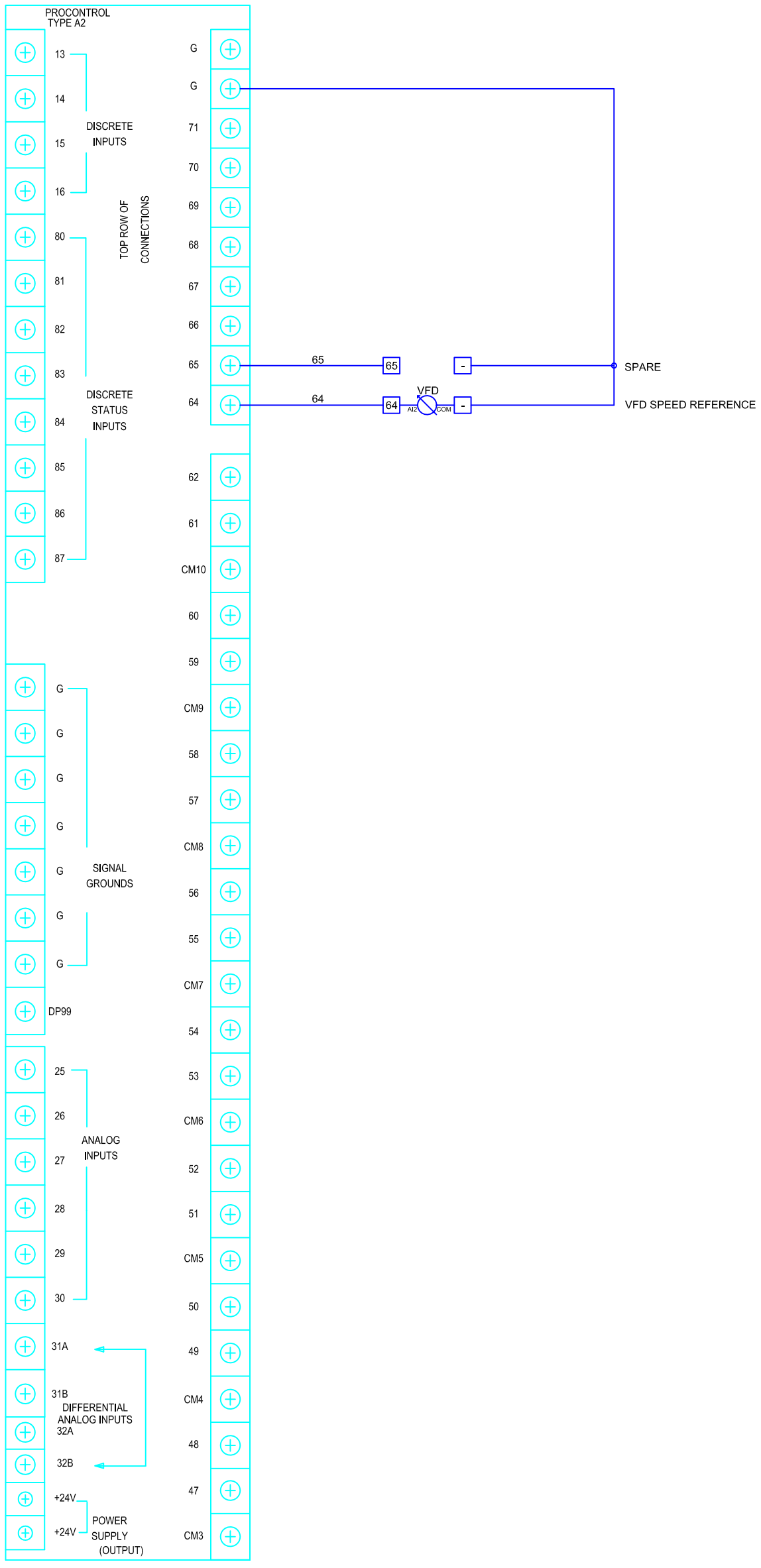
TITLE: PLC WIRING DIAGRAM

AECOM - SVE
FORMER OZONE INDUSTRIES SITE QUEENS, NY

JOB NO. 15-152 (SVE)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	I-2	1 OF 3	A

EOS TOP ROW



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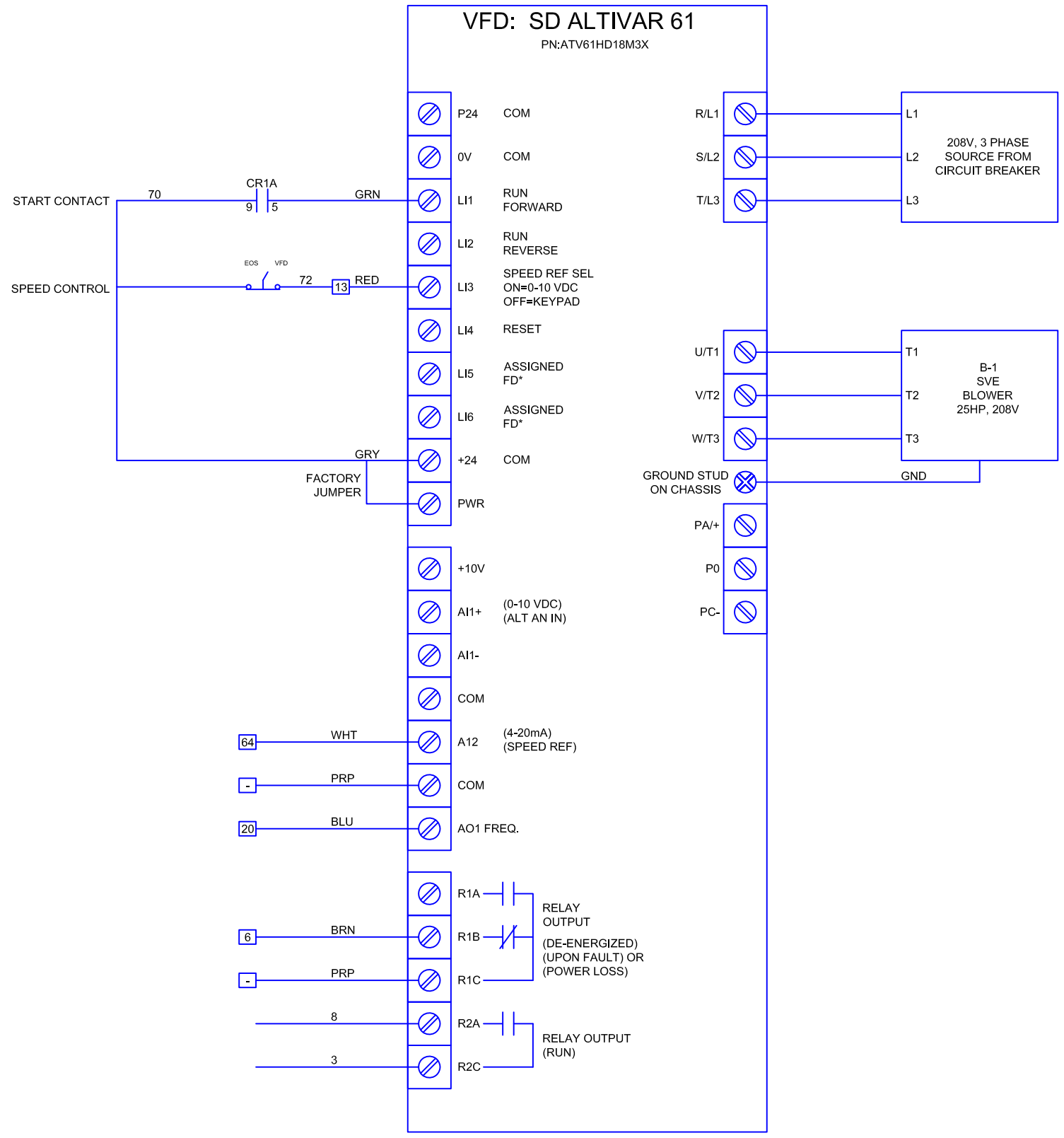
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TITLE
PLC WIRING DIAGRAM

AECOM - SVE FORMER OZONE INDUSTRIES SITE QUEENS, NY			JOB NO. 15-152 (SVE)		
SCALE NTS	SIZE B	DWG NO. I-2	SHEET 2 OF 3	REV A	

VFD1 WIRING



REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	10-08-15	EMB

REVISIONS

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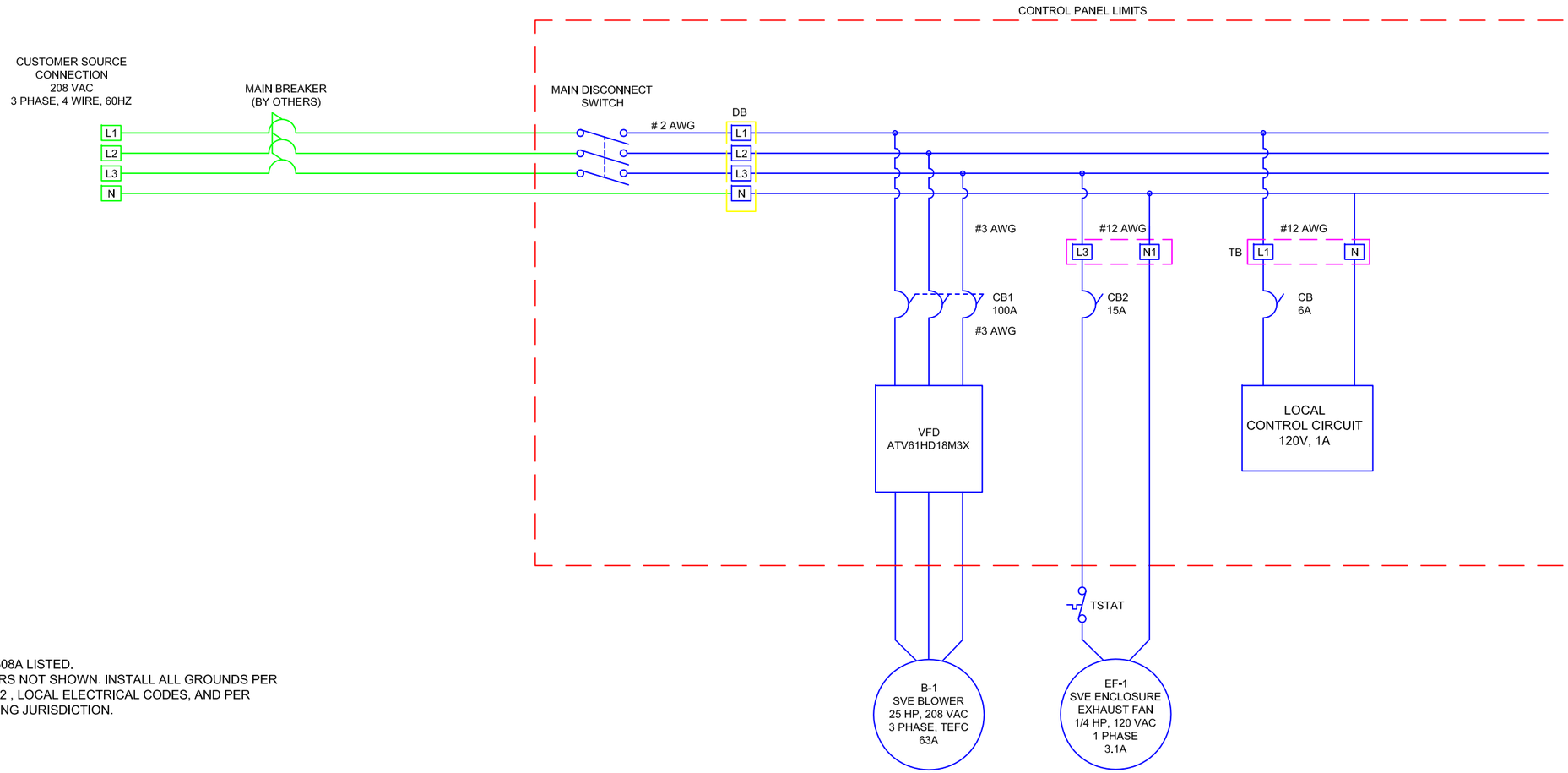
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TITLE
VFD WIRING DIAGRAM

AECOM - SVE
FORMER OZONE INDUSTRIES SITE QUEENS, NY

JOB NO. 15-152 (SVE)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	I-2	3 OF 3	A



NOTES:
1. CONTROL PANEL UL 508A LISTED.
2. GROUND CONDUCTORS NOT SHOWN. INSTALL ALL GROUNDS PER NEC ARTICLES 250.122 , LOCAL ELECTRICAL CODES, AND PER THE AUTHORITY HAVING JURISDICTION.

	LEGEND
AWG	AMERICAN WIRE GAUGE
CB	CIRCUIT BREAKER
DB	DISTRIBUTION BLOCK
TB	TERMINAL BLOCK
VFD	VARIABLE FREQUENCY DRIVE
— —	CONTROL PANEL LIMITS
———	FIELD WIRING CONNECTIONS

REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	10-08-15	EMB

REVISIONS

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TITLE: LINE DIAGRAM

AECOM - SVE
FORMER OZONE INDUSTRIES SITE QUEENS, NY

JOB NO. 15-152 (SVE)

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	E-1	1 OF 1	A

TABLE 5
ATV 61

VFD SETTINGS
NES 15-152, REVISION A - (October, 2015)
AECOM - Former Ozone Industries Site (SVE)
Queens, NY

SETPOINTS LOADED BY NES - VIA VFD INTEGRAL KEYPAD

MAIN MENU	SUB-MENU	SUB-SUB-MENU	DESCRIPTION
2 ACCESS LEVEL			LEVEL OF ACCESS CONTROL
1 DRIVE MENU	1.1 SIMPLE START		STD. MOTOR CURRENT
1 DRIVE MENU	1.1 SIMPLE START		STD. MOTOR FREQUENCY
1 DRIVE MENU	1.1 SIMPLE START		NOMINAL MOTOR SPEED
1 DRIVE MENU	1.1 SIMPLE START		MAX. OUTPUT FREQUENCY
1 DRIVE MENU	1.5 INPUTS/OUTPUTS CFG	AI2 CONFIGURATION	AI2 MINIMUM VALUE
1 DRIVE MENU	1.5 INPUTS/OUTPUTS CFG	AI2 CONFIGURATION	AI2 MAXIMUM VALUE
1 DRIVE MENU	1.5 INPUTS/OUTPUTS CFG	AO1 CONFIGURATION	AO1 ASSIGNMENT
1 DRIVE MENU	1.5 INPUTS/OUTPUTS CFG	AO1 CONFIGURATION	AO1 MIN OUTPUT VALUE
1 DRIVE MENU	1.5 INPUTS/OUTPUTS CFG	AO1 CONFIGURATION	AO1 MAX OUTPUT VALUE
1 DRIVE MENU	1.6 COMMAND		CONFIGURATION REFERENCE 1
1 DRIVE MENU	1.6 COMMAND		CHANNEL MODE CONFIG.
1 DRIVE MENU	1.6 COMMAND		CONTROL CHANNEL 1 CONFIG.
1 DRIVE MENU	1.6 COMMAND		CONTROL CHANNEL 2 CONFIG.
1 DRIVE MENU	1.7 APPLICATION FUNCTION	STOP COFIGURATION	TYPE OF STOP

PLEASE NOTE: PARAMETERS NOT LISTED REMAIN AT FACTORY DEFAULT

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TABLE 5
ATV 61

SETTINGS
Expert
63 AMPS
60Hz NEMA
3540 RPM
60 Hz
4.2 mA
20 mA
MOTOR FREQ.
4 mA
20 Ma
HMI
SEPARATE
TERMINALS
HMI
FREEWHEEL

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SECTION 7 - CONTROL COMPONENTS

ENCLOSURE NEMA4 42 X 36 X 12 - MILD STEEL W/ LOCKING HANDLE - HAMMOND EN4SD423612GY

VENT FAN 210CFM 115VAC 6 IN - HAMMOND FAN150AC115

VENT FAN ADJ. 30-140F BI-METAL TEMP SWITCH N.O. - HAMMOND SKT011419NO

NON-FUSED THROUGH DOOR DISCONNECT 3-PHASE 100 AMP - ABB OT200U03

PROCONTROL PLC 24DI,16AI,30DO,8A - EOS A2

PROVIEW USER'S GUIDE - EOS

PROCONTROL CELL MODEM W/ 80FT ANTENNA CABLE - EOS CELL MODEM

UPS, 350VA, 200W, 120V, 1PH, 3 UPS & SURGE OUTLET 3 SURGE ONLY - APC BE350G

VFD 25 HP 208/230V 75 A 3-PHASE NEMA1 - SQUARE D ATV61HD18M3X

QUARTZ DRIVE ANALOG HOUR METER 2.8IN DIAMETER BEZEL 115VAC - ENM T50B212

POWER SUPPLY 24VDC 2.5A - ADI PSC-24-060

MUSHROOM SWITCH RED TRIGGER ACTION - TURN TO RELEASE - SQUARE D ZB5AS844

HAMMOND MANUFACTURING

Quality Products. Service Excellence.

Type 4 Mild Steel Wallmount Enclosure *Eclipse Series*

Hinge Door with Quarter Turn/Handle







Panel Sold Separately

Application

- Designed to enclose electrical and/or electronic equipment and protect against harsh, industrial environments for wallmount applications.
- Impressive styling features like hidden hinges, attractive latching systems make the Eclipse a suitable addition to any high-tech equipment installation.
- A wide range of sizes and practical accessories make this product line a complete package.

Standards

- UL 508 Type 3R, 4, and 12
- CSA Type 3R, 4, and 12
- Complies with
  - NEMA Type 3R, 4, and 12
  - IEC 60529, IP66

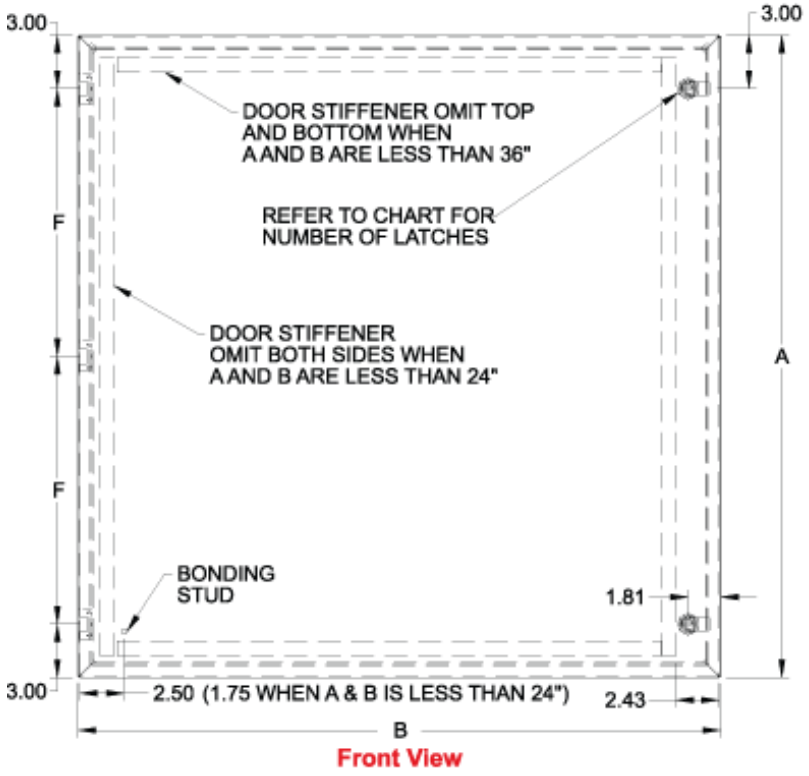
Construction

- Formed 14 or 16 gauge steel.
- Smooth, continuously welded seams ground smooth.
- Door stiffeners are provided where required for increased strength and rigidity - designed to also permit additional mounting options.
- Formed lip on enclosure to exclude flowing liquids and contaminants.
- Door latches feature the added safety of quarter turn slot requiring use of tool for opening.
- Doors may be easily removed for modifications and are interchangeable.
- Seamless poured-in place gasket.
- Collar studs provided for mounting inner panel.
- Includes hardware kit with panel mounting nuts and sealing washers for wall mounting holes.
- Bonding stud provided on door and grounding stud installed in enclosure.
- Hinges are constructed from 304 stainless steel.
- Hinge pins are stainless steel.
- Quarter turn latch and multi-point handle (key lockable) are zinc diecast with black epoxy finish.
- Door alignment guide provided on 36" wide enclosures.

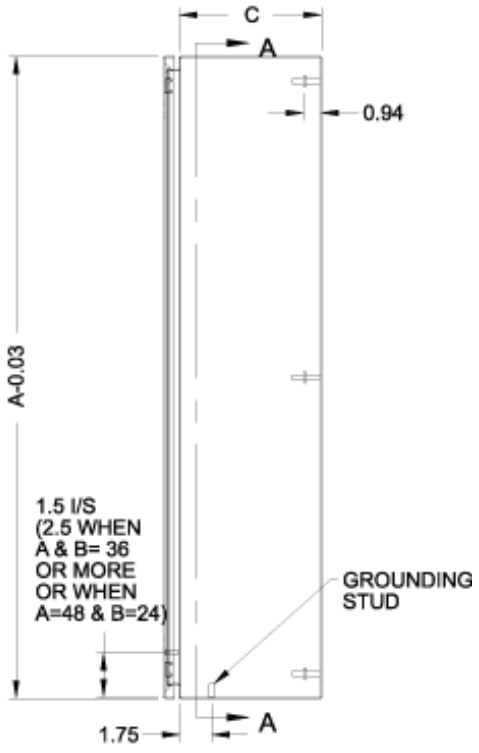
Finish

- Cover and enclosure are phosphatized and finished with a recoatable powder inside and out with choice of ANSI 61 smooth Gray (GY) or RAL7035 textured light gray (LG).

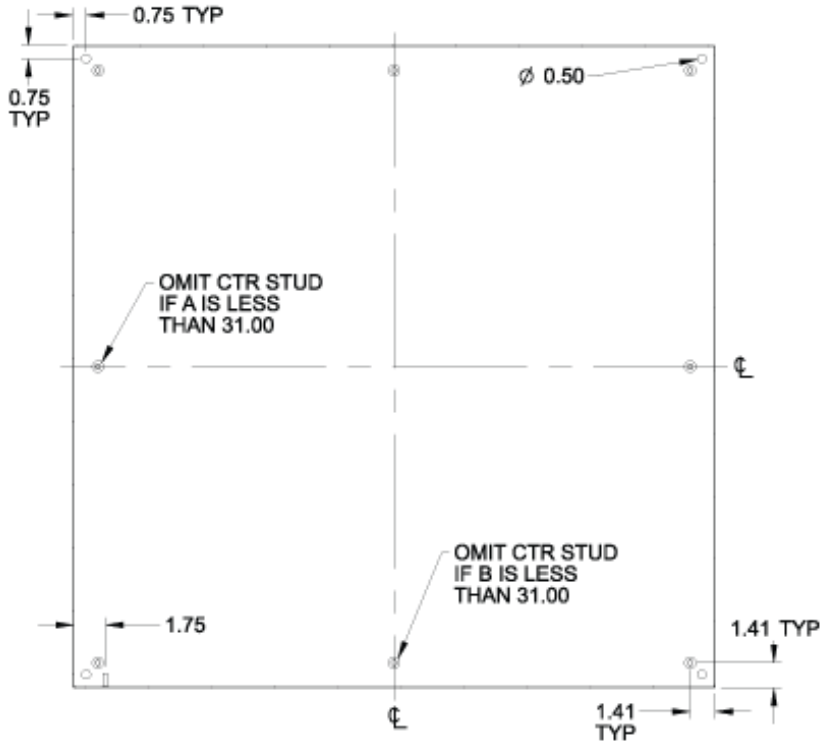
Accessories



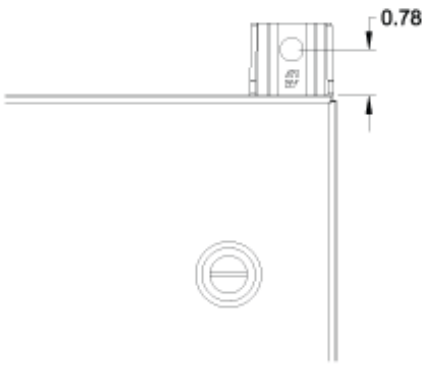
Front View



Side View



SECTION A-A



Mounting Foot Detail

Part No. (ANSI 61 Gray)	Part No. (RAL 7035 Light Gray)	Overall Dimensions A	B	C	Door/Body Gauge	Latches Qty	Type	Opt. Panel Part No.	Panel Size D	E	# Hinges	F	Ship Wt. (lbs)
EN4SD12126GY	**EN4SD12126LG**	12.00	12.00	6.00	16	1	Qtr Turn	**EP1212**	10.20	10.20	2	6.00	12
EN4SD12246GY	**EN4SD12246LG**	12.00	24.00	6.00	16	1	Qtr Turn	**EP1224**	10.20	22.20	2	18.00	24
EN4SD16126GY	**EN4SD16126LG**	16.00	12.00	6.00	16	1	Qtr Turn	**EP1612**	14.20	10.20	2	10.00	16
EN4SD16166GY	**EN4SD16166LG**	16.00	16.00	6.00	16	1	Qtr Turn	**EP1616**	14.20	14.20	2	10.00	19
EN4SD16206GY	**EN4SD16206LG**	16.00	20.00	6.00	16	1	Qtr Turn	**EP1620**	14.20	18.20	2	10.00	22
EN4SD20126GY	**EN4SD20126LG**	20.00	12.00	6.00	16	1	Qtr Turn	**EP2012**	18.20	10.20	2	14.00	20

Part No. (ANSI 61 Gray)	Part No. (RAL 7035 Light Gray)	Overall Dimensions A	B	C	Door/Body Gauge	Latches Qty	Type	Opt. Panel Part No.	Panel Size D	E	# Hinges	F	Ship Wt. (lbs)
EN4SD202410GY	**EN4SD202410LG**	20.00	24.00	10.00	16	1	Qtr. Turn	**EP2024**	18.20	22.20	2	14.00	36
EN4SD241210GY	**EN4SD241210LG**	24.00	12.00	10.00	16	1	Qtr Turn	**EP2412**	22.20	10.20	2	18.00	26
EN4SD241610GY	**EN4SD241610LG**	24.00	16.00	10.00	16	1	Qtr. Turn	**EP2416**	22.20	14.20	2	18.00	30
EN4SD242010GY	**EN4SD242010LG**	24.00	20.00	10.00	16	1	Qtr. Turn	**EP2420**	22.20	18.20	2	18.00	36
EN4SD242410GY	**EN4SD242410LG**	24.00	24.00	10.00	14	2	Qtr. Turn	**EP2424**	22.20	22.20	2	18.00	45
EN4SD243010GY	**EN4SD243010LG**	24.00	30.00	10.00	14	2	Qtr. Turn	**EP2430**	22.20	28.20	2	18.00	53
EN4SD302010GY	**EN4SD302010LG**	30.00	20.00	10.00	14	2	Qtr. Turn	**EP3020**	28.20	18.20	3	12.00	47
EN4SD302410GY	**EN4SD302410LG**	30.00	24.00	10.00	14	2	Qtr. Turn	**EP3024**	28.20	22.20	3	12.00	53
EN4SD303010GY	**EN4SD303010LG**	30.00	30.00	10.00	14	2	Qtr. Turn	**EP3030**	28.20	28.20	3	12.00	75
EN4SD362410GY	**EN4SD362410LG**	36.00	24.00	10.00	14	2	Qtr. Turn	**EP3624**	34.20	22.20	3	15.00	70
EN4SD363010GY	**EN4SD363010LG**	36.00	30.00	10.00	14	2	Qtr. Turn	**EP3630**	34.20	28.20	3	15.00	84
EN4SD363610GY	**EN4SD363610LG**	36.00	36.00	10.00	14	2	Qtr. Turn	**EP3636**	34.20	34.20	3	15.00	100
EN4SD423010GY	**EN4SD423010LG**	42.00	30.00	10.00	14	1	3-point	**EP4230**	40.20	28.20	4	12.00	107
EN4SD423610GY	**EN4SD423610LG**	42.00	36.00	10.00	14	1	3-point	**EP4236**	40.20	34.20	4	12.00	117
EN4SD482410GY	**EN4SD482410LG**	48.00	24.00	10.00	14	1	3-point	**EP4824**	46.20	22.20	4	14.00	95
EN4SD483010GY	**EN4SD483010LG**	48.00	30.00	10.00	14	1	3-point	**EP4830**	46.20	28.20	4	14.00	120
EN4SD483610GY	**EN4SD483610LG**	48.00	36.00	10.00	14	1	3-point	**EP4836**	46.20	34.20	4	14.00	125
EN4SD603610GY	**EN4SD603610LG**	60.00	36.00	10.00	14	1	3-point	**EP6036**	58.20	34.20	4	18.00	150
EN4SD201612GY	**EN4SD201612LG**	20.00	16.00	12.00	16	1	Qtr Turn	**EP2016**	18.20	14.20	2	14.00	32
EN4SD202012GY	**EN4SD202012LG**	20.00	20.00	12.00	16	1	Qtr Turn	**EP2020**	18.20	18.20	2	14.00	34
EN4SD242012GY	**EN4SD242012LG**	24.00	20.00	12.00	16	1	Qtr Turn	**EP2420**	22.20	18.20	2	18.00	38
EN4SD242412GY	**EN4SD242412LG**	24.00	24.00	12.00	14	2	Qtr Turn	**EP2424**	22.20	22.20	2	18.00	47
EN4SD302412GY	**EN4SD302412LG**	30.00	24.00	12.00	14	2	Qtr Turn	**EP3024**	28.20	22.20	3	12.00	57
EN4SD303012GY	**EN4SD303012LG**	30.00	30.00	12.00	14	2	Qtr Turn	**EP3030**	28.20	28.20	3	12.00	80
EN4SD362412GY	**EN4SD362412LG**	36.00	24.00	12.00	14	2	Qtr Turn	**EP3624**	34.20	22.20	3	15.00	62
EN4SD363012GY	**EN4SD363012LG**	36.00	30.00	12.00	14	2	Qtr Turn	**EP3630**	34.20	28.20	3	15.00	91
EN4SD363612GY	**EN4SD363612LG**	36.00	36.00	12.00	14	2	Qtr Turn	**EP3636**	34.20	34.20	3	15.00	104
EN4SD423012GY	**EN4SD423012LG**	42.00	30.00	12.00	14	1	3-point	**EP4230**	40.20	28.20	4	12.00	111
EN4SD423612GY	**EN4SD423612LG**	42.00	36.00	12.00	14	1	3-point	**EP4236**	40.20	34.20	4	12.00	121
EN4SD482412GY	**EN4SD482412LG**	48.00	24.00	12.00	14	1	3-point	**EP4824**	46.20	22.20	4	14.00	98
EN4SD483612GY	**EN4SD483612LG**	48.00	36.00	12.00	14	1	3-point	**EP4836**	46.20	34.20	4	14.00	148
EN4SD603612GY	**EN4SD603612LG**	60.00	36.00	12.00	14	1	3-point	**EP6036**	58.20	34.20	4	18.00	165
EN4SD723012GY	**EN4SD723012LG**	72.00	30.00	12.00	14	2	Qtr Turn, 5-point	**EP7230**	70.20	28.20	5	16.50	190
EN4SD723612GY	**EN4SD723612LG**	72.00	36.00	12.00	14	2	Qtr Turn, 5-point	**EP7236**	70.20	34.20	5	16.50	195
EN4SD242016GY	**EN4SD242016LG**	24.00	20.00	16.00	16	1	Qtr Turn	**EP2420**	22.20	18.20	2	18.00	52
EN4SD242416GY	**EN4SD242416LG**	24.00	24.00	16.00	14	2	Qtr Turn	**EP2424**	22.20	22.20	2	18.00	66
EN4SD302416GY	**EN4SD302416LG**	30.00	24.00	16.00	14	2	Qtr Turn	**EP3024**	28.20	22.20	3	12.00	85
EN4SD363016GY	**EN4SD363016LG**	36.00	30.00	16.00	14	2	Qtr Turn	**EP3630**	34.20	28.20	3	15.00	102
EN4SD423616GY	**EN4SD423616LG**	42.00	36.00	16.00	14	1	3-point	**EP4236**	40.20	34.20	4	12.00	140

HAMMOND MANUFACTURING

Quality Products. Service Excellence.

Tube Axial Fans *DNMF Series*









Features

- Choice of 4.70" (120mm), 3.15" (80mm), 5.91" (150mm) or 10" (254mm).
- Choice of either 115 or 230 VAC, 50/60 Hz.
- Impedance protected motor.
- Class-B insulated.
- Ball bearing construction, metal or plastic blades.
- Diecast aluminum body.
- DNMF100AC, FAN150AC and FAN10A fans have male plug terminations (requires fan cords).
- FAN80AC fans have 11" long lead wires.
- Fan is cooled by incoming air.
- Fan component is recognized to UL 507 and CSA certified.
- Includes mounting hardware.

Accessories

- Fan Cords

Part No. 115 VAC	Part No. 230 VAC	Overall Dimensions Height	Width	Depth	CFM	Wattage 50Hz	60Hz	Speed (RPM)	Noise (dB)	Use With Fan Guard Part No.	Use With Filter Grill Part No.
FAN80AC115	**FAN80AC230**	3.15	3.15	1.50	32	11	10	3100	34	FAN80FG	XPFA80*
DNMF100AC115	**DNMF100AC230**	4.70	4.70	1.50	105	24	22	3000	50	DNFG	XPFA120*
FAN150AC115	**FAN150AC230**	5.75 & 5.90	6.72	2.00 & 2.20	210 & 230	27 & 46	26 & 40	3100 & 3400	63 & 53	FAN150FG	n/a
FAN10A115	**FAN10A220**	10.00 dia.		3.50	550	30	35	1650	55	FAN10FG	XPFA254*

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Thermostats *SKT Series*



Features

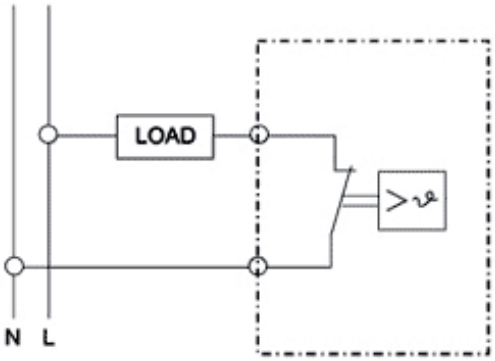
- Designed to provide air temperature control and monitoring in cabinets.
- Thermostat NC (Normally Closed) for the control of heaters and heater fans
- Thermostat NO (Normally Open) for the control of cooling units, or for switching signal transmitters in case of overheating.
- Available in Fahrenheit or Celsius.

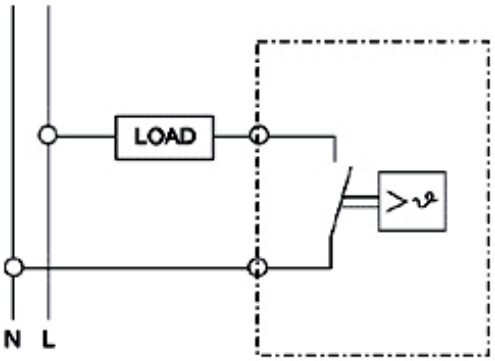
NC - Normally Closed (Red)

- Used in conjunction with heaters.
- Contact opens when rising temperatures reach the set point temperature, shutting heater off.

NO - Normally open (Blue)

- Used in conjunction with fans.
- Contact closes when rising temperatures reach the set point temperature, turning fan on.





Part No.	Scale	Contact Type	Dimensions Height x Width x Depth	Switching Capacity	Ship Wt. lbs
SKT011409NC	F°	Normally Closed	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1

Part No.	Scale	Contact Type	Dimensions Height x Width x Depth	Switching Capacity	Ship Wt. lbs
SKT011409NC-C	C°	Normally Closed	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1
SKT011419NO	F°	Normally Open	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1
SKT011419NO-C	C°	Normally Open	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1

Sensor Element:	Thermostatic bi-metal
Switching difference (hysteresis):	+ or - 4°F (+or- 3°K)
Adjustment Range:	30 - 140°F
Noise Suppression:	N (according to VDE 0875)
Connection:	2 pole terminal for AWG 14 (2.5 mm²)
Mounting:	Easily installed by clip mounting on 35 or 38mm DIN rail (included)
Housing:	Flame retardant plastic UL94VO
Color:	Gray (SB)
Protection:	IP20
Approval:	UL Recognized Component, cUL Recognized Component, CE

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OT200U03

General Information

Extended Product Type:	OT200U03
Product ID:	1SCA022723R0220
EAN:	6417019232645
Catalog Description:	OT200U03 Switch-disconnector
Long Description:	Handle and shaft must be ordered separatly.

Categories

Products » Low Voltage Products and Systems » Switches » Disconnect Switches

Ordering

EAN:	6417019232645
Minimum Order Quantity:	1 piece
Customs Tariff Number:	85365080

Dimensions

Product Net Width:	170 mm
Product Net Height:	170 mm
Product Net Depth:	70 mm
Product Net Weight:	1.577 kg

Container Information

Package Level 1 Units:	1 piece
Package Level 1 Width:	183 mm
Package Level 1 Height:	95 mm
Package Level 1 Length:	240 mm
Package Level 1 Gross Weight:	1.577 kg

Environmental

RoHS Status:	Planned to follow EU Directive 2002/95/EC August 18, 2005 and amendment after 2009 Q4

Additional Information

IIT Publishing Status:	Level 0 - Information enabled
Number of Poles:	3
Operating Mechanism:	Mechanism at the end of the switch
Pollution Degree:	3
Power Loss:	6.5 W
Product Main Type:	OT200U
Product Name:	Switch-disconnector
Rated Impulse Withstand Voltage (U_{imp}):	12 kV
Rated Insulation Voltage (U_i):	1000 V
Rated Operational Current AC-22A (I_e):	(380 ... 415 V) 250 A (500 V) 250 A (690 V) 250 A
Rated Operational Current AC-23A (I_e):	(380 ... 415 V) 250 A (500 V) 250 A (690 V) 250 A
Rated Operational Voltage (U_e):	1000 V
Rated Short-time Withstand Current (I_{cw}):	for 1.0s 8 kiloampere rms

Certificates and Declarations (Document Number)

Declaration of Conformity - CE:	1SCC301137D0202;

Classifications

ETIM 5.0:	EC000216 - Switch disconnector
Object Classification Code:	Q







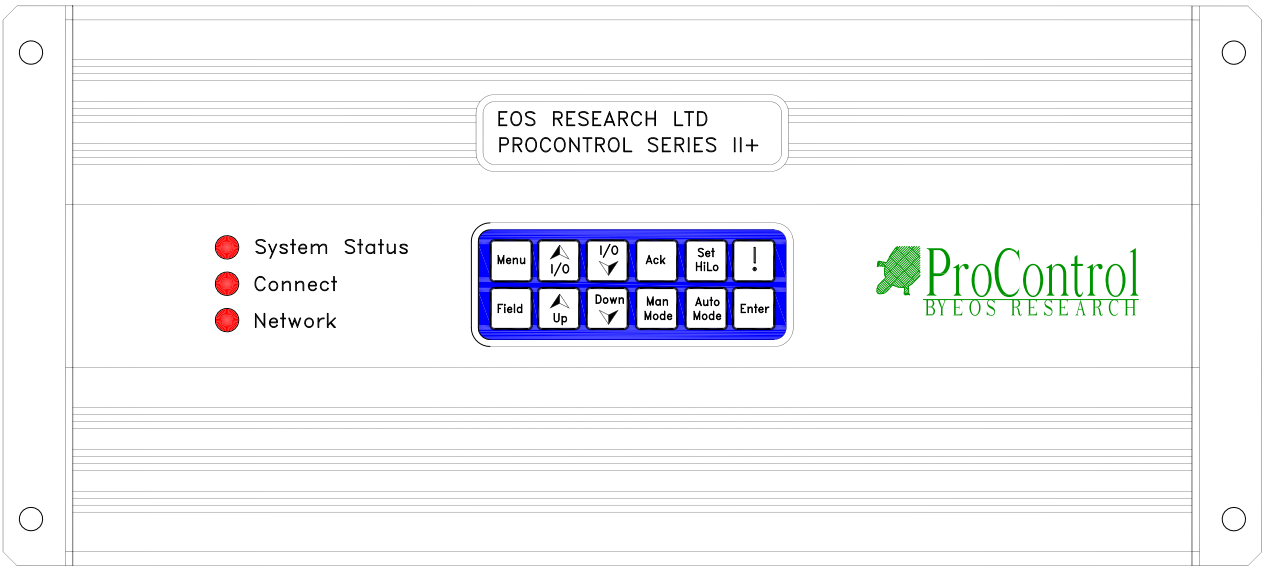






PROCONTROL series 2 plus

TYPE A
Product Specification



The next generation **Type A** ProControl features a capacity of up to 78 industrially-hardened inputs and outputs in a small and easy-to-use package. The **Series 2**^{plus} contains everything you need for the core of your control/monitoring system, including the ability to drive motor starters, solenoids and other devices directly from built-in relay outputs. The **Series 2**^{plus} includes expanded datalogging and reporting capability, a built-in power supply for your instruments and transducers, as well as pluggable connectors for all I/O. The **Type A** features higher I/O counts, large datalog memory, greater process control capacity, and a vacuum fluorescent display. Available with Ethernet, cellular data modem and analog phone modem communication options.

	Model A1	Model A2
INPUTS		
Discrete	Sixteen (16) protected discrete inputs. Support for 4 flowmeters or pulse accumulators with rates to 500Hz.	Twenty-Four (24) protected discrete inputs (eight of these are status inputs). Support for 4 flowmeters or pulse accumulators with rates to 500Hz.
Analog	Sixteen (16) 4-20ma inputs with built-in 24Vdc supply. Inputs are surge and short-circuit protected and may also be used as discrete inputs	Sixteen (16) 4-20ma inputs with built-in 24Vdc supply. Inputs are surge and short-circuit protected and may also be used as discrete inputs
OUTPUTS		
Discrete	Twenty-two (22) relay outputs - 14 rated @ 1A, remainder @ 0.5A, 120V	Thirty (30) relay outputs - 14 rated @ 1A, remainder @ 0.5A, 120V
Analog		Eight (8) 4-20ma outputs. PID loop control.

Specifications subject to change without notice.

	Model A1	Model A2
DATALOGGING		
Discrete	30,000 points standard. All logging occurs on change of state.	30,000 points standard. All logging occurs on change of state.
Analog	80,000 points standard (5000 per channel)	80,000 points standard (5000 per channel)
Event	10,000 points standard.	10,000 points standard.
Totalizer	50 points per channel	50 points per channel
COMMUNICATIONS		
Ethernet, cellular IP:	ProView™ Software, real-time monitoring from any broadband connection. Alarm and Status Emails, text messaging on alarm	
Analog phone modem:	ProView™ Software, real-time monitoring from any phone line. Alarm and Status fax reports, text/pager messages (email optional)	
ProControl Network:	Optional, can be linked via RS-485 for distributed control or higher I/O counts	
USER INTERFACE		
Display	VFD (Vacuum Fluorescent Display) 2 x 20 character display	
Keypad	2 x 6 membrane keypad.	
LEDs	LEDs: System Status, Communications Link, Networking	
PROCESS CONTROL		
System	Up to 64 regular system processes total with 16 startup and 16 shutdown processes, specified by easy-to-understand Boolean (IF...THEN) logic	
Alarms	Generate shutdowns, emails, FAX reports and/or text messages.	
Loops	PID loop control with user control of setpoint, proportional, integral and derivative gains and max change per calculation. Also open loop proportional algorithm.	
POWER		
System	10VAC, 50VA, external transformer provided	
I/O Supply	24 VDC, 15V and 9V available for powering sensors/instruments.	
ENVIRONMENTAL		
Dimensions	13.5" long x 6" wide x 3.5" high.	
Weight	7 lbs.	
Power Dissipation	30W max.	
Operating Temperature	-20C to +50C	
Humidity	95% R.H. non-condensing	

Crafted in the USA by people who know how to build something to last.

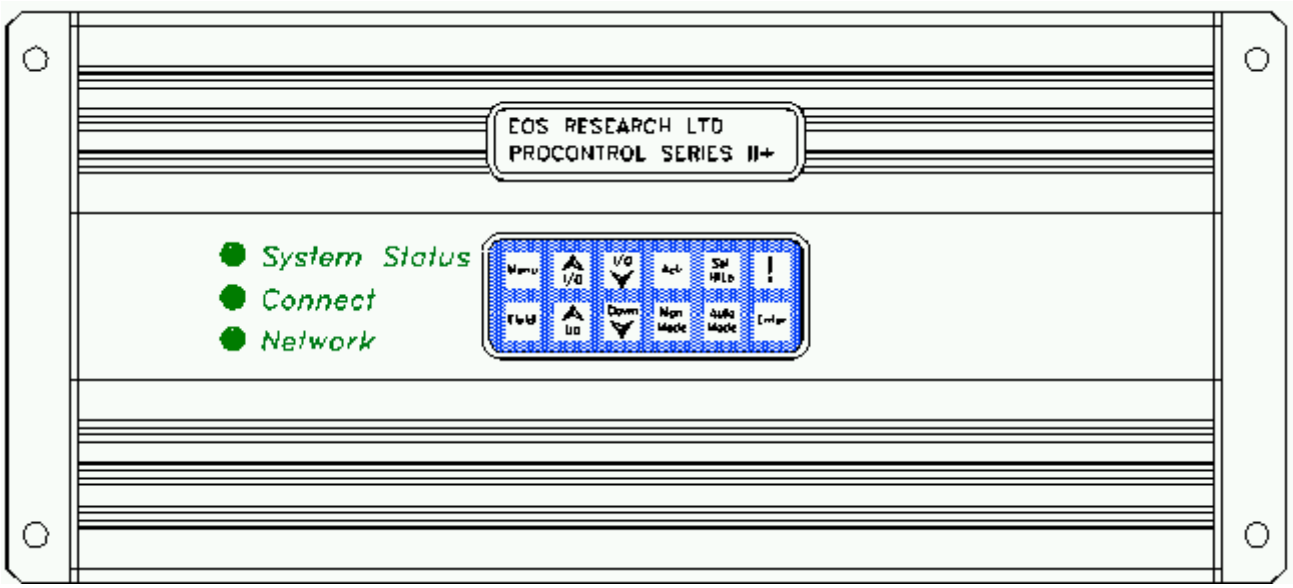
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(603) 332-2099
(603) 332-2727 FAX
www.eosresearch.com

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PROCONTROL

SERIES 2*plus* USER MANUAL



Version 2.X

LIMITED WARRANTY

EOS Research Ltd. (EOS) warrants its products to be free from defects in materials and workmanship for a period of one year from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its sole option, any such defective products. This warranty includes parts and labor. This warranty does not apply to equipment which has been damaged by accident, negligence or misapplication or has been altered or modified in any way.

EXCEPT AS PROVIDED HEREIN, EOS RESEARCH LTD. MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MECHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties, therefore the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

IMPORTANT SAFETY PRECAUTIONS

Any complex hardware or software may be difficult to document, explain or understand. It is important to consider the consequences or unexpected or abnormal behavior which may be caused by a defect or human failure to comprehend. In order to protect people and property from damage, a thorough safety analysis should always be performed. When the consequences of a failure are serious, it is essential to protect life and property against such a failure with redundant backup systems or safety devices. It is agreed between the purchaser and EOS Research Ltd. that protection against and the consequences of any such failure are entirely the purchaser's responsibility.

This device is not approved for use in life support or medical systems.

As installed, this product may be part of a system which is required to meet various electrical, fire, safety or other codes and regulations. Compliance with these codes is the purchaser's responsibility.

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APPENDIX A - Typical ProControl Wiring

Please see the ProView manual for operation of the remote access software which is supplied with the ProControl Series **2*plus***.

1.0 SYSTEM OVERVIEW

1.1 General

The *ProControl Series* **2**^{plus} is a small but powerful microprocessor based control/ telemonitoring system. By combining a control panel and remote monitor in one unit, the Series **2**^{plus} can act as a central supervisory and data management tool for any stand-alone operation. The *ProControl Series* **2**^{plus} can perform multiple tasks:

- **Stand-Alone Control:** The *ProControl Series* **2**^{plus} is a sophisticated programmable logic controller that will efficiently supervise and control your operation. It can interface with up to 70 electrical devices (float switches, pressure transducers, pH transmitters, flow meters, pumps, blowers, etc.), and execute numerous control functions simultaneously. Automatic shutdown routines can be programmed in to protect you operation during alarm conditions. It is extremely versatile in terms of the control algorithms it can execute.

- **Remote Control and Monitoring:** The *ProControl Series* **2**^{plus} gives you a window into your operation from any remote location, using the easy-to-use Windows-based software supplied with the system. You communicate with the ProControl over a modem link, which allows you to view all of your system's operating conditions, while also providing the same access to control functions that you would have if you were at the site (e.g., turning pumps on and off, adjusting alarm setpoints, etc.). No other telemonitoring device gives you the ProControl's level of remote control capability.

- **Reporting:** The *ProControl Series* **2**^{plus} will keep you informed. It will send you periodic fax status reports of your project operations on a schedule specified by you, and will alert you immediately either by fax or by numeric or alpha-numeric pager if an alarm condition warrants attention. No longer do you have to assume what's happening at your remote operation.....the ProControl will tell you exactly.

- **Datalogging:** The *ProControl Series* **2**^{plus} is your information manager. It is a powerful datalogger that automatically records all operating conditions in its battery-backed memory. You can access your logged data remotely at any time, and download it to your office computer for further processing. The datalogging capability is an invaluable tool for reporting purposes, troubleshooting, and trend graphing.

One or more of these features can be used in your installation; they are standard in every ProControl unit.

1.2 Key Concepts

The following are the building blocks of any Series **2*plus*** monitoring and control system.

Inputs and Outputs (I/O's)

No system can be effective in the real world without communication and one of the principal ways the ProControl communicates is by responding to information collected by sensors and by issuing "commands" to other electronic or electrical devices. Sensor information constitutes an *Input* while a "command" to another device constitutes an *Output*. The Series **2*plus*** works with all of the more important types of I/O devices in general use. Appendix A demonstrates how a variety of I/O devices are connected to the ProControl.

Digital Inputs

These inputs are designed to detect the closure of switch contacts such as those found on float switches or overpressure sensors. They can respond to any normally open or normally closed dry contact. The Series **2*plus*** provides its own wetting (supply) voltage of 5 volts DC for each digital input circuit. The Series **2*plus*** can respond to changes in state as fast as 4 Hz or 3 Hz (cycles per second) depending on the model purchased. Digital inputs are "debounced" for 125 or 150 milliseconds, respectively. This means that a switch or other input that changes state (becomes open or closed) must stay in that state for 125 or 150 milliseconds before the Series **2*plus*** will respond to the change.

Eight high-speed digital inputs can also be used for traditional digital (pulse-output) flow meters. These inputs can detect signal changes at up to a 200/500 Hz rate. All high-speed digital inputs are "debounced" for 1250/500 microseconds. The faster rate applies only to those systems containing the 18.432 MHz processor.

Analog Inputs

These inputs are compatible with sensors which send out a 4 - 20 milliamp (mA) signal. Most analog sensors are available with this type of signal, examples being pressure transducers, pH transmitters, and many flow meters. These inputs allow the operator to read the actual "value" of a parameter, such as pressure, instead of an on/off signal.

Digital Outputs

Digital outputs turn things like pumps, solenoid valves, and alarm lights on and off. The Series **2*plus*** digital outputs are relay outputs designed to switch small loads directly, such as motor starters, lamps, and solenoid valves.

Analog Outputs

Analog outputs are typically used in process control schemes where a controlled piece of equipment can accept a signal which is variable over a range. This output is expressed as a percentage (0 - 100%) and is used to control pump speeds, chemical dosing rates, etc., instead of conventional on/off operation. The equipment that the ProControl sends the analog output to must accept a 4 - 20 mA signal. Often, an analog output is used in conjunction with an analog input such as a pH transmitter to form a control scheme known as *feedback control*. In essence, the input and output will work together to maintain a user set input level. This concept is described further in the next section under *Analog Output Processes*.

Tagnames

Each input and output is given a descriptive *Tagname* by the user that uniquely identifies it to the system operator. For instance, a digital input could be called "TANKHI", an analog input could be called "AIRFLO" and a digital output could be called "PUMP_1". This tagname is used by the local LCD display, the FAX report and by the ProView software. The analog inputs are also given a *Units Tagname* which identifies the unit of measure associated with the input sensor. Each tagname can be up to six characters long and each units tagname can be up to three characters long ("PSI", for instance). The tagnames can include the uppercase letters A-Z, the numbers 0-9, a blank space, and the underscore (_) character.

1.3 Control Basics

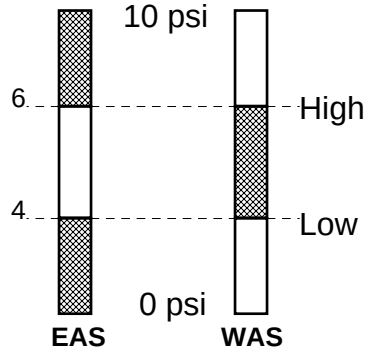
The status of all inputs or outputs can easily be monitored both locally and remotely. What gives the Series **2*plus*** its real power, however, is the ability to automatically initiate actions based on the status of the inputs and your pre-programmed instructions (this is often called *Process Control*). These actions can include switching certain outputs, faxing back a report, sending an alphanumeric or numeric page, shutting down the entire system or sounding the local alarm. Process control functions are programmed into your ProControl by EOS Research or one of our technology partners according to your specifications.

Active State

Central to the use of control on the Series **2*plus*** is the concept of *Active State*. Each input on the ProControl receives certain signals from a sensor which constitute "normal" operation and other signals which constitute an exception to normal operation.

A digital input can monitor only two states, ON or OFF (alternatively, CLOSED or OPEN). The *Active State* would be the state in which the controller would respond to the digital input, and perform certain actions or generate an alarm. For example, if a high level float switch in a tank is tripped (turned ON) by rising fluid level, we can say that its *Active State* correlates to a situation in which the fluid level is high. The active state of the float switch could cause the Series **2*plus*** to trigger an alarm, turn off a pump, or initiate some other action. The Series **2*plus*** can be set up so that either ON or OFF is the active state.

An analog input sensor can take on many states (or values) between the minimum and maximum of its measurement range. The ProControl operator, however, can set two threshold values which divide the total input span into two functional regions. These threshold values are more commonly called the *Low Alarm Limit* and the *High Alarm Limit*, although on the Series **2*plus*** these thresholds are somewhat more flexible in use than those names imply. An analog input which has transcended either its Low Alarm Limit or High Alarm Limit is said to be in its active state.



For instance, consider an analog input sensor which measures pressure from 0 to 10 PSI. The system operator could set the low limit to 4 PSI and the high limit to 6 PSI. In this case the *Active State* would usually be considered as the input state greater than 6 PSI or less than 4 PSI. This interpretation is called *Endpoint Active State* (EAS) on the Series **2*plus*** because the endpoints of the range are the areas which need to trigger action or generate alarms. The opposite interpretation is also possible and is called *Window Active State* (WAS). Any input values between 4 PSI and 6 PSI would trigger action or generate alarms.

Figure 1. Active State

If the ProControl has *Alarms Set*, when any input enters its active state, a local beeper will sound on the ProControl. The word *Alarm* here applies only to the sounding of a local beeper and is not associated with any process control. The active state condition is indicated on the LCD display and can be acknowledged by the operator. The beeper is silenced when it has been acknowledged or after 30 seconds have elapsed. The beeper only operates when the system is operating in Manual mode.

Startup Sequence

The *Startup Sequence* is a series of control algorithms or steps which run in succession and which are designed to place the system in its normal operating mode. It can be as simple as turning all the outputs on simultaneously, or as complex as a multi-stage delay with many conditions. Up to 8 or 16 individual startup steps can be declared depending on the model of the controller. The ProControl can be configured to automatically run this sequence when the unit is powered up.

Process Tasks

A *Process Task* is an ongoing control algorithm which runs continuously. Think of each process task as an IF-THEN statement, in which an action is initiated if a certain condition or combination of conditions exists. Some examples are:

- IF Tank Level Sensor 2 is on, THEN turn Pump 2 off
- IF Air Flow Rate < 10 cfm AND Reactor Temperature > 250^{o}, THEN open Bleed Valve 2

Up to 16 or 64 separate process tasks can be run simultaneously depending on the model of the controller. Process tasks can trigger FAX reports, pager alerts, and system shutdowns.

Shutdown Sequence

The *Shutdown Sequence* is a series of control steps which run in succession and which are designed to shut your system down in a manner which is best for the equipment or treatment processes involved. The shutdown sequence can be activated manually or automatically due to an alarm condition. Here is a typical shutdown sequence:

- Turn off Well Pumps 1 and 2
- Wait 5 minutes, then turn off Stripper Blower
- Open Bleed Valve 2
- When Oxidizer Temperature < 150^{o}, turn off SVE Blower

Automatic Operation

The use of the startup sequence, process tasks, and the shutdown sequence constitutes *Automatic Operation* of your system with the ProControl Series **2*plus*** (otherwise known as *Auto Mode*). The Series **2*plus*** will be placed into auto mode (automatically) when your system has been started up using the programmed startup sequence. If one condition of the programmed startup sequence is not met during the startup process, your system will be completely shut down by the ProControl as a safety measure. Once the startup sequence has been successfully completed, the ProControl begins running the process tasks continuously. **PROCESS TASKS WILL RUN ONLY WHEN IN AUTO MODE**. Please note that the audible beeper will not sound even if the ProControl has *Alarms Set* when it is in Auto Mode, since the process tasks will control these situations as the user has specified.

Manual Operation

You can override the Series **2**^{plus} programmed control functions by operating in *Manual Mode*. In manual mode, your process will respond only to operator input from the keypad of the ProControl, or to commands issued from the ProView software. **PLEASE NOTE THAT PROCESS TASKS AND THEIR ERROR-CHECKING MECHANISMS DO NOT RUN DURING MANUAL MODE!** Manual mode is useful when you wish to troubleshoot your system, but none of the system safeguards built into auto mode are available. You can place your operation into auto mode any time by issuing the command from the keypad.

Analog Output Processes

In some cases, you may want to use an analog output to control equipment that maintains an analog input at a certain constant level. For example, you may wish to automatically maintain a pH of 8.5 in a reaction tank by varying the dosing rate of a chemical feed pump. The pH you wish to maintain (8.5) is called the *SetPoint* of the analog output process. An analog input to the ProControl (in this case, a pH transmitter) is said to provide *feedback* to the unit, and combined with an analog output, constitute *feedback control*.

PID Loops

A reliable type of feedback control can be obtained through a *PID Loop*. PID stands for *Proportional-Integral-Derivative*, and is a commonly-used process control technique. We'll skip the details of the mathematics involved, but suffice it to say that a PID loop is the favored control technique for most analog output processes. With only a *Proportional* term applied in the equation, the analog output is controlled based on an error signal generated from the difference between the SetPoint and the actual analog input. The PID loop can also improve its performance as it continues to run if an *Integral* term is used and can respond to quick changes in the controlling analog input if a *Derivative* term is used. EOS Research will configure your PID loops for you and can provide further information if necessary.

Proportional Outputs

In some cases, it may be desirable to base an analog output signal on an analog input value. In this situation, no specific SetPoint is used because there is a direct relationship between the output and input values. For example, if you wanted to base the output of a metering pump on some flow rate, you might use a proportional output to relate the amount of chemical metered to the flow rate.

2.0 ON-SITE OPERATION

2.1 LCD Display

If your unit did not come with an LCD display, the following sections *do not* apply.

The 2 line x 20 character LCD display is used to display and control system operations. The display is divided into separate areas or fields, as outlined below.

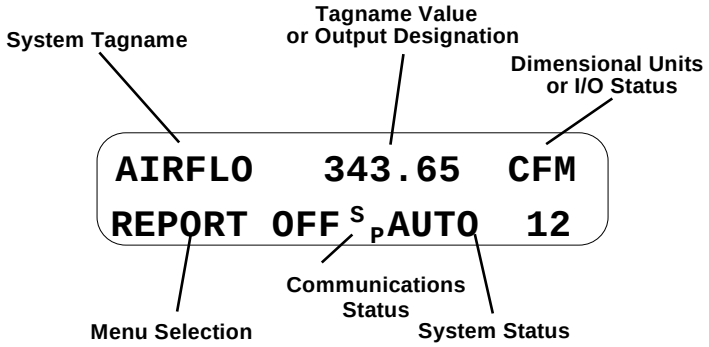


Figure 2. Display Fields

System Tagname This six-character field is used to identify the I/O point displayed. Descriptive names such as WELL1 or BLOWER are used.

Tagname Value For analog inputs, this field displays the value of the input, the high alarm limit, or the low alarm limit. For digital outputs, OUTPUT is displayed. For digital inputs, this field is unused. For analog outputs, this field displays the output percentage, the output level, or the associated input setpoint.

Dimensional Units or I/O Status For analog inputs, this three-character field displays the dimensional units associated with the input sensor, such as GPM or PSI. For digital inputs and outputs, this field displays either ON or OFF. For analog outputs, this field abbreviates percent with PCT. In the case of digital outputs, if the particular output displayed has been designated a lamp output (*see ProView manual*), and a lamp test is currently running, an asterisk (*) will appear before ON or OFF to indicate the lamp is illuminated despite the indicated output status (the output will return to this indicated status once the lamp test has been completed).

Menu Selection This field displays the current menu selection.

Communications Status This field displays one of five different descriptors which indicate any of several special functions of the ProControl. If no communications action is being taken, ">" will appear. Communications messages include: **SP** (Sending Page) - indicates that the unit is attempting to send either an alphanumeric or numeric page; **EF** (Encoding Fax) - indicates that the unit is presently encoding a facsimile report as a result of a request by either the operator or the unit itself; **SF** (Sending Fax) - indicates that the unit is attempting to send a fax report; and **DC** (Data Communications) - indicates that the unit is presently interfaced with ProView.

System Status This area displays the current system status: AUTO, MANUAL, START, or SHUTD and an associated process task number indicating the last successfully completed Auto process, current Startup process, or current Shutdown process.

2.2 Keypad

The Series **2**^{plus} keypad contains 12 buttons which are used along with the LCD Display to control the operations of the system.

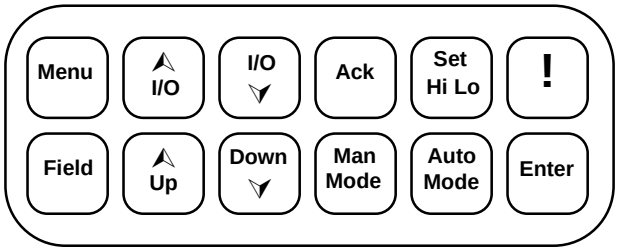


Figure 3. Series 2^{plus} Keypad

Menu — This key is used to scroll through a series of options which are displayed on the LCD screen, and which allow the user to configure various aspects of system behavior.

I/O / I/O — These keys are used to display information about particular I/O points on the LCD Screen. The keys allow the user to scroll through all of the system I/O points either forward or backward.

Ack — The Acknowledge key is used to silence the audible beeper or to acknowledge a memo sent from a remote ProView user.

Set Hi Lo — The Set Hi Lo key allows the user to change the high and low alarm limits for analog inputs or to toggle the display in the I/O Summary.

! — The Emergency Shutdown key is used to turn off all outputs and return the system to manual mode. The programmed shutdown sequence is <u>not</u> executed using this key.

Field — The Field key is used to select a character position to be edited. It is used in conjunction with any direct alphanumeric entry.

Up / Down — These keys are used to toggle system variables from one state to the next or to scroll through possible character entries when used in conjunction with the Field key.

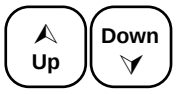
Man Mode — This key is used to place the system in manual mode.

Auto Mode — This key is used to place the system in auto mode.

Enter — The Enter key is used to initiate certain actions selected by other keys or to confirm alphanumeric editing done using other keys.

2.3 Password

When the system is first turned on the password screen is displayed and the user is prompted to enter the password to gain access to the system. "EOS" is the default password. The password on the Series **2**^{plus} was designed as a *low-level* security feature. It is not sufficient in and of itself to withstand a determined effort at system entry. The ProControl unit can be configured to bypass the password screen when the unit is powered up.




```
CUSTOMER ID TAGNAME
ENTER PASSWORD: BAA
```

Use the Up and Down keys to change the character displayed above the cursor.




```
CUSTOMER ID TAGNAME
ENTER PASSWORD: BAA
```

The Field key is used to move the cursor to the next character to be edited.




```
CUSTOMER ID TAGNAME
ENTER PASSWORD: EOS
```

The enter key submits the password for approval.

If the password was entered correctly, the following screen will be displayed for about a second before the operations screen is displayed:

```
Password Accepted
VER 2.XXX   : 1
```

ROM Version # — User Setup Version #

Otherwise, the following message will be displayed for a second and the user will be returned to the password menu:

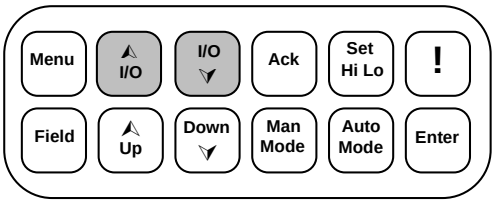
```
Incorrect Password
```

2.4 Operations Screen

After the password has been entered correctly, the operations screen is displayed. The operations screen allows the user to set system parameters and to review the status of all system inputs and outputs.

```
WELL1              OFF
ALARMS SET >MANUAL
```

2.5 I/O Keys



Pressing the I/O Up or I/O Down keys will scroll through the operational I/O points in the system. Data relevant to a particular I/O point will be displayed to right of the point's Tagname.

I/O

```
WELL2                ON
ALARMS SET >MANUAL
```

Forward scroll through I/O points

I/O

```
WELL3                OFF
ALARMS SET >MANUAL
```

Forward scroll through I/O points

I/O

```
WELL2                ON
ALARMS SET >MANUAL
```

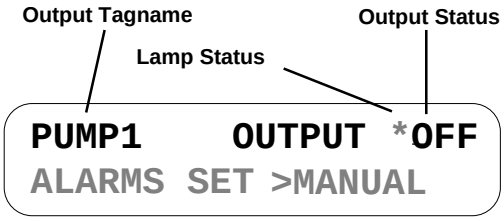
Backward scroll through I/O points

2.6 Digital Input Menu



A digital input displayed in the operations screen will be displayed as shown. When the input is in its Active State "ON" will be displayed in the Input Status area. Otherwise, "OFF" will be displayed.

2.7 Digital Output Menu



A digital output displayed in the operations screen will appear as shown. When the output has been turned on, "ON" will be displayed in the Output Status area. Otherwise, "OFF" will be displayed. The cursor is displayed under the first character in the status field to indicate that it can be changed. The Lamp Status character (*) will be shown for a lamp output if a *lamp test* is running regardless of the output's true state.

Up Down

```
PUMP1      OUTPUT  ON
ALARMS SET >MANUAL
```

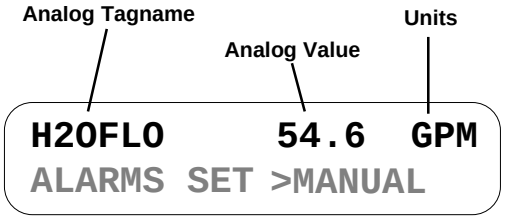
Pressing the Up or Down key will toggle the digital output state and turn the corresponding relay OFF or ON.

Field

```
PUMP1      OUTPUT  ON
ALARMS SET >MANUAL
```

Pressing the Field key will move the cursor to the Menu selection field.

2.8 Analog Input Menu



An analog input displayed in the operations screen will be displayed as shown to the left. The value of the analog input will be shown along with the dimensional units. In the case of a pulse accumulator (totalizer only), you will see only TOT where units is normally displayed.

Set Hi Lo

```
H2OFLO      20.0  GPM
LOW ALARM  >MANUAL
```

Use the Set Hi Lo key to set the low alarm limit.

Set Hi Lo

```
H2OFLO      80.0  GPM
HIGH ALARM >MANUAL
```

Press the Set Hi Lo key again to set the high alarm limit.

Set Hi Lo

```
H2OFLO    120817  GAL
TOTAL FLOW >MANUAL
```

Press the Set Hi Lo key again to see the total flow on a flow type input, and once more to return.

Up Down

```
H2OFLO      30.0  GPM
LOW ALARM  >MANUAL
```

The Up and Down keys are used to change the value of the current character, as denoted by the cursor.

Field

```
H2OFLO      30.0  GPM
LOW ALARM  >MANUAL
```

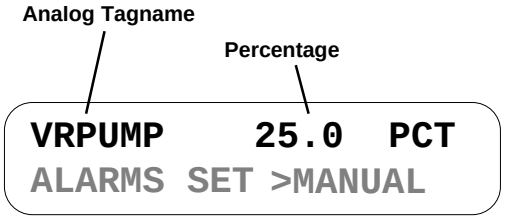
The Field key is used to move to the next character to be edited.

Enter

```
H2OFLO      30.0  GPM
LOW ALARM  >MANUAL
```

To save the low alarm limit changes, press the enter key.

2.9 Analog Output Menu



An analog output displayed in the operations screen will be displayed as shown to the left. The percentage of full scale output will be displayed as well.

Set Hi Lo



The Set Hi Lo key can be used to set the output percentage.

Set Hi Lo



Press the Set Hi Lo key again to declare the SetPoint of an associated analog input. The SetPoint is used only if a PID control loop is in use as an analog output process.

Pressing Set Hi Lo again returns to the original menu.

Up Down



The Up and Down keys are used to change the value of the current character, as denoted by the cursor.

Field



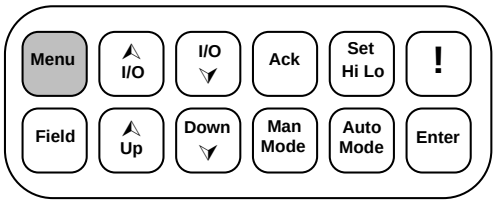
The Field key is used to move to the next character to be edited.

Enter



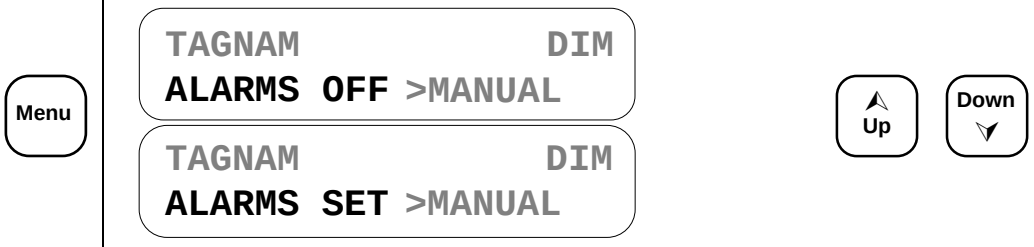
To save the output level changes, press the enter key.

2.10 Menu Key

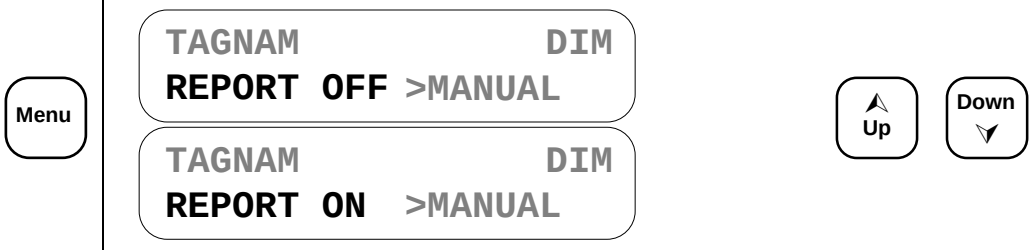


When pressed, the Menu key will scroll through a series of items which allow the user to configure various aspects of system behavior. A description of these items appear in a 10 character field at the bottom left of the display. Either the Up and Down keys or the Enter key is used to change the item.

ALARMS Use the Up and Down keys to enable or disable Alarms.



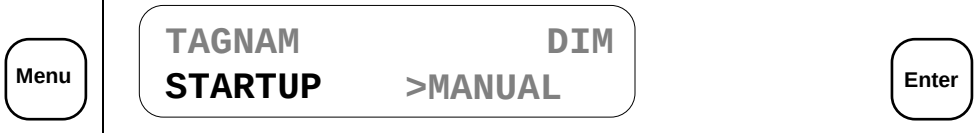
REPORT Use the Up and Down keys to enable or disable the unit's reporting capabilities (fax or page).



FAX NOW Use the Enter key to send a FAX report immediately.



STARTUP Use the Enter key to run the Startup Sequence.



SHUTDOWN Use the Enter key to run the Shutdown Sequence.



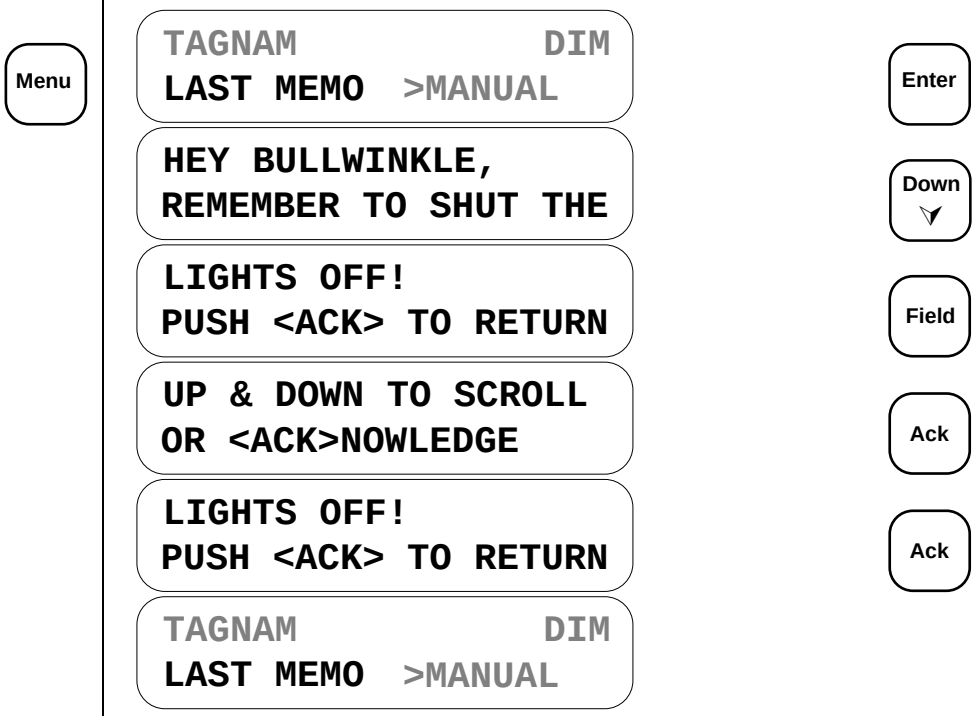
LAST SHUTDOWN This display item shows what input or output caused the last shutdown.



LOG OFF Use the Enter key to Log Off the system and return to the password menu.

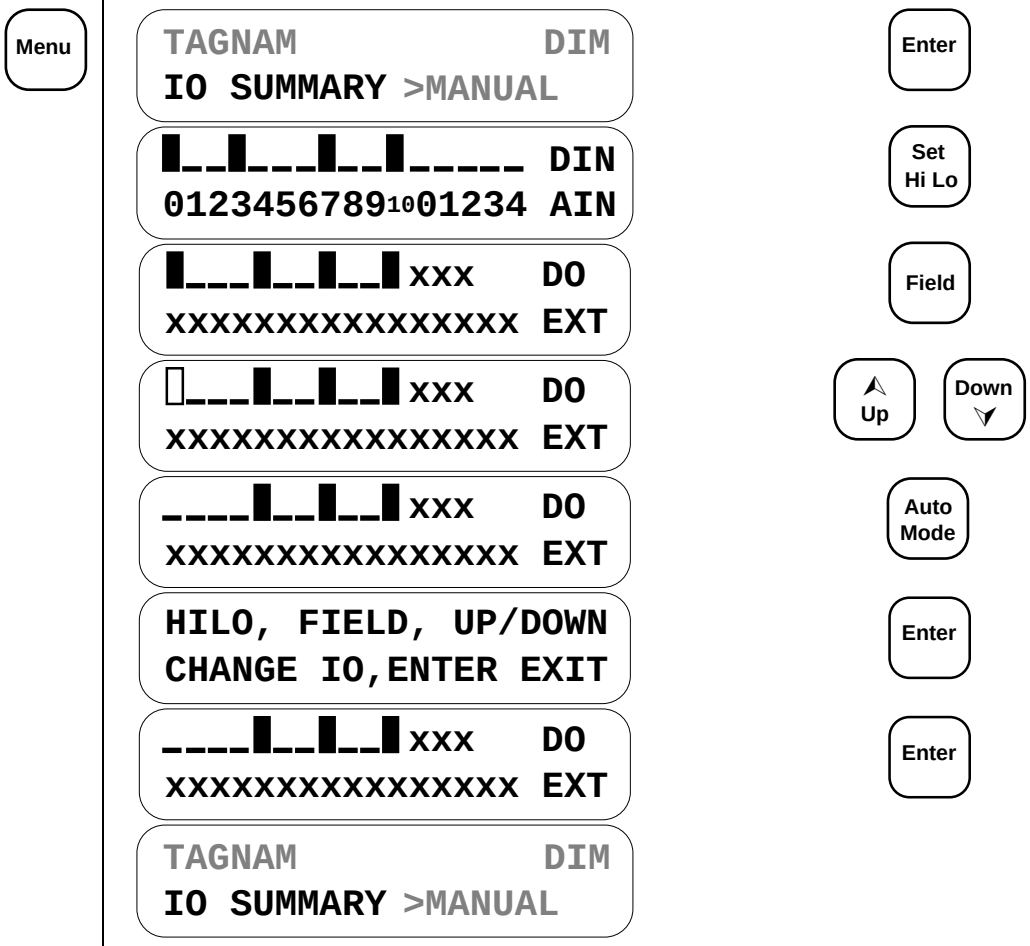


LAST MEMO Use the Enter key to see the last memo sent from the remote ProView user. Up and Down are used to scroll through the message, and Ack is used to return to the ProControl menus. If you hit any other key you will see an informative message telling you which keys are valid. The message will be displayed for 3 seconds if no keys are pressed, but can be acknowledged before the 3-second period by pressing either the Ack or Enter keys.

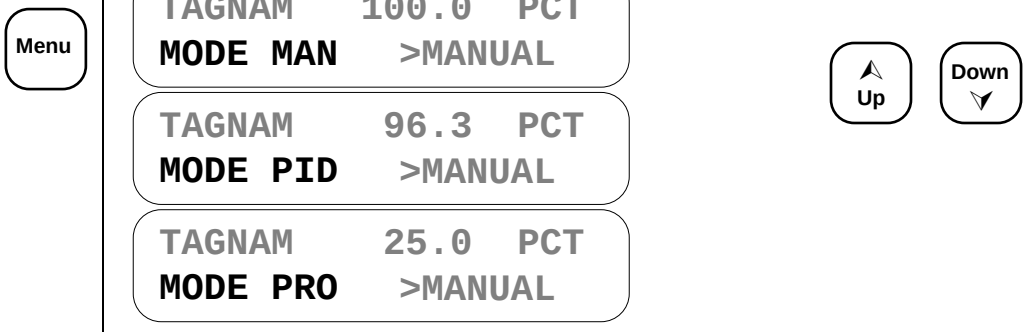


IO SUMMARY

Use the Enter key to enter the I/O summary. The analog input values 0-10 represent a percentage of full scale (i.e. 0 ≅ 4 mA, 5 ≅ 12 mA). Set HiLo is used to toggle between input/output summaries. An underscore represents an open input or an unswitched output. A block indicates a closed input or a switched output. An **x** or **X** is displayed when an output is not enabled and is unswitched or switched, respectively. An asterisk (*****) will be displayed if an output is declared as a lamp and a lamp test is currently being performed. The Field key can be used to move the blinking cursor through the outputs. The Up/Down keys can be used to toggle the state of the output whose position is covered by the blinking cursor. The Enter key will return the ProControl back to its standard menus. If you press any other keys you will see an informative message telling you which keys are valid. The message will be displayed for 3 seconds if no keys are pressed, but can be interrupted before the 3-second period by pressing the Enter key.

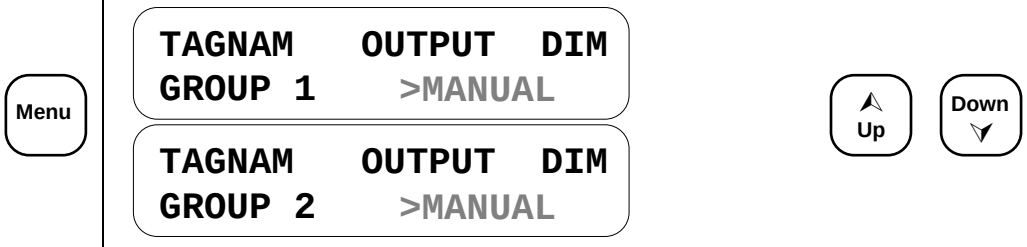


MODES Use the Up and Down keys to toggle an Analog Output from Manual control to PID control or Proportional control, depending on which analog output process is being used. This selection will only appear if an analog output tagname is displayed and the analog output is part of an analog output process.



GROUP The ProControl allows outputs to be assigned to different *Groups* to allow greater process control flexibility. In some cases, you may wish to be able to specify alternate process tasks for a given output. For instance, you can have the operation of a pump be controlled by a series of level switches in a tank, or alternately, the pump can be run on a timed cycle. By selecting the appropriate process Group, you can change the control strategy for that piece of equipment. EOS Research will configure the groups for you according to your specifications

Use the Up and Down keys to select a Group for the displayed output. This menu item is displayed only for outputs that have been configured by EOS to have alternate process Groups.



2.11 LED Indicators

Your ProControl unit has three status LEDs to the left of the keypad, which are used to indicate the following:

System Status: Normally ON when unit is powered.
One blink - The system has internally reset.
Two blinks - An internal error has occurred.

Connect: ON if user is remotely or locally connected.
ON if system is faxing or paging.
Slow blink - last fax or page failed, press ACK to clear.
Fast blink - local connect cable inadvertantly left plugged in, press ACK to clear.

Network: Rapid blinking indicates an active network connection.

3.0 REPORTING FEATURES

3.1 Fax Report

The ProControl unit will keep you informed of your system's operations with facsimile status reports. With the supplied ProView software you can configure the unit to send fax reports to up to two different numbers. You can also have these reports sent on a daily basis, at regular intervals during the day, or when triggered by specific process tasks. You can send one at any time by using the *Fax Now* option either from the menu on the ProControl's display, or through the ProView software.

The fax report you receive will contain several fields, each denoted by a shadow box. The number of fields will depend on the configuration of your system. For instance, you would not see a field indicating *Analog Outputs* if your system does not contain any of these.

The fields as you will see them are shown below. All information enclosed in brackets is variable and depends on your particular system configuration.

To:

```
<FAX RECIPIENT>
```

will indicate the intended fax recipient's name.

From:

```
THE <SYSTEM NAME>        SYSTEM IN <SITE LOCATION>   AT <TIME> ON <DATE>
SETUP VERSION X       :  ROM VERSION 2.x          :  MODEL B1
```

will indicate the name and location of your system, the date and time at which the fax report was initiated, your current ProView setup version, and the current on-board software version 2.X.




```
<MODE><PXX>  :   LAST SHUTDOWN AT <TIME> ON <DATE> BY <SHUTDOWN CAUSE>
                 FAX REPORT INITIATED BY <FAX CAUSE>
```

will indicate the current <MODE> of the controller and associated process. For example, if the controller is running the startup or shutdown sequence, you would see either START or SHUTD followed by the current algorithm. Similarly, in auto mode, you would see AUTO followed by the last successfully completed process task.

The LAST SHUTDOWN indicates when the system last initiated the shutdown sequence and what caused it to happen. For example, if the shutdown sequence were initiated by a key press, the cause you would see would be KEYPAD. Similarly, if the shutdown sequence were caused by a process task such as a high pressure sensor whose tagname was HIPRES, you would see HIPRES as the <SHUTDOWN CAUSE>. If multiple inputs or outputs caused the shutdown (i.e. a process task was dependent on more than one input being in the active state and/or multiple outputs being ON), the most recent one which changed will appear as the cause.

Similarly, the FAX REPORT INITIATED BY line will indicate the tagname of the I/O point which caused the fax to be sent, provided there was only one I/O point responsible. If multiple I/O points were responsible, the process itself will be indicated. Consider, for example, a process task where a shutdown was caused by HIPRES and BLOWER, and a fax was also generated. The <FAX CAUSE> would be PROCESS XX, where *XX* is the number from 1 - 64 of this process task. In the case where *Fax Now* was selected from the menu option on the LCD, the <FAX CAUSE> would be KEYPAD. The <FAX CAUSE> from a ProView generated *Fax Now* command would be REMOTE. This line will <u>not</u> appear on daily or interval scheduled fax reports.

Discrete Inputs:

```
<TAGNAME> is <STATE>   <TAGNAME> is <STATE> ...
```

will indicate the status of all of the digital inputs in four columns. Inputs which are in the active state will appear as ON and those which are in their normal state will appear as OFF.

Discrete Outputs:

```
<TAGNAME> is <STATE>   <TAGNAME> is <STATE> ...
```

will indicate the status of all of the digital outputs in four columns.

Analog Inputs:

```
<TAGNAME> is <VALUE> <DIM> LIMITS are L: <LO-LIM> <DIM> H: <HI-LIM> <DIM>
<TAGNAME> is <VALUE> <DIM> TOTAL FLOW is <FLOW>   <DIM>
<TAGNAME>                  TOTAL FLOW is <FLOW>   <DIM>
...
```

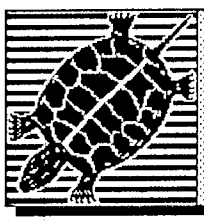
will indicate the current value, dimensional units, low alarm limit, and high alarm limit for all analog inputs which are not flow-type inputs. The precision of the values displayed can be selected through ProView. Any flow-type analog input which is responsible for maintaining a total flow will display that flow in place of the alarm limits. Any pulse-type digital input used for a digital flow meter will appear here since the information being obtained by that type of flow meter is analog in nature. In addition, pulse accumulators (volume totalizers) will appear here.

Analog Outputs:

```
<TAGNAME>   <PCT>  PCT  <MODE>      <TAGNAME>   <PCT>  PCT  <MODE>
...
```

will indicate the output percentage and mode of operation of all analog outputs. The precision is fixed to one decimal place and will range from 0.0 to 100.0, expressed as a percentage. The <MODE> of operation will be PID if the analog output is currently being used in a PID loop, or PRO if the analog output is currently being used in a Proportional scheme, otherwise it will be MAN indicating that the analog output is under manual control.

The next two pages contain examples of scheduled and alarm fax reports.



ProControl Series II+

EOS Research Ltd.

Fax Report

To:

BULLWINKLE J MOOSE

From:

THE NORTH WATER SUPPLY SYSTEM IN MAYBERRY USA @ 09:44:00 ON 12/10/1999
SETUP VERSION 1 : ROM VERSION 2.156 : MODEL B2

System Status:

AUTO P04 : NO PREVIOUS SHUTDOWN

Discrete Inputs:

WEL1LO is OFF	WEL2LO is OFF	TWR_HH is OFF	TNK_HH is OFF
RESET is OFF			

Discrete Outputs:

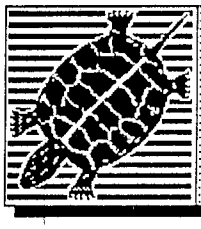
WLPMP1 is ON	WLPMP2 is ON	FINPMP is ON	CHLMET is ON
NAOMET is ON	PH_ALM is ON	CL_ALM is ON	TWRALM is OFF
WL1ALM is OFF	WL2ALM is OFF	TNKALM is OFF	

Analog Inputs:

TWRLVL is	59.2	FT	LIMITS are	L:	8.0	FT	H: 70.0	FT
TNKLVL is	0.00	FT	LIMITS are	L:	8.00	FT	H: 12.00	FT
FINFLO is	501.3	GPM	TOTAL FLOW is		14794	GAL		
FLOW_2 is	399.3	GPM	TOTAL FLOW is		12561	GAL		
FLOW_1 is	0.0	GPM	TOTAL FLOW is		0	GAL		
FIN_PH is	0.00	PH	LIMITS are	L:	6.00	PH	H: 8.00	PH
FIN_CL is	0.00	PPM	LIMITS are	L:	0.75	PPM	H: 2.00	PPM

Analog Outputs:

VSPMP1	86.8 PCT	PID	VSPMP2	100.0 PCT	PID
NAOHFD	100.0 PCT	PID	CHLRFD	20.0 PCT	PRO



ALARM Fax Report

EOS Research Ltd. — ProControl Series II+

To:

BULLWINKLE J MOOSE

From:

THE NORTH WATER SUPPLY SYSTEM IN MAYBERRY USA @ 09:34:12 ON 12/10/1999
SETUP VERSION 1 : ROM VERSION 2.156 : MODEL B2

System Status:

AUTO P04 : NO PREVIOUS SHUTDOWN
FAX REPORT INITIATED BY REMOTE

Discrete Inputs:

WEL1LO is OFF	WEL2LO is OFF	TWR_HH is OFF	TNK_HH is OFF
RESET is OFF			

Discrete Outputs:

WLPMP1 is ON	WLPMP2 is ON	FINPMP is ON	CHLMET is ON
NAOMET is ON	PH_ALM is ON	CL_ALM is ON	TWRALM is OFF
WL1ALM is OFF	WL2ALM is OFF	TNKALM is OFF	

Analog Inputs:

TWRLVL is 59.1	FT	LIMITS are	L: 8.0	FT	H: 70.0	FT
TNKLVL is 0.00	FT	LIMITS are	L: 8.00	FT	H: 12.00	FT
FINFLO is 203.5	GPM	TOTAL FLOW is	11348	GAL		
FLOW_2 is 399.6	GPM	TOTAL FLOW is	8671	GAL		
FLOW_1 is 0.0	GPM	TOTAL FLOW is	0	GAL		
FIN_PH is 0.00	PH	LIMITS are	L: 6.00	PH	H: 8.00	PH
FIN_CL is 0.00	PPM	LIMITS are	L: 0.75	PPM	H: 2.00	PPM

Analog Outputs:

VSPMP1	37.4 PCT	PID	VSPMP2	100.0 PCT	PID
NAOHFD	100.0 PCT	PID	CHLRFD	20.0 PCT	PRO

3.2 Page Alerts

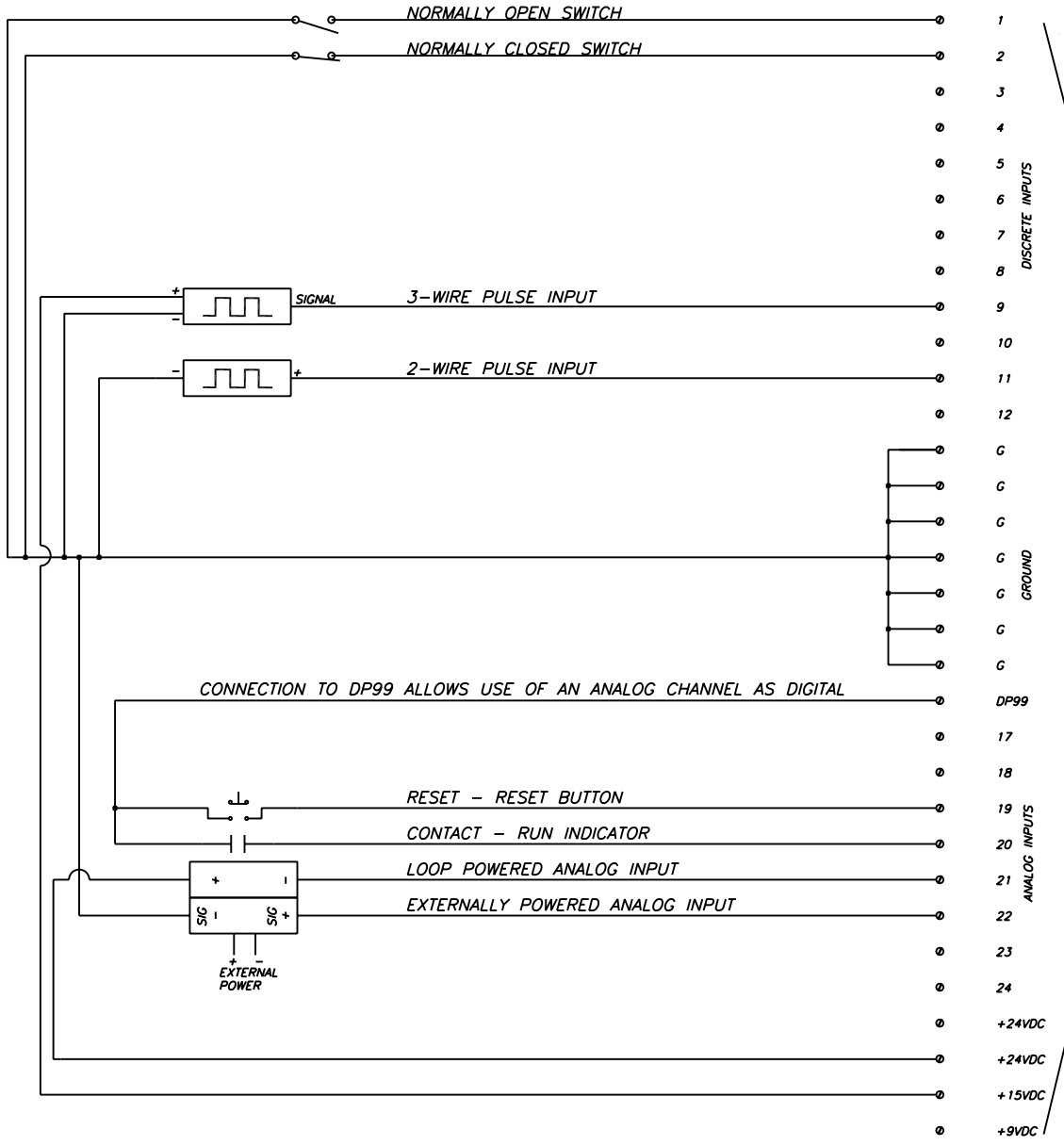
The ProControl unit can alert you to important conditions at your site via a page alert. Any system that is not in manual mode, that is, executing process tasks or the startup or shutdown sequences, can send a message up to eighty characters in length to an alphanumeric pager or up to nineteen digits in length to a numeric pager. If you are out of the office and away from a fax machine, you will still be alerted to any trouble at your site. With ProView you can select up to two pager numbers to be called. Each process task or startup/shutdown algorithm is capable of sending a message to either or both of these pagers. The pager messages are configured by EOS Research according to your specifications.

An example message for an alphanumeric pager would be:

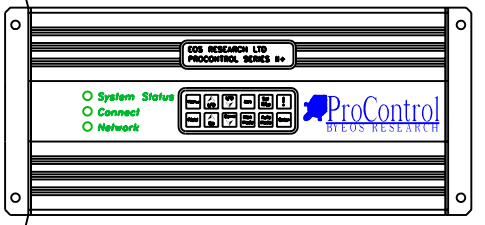
```
ANYTOWN SITE
High water level EQ Tank
System shut down!
Call Fred to fix: 555-6789
```

APPENDIX A

EXAMPLE WIRING DIAGRAM



SERIES 2*plus* Type B1-B2, A1-A2

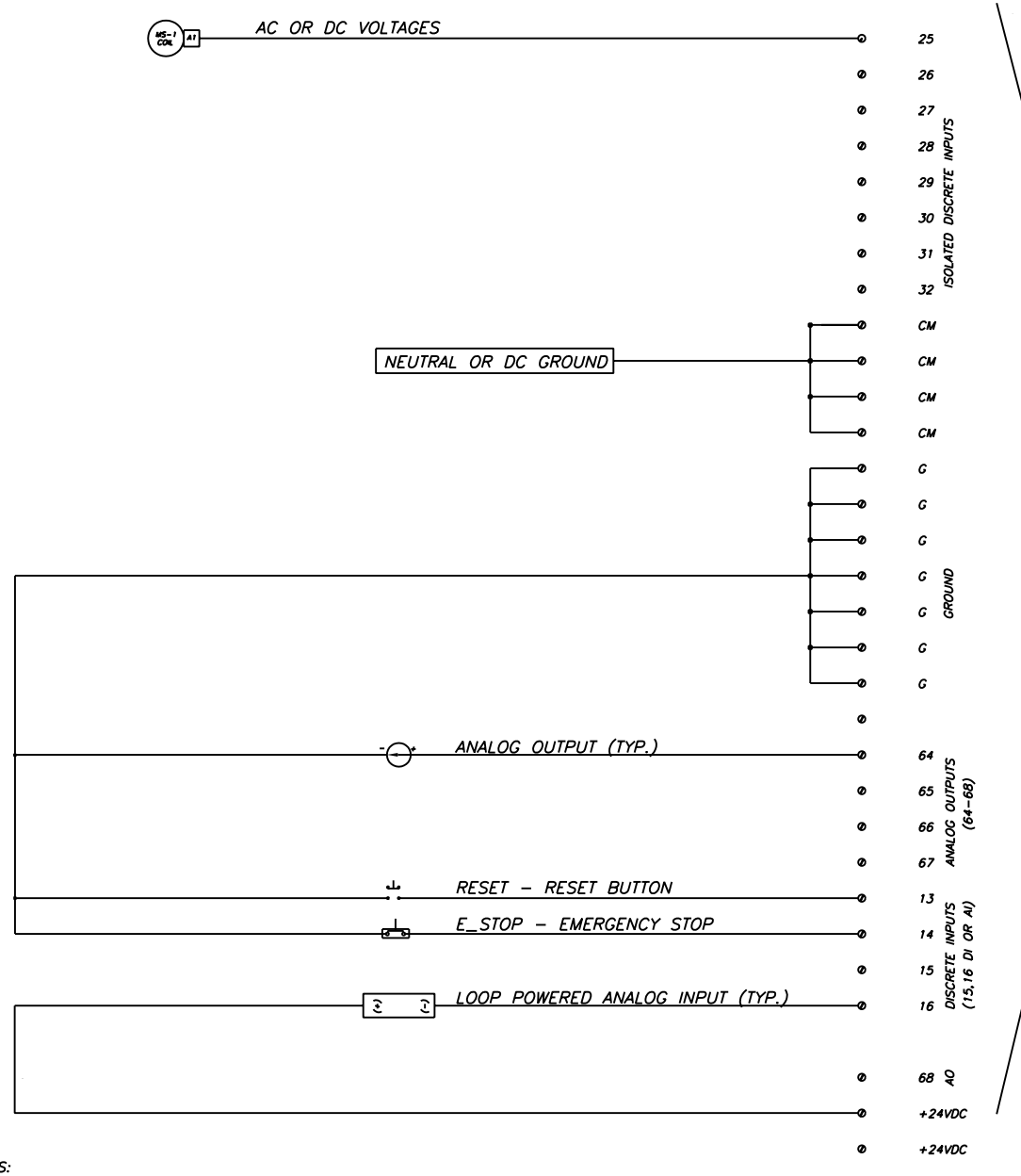


NOTES:
1. FOR ANALOG INPUTS, MAINTAIN VOLTAGE AND TOTAL LOOP RESISTANCE PER MFG. SPECIFICATIONS.
2. INPUT IMPEDANCE FOR SERIES 2Plus ANALOG INPUTS IS 135 OHMS.
3. ACTIVE DISCRETE INPUTS WILL SOURCE 1mA WHEN GROUNDED.
4. THE ProControl SOURCES 5VDC FOR DISCRETE INPUTS.
5. DISTRIBUTE ANALOG INSTRUMENTS EVENLY ACROSS +24VDC TERMINALS.

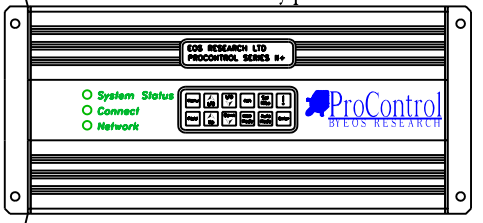
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TYPICAL ProControl WIRING
DIGITAL & ANALOG INPUTS - BOTTOM LEFT SIDE

EXAMPLE WIRING DIAGRAM



SERIES 2*plus* Type B2 ONLY

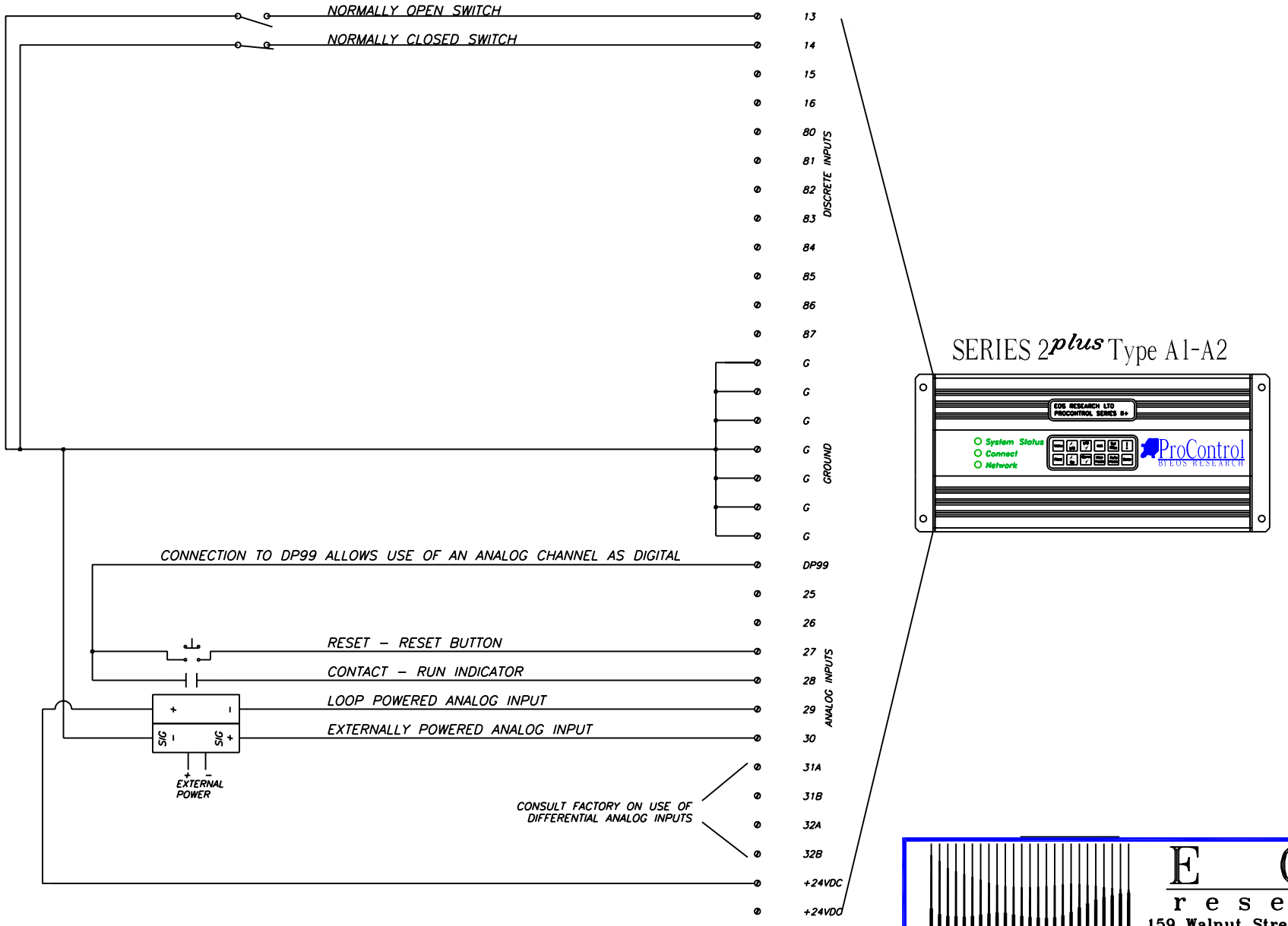


NOTES:
1. FOR ANALOG INPUTS, MAINTAIN VOLTAGE AND TOTAL LOOP RESISTANCE PER MFG. SPECIFICATIONS.
2. INPUT IMPEDANCE FOR SERIES 2Plus ANALOG INPUTS IS 135 OHMS.
3. MAXIMUM ISOLATED DISCRETE INPUT VOLTAGE 120V. ALL INPUTS MUST BE SAME VOLTAGE AND SHARE THE SAME COMMON OR NEUTRAL!
4. CM REPRESENTS COMMON FOR INPUTS 25-32. (ie. 120VAC, CM=NEUTRAL/ 24VDC, CM=DC GROUND)

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TYPICAL ProControl WIRING
DIGITAL INPUTS & ANALOG OUTPUTS
TYPE B2 - TOP LEFT SIDE

EXAMPLE WIRING DIAGRAM



SERIES 2*plus* Type A1-A2

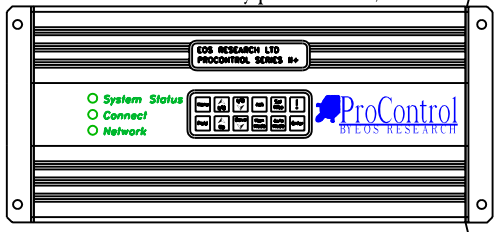
NOTES:
1. FOR ANALOG INPUTS, MAINTAIN VOLTAGE AND TOTAL LOOP RESISTANCE PER MFG. SPECIFICATIONS.
2. INPUT IMPEDANCE FOR SERIES 2Plus ANALOG INPUTS IS 135 OHMS.
3. ACTIVE DISCRETE INPUTS WILL SOURCE 1mA WHEN GROUNDED.
4. THE ProControl SOURCES 5VDC FOR DISCRETE INPUTS.
5. DISTRIBUTE ANALOG INSTRUMENTS EVENLY ACROSS +24VDC TERMINALS.

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TYPICAL ProControl WIRING
DIGITAL & ANALOG INPUTS -
TYPE A - TOP LEFT SIDE

EXAMPLE WIRING DIAGRAM

SERIES 2*plus* Type B1-B2, A1-A2



RS-232/SERIAL RJ-45 LOCAL CONNECTION PORT

TEL./RS-485 RJ-11 TELEPHONE/NETWORKING PORT

NEUTRAL LINE GROUND +24VDC

DISCRETE OUTPUTS

46
45 SLNVLV - SOLENOID VALVE
44 AIRCMP - AIR COMPRESSOR — MS-2 COIL
43 DISPMP - DISCHARGE PUMP — MS-1 COIL
42
41
40
CM2 COMMON FOR 40-46
39
38
37
36
35 VACALM - HIGH VACUUM ALARM — R
34 PRSALM - LOW PRESSURE ALARM — R
33 SMPALM - HIGH LEVEL ALARM — R
CM1 COMMON FOR 33-39

INPUT POWER 10VAC

10VAC TRANSFORMER SUPPLIED WITH ProControl UNIT. (REV 4 AND ABOVE)

NOTE: 20VAC-CT TRANSFORMER SUPPLIED PRIOR TO REV 4.
DO NOT USE 20VAC TRANSFORMER ON REV 4 AND ABOVE!!

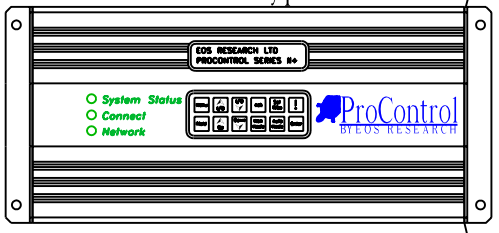
NOTES:
1. OUTPUT RELAYS RATED AT 125VAC/0.5A, 24VDC/0.5A
   UNITS SHIPPED AFTER 12/1/99 RATED AT 125VAC/1.0A, 24VDC/1.0A
2. CM1 IS SWITCHED TO 33-39 AND CM2 IS SWITCHED TO 40-46 WHEN OUTPUT IS ACTIVE.
3. DO NOT USE +24VDC FROM ProControl TO DRIVE OUTPUTS. FOR TRANSDUCER POWER ONLY.

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TYPICAL ProControl WIRING
DIGITAL OUTPUTS - RIGHT SIDE

EXAMPLE WIRING DIAGRAM

SERIES 2*plus* Type A1-A2



ANALOG OUTPUTS

G
G
71
70
69
68
67 — ANALOG OUTPUT (TYP.) (+ / -)
66
65
64
62
61
CM10

DISCRETE OUTPUTS

60 — AIRCMP – AIR COMPRESSOR — MS-2 COIL
59 — DISPMP – DISCHARGE PUMP — MS-1 COIL
CM9 — COMMON FOR 59-60

NEUTRAL
LINE
GROUND
+24VDC

58
57
CM8
56
55
CM7
54
53
CM6
52 — PRSALM – LOW PRESSURE ALARM — R
51 — SMPALM – HIGH LEVEL ALARM — R
CM5 — COMMON FOR 51-52

DISCRETE OUTPUTS

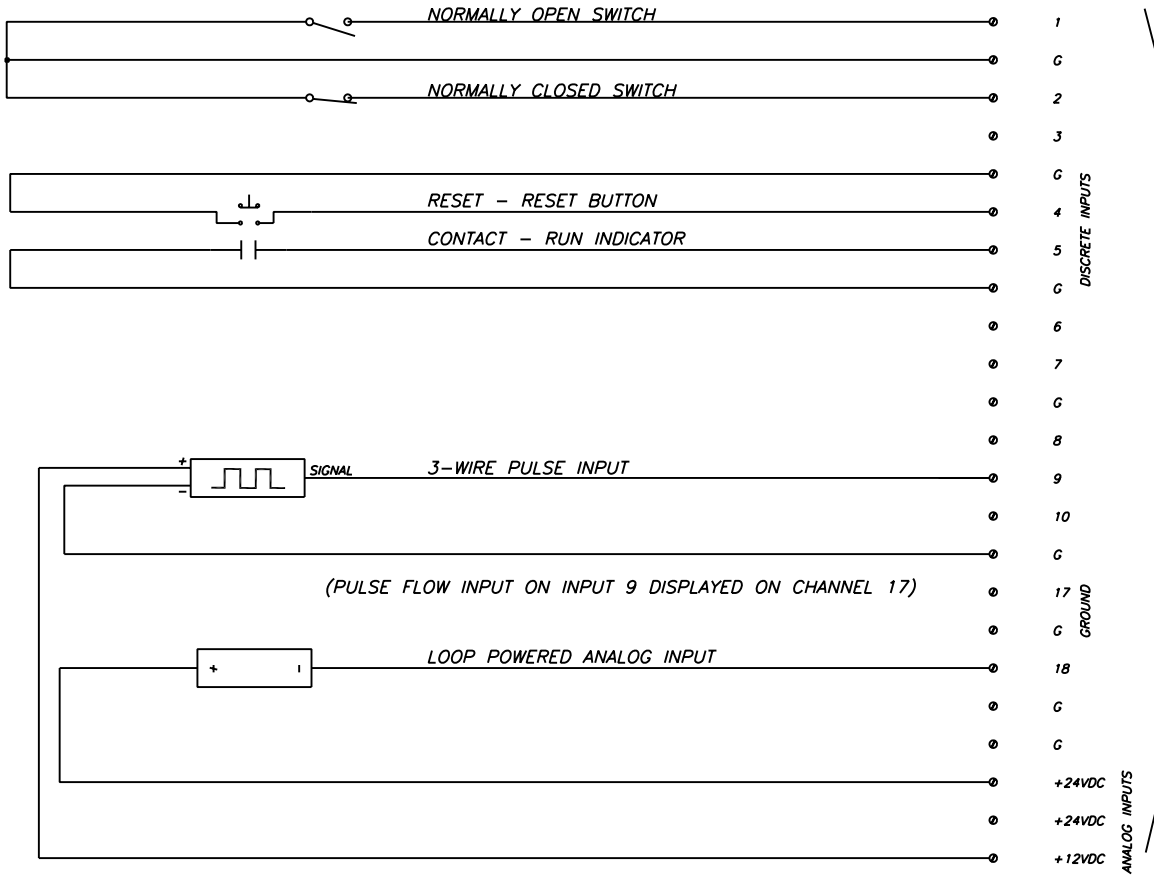
50
49
CM4
48
47
CM3

NOTES:
1. OUTPUT RELAYS ARE RATED AT 125VAC/0.5A, 24VDC/0.5A
2. CM3 IS SWITCHED TO 47-48, CM4 IS SWITCHED TO 49-50, ETC. WHEN OUTPUT IS ACTIVE.
3. DO NOT USE +24VDC FROM ProControl TO DRIVE OUTPUTS. FOR TRANSDUCER POWER ONLY.

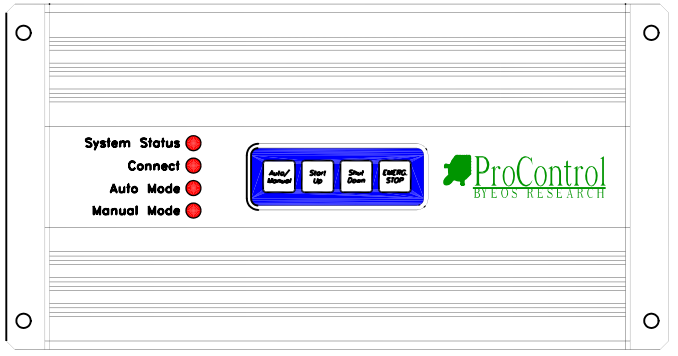
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TYPICAL ProControl WIRING
DIGITAL & ANALOG OUTPUTS
TYPE A - TOP RIGHT SIDE

EXAMPLE WIRING DIAGRAM



SERIES 2*plus* Type C1

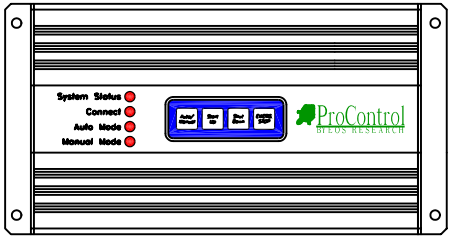


NOTES:
1. FOR ANALOG INPUTS, MAINTAIN VOLTAGE AND TOTAL LOOP RESISTANCE PER MFG. SPECIFICATIONS.
2. INPUT IMPEDANCE FOR SERIES 2Plus ANALOG INPUTS IS 135 OHMS.
3. ACTIVE DISCRETE INPUTS WILL SOURCE 1mA WHEN GROUNDED.
4. THE ProControl SOURCES 5VDC FOR DISCRETE INPUTS.
5. DISTRIBUTE ANALOG INSTRUMENTS EVENLY ACROSS +24VDC TERMINALS.

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TYPICAL ProControl Type C1 WIRING
DIGITAL & ANALOG INPUTS - BOTTOM LEFT SIDE

EXAMPLE WIRING DIAGRAM



RS-232/SERIAL RJ-45 LOCAL CONNECTION PORT

TEL./RS-485 RJ-11 TELEPHONE/NETWORKING PORT

GROUND +24VDC NEUTRAL LINE

DISCRETE OUTPUTS

40 PRSALM - LOW PRESSURE ALARM (R)

39 SMPALM - HIGH LEVEL ALARM (R)

CM4 COMMON FOR 39-40

38

37

CM3 COMMON FOR 37-38

36

35 SLNVLV - SOLENOD VALVE (CR-1 COIL)

CM2 COMMON FOR 35-36

34 AIRCMP - AIR COMPRESSOR (MS-2 COIL)

33 RW_PMP - RECOVERY WELL PUMP (MS-1 COIL)

CM1 COMMON FOR 33-34

INPUT POWER 10VAC

10VAC TRANSFORMER SUPPLIED WITH ProControl UNIT.

NOTES:
1. OUTPUT RELAYS RATED AT 125VAC/1.0A, 24VDC/1.0A
2. CM1 IS SWITCHED TO 33-34 AND CM2 IS SWITCHED TO 35-36, CM3 IS SWITCHED TO 37-38, CM4 IS SWITCHED TO 39-40 WHEN OUTPUT IS ACTIVE.
3. DO NOT USE +24VDC FROM ProControl TO DRIVE OUTPUTS. FOR TRANSDUCER POWER ONLY.

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TYPICAL ProControl TYPE C WIRING
DIGITAL OUTPUTS - RIGHT SIDE

ProView™

for ProControl Series 2plus

USER'S GUIDE



Version 2.2x

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CHAPTER 1: INTRODUCTION AND INSTALLATION

This chapter provides a brief introduction to ProView features, system requirements for running the program, and instructions for installing it.

Introduction to PROVIEW

ProView is a powerful but straightforward software package used in conjunction with the ProControl system to provide integrated stand-alone control and remote monitoring for your operation. ProView versions 2.1 and higher can serve as an on-site or remote human-machine interface (HMI) for the Series **2**^{plus} ProControl. With ProView you can:

- Monitor system sensors
- Control equipment that are outputs on the ProControl
- Change the way the system operates
- View and change system setpoints, alarm levels, etc.
- Extract and review datalogged system information

In short, ProView can be used to remotely gain the same level of control over your operation as if you were at the site. Although many system parameters can be set with the ProControl's display and keypad (if included), ProView allows a more comprehensive, easy-to-access view into system operations.

In order for ProView to function, your PC must be connected to the ProControl unit. It can be connected in one of two ways. The first way is locally with a cable (provided with your ProControl system) that connects your PC's serial port with the ProControl unit. This method of connection is most often used at the system site using a laptop PC. The second method is remotely via dial-up modem, Ethernet connection, or cellular data connection (depending on your unit) from your office or from anywhere that a connection to the telephone system (for dial-up systems) or internet (for Ethernet and cellular data systems) can be established.



You should be familiar with the operation of the ProControl unit and have read the ProControl User Manual before using ProView.

System Requirements

COMPUTER: You will need a PC or compatible with Microsoft Windows XP or later. A minimum of 10MB of Hard Disk space needs to be available. A mouse or similar pointing device is also required.



Several functions in ProView require the use of the right mouse button. Make sure the right mouse button is not assigned to some other function such as double-click. See your mouse driver software for details.

MODEM (for dial-up connections): You need a Hayes compatible (AT) Modem that supports a data rate of 9600 baud (this means almost any commonly-available modem). The modem can be external or internal. It must be assigned to COM Port 1, 2, 3 or 4.



*Some PCs have been supplied with so-called "WinModems" or "SoftModems", which are not true hardware modems and will **not** work with ProView for communication with a ProControl system. A true Hayes-compatible hardware modem is an inexpensive investment in reliable communications.*

SERIAL PORT REDIRECTOR (for Ethernet and cellular data connections): An Internet Protocol (IP) connection is used to connect to your ProControl unit, and IP is also used to provide outgoing email and text messaging capability for status and alarm reporting (please note that fax reporting is not available with this version). Third party software is required to create a virtual serial port (COM port 1, 2, 3, or 4) on your computer for connection to the static IP addess of the ProControl over the internet. Please refer to either the Ethernet or Cellular Data Quick Start Guide as applicable for more details.

How to Install ProView

1. Close **all** open programs before beginning the ProView installation procedure. Close any task bars for software packages like Microsoft Office that may be lurking at the edge of your screen. *If a ProView installation fails, it is almost always the result of having other programs open at the time of installation. Certain programs, when included in the Windows Startup group, may cause the ProView installation to fail, and must be removed temporarily from the Startup group prior to installing ProView.*

2. Go to our website at www.eosresearch.com, click on the ProView tab at the top, then under Downloads at the bottom of the page click on ProView_2.2xx.exe to download the executable to your computer (be sure to make note of the save location).

3. Go to the location of the saved file, double click on it to start the installation.

4. The ProView installation program will begin and will guide you through the rest of the installation process.

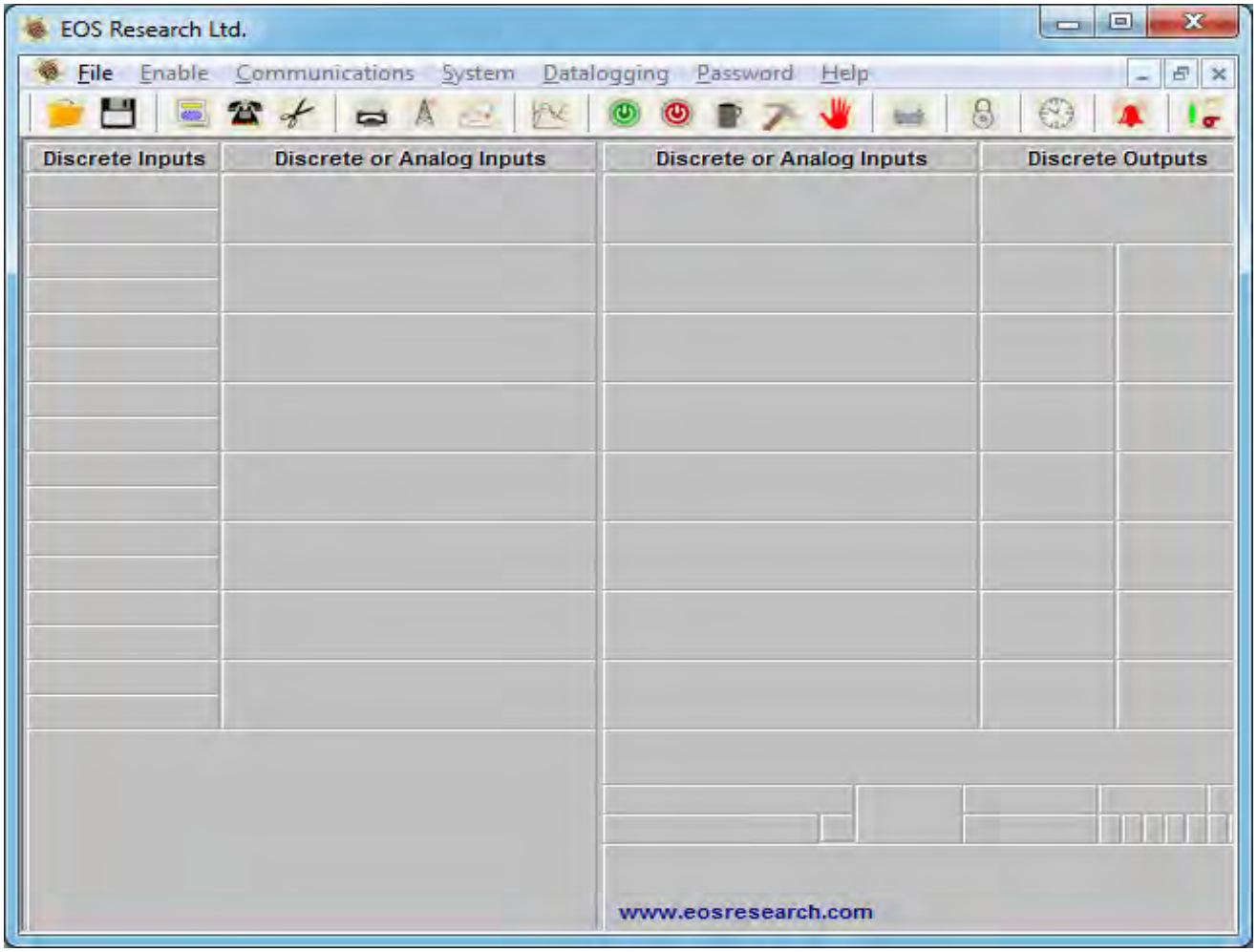
You will also be provided with configuration files (or ***site files***) for every ProControl unit you need to access. At a minimum, you will have a configuration file with a ".pvs" extension and one with a ".not" extension (these are normally supplied pre-configured for you by EOS or your system integrator). Using Windows Explorer, copy these site files to the folder in which your ProView software was installed for ease of access. Depending on your site configuration, you may have other files included along with the two standard site files. The files will have the extensions of .pid or .pvg. You must copy these files to the ProView folder as well.

When the installation is complete, you will see the ProView program group and icon. We recommend making a shortcut to ProView that you can then move to your Windows desktop. *Right*-click on the ProView turtle icon in the program group, then click on **Create Shortcut**. Drag your new shortcut to a prominent position on your Windows desktop.



Running ProView

After installing ProView as described above, double-click on the ProView icon. After an introduction screen, you will see the ProView Main screen.



The main screen contains a series of pull-down menus and a ***Toolbar*** that provides shortcut buttons for commonly-used commands. Placing the cursor over a Toolbar button and leaving it there for a short while produces a "balloon". A ***balloon*** is a small pop-up message that describes the action to be taken if the Toolbar button is "pushed".

Right now, since no site file has been loaded, the main screen is blank, and the toolbar is disabled. All menus except the **File** menu have been "ghosted". A selection is ghosted when the operation represented by the selection is unavailable.

Below the Toolbar are four columns of information arranged in a standard format. These columns are filled in based on the system setup and the current system status. The **Discrete Inputs** column contains information about the switches or sensors connected to inputs 1 through 16 on the ProControl unit. The two columns labeled **Discrete or Analog Inputs** contain information about the 4-20 milliamp (mA) sensors or discrete

switches connected to ProControl inputs 17 through 32 (examples include analog instruments such as flow meters or pressure transducers and digital devices such as float switches). The **Analog Outputs** area resides behind the third column, and is accessed by clicking on the **Discrete or Analog Inputs** label at the top of the column. The **Discrete Outputs** column contains information regarding the devices connected to the ProControl's output relays. The **Extended Outputs** area, behind the **Discrete Outputs** column, contains information regarding any outputs configured beyond the first 14, if available on the ProControl model you are using.

At the bottom of the screen are a series of information boxes. These show the status of certain important system parameters when ProView is connected to a ProControl unit.

A Word About Changing Settings

ProView has been designed to make it easy to view and change the settings that govern the way your system works. However, ProView must always be *connected* to the ProControl unit in order for these changes to take effect. It is important to remember that ProView itself is only a window into the operation of the ProControl unit. It does not provide any control functionality on its own. Chapter 3 discusses how to connect to the ProControl.

When a setting is changed in ProView (e.g., alarm level, password, datalog interval), a "?" is temporarily appended to the description or title of the information to indicate that the new value has been sent to the ProControl. When the "?" disappears, the data has been received by the ProControl and confirmed by ProView.

While many of the controls that change information in ProView are represented graphically, much of the information is displayed in text form. To edit text-based information, click on it and make your changes as you would in any Windows application. When you click on the text, it is highlighted to show that it has the current focus.



*After completing your text editing the changes must be saved by first pressing the **ENTER** key while the cursor is still within the text box being edited, and then clicking on the "OK" button for the current form.*

CHAPTER 2: GETTING STARTED

This chapter explains how to open a ProView site file, describes what's in all those little boxes on the screen, and shows you how to print the system configuration to a file.

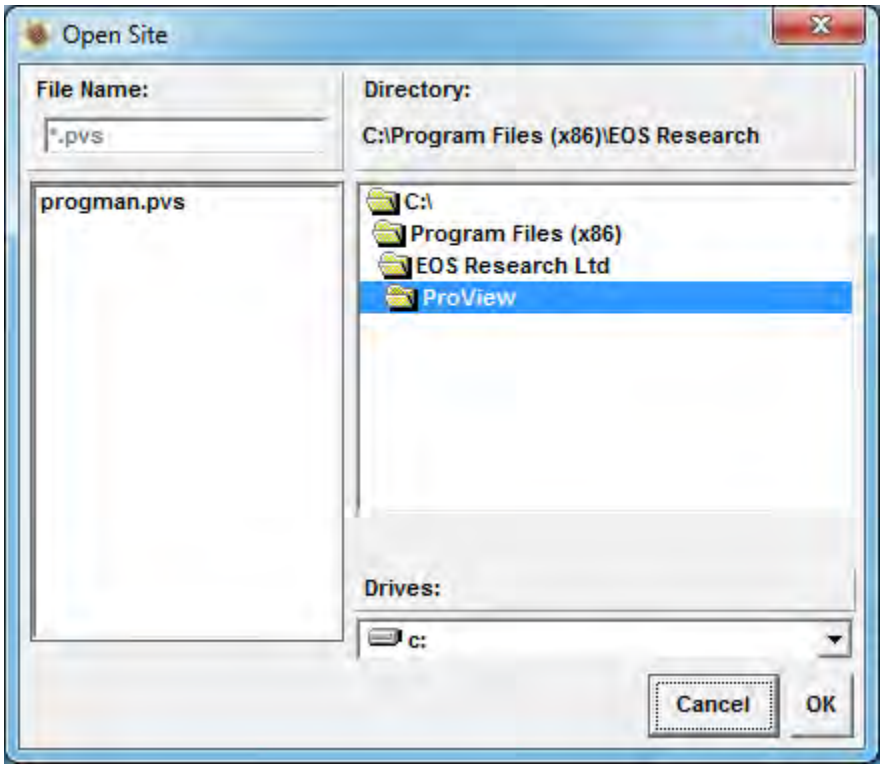
Opening a Site File

Every ProControl unit has a ***site file*** that tells the unit which inputs or outputs are enabled, what their descriptive ***Tagnames*** are and how they should respond to changes in input status. This same file is used by ProView to provide a window into what is going on within the remote ProControl unit and, by extension, with the site operation. To open a site file:

1. Click on the **File** menu, then click **Open Site**. You will see the **Open Site** dialog box. You can also use the ALT-Key combination represented by the first underlined character in the menu name. In this case, use ALT-F.



*For opening subsequent site files, you can use the **Open Site** Toolbar button at the top of the main screen. ProView will also list the last four site files that you accessed at the bottom of the **File** menu. If you wish to open one of these, just click on the appropriate file name.*



2. In the **Drives** area of the dialog box click once on the down arrow to pull down the Drives list, then click on the drive that contains the file you wish to open.

3. In the **Directory** area of the dialog box, click on the folder that contains the file. To move "up" in the directory tree, double-click on the level to which you want to move. To move "down" in the directory structure, double-click on the appropriate folder.

4. In the **File** area you will see all files in the selected drive and folder that have the extension **.pvs** or **.pvg**. Only files with these extensions can be opened. Select the file you wish to open by clicking on the file name in the file list box, then click the **OK** button to open the selected file.

The title bar of the main screen will change to include the file name and version number. The file name and version number are enclosed within brackets.

5. In the **Security** dialog box, enter the password for your site file, and click on the **OK** button or hit Enter.



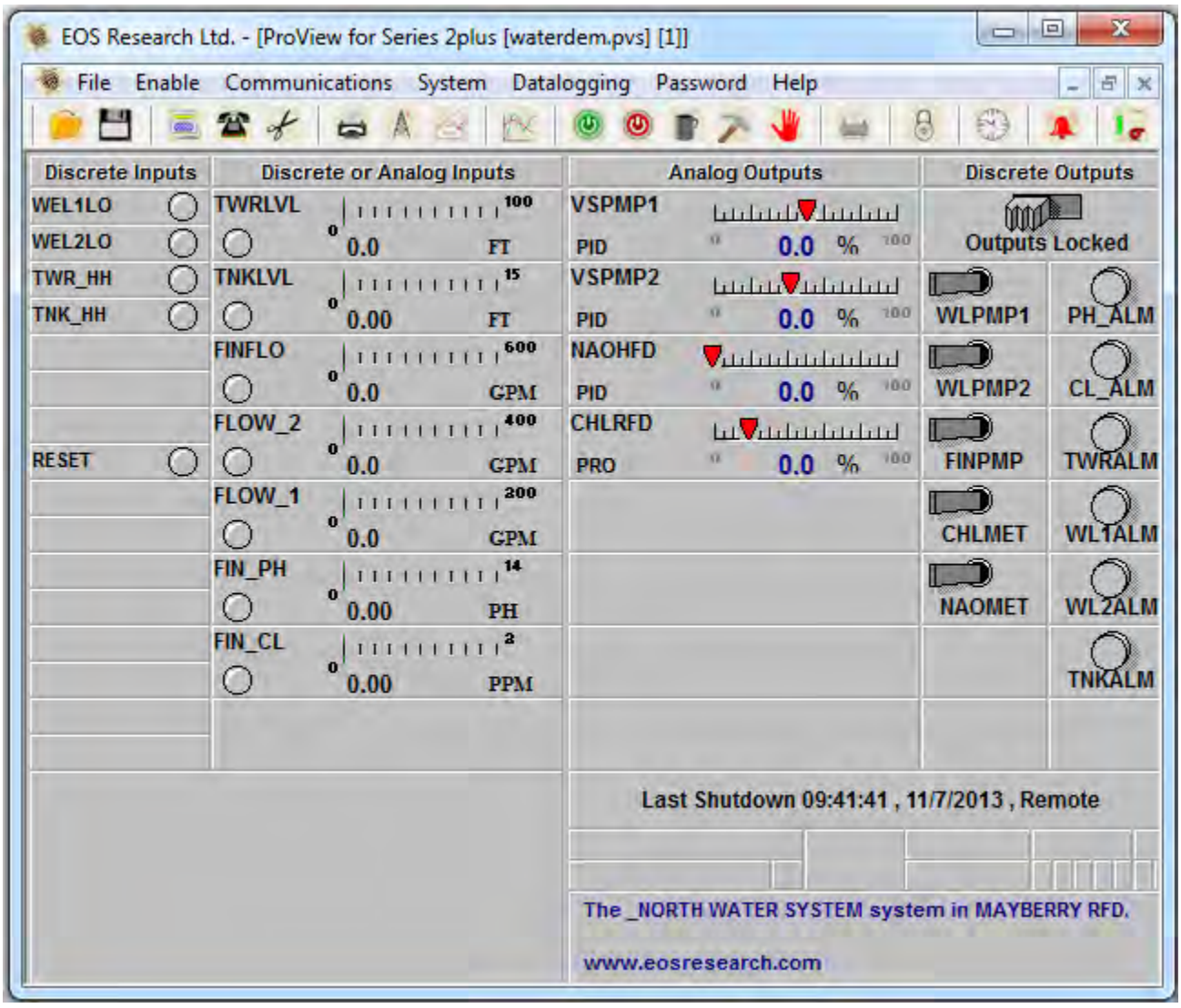
A word about passwords: *The password used in ProView can be different than the one used to access the ProControl unit through its on-board display. In either case the valid characters are 0-9 and A-Z, upper case only. Up to three characters are permitted. The password was designed as a low-level security feature sufficient to prevent inadvertent operation and to deter tampering. It is* ***NOT*** *sufficient in and of itself to withstand a* ***determined*** *effort at system entry. The default password is supplied to you with your ProControl unit by your system integrator.*

6. If the password is incorrect, the dialog box will disappear and a beep will sound. No system configuration information will be shown. You will need to select the **Password** menu and re-enter it.

7. If the password is correct, the **Security** dialog box will disappear and the system configuration information will be shown on the main screen.

FYI

ProView is supplied with a View-Only Mode password, "VOM", which may be used to connect to the ProControl to observe the system status and obtain logged data; however, no changes to any ProControl operating settings may be made when in this mode.



Examining the Main Screen

This particular site file shows five discrete inputs, seven analog inputs, eleven discrete outputs, and four analog outputs.

Discrete Inputs



On the left side of the screen below the heading **Discrete Inputs** are shown the tagnames of enabled discrete (or digital) inputs. To the right of the tagname is a virtual "LED". This LED's color or shape will change based on the status of the input. If a discrete input is "OFF", the LED next to the tagname is gray in color. If a discrete input is "ON", then the LED is green. If the discrete input is "ON" and has been set up as an alarm input the LED becomes a red "Alarm Bell". Some panels are blank because those inputs have not been enabled in this particular site configuration.

Analog Inputs



In the second column below the heading **Analog or Discrete Inputs** are shown the enabled analog inputs. Analog inputs can also be configured as simple discrete inputs. Below the tagname is another LED. This LED behaves in a similar fashion to those for discrete inputs; it is gray when the input is not "active", and green or red when it is in the active state (see the definition for Active State in the ProControl User Manual). A small bar graph provides a visual indication of the value of the analog input. At the left and right ends of the bar graph are numbers that represent the lower and upper limits, respectively, of the analog input values (corresponding to 4 and 20 mA). In this case FLOW_1 has been set up with a range of 0 to 200 GPM. Below the bar graph is a numerical representation of the current value of FLOW_1.

Discrete Outputs

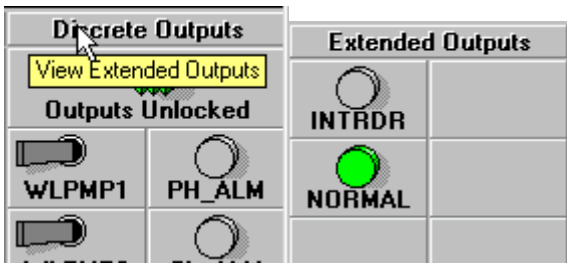


On the right side of the screen below the heading **Discrete Outputs** are shown the enabled discrete outputs, corresponding to the relay outputs in the ProControl. In this site configuration there are 11 outputs. Above the tagname of the output is either a virtual "Toggle Switch" or lamp/button representation. By its position and/or its color it shows the state of discrete output: if the switch is left-leaning and gray the output is "OFF"; if the switch is right-leaning and green then the output is "ON".



Discrete outputs can be configured as an alarm lamp or button when this would be more appropriate. If the lamp/button appears gray then the output is "OFF". If the lamp/button appears red or green then the output is "ON".

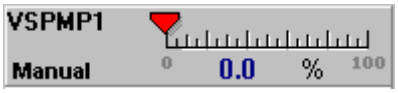
Your system may also have **Extended Outputs**, which are located on a panel behind the discrete outputs. To access these outputs, point your mouse at the words **Discrete Outputs** at the top of the column and click the left mouse button.



FYI

Regardless of what the discrete outputs look like in ProView, they all behave the same way on the ProControl itself – namely, the associated relay output is energized when the output is ON.

Analog Outputs



The third column contains the **Analog Outputs** area. It may be concealed by the second column of **Discrete or Analog Inputs**. To pull the analog outputs to the front, click on the title **Discrete or Analog Inputs** at the top of the third column of the ProView screen.

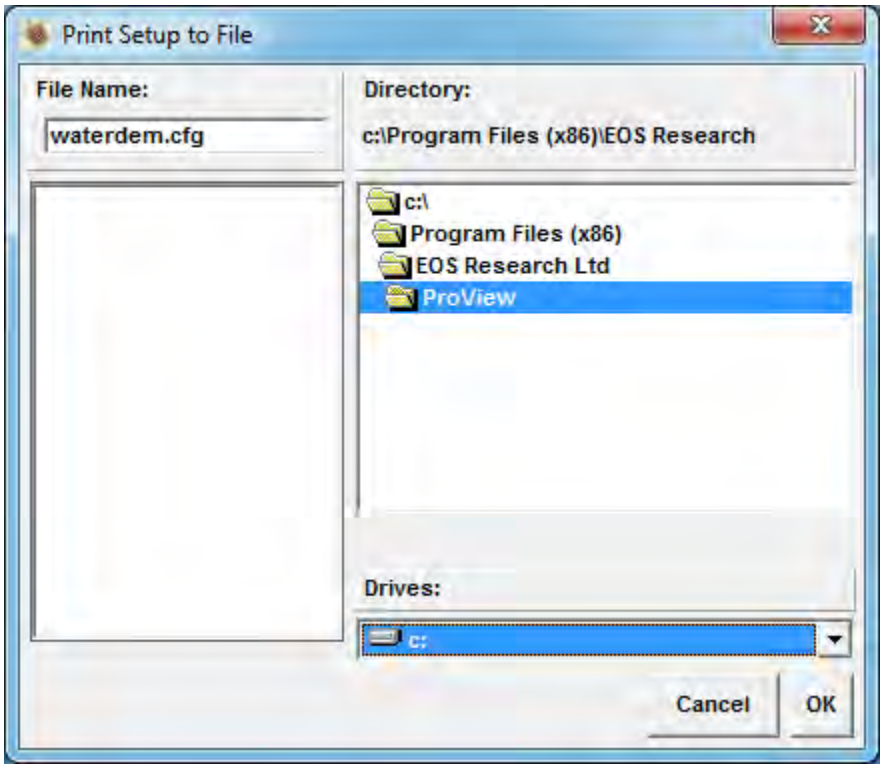
To the right of the tagname there is a slide-scale that indicates the current percentage of full-scale output (0% to 100%), displayed both graphically and with text. Below the tagname is the current mode of the output. This mode can be changed from **Manual**, which indicates the output is under user control, to **PID** or **PRO**, which would indicate that the output is involved in an output control scheme and is under automatic control. These output control schemes are described in Chapter 5 under Analog Output Options.

Printing the Setup to File

A more detailed listing of the site configuration can be made by printing the setup data to a text file. To print the setup, do the following:

1. Click on **Print Setup** in the **File** menu.
   Or
   Click on the Print Setup button. 

2. You will see the **Print Setup to File** dialog box.

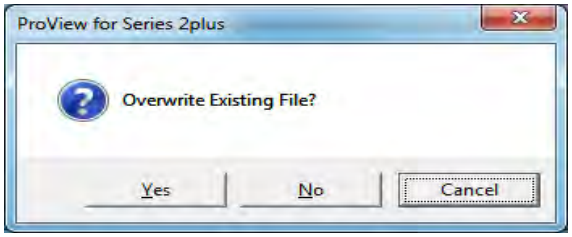


3. Specify the drive and folder in which the text file will be saved.

4. ProView will select a default file name for you, with the extension **.cfg**. However, you can give the file another name if you wish. You can also select an existing .cfg file name by clicking on the file name in the file list box.

5. Click on the OK button to print the setup to the selected file.

If you are overwriting an existing file, a message box pops up to make sure that you don't make a mistake.



A word about Files:
Do not confuse the site configuration file (.pvs), which is a binary file, with the printed setup file (.cfg), which is a text file. A text file can be viewed with a word processing program while a binary file typically cannot.

Examining the Setup File

To examine your site configuration file, use a text editor or word processor such as Notepad or Word to open the file you have just created.

The file produced by our sample site is shown below. The first section consists of identifying information about the ProControl unit and information about the inputs and outputs wired to it.

```
                    EOS RESEARCH LTD.
                  ProControl Series II+

              ProView Configuration File Information


*******************************************************
***** FAX Recipient:     BULLWINKLE MOOSE          *****
***** Customer:          MAYBERRY WATER DEPT       *****
***** Site Location:     MAYBERRY RFD              *****
*******************************************************
***** Setup:             1                         *****
***** Option:            B                         *****
***** Type:              122                       *****
***** Serial Number:     9999                      *****
***** Date:              12/03/2014                *****
***** Time:              15:20:11                  *****
***** ProView:           Version 2.200             *****
*******************************************************
```

THE INPUTS INCLUDED IN THIS SYSTEM ARE:

#	TAGNAME	TAGNAME DESCRIPTION	SETUP*	RANGE
1	WEL1LO	Well 1 Low Level	D,NO,AL	
2	WEL2LO	Well 2 Low Level	D,NO,AL	
3	TWR_HH	Water Tower High Alarm Level	D,NO,AL	
4	TNK_HH	Clearwell Tank High Alarm Level	D,NO,AL	
8	RESET	Reset Switch	D,NO,ST,SU	
17	TWRLVL	Water Tower Level	A,EP,ST	0-100 FT
18	TNKLVL	Clearwell Tank Water Level	A,EP,AL	0-15 FT
19	FINFLO	Finish Flow Rate	A,EP,ST	0-600 GPM
20	FLOW_2	Well 2 Flow Rate	A,EP,ST	0-400 GPM
21	FLOW_1	Well 1 Flow Rate	A,EP,ST	0-200 GPM
22	FIN_PH	Finish Water pH	A,EP,AL	0-14 PH
23	FIN_CL	Finish Water Chlorine Residual	A,EP,AL	0-2 PPM

*INPUT SETUP NOTES

D - This input is a (Discrete) or ON/OFF Input.
A - This input is a (Analog) or Variable Input.
C - This input is a Pulse Flowmeter Input.
P - This input is a Pulse Accumulator Input.
UPP - Units per Pulse. Number of units (i.e. Gallons) to record for each pulse
NO-This input is a (Normally Open) Discrete Input.
NC-This input is a (Normally Closed) Discrete Input.
EP-(Endpoint) This input is "Active" when its value is outside the low to high alarm levels.
WD-(Window) This input is "Active" when its value is between the low and high alarm levels.
ST-(Status) This input shows a green LED in ProView when it is in its Active State.
AL-(Alarm) This input shows a red alarm bell in ProView when it is in its Active State.
SU-(Startup) This is a menu function input. When activated it will run the startup routine.
SD-(Shutdown) This is a menu function input. When activated it will run an emergency shutdown.
MN-(Manual) This is a menu function input. When activated it place the unit in Manual Mode.
AU-(Auto) This is a menu function input. When activated it place the unit in Auto Mode.
SQ-(Square Root) This analog channel's reading is proportional to the square root of the input.
LT-(Lamp Test)This is a Lamp Test input. When activated it will turn on all Alarm Light outputs.

THE DISCRETE OUTPUTS INCLUDED IN THIS SYSTEM ARE:

#	TAGNAME	TAGNAME DESCRIPTION	SETUP*
1	WLPMP1	Well 1 Pump	
2	WLPMP2	Well 2 Pump	
3	FINPMP	Finish Water Pump	
4	CHLMET	Chlorine Metering Pump	
5	NAOMET	Sodium Hydroxide Metering Pump	
8	PH_ALM	pH Alarm	AI
9	CL_ALM	Chlorine Alarm	AI
10	TWRALM	Water Tower High Alarm	AI
11	WL1ALM	Well 1 Low Level Alarm	AI
12	WL2ALM	Well 2 Low Level Alarm	AI
13	TNKALM	Clearwell Tank High Level Alarm	AI

*OUTPUT SETUP NOTES

G1-(Group 1)- This output will not respond to processes 17-32.
G2-(Group 2)- This output will not respond to processes 01-16.
LT-(Lamp Test) - This output has been declared as an alarm light.
AI-(Alternate Image) - This output is displayed as an icon other than the default switch.

```
THE ANALOG OUTPUTS INCLUDED IN THIS SYSTEM ARE:

#  TAGNAME                TAGNAME DESCRIPTION                    SETUP*   INPUT
-- ------- ------------------------------------------------- ---------- ------
1  VSPMP1  Variable Speed Drive for Finish Water Pump         PID,FOR    TWRLVL
2  VSPMP2  Variable Speed Drive for Well 2 Pump               PID,FOR    TNKLVL
3  NAOHFD  Caustic Soda Feed Rate                             PID,FOR    FIN_PH
4  CHLRFD  Chlorine Feed Rate                                 PRO,FOR    FLOW_2

*ANALOG OUTPUT SETUP NOTES
--------------------------
PID  -This output is involved in a PID (Proportional,Integral,Derivative) control loop.
PRO  -This output is involved in an open (Proportional) control loop.
FOR  -The PID or PRO loop will run in the (Forward) direction.
REV  -The PID or PRO loop will run in the (Reverse) direction.
INPUT-This Tagname will serve as the input to the control loop.
```

Input and Output Configuration

The INPUTS section identifies all enabled system inputs from 1 to 32 and describes how they are configured. the input number is followed by its TAGNAME and the TAGNAME DESCRIPTION, which is taken from the Notes file (more on that in Chapter 5). In addition, a SETUP section further identifies each input in terms of its signal nature, analog (A) or discrete (D); its configuration if discrete as Normally Open (NO) or Normally Closed (NC); and its alarm display nature when active, Alarm (AL) or Status (ST). Discrete Inputs can also be configured as functions such as Startup (SU) or Emergency Shutdown (SD), and can be used as a lamp tester (LT) which will illuminate any Discrete Outputs that are configured as lamps. A RANGE is specified for all Analog Inputs as well as the Active State region, denoted Endpoint (EP) or Window (WD).



See the ProControl User Manual for a further explanation of Normally Open, Normally Closed, and related terminology and a description of Endpoint and Window Active States.

The DISCRETE OUTPUTS section is similar except that there are some different SETUP codes. Some outputs may be assigned to groups (G1,G2) that affect the way they are viewed by the process tasks. Outputs which display an Alternate Image (lamp image) than the standard switch image are designated AI.

The ANALOG OUTPUTS section details the setup of any enabled 4-20 mA output loops. The SETUP codes PID and PRO indicate whether or not the output is involved in one of two analog output control schemes known as PID loops or open loop Proportional control. The direction of the analog output control scheme is indicated by forward (FOR) or reverse (REV). The input that provides the reference signal upon which the analog output scheme is based is designated under the INPUT heading.



For a further explanation of PID or open loop Proportional control please see the Analog Output Options section in Chapter 5.

In this particular setup, TWRLVL is the input to the PID control loop that operates on the variable speed pump VSPMP1, with VSPMP1 maintaining a "setpoint" for the value of TWRLVL. The chlorine feed rate CHLRFD will be varied in proportion to the flow rate FLOW_2 under open loop proportional control.

Process Tasks

The next section of the setup file is a listing of PROCESS CONTROL TASKS. These determine how the ProControl unit responds to input changes while in Auto, Startup or Shutdown modes. It is important to note that the ProView software does not take any independent action itself. All automated control decisions are made by the ProControl unit, although you can change many operating parameters via ProView.

```
THE PROCESS CONTROL TASKS EXERCISED BY THIS SYSTEM ARE:

Process 01: If WEL1LO is ON
            THEN Delay for 2 Seconds, Send Report[FAX #1;Page #1],
            Switch WLPMP1 OFF
            Page Message: 'Well 1 Low Level Mayberry North '

Process 02: If WLPMP1 is OFF AND PH_ALM is OFF AND
               CL_ALM is OFF AND TWRALM is OFF AND TNKALM is OFF
            THEN Delay for 30 Seconds, Switch WLPMP1 ON

Process 03: If FIN_PH is High
            THEN Delay for 5 Seconds, Switch NAOMET OFF AND PH_ALM ON

Process 04: If FIN_CL is High
            THEN Delay for 5 Seconds, Switch CHLMET OFF AND CL_ALM ON

Process 05: If TWR_HH is ON
            THEN Delay for 2 Seconds, Send Report[FAX #1;FAX #2;Page #1;Page #2],
            Initiate Shutdown, Switch TWRALM ON
            Page Message: 'Tower's about to overflow, Bullwinkle - COME OUT NOW! '

Process 06: If TNK_HH is ON
            THEN Delay for 2 Seconds, Send Report[FAX #1;FAX #2;Page #1;Page #2],
            Switch TNKALM ON
            Page Message: 'Clearwell Tank High Mayberry North '

Process 07: If TWRLVL is High
            THEN Delay for 5 Seconds, Switch TWRALM ON

Process 08: If TWRLVL is NOT High or Low
            THEN Delay for 5 Seconds, Switch TWRALM OFF

Process 09: If TNKLVL is High
            THEN Delay for 5 Seconds, Switch TNKALM ON

Process 10: If TNKLVL is NOT High or Low
            THEN Delay for 5 Seconds, Switch TNKALM OFF

Process 11: If FIN_PH is High or Low
            THEN Delay for 5 Seconds, Send Report[FAX #1;Page #1],
            Switch PH_ALM ON
            Page Message: 'Finish Water pH Alarm Mayberry North '

Process 12: If FIN_PH is NOT High or Low
            THEN Delay for 5 Seconds, Switch NAOMET ON AND PH_ALM OFF

Process 13: If FIN_CL is High or Low
            THEN Delay for 5 Seconds, Send Report[FAX #1;FAX #2;Page #1;Page #2],
            Switch CL_ALM ON
            Page Message: 'Finish Water Chlorine Alarm Mayberry North '

Process 14: If FIN_CL is NOT High or Low
            THEN Delay for 5 Seconds, Switch CHLMET ON AND CL_ALM OFF

Startup 01: Switch WLPMP1 ON AND PH_ALM OFF AND CL_ALM OFF AND TWRALM OFF AND WL1ALM OFF AND
WL2ALM OFF AND TNKALM OFF
```

```
Startup 02: Delay for 2 Seconds, Switch WLPMP2 ON

Startup 03: Delay for 2 Seconds, Switch FINPMP ON

Startup 04: Delay for 5 Seconds, Switch CHLMET ON AND NAOMET ON


Shutdown 01: Switch CHLMET OFF AND NAOMET OFF

Shutdown 02: Delay for 2 Seconds, Switch WLPMP1 OFF AND WLPMP2 OFF

Shutdown 03: Delay for 2 Seconds, Switch FINPMP OFF
```

This sample configuration has a fairly straightforward process flow. On startup, some of the system outputs are switched on sequentially and all alarm indicators are switched off. On shutdown, all pump outputs and chemical metering devices are turned off. The process tasks are mostly self-explanatory. Some process tasks include fax and pager reporting functions. It is important to remember how and when the process tasks are run:

- Process tasks are run continuously while the ProControl unit is in AUTO mode. Process control tasks are ***event-driven***, i.e., they occur once when the "IF…" conditions are true (subject to any delays). No automatic action is taken in MANUAL mode.

- Startup and Shutdown processes are run in sequence. When the Startup sequence is finished, the unit is placed in AUTO mode and the **Process Tasks** are run. If any Startup process in the sequence fails, then all the non-lamp outputs are turned "OFF" and the unit reverts to MANUAL mode. A Startup process fails when any IF condition is not satisfied for 60 seconds after the Startup process begins (there may not be any IF conditions in your Startup sequence). The Startup sequence begins when the ProControl or ProView operator initiates it. The Startup sequence can also begin when power is first applied to the ProControl unit if the "Auto Startup" option has been enabled.

- The Shutdown sequence works in a similar manner. When the Shutdown sequence is finished, the ProControl unit reverts to MANUAL mode. If any Shutdown process in the sequence fails (is not run after 60 seconds), then all the non-lamp outputs are immediately turned "OFF" and the unit reverts to MANUAL mode. The Shutdown sequence can be initiated either by the ProControl or ProView operator or by a process task (Process 5 does this in our example).

Process Capability

The ProControl runs process tasks which are based on Boolean IF ___ AND ___ THEN ___ logic. There are 64 available processes, 16 of which can be used as part of a startup sequence, and 16 of which can be used as part of a shutdown sequence. Each process can:

- be based on several, simultaneously existing I/O conditions
- include short or long delays for de-bouncing or simple time delay
- use memory variables (registers) for linking processes
- cycle outputs with timers or during certain times of the day
- perform system shutdowns
- send reports to fax and/or pagers

FYI

If you wish to modify the ProControl programming, please contact your Control System Integrator for assistance.

CHAPTER 3: ESTABLISHING COMMUNICATION

This chapter explains how to connect to the ProControl unit using ProView by local serial cable and by remote modem.

By itself, ProView does not reveal very much about your site's operation. It must be connected to the ProControl unit in order to yield any data.

On-Site Local Connection

To establish a local connection to a ProControl equipped with serial port, perform the following:

1. Use the local serial cable supplied with the ProControl to connect the computer you are using to a ProControl unit. One end of the cable terminates with a female 9-pin connector. Use this end to plug into the serial port or USB-to-Serial adapter on your computer. The other end of the serial cable is terminated with a 9-pin RJ-45 connector. Use this connector to plug into the "RS-232/Serial" port on the right hand side of the ProControl unit.



*Be sure to disconnect the serial cable from the ProControl unit after you are finished. If you do not, remote communications and alarm reporting will **not** be possible.*



If the ProControl unit is powered OFF for any reason, wait 45 seconds after power up (3 minutes for a cellular data unit) before plugging in the cable to attempt a local connection. Otherwise, the ProControl's modem may not be properly configured.



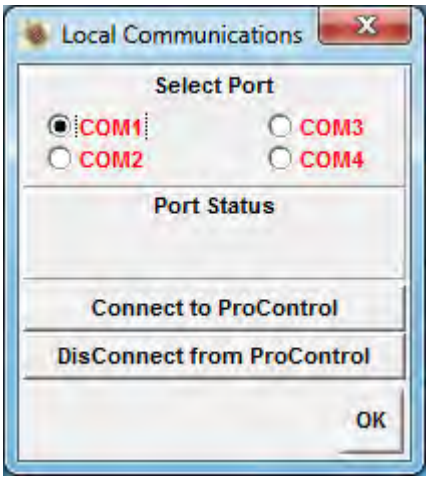
If you have a ProControl unit with Ethernet communications, consult the Ethernet Quick Start Guide for local connection information.

2. Click on **Local Connection** in the **Communications** menu. You can also use ALT-C.

Or

Click on the **Local Connection** toolbar button. 

You will see the **Local Communications** dialog box.



3. Select the COM port to which the ProControl is connected by clicking on the "radio button" next to the COM port you want to use. COM ports 1 through 4 are supported.

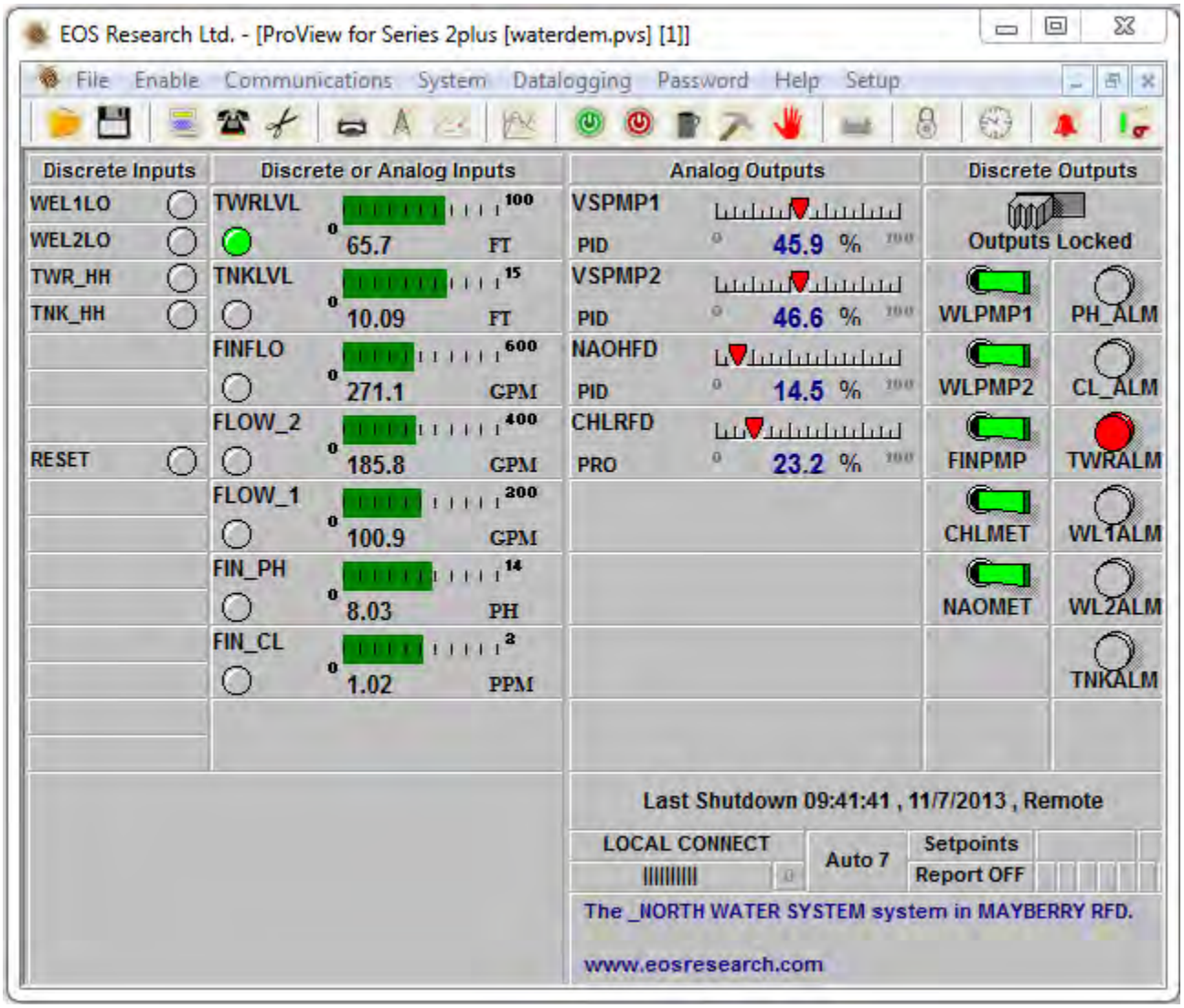
4. Click on the **Connect to ProControl** button.

5. You will see status messages in both the **Port Status** area of the **Local Communications** dialog box and in a small information box near the bottom of the main screen. Usually you will see "Trying Local..." followed by "LOCAL CONNECT" if the attempt is successful. If the attempt is unsuccessful you will see message boxes outlining the suspected problem.

6. After connecting, click on the **OK** button to hide the **Local Communications** dialog box.

After establishing a local connection, ProView will perform an initial scan of site conditions. This will take a few moments during which time the mouse pointer will turn into an hourglass. After the initial scan, data will be updated on the screen every second or so.

Here is a view of the main screen after a local connection has been established:



Note that the screen has been updated to reflect the current operating conditions at the site. At the bottom of the screen, various message panels have been filled in as well.

Dial-Up Remote Connection

For a dial-up remote connection, the procedure is a little different. Follow these steps:

1. Make sure that your modem has been installed properly and that the phone line is plugged in to the proper port on the modem.

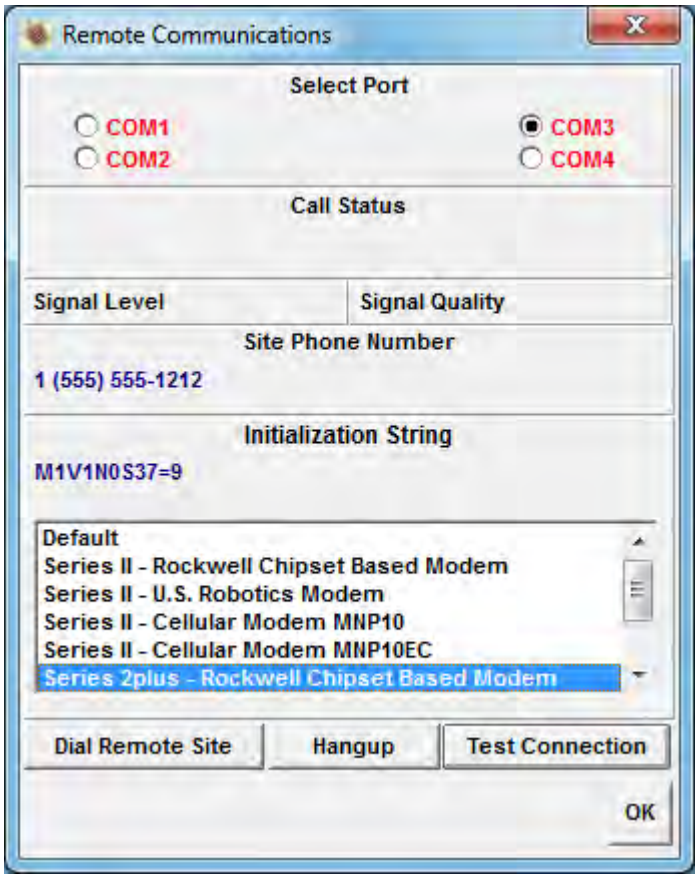
Your modem must be Hayes (AT) compatible and capable of operation at 9600 baud.

2. Click on **Remote Connection** in the **Communications** menu.

Or

Click on the **Remote Connection** toolbar button.

You will see the **Remote Communications** dialog box.



3. Select the COM port to which your modem is connected by clicking on the "radio button" next to the COM port you want to use. COM ports 1 through 4 are supported.

4. Check to see that the **Site Phone Number** is the one you want to dial. If not, click on the phone number and change it. If you need to dial an 8, 9 or some other prefix first to get an outside line, add a comma or two after the prefix to obtain a pause before dialing the main number (e.g., 8,555-1212). Do not add parentheses or dashes.

5. Examine the **Initialization String** to see if it is correct for your type of modem. For Series 2^{plus} systems, you will usually use the **Initialization String** for Rockwell Chipset or U.S. Robotics modems. If these do not work, use the Default string instead.

6. Click on the **Dial Remote Site** button.

7. You will see status messages in both the **Call Status** area of the **Remote Communications** dialog box and in the lower portion of the main screen. Usually you will see the following messages:

Trying Remote...	ProView is attempting to contact your PC's modem
OK	ProView has successfully connected to the modem
Setup...	ProView is sending the initialization string to the modem
Dialing...	ProView is dialing the site phone number
CONNECT 9600	Connection has been established with the remote modem
REMOTE CONNECT	Connection has been established with the remote ProControl unit

8. If the attempt is unsuccessful you will see message boxes outlining the suspected problem.

9. After connecting, click on the **OK** button to hide the **Remote Communications** dialog box.

Cellular Data Connection

For a cellular data connection, please see the instructions in the current version of the Cellular Data QuickStart Guide.

Ethernet Connection

For an Ethernet data connection, please see the instructions in the current version of the Ethernet Quick Start Guide.

Ending a Connection

The simplest way to end a connection, to hang up in essence, is to click on the **Disconnect** button on the Toolbar.  This works for either a local or remote connection.

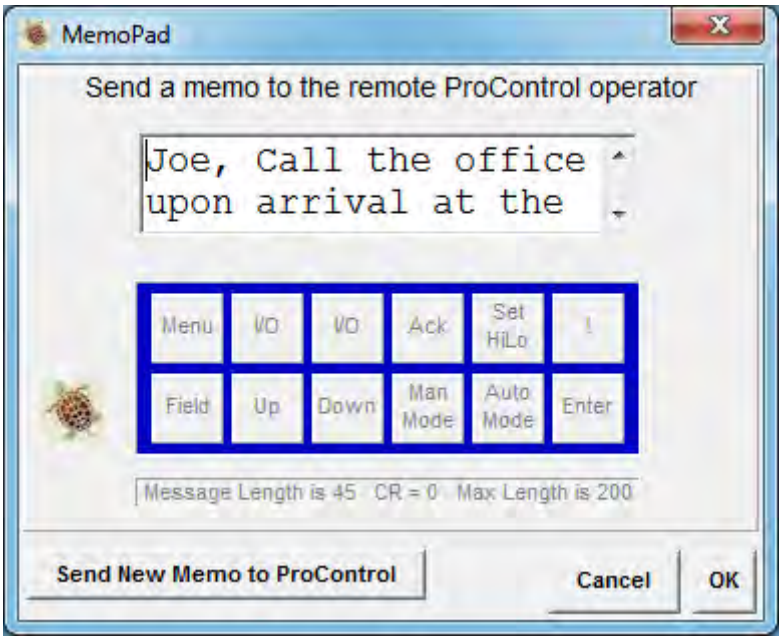
Alternatively, you can re-open the **Local** or **Remote Communications** dialog box and click on either the **Disconnect from ProControl** button (Local) or the **Hangup** button (Remote). After ending the connection, you should see **NOT CONNECTED** in a message box near the bottom of the screen. 

Sending a Memo

A useful feature of the ProControl is the ability to transmit short memos to a site operator. From ProView, you can send a message of up to 160 characters to the display of the ProControl unit. The site operator must acknowledge your memo before returning to his normal display. This feature may be useful in communicating with a person at the remote site.

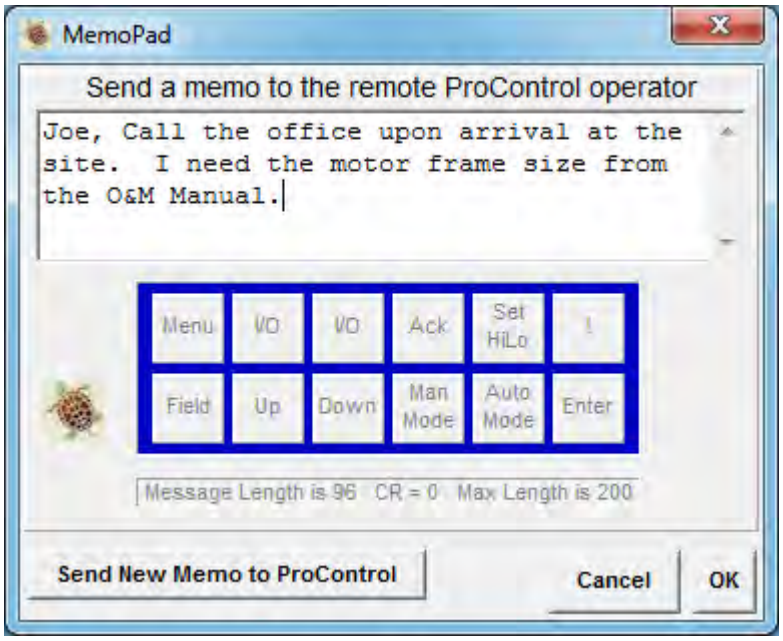
To send a memo, follow these steps:

1. From the **Communications** menu, select **Send Memo**.



2. Type your memo onto the screen of the **MemoPad**. It will appear on the ProControl's display exactly as it appears to you on the MemoPad, two lines at a time. Words will automatically wrap around to the next line, but you may hit Enter (Carriage Return or CR) to jump to the next line if necessary. However, the fewer <CR> characters you use, the longer the text message you can type, since each <CR> represents 20 characters. The **Message Length** counter will keep track of the number of characters you have used. The **Max Length** counter will decrease to let you know how many more characters can be entered.

3. By clicking the right mouse button when the pointer is over the text window, the text window will become larger, allowing you to view more text without having to scroll up and down.



4. Click the **Send New Memo to ProControl** button to send the memo to the ProControl's display, **OK** to temporarily save the memo but not transmit it, or **Cancel** to abort the entire procedure.

5. The **Ack** button on the MemoPad will flash red and your PC will beep to indicate when the ProControl operator has acknowledged your memo.

CHAPTER 4: MANAGING YOUR SITE

This chapter explains how to change the way your ProControl system operates by switching between Manual and Automatic modes, initiating a startup or shutdown sequence, and changing other general system settings.

Switching Between System Modes

There are four modes of operation for the ProControl: Manual, Automatic, Startup and Shutdown. To initiate a switch to a different mode, simply click on the appropriate Toolbar button  or click on **Process Operations** in the **System** menu.

Goto AUTO Mode:  Clicking on the coffee cup will place the ProControl into Automatic mode.

Goto MANUAL Mode:  Clicking on the hammer will place the ProControl into Manual mode.

STARTUP System:  Clicking on the green "power button" causes the ProControl to initiate a Startup sequence.

SHUTDOWN System:  Clicking on the red "power down" button causes the ProControl to initiate a Shutdown sequence.

Emergency OFF:  Clicking on the red hand will cause an Emergency Shutdown, which turns off all outputs immediately and places the ProControl in Manual mode.



*Be sure you understand the safety risks and other implications of issuing these commands. When the icons are clicked, the actions are **immediate** and equipment may start up or shut down automatically. **Most importantly, switching the ProControl to Manual mode will defeat any safeguards programmed into the system and allow equipment to continue running without any process control.** Manual mode should only be used on a short-term basis for system troubleshooting or clearing alarm conditions, preferably with de-powered equipment circuits.*

You can monitor the current system mode by looking at the message panel at the bottom of the main screen.



The system is currently in Manual mode.



The system is currently in Auto mode.

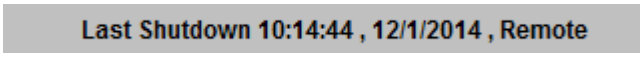


The system is currently in Startup mode, the last startup task run was startup task #2.



The system is currently in Shutdown mode, the last shutdown task run was shutdown task #2.

The last action to initiate a Shutdown is listed in another message panel at the bottom of the screen. In the example below, the shutdown was initiated by a remote user.



System Operations

Following are several other operational parameters that can be set by ProView.

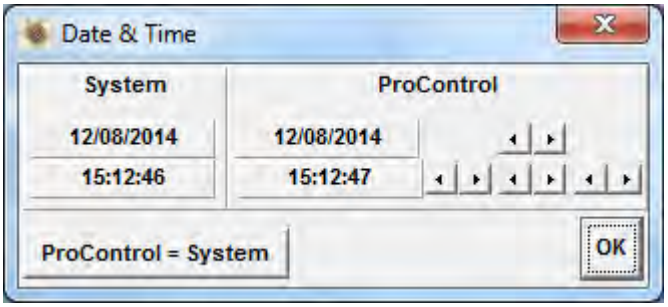
Date & Time

The ProControl unit maintains an internal real-time clock which it uses to time-stamp datalogged information and control other important system functions. To set the **Date & Time**:

1. Click on the **System Time** toolbar button. 

   Or

   Choose **System Operations** from the **System** menu and click **System Time**. You will see the **Date & Time** dialog box.



2. The left side of the dialog box displays the current date and time kept on your PC. The right side of the dialog box is the date and time according to the ProControl unit. Follow the procedure outlined below if you need to change the time.

3. To set the ProControl's clock equal to the PC's clock click on the **ProControl = System** button. To set the ProControl's clock to a specific time use the time spinners  . The upper spinner changes the date and lower set of three spinners change the hour, minute and second (left to right, respectively).

4. To set your PC's time (System time) use the Windows Control Panel.

FYI

Daylight Savings Time is not supported by the ProControl's clock. You will need to make any necessary changes manually.

Changing the time by a large amount can lead to discontinuities in the datalogging history of your ProControl unit, particularly if you move the ProControl's time forward. See the section on Datalogging Setup in Chapter 5 to check on your system's datalogging status.

Alarms

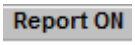
An alarm is only an **audible** indication to the operator that an input signal is in its ***active state***. On the ProControl unit, the beeper sounds if the **Alarms** are **Set**, the unit is in Manual mode and an input is in the active state. The Alarm continues to sound until it either is acknowledged by the operator or times out by itself. In ProView, a "Beep" sounds from the PC if the **Alarms** are **Set**, and an input that has been configured as an **Alarm Input** enters the active state. No acknowledgment is necessary.

The current status of the alarm feature is displayed in a message box at the bottom of the main screen. To enable or disable Alarms, click on the **Alarms** toolbar button,  which toggles this feature on and off.

Or

Click on **Set Alarms** in the **Enable** menu.

Remote Reporting

A report can be a fax or a pager message (for dial-up units) or an email or text message (for cellular data and Ethernet units) sent by the ProControl. In order for any reporting to occur, **Remote Reporting** must be enabled. The current status of the reporting feature is indicated in a message box at the bottom of the main screen. 

To enable or disable remote reporting, click on **Remote Reporting** under the **Enable** menu. A check mark is displayed if reporting is enabled.

Log Off Remote User

This function is used occasionally to reset the remote ProControl's display to the password menu. It is often used to ensure that an on-site user does not change any ProControl settings while you are remotely connected, and to ensure that password protection is restored if the last user did not Log Off locally.

To Log Off the remote user, choose **System Operations** from the **Systems** menu, and click on **Log Off Remote User**.

Initiate FAX NOW!

This function is the equivalent of pressing FAX NOW on the ProControl unit. It is used to generate and send a current fax status report to the currently enabled fax numbers. Fax reports must be enabled in the **FAX Report Setup** dialog box and ProView must be connected via modem (remotely) for this command to proceed.

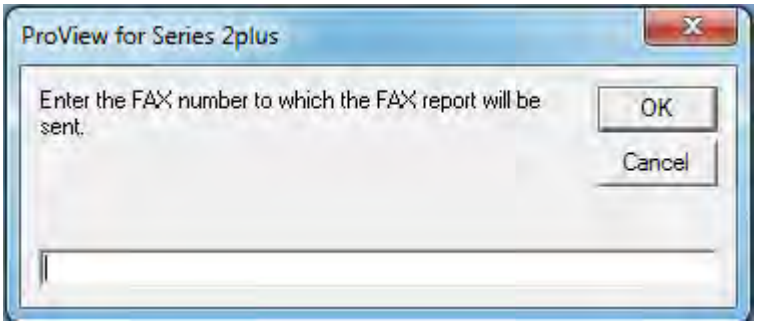
ProView will disconnect from the ProControl unit (hang up) after issuing this command to free the remote phone line for fax use. Normal FAX back operations and times will not be affected.

To initiate the fax, choose **System Operations** from the **Systems** menu, and click on **Initiate FAX NOW!**

Initiate New FAX NOW!

This function is identical to **Initiate FAX NOW!** except that you can specify a number that is not currently enabled to receive faxes from the ProControl. You can use this for testing the fax capabilities or to send a fax update to a third party.

To initiate the fax, choose **System Operations** from the **Systems** menu, and click on **Initiate New FAX NOW!**



ProView will alert you first that you will be disconnected from the system in order for the fax to proceed. Enter the FAX number to which the fax report will be sent, making sure you include a prefix or the numeral 1 and the area code, if necessary. Click the OK button to send the fax report.

CHAPTER 5: CHANGING SYSTEM PARAMETERS

This chapter explains how to change the settings that govern much of the operation of your system, such as the state of a discrete output, analog alarm levels and fax, text, email and datalogging setups.

Switching an Output State

The state of a discrete output can be changed manually by clicking on the "switch" associated with its tagname. ProView includes a "locking" feature for discrete outputs as a safety measure to prevent inadvertent output changes; you must "unlock" the outputs in order to turn them on or off. The outputs are locked and unlocked by clicking on the "slide switch" at the top of the **Discrete Outputs** section of the main screen.





You should leave the slide switch in the **Locked** position whenever possible.

! *Bear in mind that if the ProControl unit is in Auto mode, any discrete output change you make may be "overridden" by a process control task. Do not turn outputs on or off unless you are familiar with the process control in effect for your system.*

1. 

To change the state of a discrete output, click on the toggle switch.

2. 

The toggle switch will change positions, and a "?" will appear for a moment after the tagname. This indicates that the command was sent to the ProControl unit but that confirmation of the state change has not yet been received.

3. 

The "?" will disappear after confirmation of the state change has been received from the ProControl unit.

Depending on your site configuration, you may be able to change certain parameters that affect how the discrete outputs in your system operate in Auto mode.

Process Groups

The ability to set a ***Process Group*** is a rarely-used feature that prevents an individual output from being switched by certain process tasks when in Auto mode. If your ProControl has been configured for Process Groups, you can switch between Group 1 (ignore processes 17 – 32) and Group 2 (ignore processes 1 – 16).

Do NOT enable process groups unless your ProControl has been configured specifically to use this feature! *Be sure you understand the safety risks and other implications of issuing these commands.*

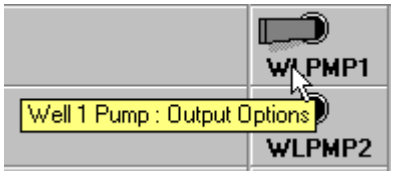
Output Cycle

Some of your outputs may have been configured as "Switched" outputs, where the output is turned on and off according to a timed cycle, or during a specific time of day.

Output Options

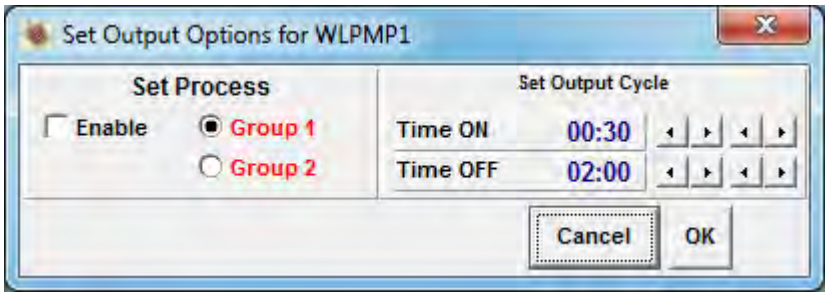
To change an output option, do the following:

1. Place your mouse pointer over the output's tagname until a balloon appears. Click the *right* mouse button until you see **Output Options**.



2. Click the *left* mouse button.

3. You will see the **Set Output Options** dialog box. The **Set Process** or **Set Output Cycle** panels may not be visible if those options do not apply. Both panels will be disabled if ProView is not connected to a ProControl unit.



4. To enable a Process Group click on the **Enable** check box and click either the **Group 1** or **Group 2** radio buttons in the **Set Process** panel. Once again, ***Do NOT enable process groups unless your ProControl has been configured specifically to use this feature!***

5. If the output has been configured to run in a switched mode, you will be able to change the **Output Cycle** times by clicking on the value you want to change and entering the new time in an **hours:minutes** format (be sure to hit Enter after you type in the new time). Alternatively, click on the up or down spinners to increase or decrease the time you want to change.

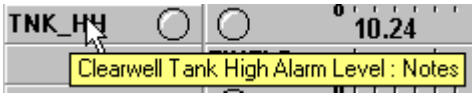
6. Click on the **OK** button to confirm the changes and send them to the ProControl unit. Click on **Cancel** to get rid of any changes.

Notes

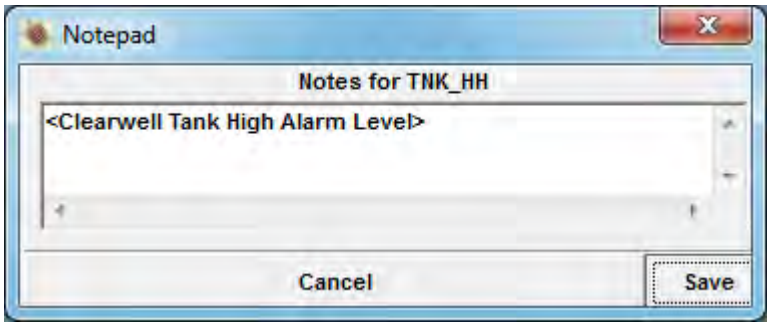
Each I/O point can have its own set of associated ***Notes***. The notes are stored on your PC in a file with a **.not** extension along with your **.pvs** file. You can attach notes that explain the functional purpose of the I/O point or define the I/O point in more detail. This can eliminate uncertainty that may result from the limitation of six characters in each point's tagname.

To edit an I/O point's notes do the following:

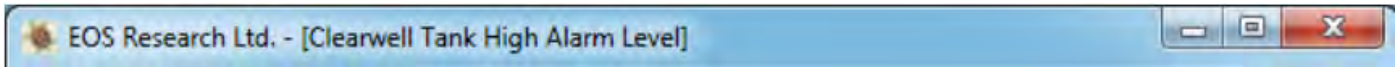
1. Position the mouse pointer over the I/O point's tagname until a balloon appears, and *right*-click until you see **Notes**.



2. Click the left mouse button to enter the "Notes" feature. The **Notepad** dialog box appears.



3. Click in the **Notes** window to edit or add descriptive text. Any notes enclosed in angle-brackets (i.e. <note>) will appear within the balloon when you position the mouse pointer over the tagname, and at the top of the main screen.



4. Click the **Save** button to save your notes and/or definitions or press **Cancel** to exit without saving. You must also save the site file before exiting ProView to retain any changes made in Notes.

FYI

Sometimes it is a good idea to provide a more complete description of what an input or output does in the Notes; e.g., "Causes System Shutdown" or "Turns ON when Tank is Full". Feel free to customize the notes to suit your purposes; they are stored locally on your PC and do not affect the operation of the ProControl itself.

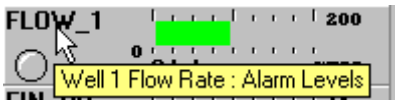
Analog Alarm Levels

The analog alarm levels define what parts of an analog input's range are considered "active" and which are not. This affects not only the color of LED's and bar graphs on the main screen but also can affect process control if the analog input is used in a process task. Depending on how your system has been configured, you

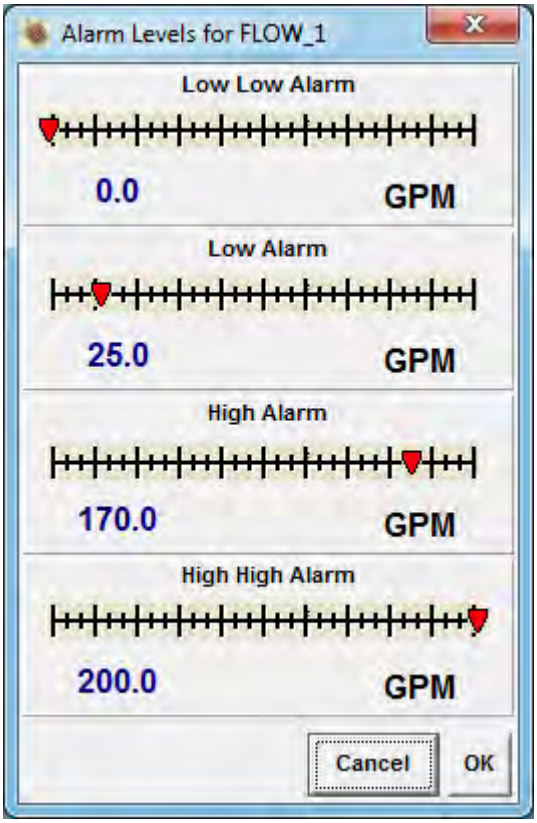
will be able to set up to four "activation levels" that define when an input becomes active. Some ProControl configurations allow you to set a ***Low Alarm Limit*** and a ***High Alarm Limit***, while others allow you to additionally define a ***Low-Low Alarm Limit*** and a ***High-High Alarm Limit***. These activation levels are somewhat more flexible in use than their names imply, in that they are not only used to trigger alarms. If an alarm limit value is exceeded, it could be used to simply turn on a pump or reset a switch, for example.

To set an analog alarm level, do the following:

1. Position the mouse pointer over the I/O point's tagname until a balloon appears, *right*-click until you see **Alarm Levels**.

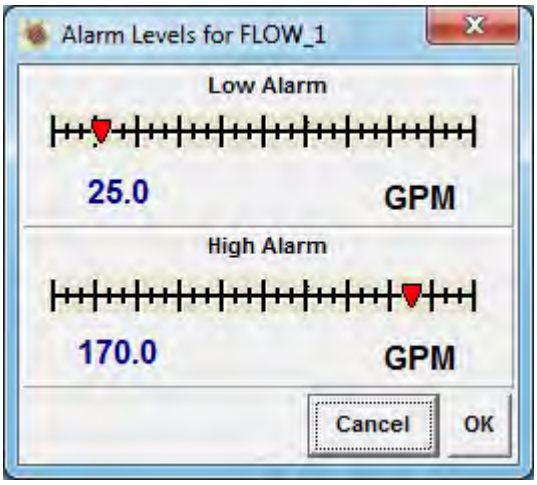


2. Left-click and the **Alarm Levels** dialog box appears.

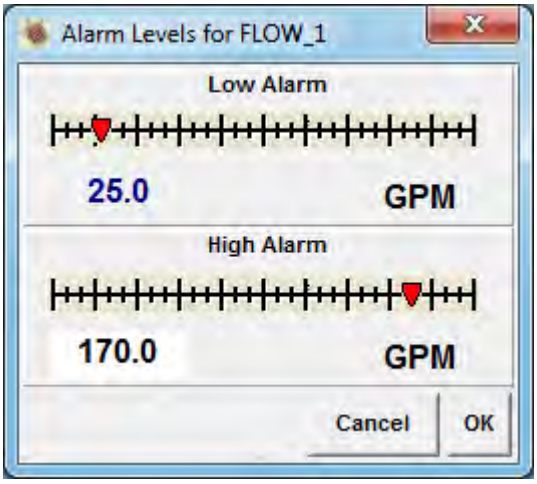


3. The present alarm levels are shown in text as well as in the position of the sliders. Note that the **High Alarm** value must be greater than the **Low Alarm** value, and the **High High Alarm** value must be greater than the **Low Low Alarm** value.

4. You may adjust the alarm values by clicking and holding a red slider and moving it to the left or right. As you move the slider the numeric value is updated to reflect the change you are making. The alarm level will be set to a new value when you release the mouse button.



5. Alternatively, you may click on the alarm level text and edit the value for the alarm level. This is usually a better way to input a precise value. Be sure to hit the Enter key to send the new value to the ProControl unit. Click on the **OK** button to hide the **Alarm Levels** dialog box.





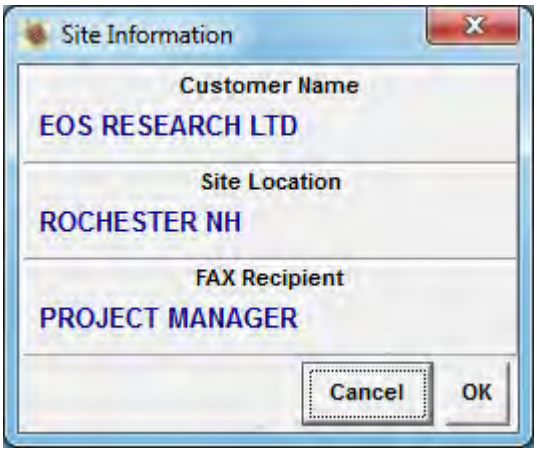
*Remember that any changes you make to the alarm levels are **immediate** and may impact the process control for your system. Be sure you understand the safety risks and other implications of issuing these commands.*

Site Information

Site Information refers to data used in the fax report and in the various files printed by ProView.

To view or change the Site Information do the following:

1. Click on **Site Information** in the **File** menu. The **Site Information** dialog box appears.



2. To change the **Customer Name**, **Site Location** or **FAX Recipient** click on the text you want to change and edit it. Only uppercase letters, numbers and blank spaces are allowed. The **Customer Name** field also appears on the main screen of the ProControl unit's display.

3. Click on the **OK** button to confirm the changes and send them to the ProControl unit. Click on **Cancel** to get rid of any changes.

FAX Report Setup

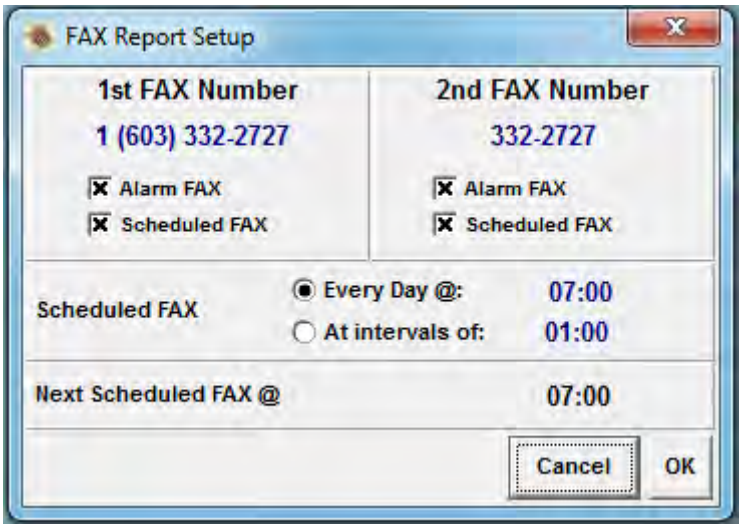
This setup screen is used to change when and where the ProControl's fax report is sent, and whether individual fax recipients are enabled (only applicable to dial-up ProControl units).

To view or change the FAX Report Setup, do the following:

1. Click on **FAX Report Setup** in the **Communications** menu.

Or

Click on the **FAX Report Setup** toolbar button.  You will see the **FAX Report Setup** dialog box.



2. If **Remote Reporting** is not enabled, the contents of the dialog box will appear "grayed out" or disabled.

3. The first and second FAX number panels determine what kinds of fax reports are sent by the ProControl unit and where they will be delivered. There are two kinds of fax reports generated by the ProControl. A **Scheduled FAX** report occurs on a regular basis to provide a status report, while an **Alarm FAX** report will be sent when issued by a Process Task that has been configured to do so (usually to report an alarm condition). To enable either type of fax report click on the **Alarm FAX** or **Scheduled FAX** check boxes. If you enable Scheduled FAX reports the Alarm FAX reports for that same number are automatically enabled as well. You cannot enable only Scheduled FAX reports.

4. To change the phone number to which the ProControl will fax reports click on the phone number and edit it. The ProControl can fax to two different phone numbers. It will make up to three attempts to send the fax. If the first try is unsuccessful, the second try will be initiated 5 minutes later, and a third attempt will be made 5 minutes after that. If the third try is unsuccessful the fax attempt will be abandoned and the ProControl will enter a fax failure into the Events log (see Chapter 6). The ProControl will try both phone numbers (if they are both enabled) on the first try before moving on to a second attempt.

5. In the **Scheduled FAX** panel, you can select when the regularly scheduled faxes are sent. Choose the **Every Day @** button and edit the time to the right of it to have a report sent at the same time every day (24-hour clock). To have a report sent at a specific time *interval*, choose the **At intervals of** button and enter the time interval in HH:MM format. When you hit Enter, the data will be sent to the ProControl unit.

6. The **Next Scheduled FAX** variable indicates when the next *scheduled* fax report will be sent. You can also change it yourself if, for instance, the ProControl is set to fax every hour but you would like it to skip a few hours before resuming. To set the **Next Scheduled FAX** time click on the time in that panel and enter the new time in 24 hour format. Note that if you enter a Next Scheduled FAX time that is earlier than the current time as determined by the ProControl's clock, you will prevent any scheduled faxes from being sent until the next day at that time.

7. Click on the **OK** button to confirm the changes and send them to the ProControl unit.

Texting/Paging Setup

This setup screen is used to change where the ProControl's alarm text or pager messages are sent, and whether individual recipients are enabled. Note that dial-up units require a modem access phone number for texting or paging - you will need to contact your paging/messaging service directly to obtain some of the information necessary for proper messaging setup. Cellular data and Ethernet units require the cell phone carrier's messaging web address (e.g., vtext.com for Verizon) in combination with the cell phone number. The texting/paging capability is similar to the ProControl's fax capability in that you can send information to two cell phones/pagers and it will make three attempts at reaching each number.



For dial-up units you will need to obtain your pager company's modem dial-up phone number and your pager's modem dial-up ID (this is often different than your regular pager ID). This information is generally not available from the customer service staff at the pager company. You may need to ask for someone in technical support who is familiar with TAP modem dial-up.

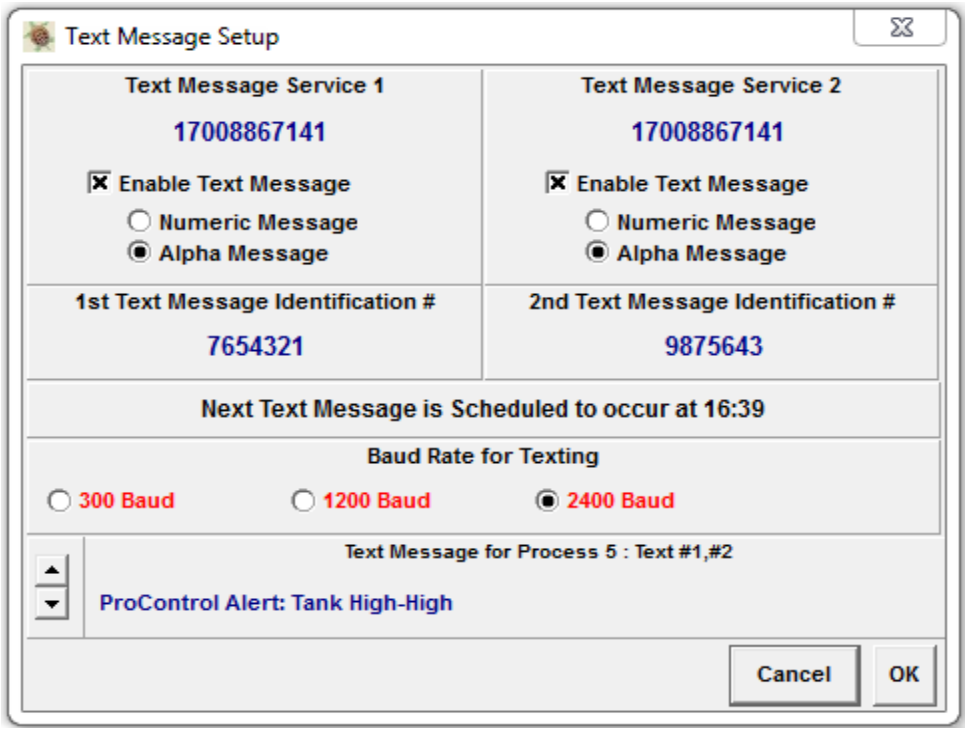
To view or change the texting/paging setup, do the following:

1. Click on **Text Message Setup** in the **Communications** menu.

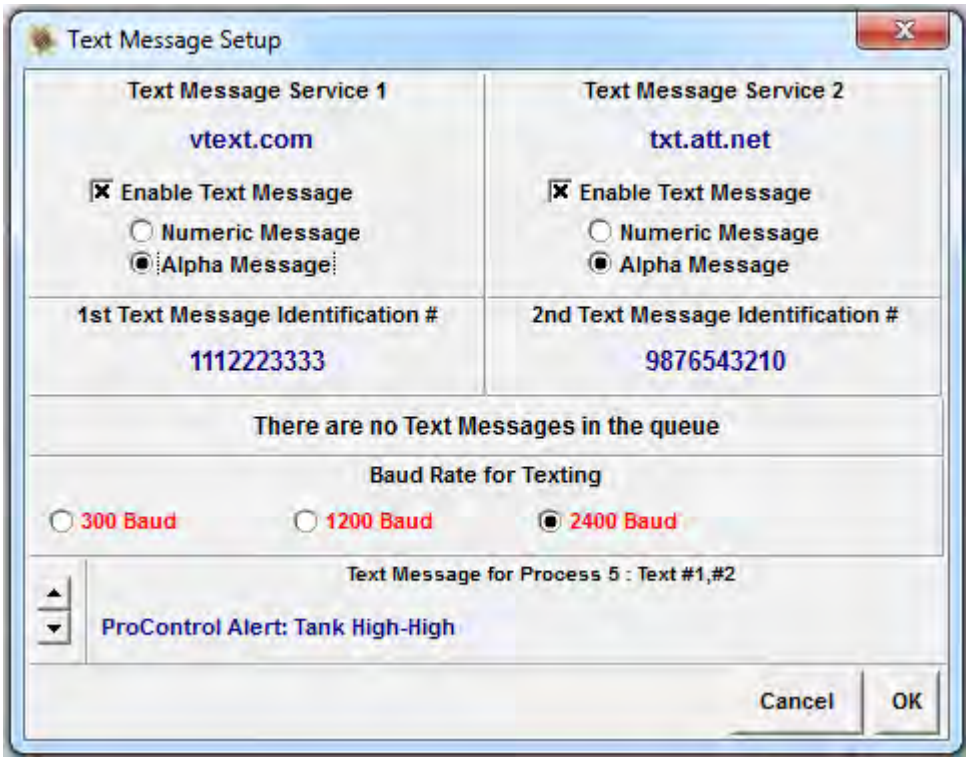
   Or

   Click on the **Text Massage Setup** toolbar button.  You will see the **Text Message Setup** dialog box.

Dial-Up Unit Example



Cellular Data/Ethernet Unit Example

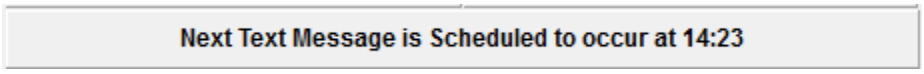


2. For dial-up units - In the **Text Message Service** panels, enter the telephone number for your pager/messaging service company's modem dial-up and hit enter to update the ProControl. For cellular data and Ethernet units enter the cell phone carrier's messaging web address and hit enter to update the ProControl.

3. Click on the **Enable Text Message** check box, and choose **Numeric Message** or **Alpha Message** (text). For cellular data and Ethernet units always select Alpha Message.

4. Enter the pager ID number you obtained from the pager company or 10-digit cell phone number in the **Text Message Identification #** panels and hit enter to update the ProControl.

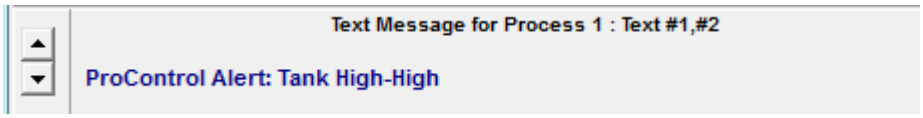
5. The next panel indicates whether there are any queued pages or text messages. In other words, if a message has not yet been successfully completed and you have connected to the ProControl with ProView, you may be interfering with the ProControl's attempts to send a message.



6. For dial-up units only, select the baud rate in the **Baud Rate for Texting** panel, which is the speed at which the message information is sent to your paging/cellular provider. It is generally recommended that you use 1200 baud or less for the greatest reliability. Even at 300 baud, the ProControl takes only a few seconds to transmit the information to your provider.

7. The **Text Message** field allows you to view and/or change the information that will be transmitted to your cell phone/pager from specific events. If you are using a numeric pager, this message cannot

exceed nineteen digits in length and may contain only numerals. If you are using an alphanumeric pager, this message can be up to 80 characters in length. After you edit the message, hit Enter to send the updated message to the ProControl unit. Use the up and down spinners to view the other Process Tasks that cause pages to be sent. You should be familiar with the process control of your system before attempting to make changes to these messages.

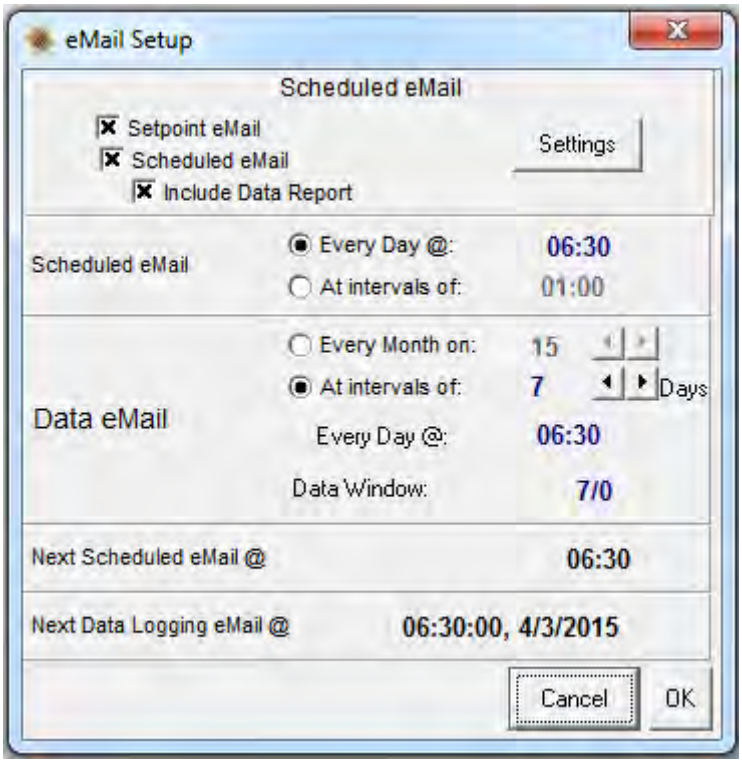


8. Once you have finished making your changes click **OK** to close the dialog box.

Email Set-Up for Cellular Data and Ethernet Units

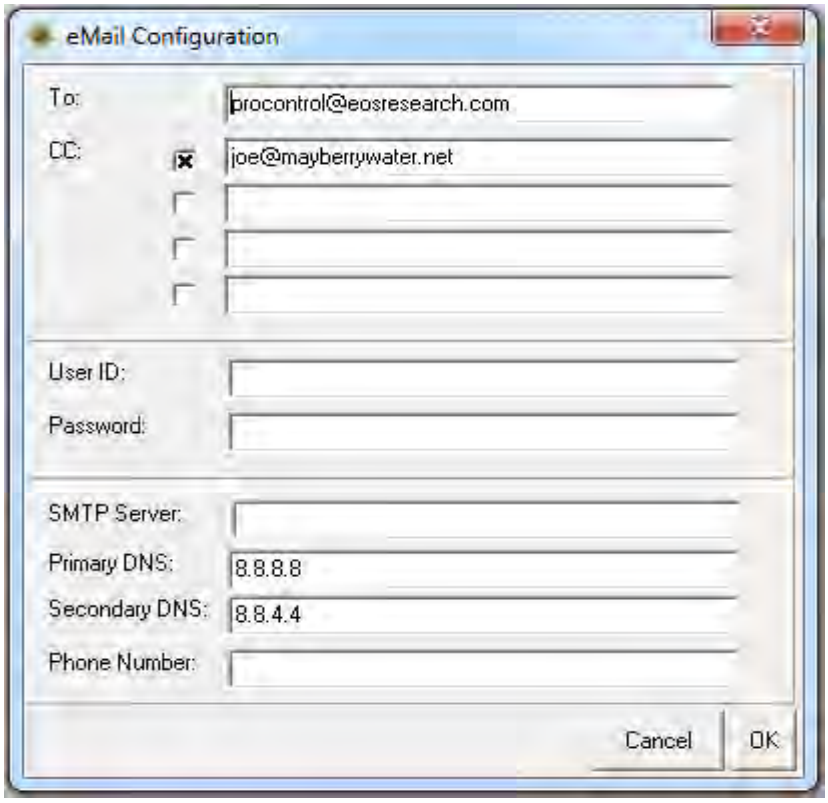
Cellular data and Ethernet units will send status, alarm, and datalog emails to up to 5 recipients

1. Click on the "eMail Report Setup" icon  and the following screen appears:



The report options are generally self-explanatory. Click the "Include Data Report" checkbox to have datalog files attached to the scheduled emails. The "Data Window" indicates the number of days/hours of data to include.

2. Click the "Settings" button to see the following screen:



Enter email addresses of the desired recipients here. Be sure to hit the "Enter" key after each entry. The only other settings in this window are the SMTP Server and DNS addresses. EOS Research personnel will configure these for you; **please contact EOS Research before making any changes to these settings**. Click the "OK" button to save the configuration.

Datalogging Setup

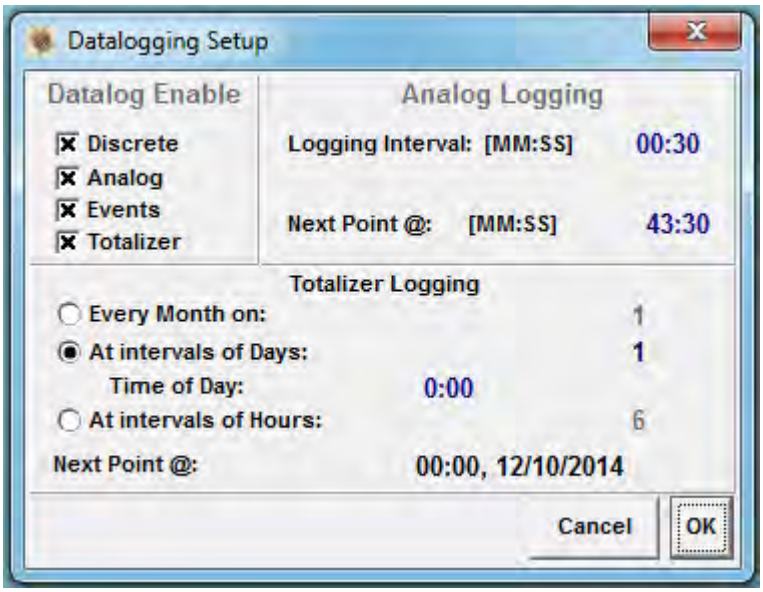
There are three different types of datalogging on the ProControl. Discrete input and output changes are logged as they happen. Events are also logged as they happen, and include changes in control mode (e.g., Auto, Manual), local and remote connections to the ProControl, system startup/shutdowns, fax or page failures, and execution of *Process Tasks*. Analog input and output values are logged at specific time intervals determined by the user. The **Datalogging Setup** dialog box is used to determine how datalogging is carried out in the ProControl unit.

To view or change the **Datalogging Setup** do the following:

1. Click on **Datalogging Setup** in the **Datalogging** menu.

Or

Click on the **Datalogging Setup** toolbar button.  You will see the **Datalogging Setup** dialog box.



2. To enable a type of datalogging click on the **Discrete**, **Analog, Event or Totalizer** check boxes located in the **Datalog Enable** panel.

3. To change the logging interval for analog inputs click on the time value indicated for **Logging Interval** and edit it. This interval can range from 1 second to 24 hours, expressed in minute/second format or hour/minute format (default). Clicking on the **HH:MM** adjacent to the **Logging Interval** will toggle between hour/minute format and minute/second format.

4. The **Next Point @** variable is set by the ProControl every time a data point is logged to show you when the next analog data points will be logged. You can change this value if you wish the ProControl to delay before resuming analog datalogging. Click on the time associated with **Next Point @** and enter the new time in either HH:MM or MM:SS format. Note that if you enter a **Next Point @** time that is earlier than the current time *as determined by the ProControl's clock*, you will prevent any analog datalogging from occurring until the next day at that time (or next hour if using MM:SS format).

5. Totalizer logging can be performed on intervals of hours, number of days, or up to a month.

6. Once you have finished making your changes click **OK** to close the dialog box.

FYI

When setting your analog logging interval, be aware of the available memory in the ProControl unit you are using. If, for instance, your ProControl has a capacity of 5,000 analog data points per input channel and you specify a 5-minute logging interval, there will be available memory for approximately 17 days worth of analog data. Changing the log interval to 10 minutes will make the memory last twice that long. Once the memory is full, the oldest data points are purged one at a time to make room for the current data.

Changing the Password

You can change the password for opening a site file in ProView or for access to the ProControl unit from its keypad. The passwords do not have to be the same. If you change the password while ProView is connected to a ProControl unit, the new password will be used for both ProView and the ProControl unit. If you change the password while not connected to a ProControl unit, the new password will be used only for that site file in ProView. In order to save the new password for the site file in ProView, you must save the site file (**File…Save Site**). However, any change to the password in the ProControl unit itself is immediate.

To change the password, follow these steps:

1. Click on the **Password** menu.

   Or

   Click on the **Password** toolbar button.  You will see the **Security** dialog box.



2. Click on the **Change Password** button. You will prompted to enter the **Old Password** in the text box. Click the **OK** button or hit the enter key. If you do not enter the password correctly, a beep sounds and the security dialog box disappears.



3. You will then be prompted to enter the **New Password** in the text box. Recall that the password can be up to three characters consisting of the numbers 0-9 and the letters A-Z. After clicking on the **OK** button or hitting the enter key, you will be prompted for the new password again.



4. If both new password attempts were identical, the new password will be accepted and the **Security** dialog box will disappear. If ProView is connected to the ProControl, the new password will be in effect for both ProView and the ProControl unit.

Analog Output Options

If your ProControl system is configured with analog outputs, you will be able to adjust the output level, or the parameters used in a control algorithm associated with that output. Your system integrator should have already configured your analog outputs with these algorithms if they apply to your process. Analog outputs can be involved in one of two different types of control scheme: **PID** or **Proportional** control. A **PID** (Proportional-Integral-Derivative) Loop is a feedback-based loop that maintains an analog input at a user-defined ***Setpoint***. The ProControl automatically adjusts the analog output using a mathematical formula that includes ***Gains*** for the proportional, integral and derivative terms. PID control is a commonly-used process control technique, descriptions of which can be found in most control theory texts.

FYI

If you are familiar with PID control terms, note that the PID gains used by the ProControl are defined differently than some of the terms in traditional use. **Proportional Gain** *on the ProControl corresponds with the classic definition of* **proportional band**. *However, the* **Integral Gain** *and* **Derivative Gain** *are the* ***inverse*** *of* **integral (or reset) time** *and* **derivative time**. *Hence, an* ***increase*** *in any of these gains tends to* ***increase*** *the corresponding proportional, integral and derivative action.*

A **PRO** (Open-loop Proportional) algorithm generates an analog output signal that is directly proportional to the value of an analog input. The analog output percentage is computed by multiplying a constant of proportionality by the associated input's percentage of full-scale.

If a control scheme is not assigned to an analog output (or if the output has been placed in **Manual** mode), you can change the output value by clicking on the slider for that output and dragging it up or down, or by highlighting the number beneath the slider scale and typing a new value.

You can modify the PID parameters of a PID-controlled analog output (the **P**, **I** and **D Gains**) if your analog output is not responding smoothly or quickly enough to changes in its associated input. The proportional (**P**) gain specifies the output level based on the error between the **Set Point** (desired input level) and the actual input level. Integral (**I**) gain smoothes the output level based on the tracking history of the input to the **Set Point** and provides a means of better steady state control. Derivative (**D**) gain will allow the output to respond to quick changes in the input and provides a means of establishing good transient or instantaneous control.

In the case of a **PRO** output, you can modify the **P Gain** to alter how much the output value changes as the associated input changes. A value of 100 indicates that the output will be 100% when the input is at full scale. A value of 50 indicates that the output will be 50% when the input is at full scale

The **Max Change** parameter allows you to regulate how much the analog output can change in one control cycle (one control cycle is about 1/4 of a second).

!

Be sure you fully understand PID and proportional control concepts before adjusting any of these parameters. Large changes in output can result from changing the gains or the set point, which can cause equipment damage or unforeseen safety hazards. For help in choosing appropriate gains for your process, contact EOS Research technical support.

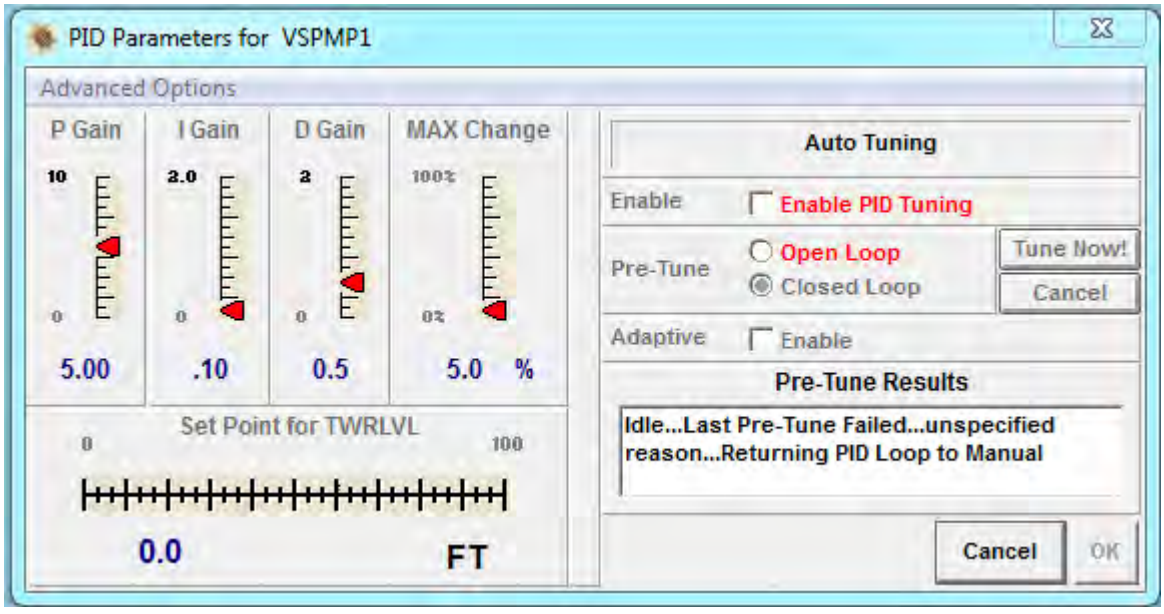
To change the **PRO** or **PID** parameters, **Set Point**, or **Max Change** parameters:

1. It is highly recommended to first place your analog output into **Manual** mode. Click on the **PID** (or **PRO**) beneath the Tagname and wait a second for it to change to **Manual**.

2. Position the mouse pointer over the analog output's tagname until a balloon appears, and *right*-click until you see **PID Options**.



3. Left-click and the **PID Parameters** dialog box appears.



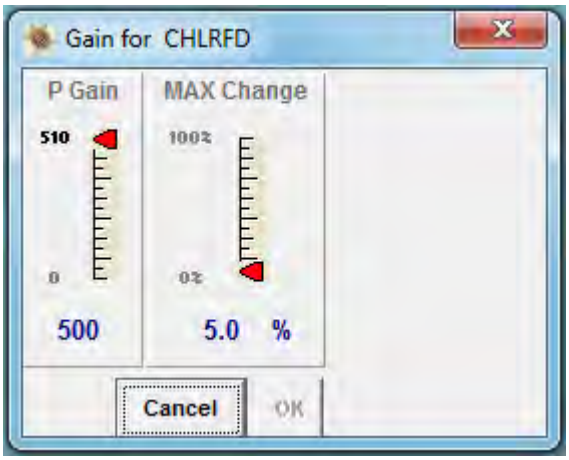
4. To change any of these parameters, you can either click and drag the sliding scale or click the numerical text and enter the value through the keyboard. You can also change the upper limit on all of the gain scales.

5. Click the **OK** button to save your changes. If not, click the **Cancel** button.

6. To restart your PID loop, click the word **Manual** underneath the Tagname and wait a second for it to change to **PID**. Your new parameters are now in use by the ProControl.

   One type of auto-tuning algorithm is provided with ProView, and can be used to calculate optimal PID parameters for *certain types* of process loops. Contact EOS Research technical support to see if this version of auto-tuning may benefit your process.

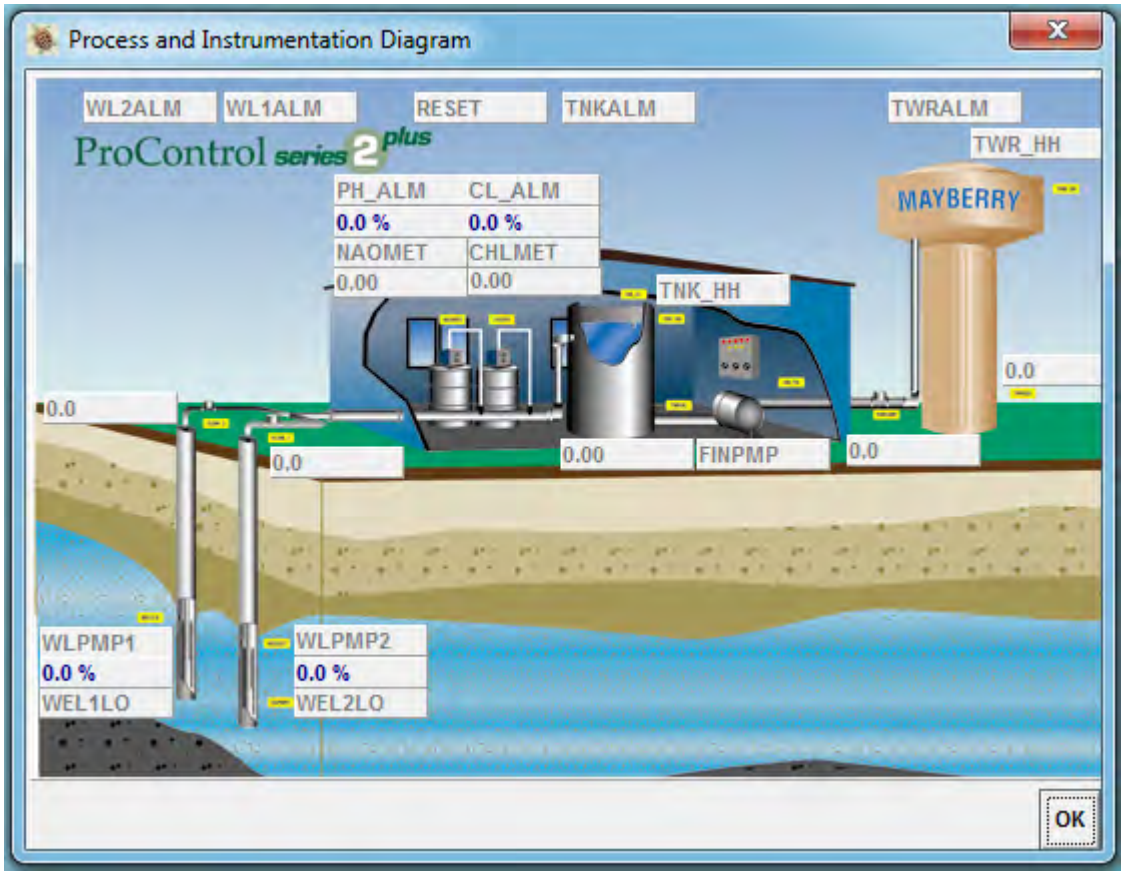
   If the analog output is configured for proportional output, the dialog box on the right will be displayed. You can make changes as outlined above.



Process and Instrumentation Diagram

The **P&ID** option allows you to pull up an alternate "process and instrumentation diagram" representation of your system, which can be used to display operating data that is superimposed on a process diagram (or map, or picture of your dog, etc.). The P&ID option is designed to provide an alternate human-machine interface (HMI) for ProView with customizable graphics. Note that the P&ID screen is not interactive like the main ProView screen is; that is, data can be displayed on this screen, but commands cannot be issued from it.

Typically, your system integrator would configure this screen for you. The P&ID capability must be enabled by the integrator in order for you to use this feature. If this option has been included in your system configuration, you can view this diagram by clicking on the P & ID icon. 



The **Process and Instrumentation Diagram** contains a graphical representation of your system. Digital inputs and outputs are displayed as tagname boxes that change color when the I/O point is active (red or green). Analog I/O are displayed as numerical values, with analog outputs also containing the **%** symbol to distinguish them from analog inputs. Click the **OK** button to go back to the main ProView screen.

As discussed above, the P&ID screen is typically supplied by your system integrator. However, if you would like to make changes to the P&ID screen, follow the procedures outlined below. If you want to change the

background image, you can create a new **.pid** file. The P&ID must be a bitmap format file (.bmp) that can be created with a drawing program. The bitmap image can be any size you choose, the file name must be the same as your ProView site file (**.pvs**) with the filename extension changed to **.pid**, and it must be placed in the same folder as your .pvs file.

When you open the P&ID screen in ProView, you can move or remove the I/O boxes as you choose. Remember to **Save** the site file before you exit ProView to store these changes.

To change the appearance of the P & ID:

1. To move a descriptive box containing either a tagname or value, hold the shift key and click the left mouse button when positioned on the appropriate box. This will enable you to drag and re-position the box wherever you choose.
2. To remove a descriptive box, double-click on the box. Once you have removed a box, it will no longer be available to you unless you restore all boxes.
3. To restore all descriptive boxes, position the mouse at the bottom of the P & ID window in the gray area. Then hold down the control and shift keys while simultaneously clicking the left mouse button.

CHAPTER 6: WORKING WITH LOGGED DATA

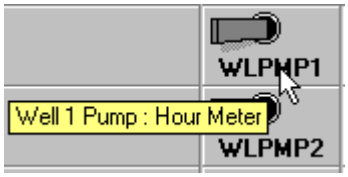
This chapter explains how to gather and analyze logged data that is being stored in the ProControl unit's battery-backed memory.

Hour Meters

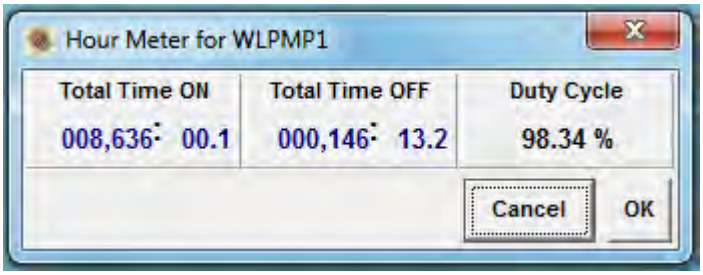
The ProControl maintains **Hour Meters** for inputs and outputs to indicate how long the I/O point has been ON and OFF. The hour meters are particularly useful in keeping track of equipment "run" times (discrete outputs), but are also maintained for discrete and analog inputs. For analog inputs, the hour meters indicate the time the input has been in and out of its *Active State* (see the definition of Active State in the Series 2^{plus} User Manual). The hour meters are updated every second on the ProControl unit. The ON and OFF times are displayed at a resolution of 1/10 (0.1) of a minute.

To read the Hour Meters, follow these steps:

1. Position the mouse pointer over the I/O point's tagname until a balloon appears, then *right*-click until you see **Hour Meter**.



2. Click the left mouse button to view the hour meter. The **Hour Meter** dialog box appears.



3. The **Hour Meter** box displays information in the form of **Hours : Minutes.10th Minutes** for both ON time and OFF time. The **Duty Cycle** or ratio of ON time to total time is also displayed. It may take a few seconds for the display to be updated once the dialog box appears.

4. To edit the **Total Time ON** or **Total Time OFF**, click and highlight the total time text and make the required changes. Press the enter key to confirm the changes and send the new value to the ProControl unit. Resetting the time values to zero, for instance, can be used when a motor is changed out, to keep track of lubrication intervals, etc.

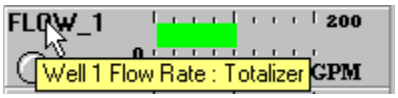
5. Click on the **OK** button to close the **Hour Meter** dialog box.

Totalizers

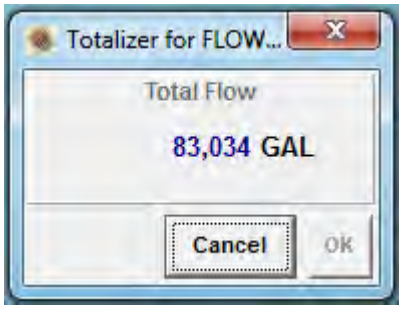
If your site configuration includes an analog input to which a flow meter or pulse counter is connected, it may also include a **Totalizer**. Totalizers provide the ability to view the cumulative total of a flow-based input or accumulated pulses from a counting device.

To view the **Totalizer,** do the following:

1. Position the mouse pointer over the I/O point's tagname until a balloon appears, then *right*-click until you see **Totalizer**.



2. Click the left mouse button to view the totalizer. The **Totalizer** dialog box appears.



3. The **Total Flow** for this input since the totalizer was last reset is displayed. It is updated every second while the dialog box is visible and while ProView is connected to the ProControl unit.

4. If you would like to set the totalizer to a different value, click on the value displayed in the dialog box. Enter the new value for the totalizer and press the enter key.

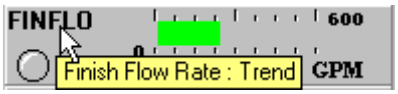
5. Click on the **OK** button to close the **Totalizer** dialog box.

Trend Graphing

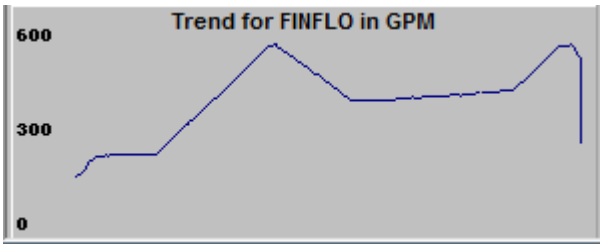
ProView can display a real-time trend graph while you are connected either locally or remotely to the ProControl. A 5-minute trend can be displayed in the lower left hand side of the ProView window.

To start trend graphing:

1. Position the mouse pointer over an analog input's tagname until a balloon appears, then *right*-click until you see **Trend**.



2. Click the left mouse button to produce the **Trend** window for that input.

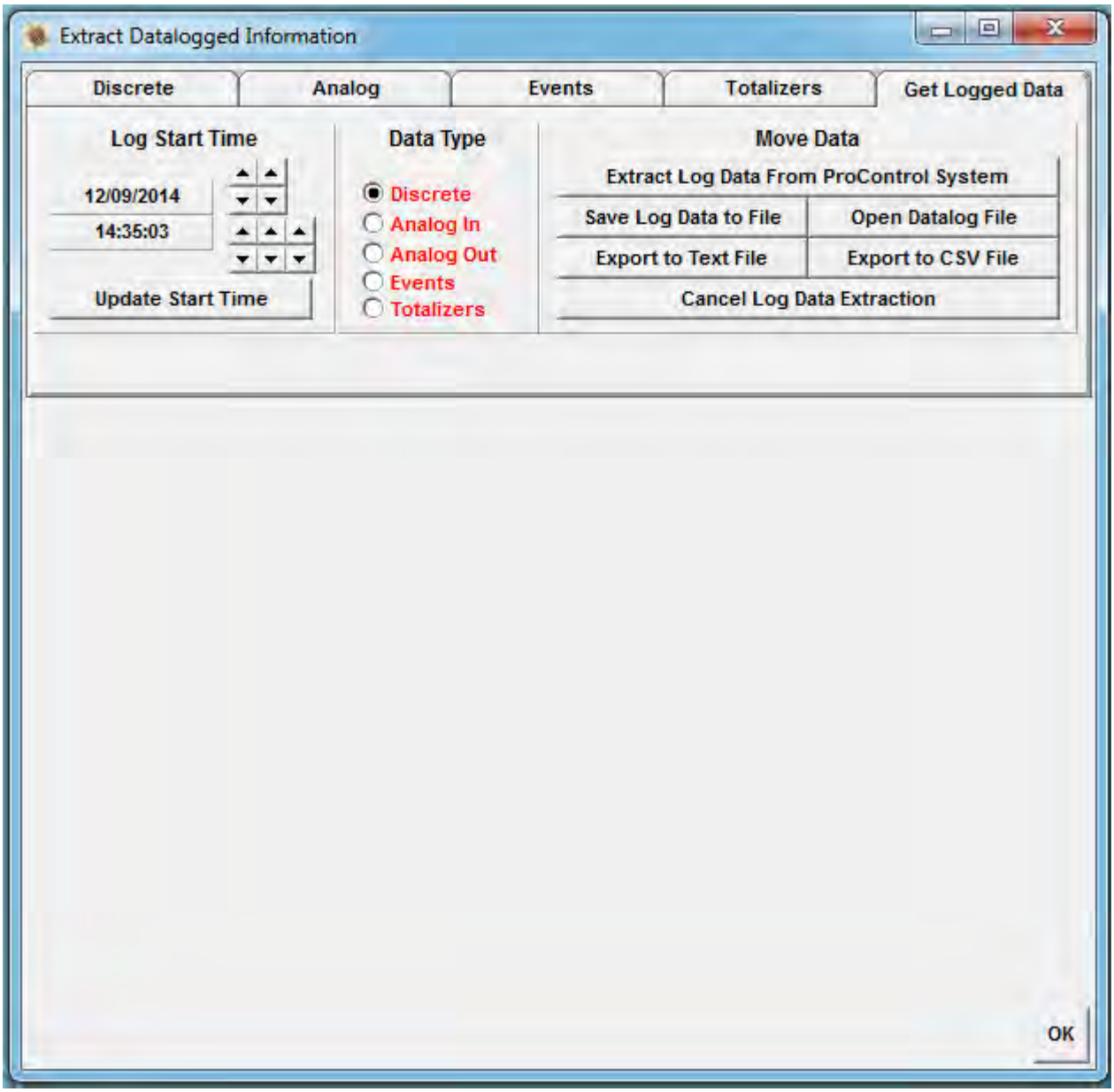


3. The trend window provides a 5-minute history of the real-time data for that analog input. You will see the trend "drift" from right to left across the window, and it will be updated as long as you are connected to the ProControl. If you wish to observe another trend, click on the tagname of another analog input and the trend window will be refreshed with the new data.

4. To stop trending and empty the trend window, click on the **Trend for…** text block in the trend panel.

Downloading Logged Data

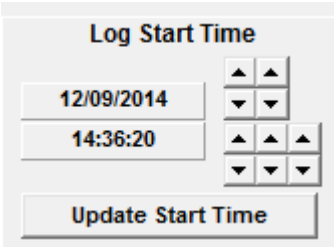
Operations data is stored electronically in the ProControl's memory in accordance with the datalogging setup (Chapter 5). To view the logged data, click on **Get Logged Data** in the **Datalogging** menu. This opens the **Extract Datalogged Information** dialog box.



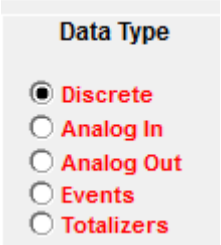
Getting Logged Data

To extract datalogged information from the ProControl unit, do the following:

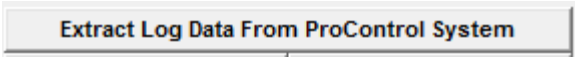
1. Select the start time in the **Log Start Time** panel. ProView will extract all data that has been logged since this time. Change the start time by clicking on the spin buttons to increase or decrease the Month, Day, Hour, Minute or Second. Click on the **Update Start Time** button to reset the start time to the current time.



2. Select the type of data you wish to extract. Click on the **Discrete**, **Analog In**, **Analog Out** or **Events** radio button.



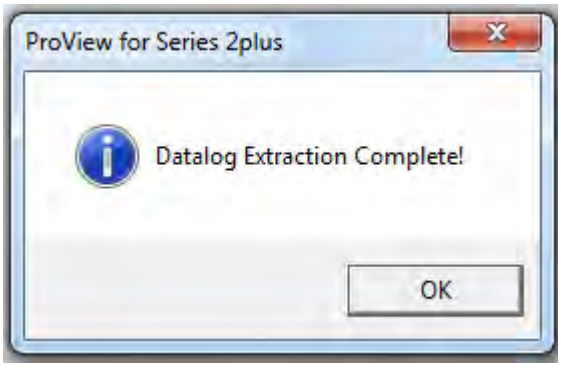
3. Click on the **Extract Log Data From ProControl System** button.



4. ProView performs a scan of available data. You can then monitor the progress of the data extraction.

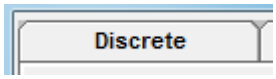


5. A message box will appear when the data extraction process is complete.

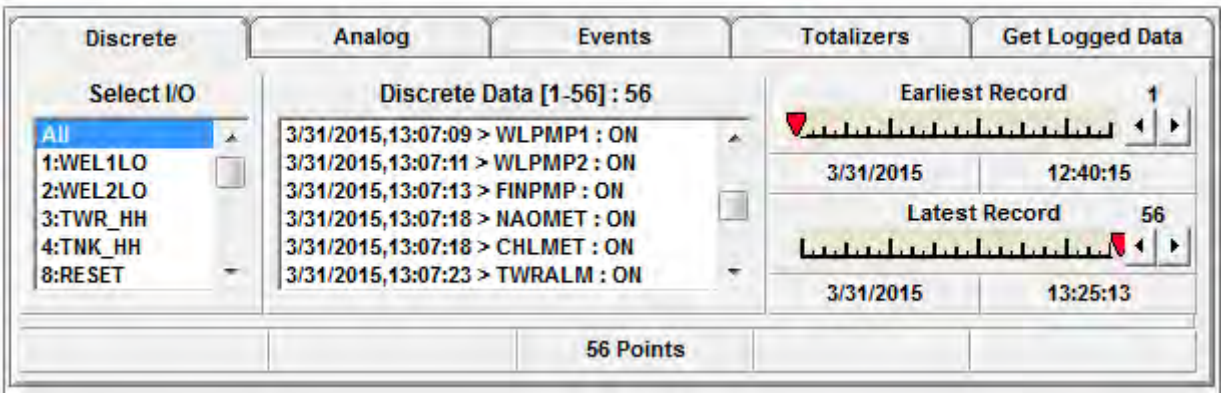


Looking at Discrete Data

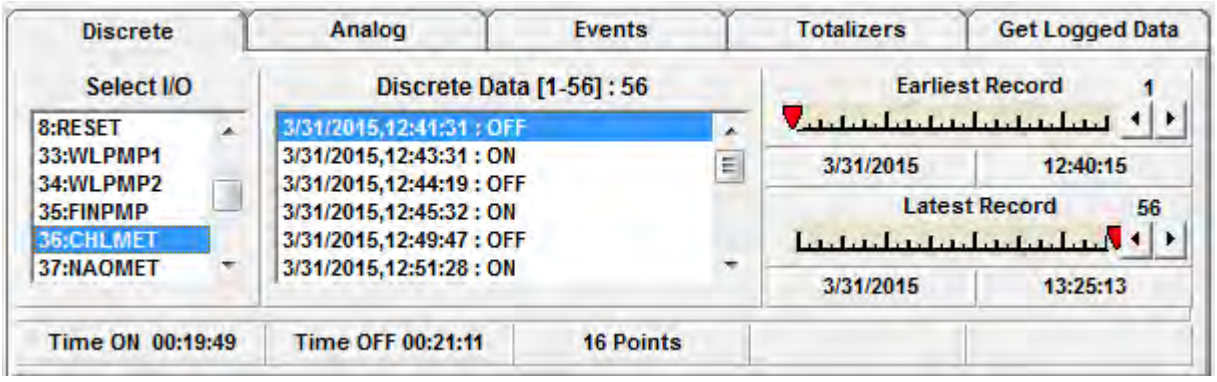
To examine the discrete datalog record that you have extracted click on the **Discrete** tab.



The **Discrete** data window appears. On the left, the **Select I/O** list box contains a list of all enabled discrete inputs and outputs. In the middle is the **Discrete Data** record. On the right, the **Earliest Record** extracted is shown as 13:07:09 on 3/31/15. The **Latest Record** is 13:25:13 on 3/31/15. A total of 56 records were extracted. Clicking on **All** in the **Select I/O** list box will show the entire discrete record in the **Discrete Data** window. You can scroll through the discrete records in the window.

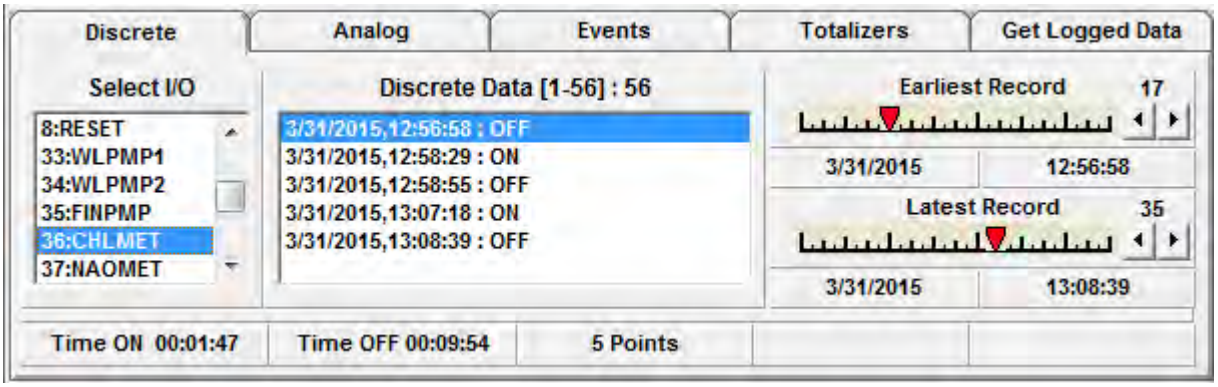


The **Select I/O** list box can be used to filter the data record to include just one discrete input or output. In the example below, the **CHLMET** output has been selected. Whenever a single input or output is selected, statistics are generated regarding the selected input or output, spanning the period of time from the first state change to the last one in the record. There are 16 data points for **CHLMET** below, and the input was ON for 19 minutes and 49 seconds and OFF for 21 minutes and 11 seconds for the period of time between the first and last record.



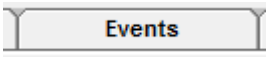
Moving the **Earliest Record** and **Latest Record** sliders or spin buttons will filter the total record with respect to time. Click and hold a slider and move the mouse to the left or right. You can also click on the spin buttons to change the time window. When you are finished filtering the time, click again on the input you

wish to examine in the **Select I/O** list box to see the results of your changes. In the example below, the total record has been limited to records 17 through 35. Within this time interval, 5 state changes of **CHLMET** occurred.

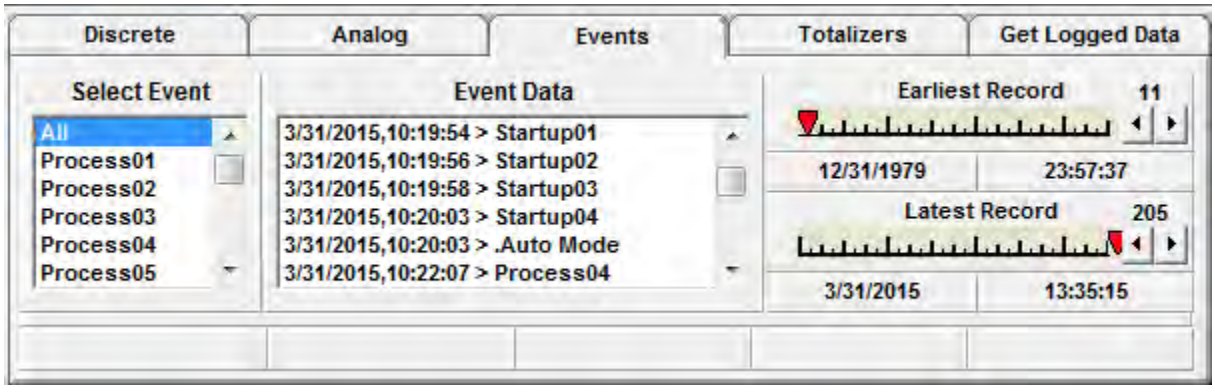


Looking at Events Data

First, go back to the **Get Logged Data** tab and extract the **Events** data. After the data has been extracted, click on the **Events** tab to examine the event datalogging record.



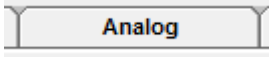
The **Events** data window appears. The **Select Event** list box contains a list of all enabled processes and other ProControl events. In the middle is the **Event Data** record. The **Earliest Record** and **Latest Record** extracted are shown to the right.



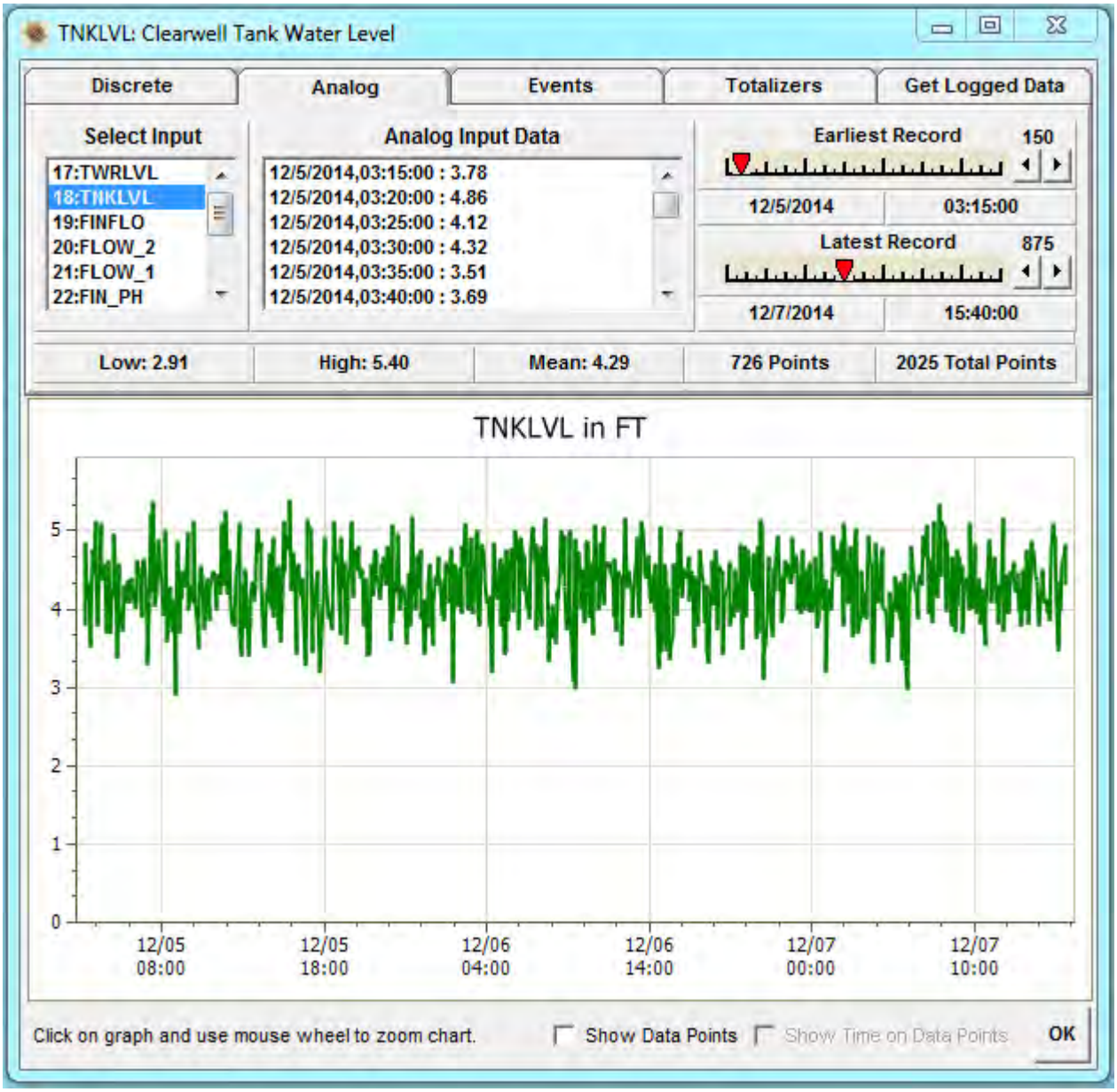
To view the data, follow the same procedure described for **Discrete Data**. Clicking on **All** in the **Select Event** list box will display all the events that were extracted. By clicking on an event in the **Event Data** window, a description is provided in the **Process Description** window below.

Looking at Analog Data

First, go back to the **Get Logged Data** tab and extract the **Analog In** or **Analog Out** data. After the data has been extracted, click on the **Analog** tab to examine the event datalogging record.



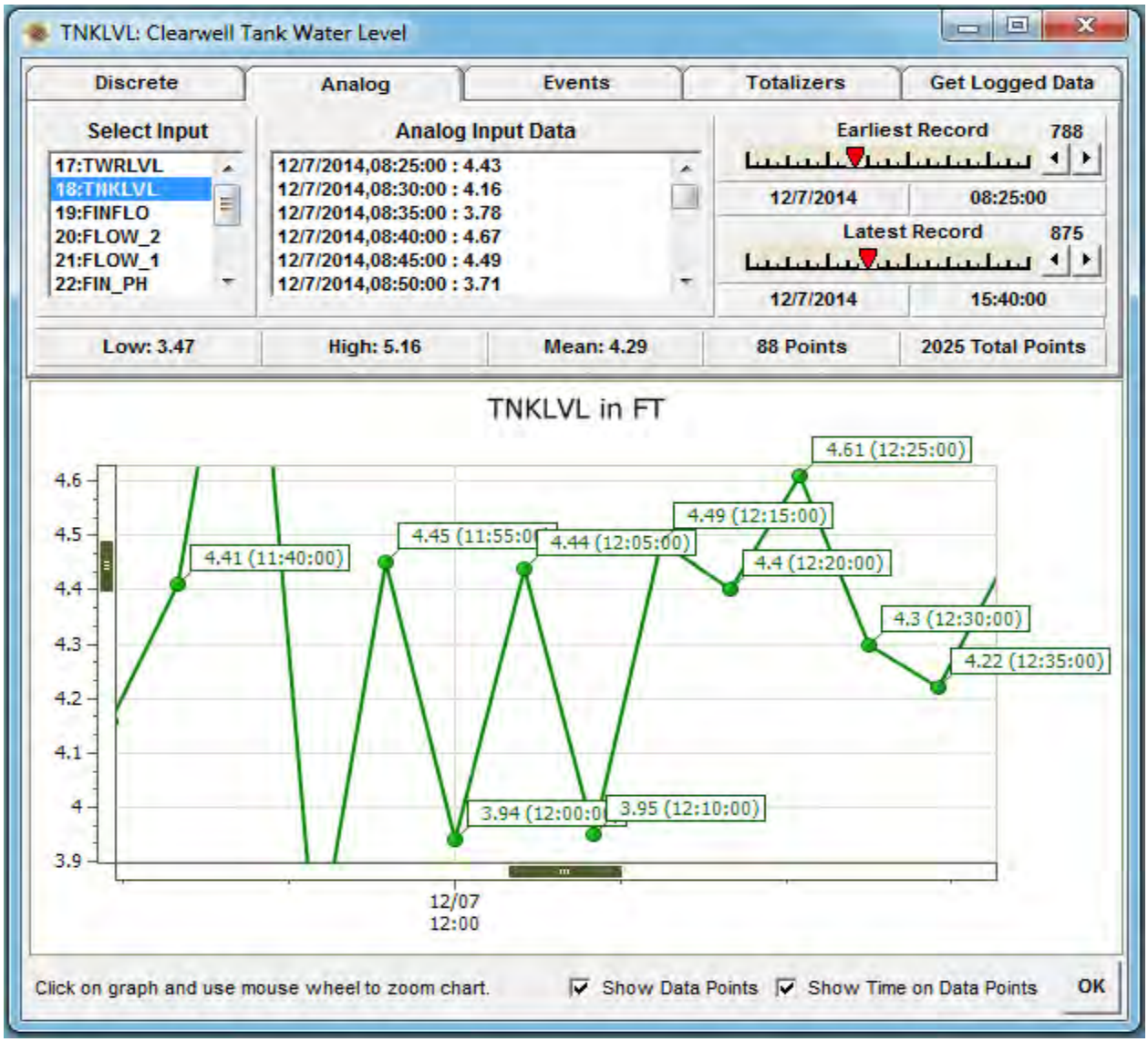
The **Analog** data window appears. The **Select Input** list box contains a list of all enabled analog inputs and outputs. In the middle is the **Analog Input Data** record. The **Earliest Record** and **Latest Record** extracted are shown to the right. By clicking on an input or output in the **Select Input** list box, a graph will be displayed in the window below.



In the example above, a tank level is shown as it varies over time. Immediately above the graph, statistics are shown regarding the selected analog point (in this case there are 726 data points with a **Low** of 2.91, a **High** of 5.40 and a **Mean** of 4.29). As with the digital and events data, the **Earliest Record** and **Latest Record** sliders and spin buttons can be used to filter the total record with respect to time, which is helpful in focusing on a smaller portion of the graph. If you filter the data in this way, be sure to click on the input tagname again in the **Select Input** list box to see the results of your changes.

Graphing Options

Graph options are available to change the look of the analog graph. You can left click on the chart and use your mouse wheel to zoom in on the data. Other graphing options are on the bottom right of the datalog window and allow you to show data points and show time on data points. Click on the check box adjacent to the option you want to use to enable it. It is generally recommended that you zoom in on a portion of the graph before you use the "show data point" options.



After you are finished examining the datalogged information, you may want to save it for future reference within ProView or export it to a spreadsheet, database program or word processor.

Saving Logged Data to File

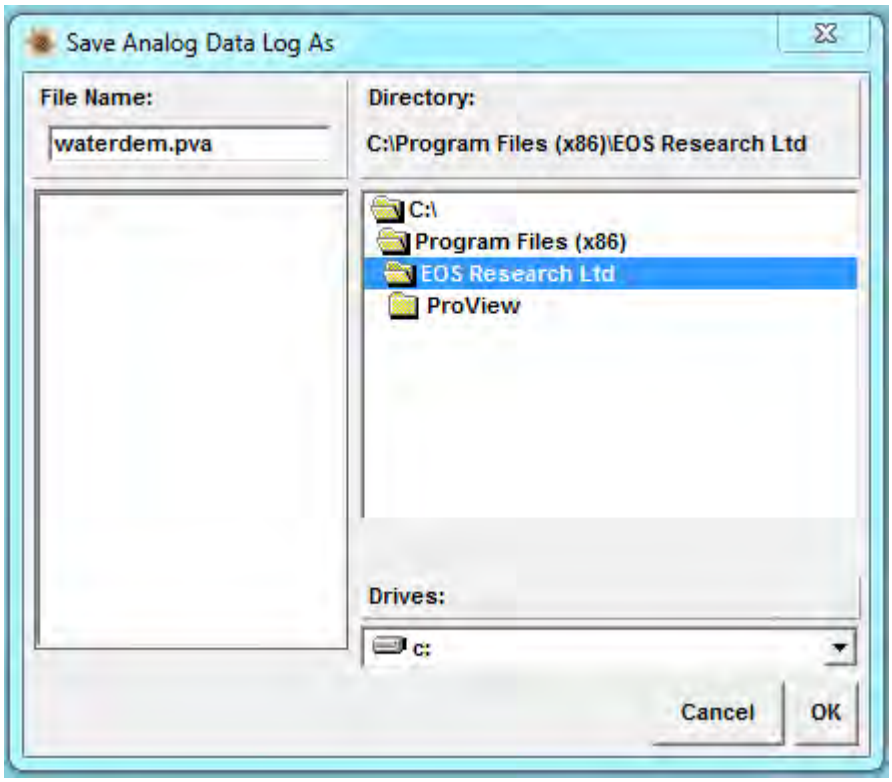
To save a datalogging record to a ProView-readable file, do the following:

1. Click on the **Get Logged Data** tab. Select the type of file you wish to save by clicking on the appropriate button in the **Data Type** panel. *Remember that you must have already completed the separate step of extracting the data type you wish to save.*

2. Click on the **Save Log Data to File** button.



3. This opens the **Save *xxxxxx* Data Log As** dialog box, where ***xxxxxx*** is the type of data you wish to save. ProView selects a default file name for you, which is the name of the site configuration file with the .pvd, .pva or .pve file extension depending on the type of data file you intend to save (discrete, analog, or events, respectively). However, you may wish to change the file name to indicate a date representative of the log you are saving, for instance.



5. Click the **OK** button to save the file.

Opening a Datalog File

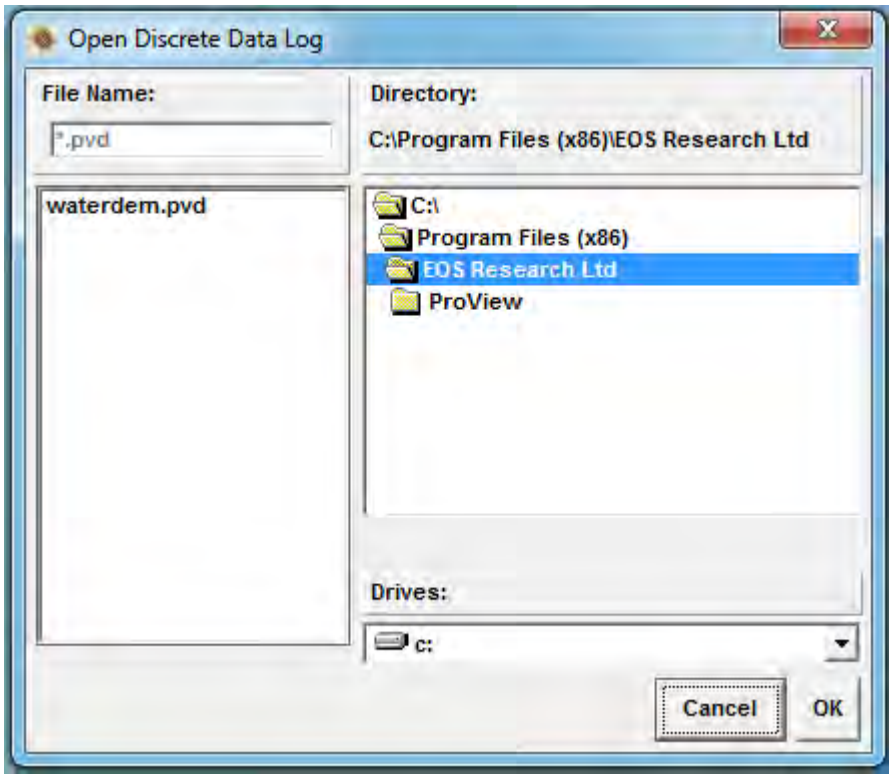
To view data that was previously saved in ProView-readable format, do the following:

1. In the **Get Logged Data** tab of the **Extract Datalogged Information** dialog box, select the type of data file you wish to open by clicking on the appropriate button in the **Data Type** panel.

2. Click on the **Open Datalog File** button.



3. This opens the **Open *xxxxxx* Data Log As** dialog box, where ***xxxxxx*** is the type of data you wish to view. ProView lists any files in the folder you have selected that contain the .pvd, .pva or .pve file extension (depending on the type of data file you intend to open). Click on the name of the file you wish to open, and it will appear in the **File Name:** text box. If the file you wish to open is stored elsewhere, select the location in the **Drives:** and **Directory:** list boxes.



4. Click on the **OK** button to open the file. View the data as you would any logged data that you have just extracted.

Exporting Logged Data for use in Other Applications

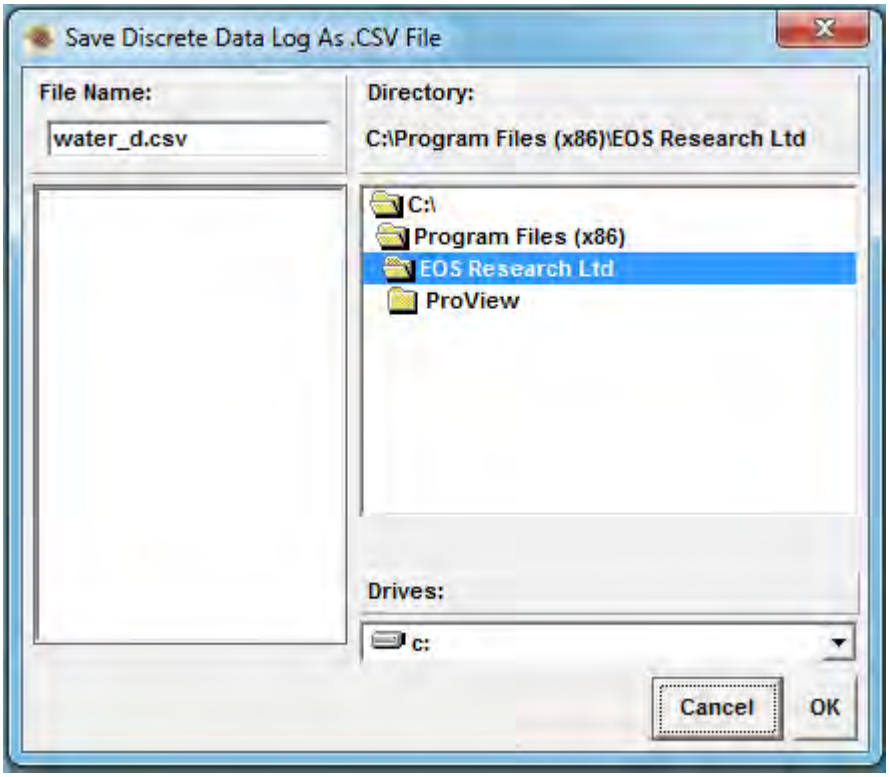
ProView provides users the ability to export data for use in other applications, so that you can take advantage of the data manipulation and graphing capabilities provided by widely-used software. ProView allows you to export analog, discrete or event data to a CSV (Comma-Separated Variable) file, which can then be opened by any spreadsheet or database program (e.g., Microsoft Excel™). You can also export discrete and event data to a text file for use in a word processor.

1. In the **Extract Datalogged Information** dialog box, click on the **Get Logged Data** tab. Select the type of file you wish to export by clicking on the appropriate button in the **Data Type** panel. Note that analog output data cannot be exported.

2. Click on the **Export to Text File** or **Export to CSV File** button.



3. This opens the **Save Analog Data Log As .CSV File,** the **Save Discrete Data Log As .TXT File** or other dialog box, depending on the type of file you wish to export. The default file name is the truncated name of the site configuration file with the .csv or .txt extension. However, you may wish to change the file name to indicate a date representative of the log you are saving, for instance.



5. Click the **OK** button to export the file.

6. You will be asked whether you would like to include header information in the file that is saved. The header provides two lines of basic site information and titles for the columns of data.

!

*The CSV file format is considered a **Text** format by most spreadsheet and database software. When you open the .csv file created by ProView, be sure to specify that you are opening a Text file. For instance, in Excel, in the **File….Open** dialog box, choose **Text Files** from the list in the **File of type** list box.*

FYI

*A word about the date format in the exported files: Discrete and event data are exported using a time stamp in which the date and the time are in separate columns or separated by a comma (for example, 9/15/2000,09:39:08). Analog data are exported using a combined date/time in standard Windows format (which is the decimal equivalent of the number of days and fractions of a day since January 1, 1900). When an analog data file is opened in a spreadsheet or database software package, you will probably want to reformat the date/time information in the leftmost column. For instance, in Excel, select the column, choose **Format….Cells**, and select a **Number** format that includes both the date and the time.*

CHAPTER 7: OTHER OPERATIONS

This chapter explains how to save the site setup, print current operating data to a file, view the process configuration, use the annunciator feature and exit the program.

Saving the Site Configuration to File

While you work in ProView, you may change certain system settings that are stored in your site configuration (or .pvs) file. Examples of some of the parameters stored with your site file include remote communication settings, passwords, and notes for your tagnames. You should save your .pvs file before closing ProView if you make any changes to these parameters.

FYI

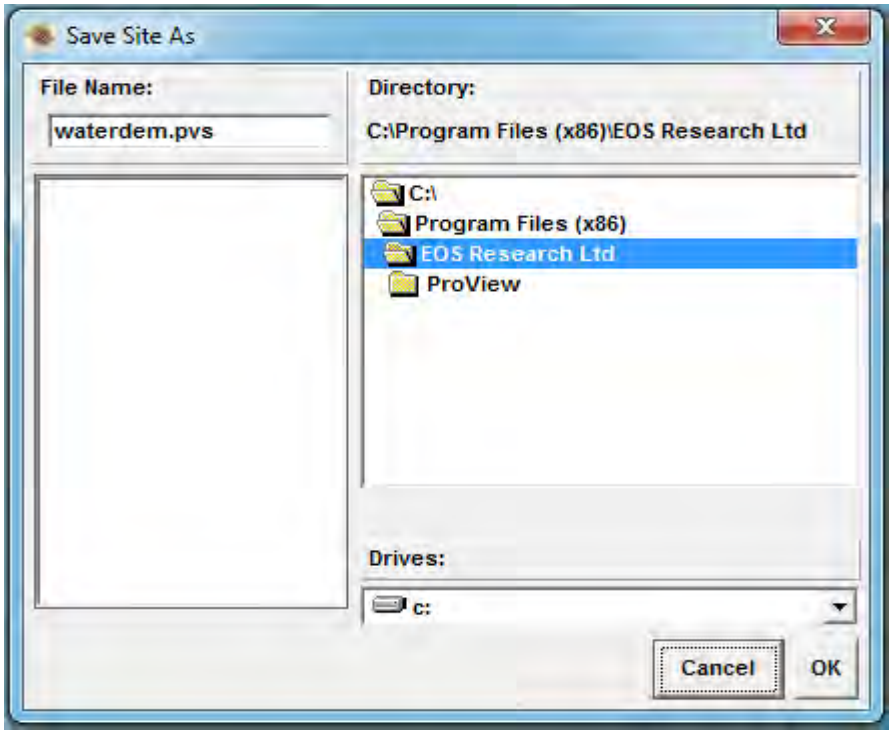
Remember that most operational settings, such as alarm levels, fax report numbers, datalogging setup, PID gains, etc. are stored in the ProControl unit, not in your site file. ProView "pulls up" this information stored in the ProControl unit when you connect to it. There is no need to save your site file if you only make changes to these operational settings.

To save your site configuration do the following:

1. Click on **Save Site** or **Save Site As…** in the **File** menu.

   Or

   Click on the **Save File** button on the toolbar. The **Save Site As** dialog box appears. If you chose **File…Save Site**, ProView bypasses the dialog box.



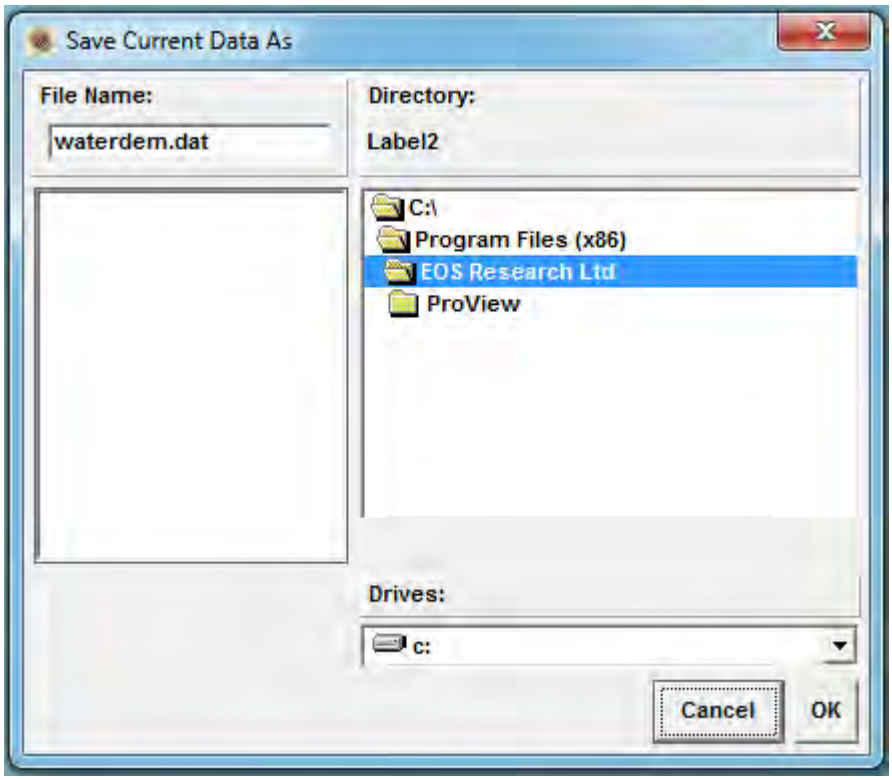
2. Select the **Drive**, **Directory** and **File Name** you would like and click on the **OK** button to save the file. You will be asked whether you wish to overwrite the existing file. Choose **Yes** to complete the file save.

Printing the Current Data to File

While you are connected to your ProControl via ProView, you can print the current operating data to a text file for future reference. This can prove useful for documentation and reporting purposes.

To save your current process data to a text file, do the following:

1. Click on **Print Current Data** in the **File** menu. You will see the **Save Current Data As** dialog box.



2. Select the **Drive**, **Directory** and **File Name** you would like. ProView selects a default file name for you, which is the name of the site configuration file with a .dat file extension. However, you may wish to change the file name to indicate a date representative of the information you are saving, for instance. Click the **OK** button to save the current data to the file.

You can examine the current data file with any text editor or word processor. An example of a file generated for our sample operation is shown on the following pages.

EOS RESEARCH LTD.
ProControl Series II+

ProView Current Operational Information

***** FAX Recipient:	BULLWINKLE MOOSE
***** Customer:	MAYBERRY WATER DEPT
***** Site Location:	MAYBERRY RFD
***** Setup:	1
***** Option:	B
***** Type:	102
***** Serial Number:	9999
***** Date:	12/9/2014
***** Time:	14:52:35
***** ProView:	Version 2.200

***** Communications State:	REMOTE CONNECT
***** System Mode:	Auto 14
***** Last Shutdown:	Last Shutdown 12:28:27 , 2/20/2014 , Remote
***** Alarms:	Alarms SET
***** FAX:	Report ON

THE CURRENT INPUT STATUS:

#	TAGNAME	CURRENT VALUE	LO ALARM	HI ALARM	TOTALIZER		HOURS ON		HOURS OFF	
1	WEL1LO	is OFF					000,000	23.6	002,704	52.8
2	WEL2LO	is OFF					000,000	02.7	002,705	13.8
3	TWR_HH	is OFF					000,000	01.0	002,705	15.5
4	TNK_HH	is OFF					000,000	01.5	002,705	14.9
8	RESET	is OFF					000,000	00.8	002,705	15.7
17	TWRLVL	41.0 FT	30.0	55.0			000,044	36.7	002,660	39.6
18	TNKLVL	10.07 FT	9.00	11.00			000,018	38.8	002,686	37.7
19	FINFLO	220.0 GPM	0.0	600.0	2,707,032	GAL	000,749	30.0	001,955	46.4
20	FLOW_2	178.1 GPM	0.0	400.0	11,535,456	GAL	000,758	50.8	001,946	25.6
21	FLOW_1	95.8 GPM	35.8	170.0	10,479,505	GAL	000,003	03.4	002,702	13.1
22	FIN_PH	8.39 PH	7.50	8.50			001,004	05.6	001,701	10.8
23	FIN_CL	0.99 PPM	0.80	1.15			000,499	10.1	002,206	06.3

THE CURRENT OUTPUT STATUS:

#	TAGNAME	CURRENT VALUE	HOURS ON		HOURS OFF	
1	WLPMP1	is ON	001,871	40.2	000,833	36.1
2	WLPMP2	is ON	001,871	26.7	000,833	48.8
3	FINPMP	is ON	001,871	27.5	000,833	48.5
4	CHLMET	is ON	001,655	51.6	001,049	24.9
5	NAOMET	is ON	001,099	11.9	001,606	04.6
8	PH_ALM	is OFF	000,991	03.1	001,714	13.3
9	CL_ALM	is OFF	000,485	39.2	002,219	37.3
10	TWRALM	is OFF	000,028	11.2	002,677	05.1
11	WL1ALM	is OFF	000,000	12.0	002,705	04.6
12	WL2ALM	is OFF	000,000	00.1	002,705	16.5
13	TNKALM	is OFF	000,003	42.3	002,701	34.3

```
THE CURRENT ANALOG OUTPUT STATUS:

#  TAGNAME  VALUE  PID Mode SETPOINT  P Gain I Gain  D Gain  MAX CHG
-- ------- ------- -------- --------- ------ ------- ------- -------
1  VSPMP1  39.1  %   ALG    40.0      10.0   .010    0.1     5.0   %
2  VSPMP2  46.9  %   ALG    10.00     7.33   .010    0.5     5.0   %
3  NAOHFD  32.0  %   ALG    8.25      9.16   .010    0.1     5.0   %
4  CHLRFD  22.3  %   ALG              50                     5.0   %

ANALOG OUTPUT NOTES
-------------------
VALUE   - The current output level expressed as a percentage 0%=4ma 100%=20ma.
MAN     - (Manual) The PID or PRO control loop algorithm has been turned off.
PID     - The (Proportional, Integral, Derivative) control loop is running.
PRO     - The open loop (Proportional) algorithm is running.
MAX CHG - The maximum amount the output can change in one control cycle.


THE CURRENT REPORTING SETUP:

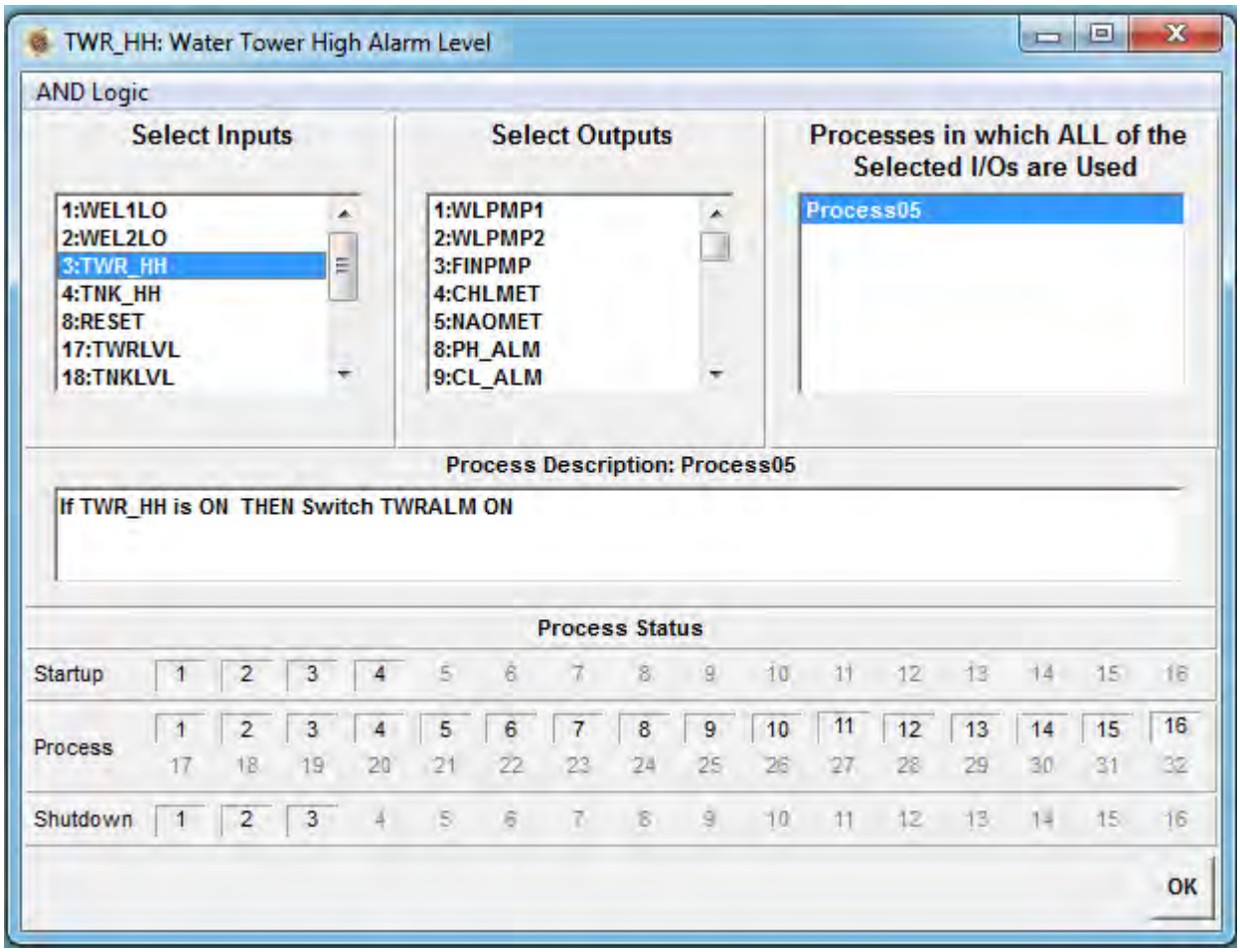
     ***************************************************************************
     ***** Report Enable:          ON                                      *****
     ***** FAX Number 1:           1 (999) 555-1234                        *****
     ***** FAX Number 2:           555-4321                                *****
     ***** Scheduled FAX:          Every Day at:       07:00               *****
     ***** Next Scheduled FAX:     07:00                                   *****
     ***** Pager #1:               Enabled, Numeric                        *****
     ***** Pager #2:               Enabled, AlphaNumeric                   *****
     ***** Paging:                 Will occur at 2400 baud                 *****
     ***** Page Number 1:          1 (700) 555-6789                        *****
     ***** Pager ID    1:          9876543                                 *****
     ***** Page Number 2:          1 (700) 555-6789                        *****
     ***** Pager ID    2:          3456789                                 *****
     ***************************************************************************

THE CURRENT DATALOGGING SETUP:

     ***************************************************************************
     ***** Enabled Datalogging:    Digital ,Analog ,Event                  *****
     ***** Datalogging Interval:   00:01                                   *****
     ***** Next Datalog Time:      13:47                                   *****
     ***************************************************************************
```

Reviewing the Process Configuration

ProView includes a utility that can help you understand the control logic that is programmed into your ProControl unit (if your site file is not the most up-to-date version, note that the control logic shown may not match what is in your ProControl unit). Click on **Process Configuration** under the **File** menu, and the following screen will appear, showing the inputs and outputs that are configured for your system:



By selecting inputs and outputs from the left and center columns, respectively, you will see a listing of process tasks that include your selected I/O. For instance, if you choose an output from the center column, you will see a list of processes that turn that output ON or OFF in the window on the right. Clicking on a process will provide a description in the **Process Description** window. You can select both inputs and outputs to filter the list of processes. To de-select an I/O point, **<Ctrl> - left click** on it.

Annunciators

The Annunciator feature is useful for those ProControl users that remain connected to their systems for extended periods of time via ProView. The Annunciator is a visual alarm indicator for the ProView screen that is designed to draw attention to an alarm condition that *presently exists*, or *has occurred but has now cleared*. Clicking on **Annunciation** in the **File** menu toggles the Annunciation feature on and off. If any discrete or analog input that is configured as an alarm input becomes *active*, the input's tagname will turn red, and the System Status panel (the panel that indicates **Auto** or **Manual** mode) will begin to flash red. The annunciator continues to flash even if the input is no longer active, so that the operator does not miss an alarm condition. To acknowledge the alarm, click on **Clear Annunciators** in the **System** menu. If an alarm condition still exists, the annunciator will begin flashing again. *Note that only those alarm conditions that occur in the current ProView session will be annunciated.*

Exiting ProView

You can exit ProView by clicking on the  at the top of the main screen or by clicking **Exit** in the **File** menu. You will be asked whether you want to save your site file and any logged data that you have extracted.

ProControl Cellular Data Modem Kit
Quick Start Guide

Introduction

The ProControl Cellular Data Modem Kit works in conjuction with a special version of firmware in your ProControl unit to provide a wireless internet protocol (IP) connection to your ProControl unit, along with outgoing email and text messaging capability for status and alarm reporting (please note that fax reporting is not available with this version). The kit includes a CDMA IP modem from MultiTech Systems that is configured to work seamlessly with the ProControl to enable a wireless connection anywhere Verizon Wireless data service is available.

What's Included

The ProControl Cellular Data Modem Kit includes the following:

- Special firmware in your ProControl unit to operate seamlessly with the IP modem.
- A MultiTech wireless IP modem, which has already been activated for data communication by EOS Research. It is labeled with the static IP address that has been assigned to the modem
- Power cord for the modem to obtain power from the ProControl
- Serial interface cable to connect the modem to the ProControl
- A 3 dBi magnetic-mount antenna to ensure highest signal strength for the modem

Installation

1. Mount the modem in a dry, non-condensing location (NEMA 4 enclosure recommended) in close proximity to your ProControl. The operating temperature range for the modem is -22° to 122° F.
2. For best cellular data reception, mount your antenna in the center of a flat metal surface at least 12" x 12" in size, preferably outdoors. Route your antenna cable with a drip loop outside of the building, and screw the adapter on the other end of the cable to the bronze-colored antenna port on the back of the modem.

3. Connect the 9-pin connector on the modem serial interface cable to the "RS-232" port on the modem and tighten the holding screws. Connect the other end to the "RS-232/Serial" port on the ProControl.
4. With your ProControl powered down, attach the power adapter cable to the modem, tighten the connecting barrel, and tie the other end of the cable to the terminal designated "+24v cell" (red striped wire) and "G" (black wire).

Initial Start-Up

Simply power up your ProControl, and it will be ready to communicate after approximately 2 minutes of configuring the modem and self-testing. After a minute or so, the signal strength LEDs on the front of the modem will be lit; signal strength should be two bars or greater for reliable communication. *Please note that your standard Local Connect cable can also be used for a local connection to the ProControl using ProView - simply unplug the IP modem's serial cable first. When reconnecting the IP modem, we recommend that you repower the ProControl.*

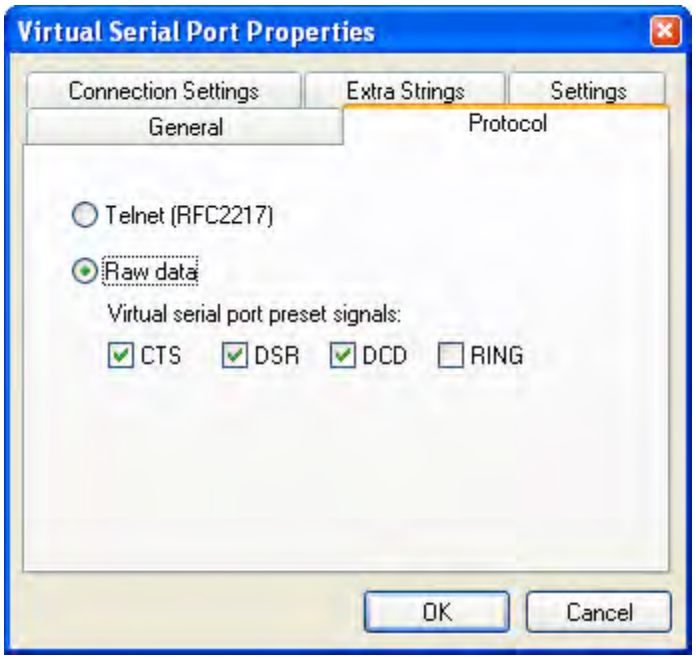
Communicating with your ProControl Using ProView

1. If you haven't done so already, download and install Serial Port Redirector software on your PC: www.fabulatech.com/serial-port-redirector-purchase.html Current purchase price is $99 for one license on one PC (discounts available for multiple licenses), and this can be used along with ProView to connect to any number of ProControl units. A free 15-day trial is available.
2. Serial Port Redirector creates a "virtual serial port" on your PC. Click the  icon and the following screen appears:

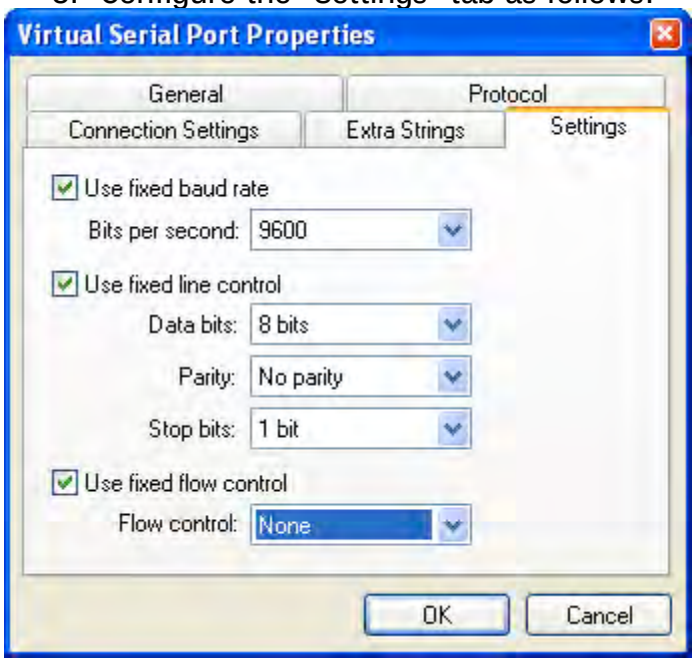


3. Choose a virtual serial port (COM1 – COM4) that is not already in use on your PC, enter the IP address of your IP modem, and enter 14000 into the "TCP-port" box.

4. Click the Advanced button to configure other settings as follows. In the Protocol tab, choose “Raw Data”:



5. Configure the “Settings” tab as follows:

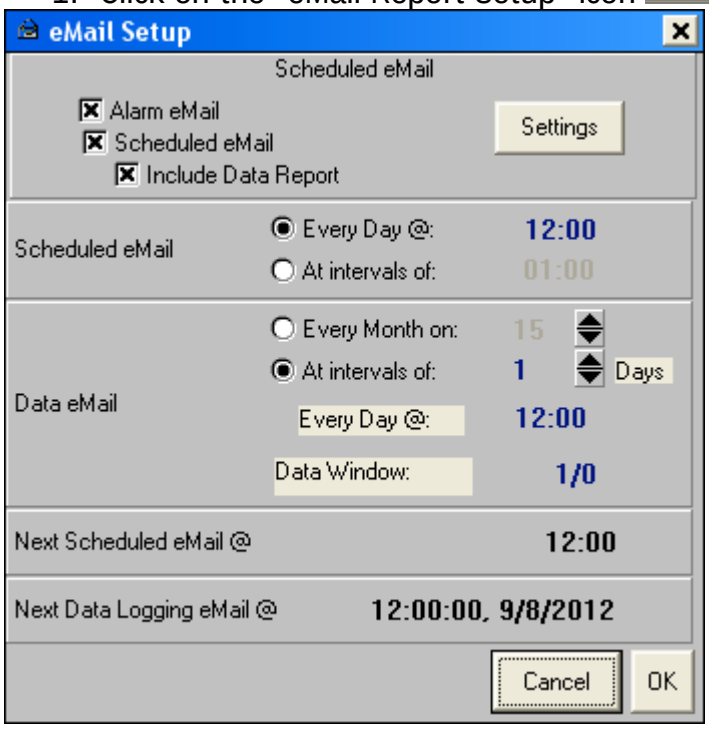


6. All other settings remain at default. Once you have established these settings, you will not need to change them again, unless you wish to connect to a different IP address.
7. Open ProView and open the appropriate site file. We recommend keeping the Serial Port Redirector screen visible on your desktop to view the status of the virtual serial port, and click on the Local Connect icon.

8. Choose the COM port that you just set up using Serial Port Redirector, and click the "Connect to ProControl" button. Please note that there is usually a delay of several seconds while your IP modem is located, at which point the connection in the small status light next to the "pipeline" in Serial Port Redirector will turn green. Only then will ProView start its Initial Query of your ProControl.
9. You may now use ProView as you normally would. *After you disconnect from the ProControl, please allow two minutes before attempting to reconnect.*

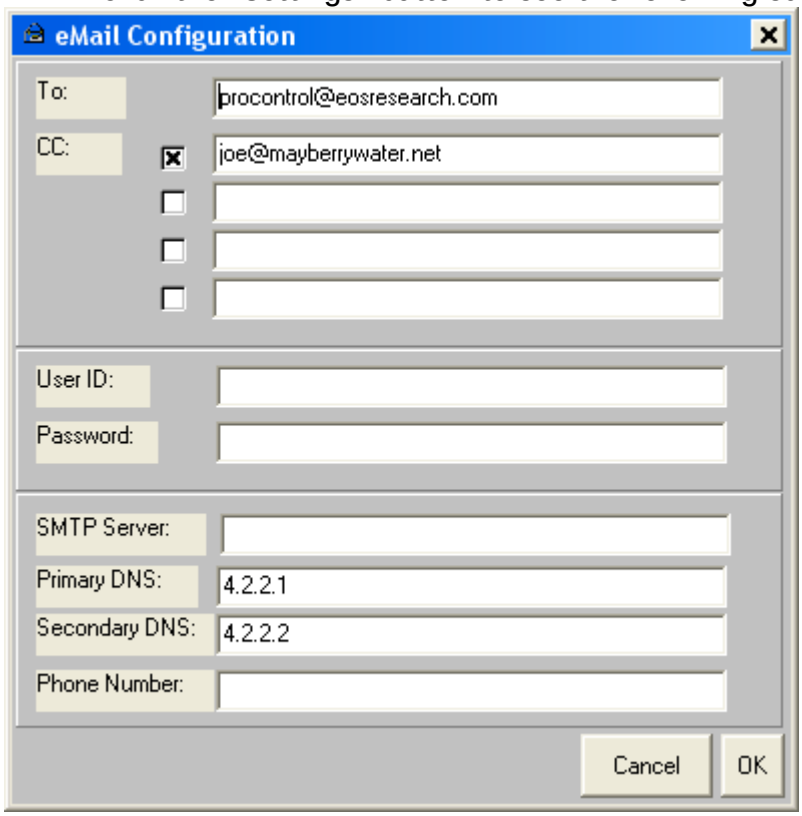
Email Report Settings

1. Click on the "eMail Report Setup" icon  and the following screen appears:



The report options are generally self-explanatory. Click the "Include Data Report" checkbox to have datalog files attached to the scheduled emails. The "Data Window" indicates the number of days/hours of data to include.

2. Click the “Settings” button to see the following screen:



Enter email addresses of the desired recipients here. Be sure to hit the “Enter” key after each entry. The only other settings in this window applicable to a cellular IP connected ProControl are the SMTP Server and DNS addresses. EOS Research personnel will configure these for you; please contact EOS Research before making any changes to these settings. Click the “OK” button to save the configuration.

Text Messaging

Contact EOS Research to set up outgoing alarm text messaging.

IMPORTANT NOTE ABOUT DATA USAGE:

Your cellular IP modem has been allocated a monthly usage allowance of 10 MB. This is easily sufficient for modest duration, daily connections to your ProControl using ProView, and outgoing email traffic from the ProControl. Avoid extended connection periods – you will be billed for monthly use over 10 MB at $7/MB.

MultiModem® iCell

Intelligent CDMA Cellular Modem



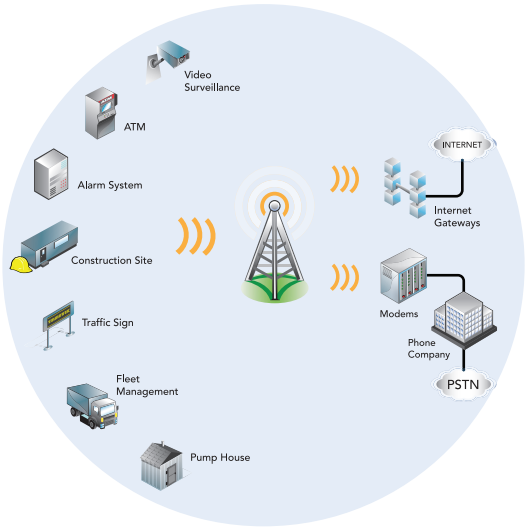
Benefits

- Intelligent Universal IP stack
- Enhanced M2M functionality
- Programmable GPIO ports
- Carrier approved

The MultiModem® iCell intelligent CDMA cellular modem offers standards-based dual-band CDMA2000 1xRTT performance. This ready-to-deploy, standalone modem provides wireless data communication and GPS tracking and integrates seamlessly with virtually any application. The intelligence of the embedded Universal IP™ stack allows for automatic/persistent connectivity for mission-critical applications and enhanced M2M functionality. The MultiModem iCell intelligent cellular modem is based on industry-standard open interfaces and can be desktop or panel mounted.

Features

- CDMA2000 1xRTT
- Dual-band 800/1900 MHz CDMA
- Intelligent Universal IP stack for enhanced machine-to-machine functionality
- Models with GPS tracking capability
- NMEA-0183 V3.01 compliant GPS messages
- Event monitoring and reporting via integrated GPIO ports
- Supports Short Message Service
- Available with RS-232 and USB 2.0 interfaces
- Packet data up to 153.6K bps
- Circuit-switched data up to 14.4K bps
- SMA antenna connector(s)
- Desktop or panel mounting
- FCC, IC and CDG certified
- AT command compatible
- Two-year warranty



MultiTech® Systems

Highlights

Applications. The MultiModem iCell intelligent cellular modem with CDMA support is ideal for highly data-intensive, mission-critical applications such as remote video surveillance and other multimedia applications where you are sending digital images, web pages and photographs. For asset tracking and fleet management applications, models with a dedicated GPS receiver are available.

Universal IP for Enhanced M2M Connectivity. Multi-Tech's Universal IP stack consists of a common set of TCP/IP networking protocols and M2M applications implemented using a standard AT command interface. Universal IP provides developers a common programming interface effectively future proofing their application as new cellular technologies are introduced. Some of the benefits of Universal IP are Automatic/Persistent Connectivity, Device Monitor, Event Monitoring/Reporting, Ping & TCP Keep Alive and Wake-up on Caller ID/Wake-up on Ring.

Reduces Development Time. The MultiModem iCell intelligent cellular modem can make your existing and next generation device communication-ready without requiring any hardware changes to its design. It actually provides faster time-to-market because it relieves the burden and expense of obtaining RF and carrier approvals.

Multiple Interface Options. The MultiModem iCell intelligent cellular modem is designed around a broad range of interface options including RS-232, USB and GPIO to provide you with seamless connectivity for your application. Each interface option offers unique features and benefits related to the technology it supports.

Comprehensive Service and Support. The Multi-Tech commitment to service means we provide a two-year product warranty and service that includes technical support, 24-hour web site and ftp support.

Ordering Information

Product	Description	Region
MTCMR-C1*	Intelligent CDMA Modem	Regional
MTCMR-C1-GP*	Intelligent CDMA Modem (GPS)	Regional
Ordering Codes		
-N2	For Sprint Networks (USA)	
-N3	For Verizon Wireless Networks (USA)	
-N16	For Aeris Communications Networks (USA)	
-NAM	Includes US Style Power Plug	

* Use ordering codes for specific build options. Go to www.multitech.com for detailed product model numbers.

Produced in the US of US and non-US components.

Features and specifications are subject to change without notice.

Trademarks / Registered Trademarks: MultiModem, Universal IP, Multi-Tech, and the Multi-Tech logo: Multi-Tech Systems, Inc. / All other products and technologies are the trademarks or registered trademarks of their respective holders.

Specifications

Packet Data Features
CDMA2000 1xRTT dual-band 800/1900 MHz
CDMA IS-95A, IS-95B backwards compatible

Circuit Switched Data
Asynchronous, non-transparent up to 14.4K bps

SMS Features
Text, Point-to-Point MO & MT, cell broadcast

Universal IP Features
TCP/IP features: DNS resolve, FTP client, Ping, POP3 client, PPP (dial-out), SMTP client, TCP RAW client & server, UDP RAW client & server, PAP, CHAP

GPS
Position: 2.5 meters
Aquisition: Hot start 1 second; cold start 29 seconds avg.
Sensitivity: Tracking -161 dBm
Protocol: NMEA-0183 V3.01, GGA, GLL, GSA, GSV, RMC, VTG

Connectors
RF & GPS Antenna: 50 ohm SMA female
RS-232: DE-9 female / USB: USB Type B
Power: 2.5mm miniature screw
GPIO: 6-pin Molex female with ESD protection

Power Requirements
9V to 32VDC

GPIO Functions
Pin 1-2: Digital input, 24V tolerance
Pin 3-4: Configurable as digital input (5V tolerant TTL/CMOS levels); digital outputs (3.3V high), or ADC inputs (0 to 3.3V rail)
Pin 5: ADC input (0 to 3.3V rail)
Pin 6: Ground (must be connected to the ground of the attached device)

Operating System Support
Windows 2000/XP/2003/Vista/2008/7 (32-bit/64-bit), Linux

Physical Description
4.9" w x 1.1" h x 3.5" d; 8 oz.
(12.4 cm x 2.8 cm x 8.9 cm; 227g)

Environment
Temperature Range: -40° to +185° F (-40° to +85° C)
Humidity: 20% to 90% RH non-condensing

Approvals
EMC Compliance: FCC Part 15 Class B
Radio Compliance: FCC Part 22, 24; RSS 132, 133
Safety Compliance: cUL 60950-1, UL 60950-1; IEC 60950-1
Network: CDG 1 & 2
RoHS Compliant

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MultiModem® iCell

MTCMR User Guide

MultiModem® iCell User Guide

Models: MTCMR-E1, -C1, -G2, -H5, -EV2, -EV3, optional -GP builds

Part Number: S000484, Version 9.1

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Contacting Multi-Tech

Knowledge Base

The Knowledge Base provides immediate access to support information and resolutions for all Multi-Tech products. Visit http://www.multitech.com/kb.go.

Support Portal

To create an account and submit a support case directly to our technical support team, visit: https://support.multitech.com.

Support

Business Hours: M-F, 9am to 5pm CT

Country	By Email	By Phone
Europe, Middle East, Africa:	support@multitech.co.uk	+(44) 118 959 7774
U.S., Canada, all others:	support@multitech.com	(800) 972-2439 or (763) 717-5863

Warranty

To read the warranty statement for your product, visit www.multitech.com/warranty.go. For other warranty options, visit www.multitech.com/es.go.

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Fax (763) 785-9874

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Product Overview

Overview

MultiModem iCell modems provide wireless data communications and integrate seamlessly with other applications. MultiModem iCell includes Universal IP® stack, which allows users to implement functions such as persistent connectivity and event monitoring.

Model Options

Model	Description
MTCMR-E1	Quad-band E-GPRS Class 12 performance
MTCMR-E1-GP	Quad-band E-GPRS Class 12 performance; GPS
MTCMR-C1	Multi-band CDMA2000 1xRTT performance
MTCMR-C1-GP	Multi-band CDMA2000 1xRTT performance; GPS
MTCMR-G2	Quad-band GSM/GPRS Class 10 performance
MTCMR-G2-GP	Quad-band GSM/GPRS Class 10 performance; GPS
MTCMR-H5	Standards based tri-band UMTS/HSPA performance
MTCMR-H5-GP	Standards based tri-band UMTS/HSPA performance; GPS
MTCMR-EV2	Dual-band 800/1900 MHz with receive diversity support on EVDO bands
MTCMR-EV2-GP	Dual-band 800/1900 MHz with receive diversity support on EVDO bands; GPS
MTCMR-EV3	Dual-band 800/1900 MHz with receive diversity support on EVDO bands
MTCMR-EV3-GP	Dual-band 800/1900 MHz with receive diversity support on EVDO bands; GPS

Related Documentation

Use AT Commands to configure your device. The following documentation is available on the Multi-Tech website at www.multitech.com/setup/product.go.

Model	Document
All	S000457 Universal IP AT Commands Reference Guide
MTCMR-H5	S000528 HSPA+ AT Commands Reference Guide
MTCMR-EV3	S000546 EV-DO and CDMA AT Commands Reference Guide
MTCMR-EV2	S000482 CDMA 1xEV-DO AT Commands Reference Guide
MTCMR-G2	S000463 GPRS G2 Modems AT Commands Reference Guide
MTCMR-E1	S000474 Wireless EDGE (E1) Modems AT Commands Reference Guide
MTCMR-C1	S000478 CDMA-C1 AT Commands Reference Guide
MTCMR-C2	S000546 EV-DO and CDMA AT Commands Reference Guide

Package Contents

Note: For HSPA+, EDGE, and GPRS devices, your wireless provider supplies the SIM card. Other models do not use SIM cards.

Unbundled Package with No Accessories	Bundled Package with Accessories
1 modem **Note:** Package does not include mounting screws, AC or DC power supply, and antenna(s).	1 modem 1 antenna (-GP builds have an additional GPS antenna) 1 RS-232 cable 1 USB cable 1 GPIO cable 1 power supply (-GP builds do not include power supply) **Note:** Package does not include mounting screws

Safety Notices and Warnings

General Safety

The modem is designed for and intended to be used in fixed and mobile applications. Fixed means the device is physically secured at one location and cannot be easily moved to another location. Mobile means the device is used in other than fixed locations.

CAUTION: Maintain a separation distance of at least 20 cm (8 inches) between the transmitter's antenna and the body of the user or nearby persons. The modem is not designed for or intended to be used in portable applications within 20 cm (8 inches) of the user's body.

Radio Frequency (RF) Safety

Due to the possibility of radio frequency (RF) interference, it is important that you follow any special regulations regarding the use of radio equipment. Follow the safety advice given below.

- Operating your device close to other electronic equipment may cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers' recommendations.
- Different industries and businesses restrict the use of cellular devices. Respect restrictions on the use of radio equipment in fuel depots, chemical plants, or where blasting operations are in process. Follow restrictions for any environment where you operate the device.
- Do not place the antenna outdoors.
- Switch OFF your wireless device when in an aircraft. Using portable electronic devices in an aircraft may endanger aircraft operation, disrupt the cellular network, and is illegal. Failing to observe this restriction may lead to suspension or denial of cellular services to the offender, legal action, or both.
- Switch OFF your wireless device when around gasoline or diesel-fuel pumps and before filling your vehicle with fuel.
- Switch OFF your wireless device in hospitals and any other place where medical equipment may be in use.

Interference with Pacemakers and Other Medical Devices

Potential interference

Radiofrequency energy (RF) from cellular devices can interact with some electronic devices. This is electromagnetic interference (EMI). The FDA helped develop a detailed test method to measure EMI of implanted cardiac pacemakers and defibrillators from cellular devices. This test method is part of the Association for the Advancement of Medical Instrumentation (AAMI) standard. This standard allows manufacturers to ensure that cardiac pacemakers and defibrillators are safe from cellular device EMI.

The FDA continues to monitor cellular devices for interactions with other medical devices. If harmful interference occurs, the FDA will assess the interference and work to resolve the problem.

Precautions for pacemaker wearers

If EMI occurs, it could affect a pacemaker in one of three ways:

- Stop the pacemaker from delivering the stimulating pulses that regulate the heart's rhythm.
- Cause the pacemaker to deliver the pulses irregularly.
- Cause the pacemaker to ignore the heart's own rhythm and deliver pulses at a fixed rate.

Based on current research, cellular devices do not pose a significant health problem for most pacemaker wearers. However, people with pacemakers may want to take simple precautions to be sure that their device doesn't cause a problem.

- Keep the device on the opposite the side of the body from the pacemaker to add extra distance between the pacemaker and the device.
- Avoid placing a turned-on device next to the pacemaker (for example, don't carry the device in a shirt or jacket pocket directly over the pacemaker).

Vehicle Safety

When using your device in a vehicle:

- Do not use this device while driving.
- Respect national regulations on the use of cellular devices in vehicles.
- If incorrectly installed in a vehicle, operating the wireless device could interfere with the vehicle's electronics. To avoid such problems, use qualified personnel to install the device. The installer should verify the vehicle electronics are protected from interference.
- Using an alert device to operate a vehicle's lights or horn is not permitted on public roads.
- UL evaluated this device for use in ordinary locations only. UL did NOT evaluate this device for installation in a vehicle or other outdoor locations. UL Certification does not apply or extend to use vehicles or outdoor applications or in ambient temperatures above 40° C.

User Responsibility

Respect all local regulations for operating your wireless device. Use the security features to block unauthorized use and theft.

Device Maintenance

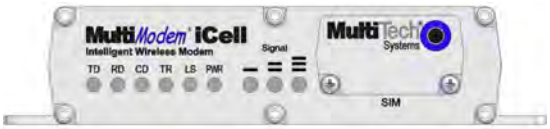
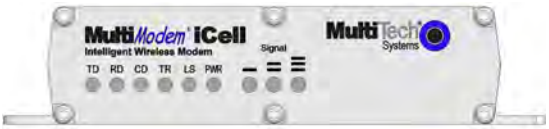
When maintaining your device:

- Do not attempt to disassemble the device. There are no user serviceable parts inside.
- Do not expose your device to any extreme environment where the temperature or humidity is high.
- Do not expose the device to water, rain, or spilled beverages. It is not waterproof.
- Do not place the device alongside computer discs, credit or travel cards, or other magnetic media. The information contained on discs or cards may be affected by the device.
- Using accessories, such as antennas, that Multi-Tech has not authorized or that are not compliant with Multi-Tech's accessory specifications may invalidate the warranty.

If the device is not working properly, contact Multi-Tech Technical Support.

LEDs, Connectors, and Specifications

Front

MTCMR-E1, -G2, -H5	MTCMR-C1, -EV2, -EV3
	

LEDs

LED	Description		
TD	**Transmit Data:** Lights when device transmits data. Not valid while in USB mode.		
RD	**Receive Data:** Lights when device receives data. Not valid while in USB mode.		
CD	**Carrier Detect:** Lights when there is a data connection. Not valid while in USB mode.		
LS	**Link Status:** LED behavior depends on model.		
	H5, EV3, and EV2 models	**G2 and C1 models**	**E1 model** **Note:** Set AT^SSYNC to 1 for the following default LED timings:
	Continuous ON indicates device is powered on and registered on the network.	Continuous ON indicates device is not registered on the network.	Continuous ON indicates connected to remote party (CSD call).
	Slow flashing (5 seconds) indicates device is on and searching for a network.	Flashing at 200 ms on / 2 sec indicates registration on network.	**Flashing at 600 ms on/600 ms off** is limited network service: No SIM card inserted or no PIN entered, or network search in progress or ongoing user authentication, or network login in progress.
	Fast flashing (0.3 seconds) indicates device is transmitting or receiving.	Flashing at 200 ms on / 600 ms off indicates it is registered on a network and communication is in progress.	**Flashing at 75 ms on/3 sec off** is idle mode: Registered to the GSM network (monitoring control channels and user interactions). No call is in progress.

LED	Description		
	OFF indicates device is turned off or not powered.	OFF indicates device is turned off or in download mode.	**Flashing at 75 ms on/ 75 ms off/75 ms on/3 sec off** indicates one or more GPRS contexts activated.
			Flashing at 500 ms on/ 25 ms off indicates packet switched data transfer in progress.
			OFF indicates ME is in one of the following modes: power down mode, airplane mode, non-cyclic sleep mode with no temporary wake-up event in progress.
TR	**Terminal Ready:** Indicates a readiness signal from the PC.		
PWR/GPS	**Power:** Lights device has DC power.		
	GPS: If device has valid GPS signal, LED blinks at 1 second ON and 0.5 second OFF. If invalid GPS signal, LED is solid.		
Signal	■ **ALL OFF** – Unit is off, not registered on a network or has an extremely weak signal (0 < = RSSI < 6). ■ **1 Bar ON** – Very weak signal (7 < = RSSI < 14) ■ **1 and 2 Bars ON** – Weak signal (15 < = RSSI < 23) ■ **1, 2, and 3 Bars ON** – Good signal (24 < = RSSI < 31)		

Back

MTCMR No GPS	MTCMR with GPS
	

MTCMR-H5 Specifications

Category	Description
General	
Performance	HSPA+
Frequency Bands	Penta band 850/900/1700/1900/2100 MHz
Speed	
Packet Data	HSDPA data service of up to 21.0 Mbps
	HSUPA data service of up to 5.76 Mbps
Physical Description	
Weight	0.45 lbs. (200 g)
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style
Power	2.5mm miniature (screw-on)
USB	Type B
SIM Holder	Standard 1.8V and 3V
Environment	
Operating Temperature	-22° to 158° F (-30° to 70° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS, Wi-Fi, Bluetooth	
SMS	Point-to-Point messaging
	Text and PDU
	Cell broadcast
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B
	EN55022 Class B

Category	Description
Radio Compliance	FCC Part 22
	FCC Part 24
	RSS 132
	RSS 133
	EN 301 511
	EN 301 489-1
	EN 301 489-3 (GPS models only)
	EN 301 489-7
	EN 301 489-24
	EN 301 908
	AS/ACIF S042.1, S042.3
Safety Compliance	UL/cUL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1
Network Compliance	PTCRB
	AT&T

[1]UL Listed at 40° C, limited by power supply. UL Certification does not apply or extend to an ambient above 40° C and has not been evaluated by UL for ambient greater than 40° C. “UL has evaluated this device for use in ordinary locations only. Installation in a vehicle or other outdoor locations has not been evaluated by UL. UL Certification does not apply or extend to use in vehicles or outdoor applications or in ambient above 40° C.”

MTCMR-EV3 Specifications

Category	Description
General	
Performance	EV-DO Rev A
Frequency Bands	Dual band 900/1800 MHz
Speed	
Packet Data	Up to 3.1M downlink and 5.76M bps uplink
Physical Description	
Weight	0.45 lbs. (200 g)
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style

Category	Description
Power	2.5mm miniature (screw-on)
USB	Type B
Environment	
Operating Temperature	-22° to 185° F (-30° to 85° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS, Wi-Fi, Bluetooth	
SMS	Point-to-Point messaging
	Text and PDU
	Cell broadcast
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B
	EN55022 Class B
	EN55024
Radio Compliance	FCC Part 22
	FCC Part 24
Safety Compliance	UL/cUL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1

[1]UL Listed at 40° C, limited by power supply. UL Certification does not apply or extend to an ambient above 40° C and has not been evaluated by UL for ambient greater than 40° C. “UL has evaluated this device for use in ordinary locations only. Installation in a vehicle or other outdoor locations has not been evaluated by UL. UL Certification does not apply or extend to use in vehicles or outdoor applications or in ambient above 40° C.”

MTCMR-EV2 Specifications

Category	Description
General	
Performance	EV-DO Rev A backwards compatible to EV-DO Rev 0 and CDMA2000 1xRTT
Frequency Bands	Dual band 800/1900 MHz
Speed	
Packet Data	Up to 3.1 Kbps download and 1.8 Kbps upload.
Circuit Switched Data	IS-95A, IS-95B up to 14.4K bps
Physical Description	
Weight	0.45 lbs. (200 g)

Category	Description
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style
Power	2.5mm miniature (screw-on)
USB	Type B
Environment	
Operating Temperature	-22° to 185° F (-30° to 85° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS, Wi-Fi, Bluetooth	
SMS	Point-to-Point messaging
	Text and PDU
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B
	EN55022 Class B
Radio Compliance	FCC Part 22
	FCC Part 24
Safety Compliance	UL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1

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MTCMR-G2 Specifications

Category	Description
General	
Performance	GPRS: Class 10
Frequency Bands	Quad-band GSM/GPRS/EDGE: 850/900/1800/1900 MHz
Speed	
Packet Data	Up to 85.6K bps, coding schemes CS1 to CS4
Circuit Switched Data	Up to 14.4 Kbps transparent and non-transparent
Physical Description	
Weight	0.45 lbs. (200 g)
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style
Power	2.5mm miniature (screw-on)
USB	Type B
SIM Holder	Standard 1.8V and 3V
Environment	
Operating Temperature	-40° to 185° F (-40° to 85° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS, Wi-Fi, Bluetooth	
SMS	Point-to-Point messaging
	Text and PDU
	Cell broadcast
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B
	EN55022 Class B

Category	Description
Radio Compliance	FCC Part 22
	FCC Part 24
	RSS 132
	RSS 133
	EN 301 511
	EN 301 489-1
	EN 301 489-3 (GPS models only)
	EN 301 489-7
	EN 301 908
	AS/ACIF S042.1, S042.3
Safety Compliance	UL/cUL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1
Network Compliance	PTCRB
	AT&T

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MTCMR-C1 Specifications

Category	Description
General	
Performance	CDMA2000 1xRTT
Frequency Bands	Dual band 800/1900 MHz
Speed	
Packet Data	Up to 153.6K bps forward and reverse
Circuit Switched Data	IS-95A, IS-95B up to 14.4K bps forward and reverse
Physical Description	
Weight	0.45 lbs. (200 g)
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style

Category	Description
Power	2.5mm miniature (screw-on)
USB	Type B
Environment	
Operating Temperature	-40° to 185° F (-40° to 85° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS	
SMS	Point-to-Point messaging
	Text and PDU
	Cell broadcast
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B
	EN55022 Class B
Radio Compliance	FCC Part 22
	FCC Part 24
	RSS 132
	RSS 133
Safety Compliance	UL/cUL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1

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MTCMR-E1 Specifications

Category	Description
General	
Performance	EDGE: E-GPRS Class 12
	GPRS: Class 10
Frequency Bands	Quad-band GSM/GPRS/EDGE: 850/900/1800/1900 MHz
Speed	

Category	Description
Packet Data	EDGE: E-GPRS Up to 240K bps, coding scheme MCS 1-9, mobile station Class B, LLC layer, 4 time slots.
	GPRS: Full PBCCH support, coding scheme 1-4, mobile station Class B
Circuit Switched Data	Up to 14.4K bps, non-transparent
Physical Description	
Weight	0.45 lbs. (200 g)
Dimensions	3.1 in x 4.9 in x 1.1 in (7.9 cm x 12.4 cm x 2.8 cm)
Connectors	
Cellular	50 ohm SMA (female connector)
RS-232	DE9
GPIO	6 pin 2x3 style
Power	2.5mm miniature (screw-on)
USB	Type B
SIM Holder	Standard 1.8V and 3V
Environment	
Operating Temperature	-22° to 158° F (-30° to 70° C)[1]
Humidity	20%-90% relative humidity, non-condensing
Power Requirements	
Voltage	9V to 32V DC
SMS, Wi-Fi, Bluetooth	
SMS	Point-to-Point messaging
	Text and PDU
	Cell broadcast
Certifications and Compliance	
EMC Compliance	EN55022 Class B

Category	Description
Radio Compliance	FCC Part 22
	FCC Part 24
	RSS 132
	RSS 133
	EN 301 511
	EN 301 489-1
	EN 301 489-3 (GPS models only)
	EN 301 489-7
	EN 301 908
	AS/ACIF S042.1, S042.3
Safety Compliance	UL/cUL 60950-1 2nd Ed
	IEC60950-1 2nd Ed am.1
Network Compliance	PTCRB
	AT&T

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Power Measurements

Multi-Tech Systems, Inc. recommends that you incorporate a 10% buffer into your power source when determining product load.

Note: Note the following:

- **Maximum:** The continuous current during maximum data rate with the radio transmitter at maximum power.
- **Peak:** The peak current during a transmission burst period.
- **In-rush Current:** The input current during power up, or a reset.

MTCMR-H5

GSM 850

	Idle	Typical	Maximum	Peak TX	In-rush Current
9 volts					
Current (AMPS)	0.057	0.080	0.185	1.18	1.61
Watts	0.526	0.740	1.700		
20 volts					
Current (AMPS)	0.030	0.044	0.087	0.530	1.71
Watts	0.600	0.880	1.740		
32 volts					
Current (AMPS)	0.021	0.031	0.054	0.332	1.46
Watts	0.672	0.992	1.73		

HSPA+

	Idle	Typical	Maximum	Peak TX	In-rush Current
9 volts					
Current (AMPS)	0.057	0.140	0.270	0.340	1.61
Watts	0.526	1.290	2.47		
20 volts					
Current (AMPS)	0.030	0.070	0.131	0.196	1.71
Watts	0.600	1.400	2.62		
32 volts					
Current (AMPS)	0.021	0.048	0.086	0.152	1.46
Watts	0.672	1.54	2.75		

MTCMR-H5-GP

GSM 850

	Idle	Typical	Maximum	Peak TX	In-rush Current
9 volts					
Current (AMPS)	0.097	0.125	0.225	1.32	1.63
Watts	0.895	1.150	2.070		
20 volts					
Current (AMPS)	0.051	0.063	0.108	0.570	1.74
Watts	1.020	1.260	2.160		
32 volts					
Current (AMPS)	0.035	0.043	0.072	0.340	1.47
Watts	1.120	1.380	2.300		

HSPA+

	Idle	Typical	Maximum	Peak TX	In-rush Current
9 volts					
Current (AMPS)	0.096	0.182	0.310	0.384	1.63
Watts	0.890	1.670	2.840		
20 volts					
Current (AMPS)	0.051	0.092	0.153	0.220	1.74
Watts	1.020	1.840	3.060		
32 volts					
Current (AMPS)	0.035	0.062	0.100	0.164	1.47
Watts	1.120	1.980	3.200		

MTCMR-EV3

CDMA 2000

	Typical	Maximum	Peak TX	In-rush Current
9 volts				
Current (AMPS)	0.121	0.330	0.404	2.55
Watts	1.09	2.97		
20 volts				
Current (AMPS)	0.061	0.155	0.228	1.89
Watts	1.22	3.10		
32 volts				

	Typical	Maximum	Peak TX	In-rush Current
Current (AMPS)	0.045	0.107	0.176	1.70
Watts	1.44	3.42		

EV-DO

	Typical	Maximum	Peak TX	In-rush Current
9 volts				
Current (AMPS)	0.118	0.275	0.360	2.55
Watts	1.06	2.48		
20 volts				
Current (AMPS)	0.061	0.133	0.204	1.89
Watts	1.22	2.66		
32 volts				
Current (AMPS)	0.043	0.091	0.156	1.70
Watts	1.38	2.91		

MTCMR-EV3-GP

CDMA 2000

	Typical	Maximum	Peak TX	In-rush Current
9 volts				
Current (AMPS)	0.160	0.354	0.430	2.42
Watts	1.44	3.19		
20 volts				
Current (AMPS)	0.086	0.173	0.24	1.86
Watts	1.72	3.46		
32 volts				
Current (AMPS)	0.049	0.110	0.18	1.65
Watts	1.57	3.52		

EV-DO

	Typical	Maximum	Peak TX	In-rush Current
9 volts				
Current (AMPS)	0.168	0.330	0.412	2.42
Watts	1.51	2.97		
20 volts				

	Typical	Maximum	Peak TX	In-rush Current
Current (AMPS)	0.084	0.158	0.232	1.86
Watts	1.68	3.16		
32 volts				
Current (AMPS)	0.056	0.105	0.176	1.65
Watts	1.79	3.36		

MTCMR-EV2

CDMA 2000

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.061	0.160	0.485
Watts	0.56	1.47	4.41
20 volts			
Current (AMPS)	0.030	0.081	0.230
Watts	0.60	1.62	4.60
32 volts			
Current (AMPS)	0.023	0.055	0.152
Watts	0.74	1.76	4.86

EV-DO

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.108	0.330	0.580
Watts	1.00	3.04	5.27
20 volts			
Current (AMPS)	0.052	0.165	0.313
Watts	1.04	3.30	6.26
32 volts			
Current (AMPS)	0.041	0.105	0.205
Watts	1.31	3.36	6.56

MTCMR-EV2

CDMA 2000

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.119	0.220	0.560
Watts	1.10	2.02	5.09
20 volts			
Current (AMPS)	0.062	0.110	0.265
Watts	1.24	2.20	5.30
32 volts			
Current (AMPS)	0.044	0.075	0.175
Watts	1.141	2.40	5.60

EV-DO

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.167	0.370	0.625
Watts	1.54	3.40	5.68
20 volts			
Current (AMPS)	0.087	0.192	0.345
Watts	1.74	3.84	6.90
32 volts			
Current (AMPS)	0.062	0.121	0.225
Watts	1.198	3.87	7.20

MTCMR-G2

	Sleep	Typical	Maximum	Peak TX
9 volts				
Current (AMPS)	0.069	0.109	0.194	1.53
Watts	0.640	1.010	1.790	
20 volts				
Current (AMPS)	0.038	0.056	0.096	0.668
Watts	0.760	1.120	1.920	
32 volts				
Current (AMPS)	0.030	0.041	0.065	0.453
Watts	0.960	1.300	2.100	

MTCMR-G2-GP

	Sleep	Typical	Maximum	Peak TX
9 volts				
Current (AMPS)	0.083	0.130	0.233	1.83
Watts	0.770	1.190	2.130	
20 volts				
Current (AMPS)	0.046	0.067	0.115	0.801
Watts	0.920	1.340	2.300	
32 volts				
Current (AMPS)	0.036	0.050	0.078	0.543
Watts	1.150	1.600	2.500	

MTCMR-C1

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.048	0.128	0.360
Watts	0.44	1.18	3.31
20 volts			
Current (AMPS)	0.027	0.065	0.171
Watts	0.54	1.30	3.42
32 volts			
Current (AMPS)	0.021	0.046	0.115

	Sleep	Typical	Maximum
Watts	0.67	1.47	3.68

MTCMR-C1-GP

	Sleep	Typical	Maximum
9 volts			
Current (AMPS)	0.096	0.175	0.435
Watts	0.89	1.62	4.00
20 volts			
Current (AMPS)	0.052	0.092	0.205
Watts	1.04	1.84	4.10
32 volts			
Current (AMPS)	0.037	0.062	0.135
Watts	1.18	1.98	4.32

MTCMR-E1

	Sleep	Typical	Maximum	Peak TX
9 volts				
Current (AMPS)	0.091	0.149	0.416	2.5
Watts	0.84	1.37	3.77	
20 volts				
Current (AMPS)	0.048	0.077	0.190	0.895
Watts	0.96	1.54	3.80	
32 volts				
Current (AMPS)	0.034	0.054	0.124	0.625
Watts	1.088	1.73	3.97	

MTCMR-E1-GP

	Sleep	Typical	Maximum	Peak TX
9 volts				
Current (AMPS)	0.098	0.160	0.410	2.25
Watts	0.91	1.48	3.77	
20 volts				
Current (AMPS)	0.051	0.080	0.190	0.890
Watts	1.02	1.60	3.80	

	Sleep	Typical	Maximum	Peak TX
32 volts				
Current (AMPS)	0.035	0.056	0.122	0.609
Watts	1.125	1.79	3.90	

RF Specifications

	GSM 850	EGSM 900	GSM 1800	GSM 1900	CDMA 800	CDMA 1900
Frequency RX	869 to 894 MHz	925 to 960 MHz	1805 to 1800 MHz	1930 to 1990 MHz	869 to 894 MHz	1930 to 1990 MHz
Frequency TX	824 to 849 MHz	880 to 915 MHz	1710 to 1785 MHz	1850 to 1910 MHz	824 to 849 MHz	1850 to 1910 MHz
RF Power Stand	2W at 12.5% duty cycle	2W at 12.5% duty cycle	1W at 12.5% duty cycle	1W at 12.5% duty cycle	--	--

Antenna Information

GSM/EGSM Antenna Requirements/Specifications

Category	Description
Frequency Range	824—960 MHz / 1710—1990 MHz
Impedance	50 Ohms
VSWR	VSWR should not exceed 2.0:1 at any point across the bands of operation
Typical Radiated Gain	3 dBi on azimuth plane
Radiation	Omni-directional
Polarization	Linear Vertical
Wave	Half Wave Dipole

Antennas Available from Multi-Tech

Part Number	Description	Quantity
Quad Band		
ANQB-1HRA	Hinged Right Angle 800/900/1800/1900 MHz Cellular Antenna, 7.5"	1
ANQB-10HRA	Hinged Right Angle 800/900/1800/1900 MHz Cellular Antenna, 7.5"	10
ANQB-50HRA	Hinged Right Angle 800/900/1800/1900 MHz Cellular Antenna, 7.5"	50
Penta Band		
ANPB-1HRA	Hinged Right Angle Penta Band Antenna	1
ANPB-10HRA	Hinged Right Angle Penta Band Antenna	10
Dual Band		

Part Number	Description	Quantity
ANF1-1HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	1
ANF1-10HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	10
ANF1-50HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	50
ANF2-1HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	1
ANF2-10HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	10
ANF2-50HRA	Hinged Right Angle 900/1800 MHz Cellular Antenna, 4"	50
Bluetooth and Wi-Fi		
ANBT-1	Hinged 2.4 MHz Bluetooth/Wi-Fi Antenna, 4"	1
ANBT-10	Hinged 2.4 MHz Bluetooth/Wi-Fi Antenna, 4"	10
Mag Mount Dual Band		
ANF1-1MMHW	Mag Mount 900/1800 MHz 1/2 Wave Cellular Antenna, 12.5"	1
ANF1-10MMHW	Mag Mount 900/1800 MHz 1/2 Wave Cellular Antenna, 12.5"	10
ANF1-50MMHW	Mag Mount 900/1800 MHz 1/2 Wave Cellular Antenna, 12.5"	50
ANF1-1MMQW	Mag Mount 900/1800 MHz 1/4 Wave Cellular Antenna, 4"	10
ANF1-10MMQW	Mag Mount 900/1800 MHz 1/4 Wave Cellular Antenna, 4"	10
ANF1-50MMQW	Mag Mount 900/1800 MHz 1/4 Wave Cellular Antenna, 4"	50
ANCF2-1MMHW	Mag Mount 850/1900 MHz 1/2 Wave Cellular Antenna, 12.5"	1
ANCF2-10MMHW	Mag Mount 850/1900 MHz 1/2 Wave Cellular Antenna, 12.5"	10
ANCF2-50MMHW	Mag Mount 850/1900 MHz 1/2 Wave Cellular Antenna, 12.5"	50
ANCF2-1MMQW	Mag Mount 850/1900 MHz 1/4 Wave Cellular Antenna, 4"	1
ANCF2-10MMQW	Mag Mount 850/1900 MHz 1/4 Wave Cellular Antenna, 4"	10
ANCF2-50MMQW	Mag Mount 850/1900 MHz 1/4 Wave Cellular Antenna, 4"	50
GPS		
ANGPS-1MM	Mag Mount GPS Antenna, 5 Meter Cable	1
ANGPS-10MM	Mag Mount GPS Antenna, 5 Meter Cable	10

PTCRB Requirements

There cannot be any alteration to the authorized antenna system. The antenna system must be the same type with similar in-band and out-of-band radiation patterns and maintain the same specifications.

FCC Requirements Note

FCC Requirements Note The antenna gain, including cable loss, for the radio you are incorporating into your product design must not exceed the requirements at 850 MHz and 1900 MHz as specified by the FCC grant for mobile operations and fixed mounted operations as defined in 2.1091 and 1.1307 of the FCC rules for satisfying RF exposure compliance. The antenna used for transmitting must be installed to provide a separation distance of at least 20 cm from all persons and must not transmit simultaneously with any other antenna transmitters. User and

installers must be provided with antenna installation instructions and transmitter operating conditions to satisfying RF exposure compliance.

Global Positioning System (GPS)

This information applies only to the models with the GPS option.

Category	Description
Receiver Type	L1 Frequency GPS C/A code SBAS Capable 51 Channel Acquisitions 14 Channel Tracking
Sensitivity Tracking	-161dBm
Accuracy	Position 2.5m CEP Velocity 0.1m/sec
Update Rate	1Hz standard
Dynamics	4G
Open Sky TTFF	Hot start 1 second Cold start 29 seconds average Reacquisition < 1s
Operational Limits	Altitude < 18,000m or Velocity < 515m/s
Datum	Default WGS-84
Interface	UART
Protocol	NMEA-0183 V3.01, GGA, GLL, GSA, GSV, RMC, VTG

Underwriters Laboratories, Inc. Global Positioning System (GPS) Statement

Underwriters Laboratories Inc.(“UL”) has not tested the performance or reliability of the Global Positioning System (“GPS”) hardware, operating software or other aspects of this product. UL has only tested for fire, shock or casualties as outlined in UL’s Standard(s) for Safety. UL60950-1 Certification does not cover the performance or reliability of the GPS hardware and GPS operating software. UL MAKES NO REPRESENTATIONS, WARRANTIES OR CERTIFICATIONS WHATSOEVER REGARDING THE PERFORMANCE OR RELIABILITY OF ANY GPS RELATED FUNCTIONS OF THIS PRODUCT.

Connecting Direct DC Power accessories

To connect direct DC power in a vehicle:

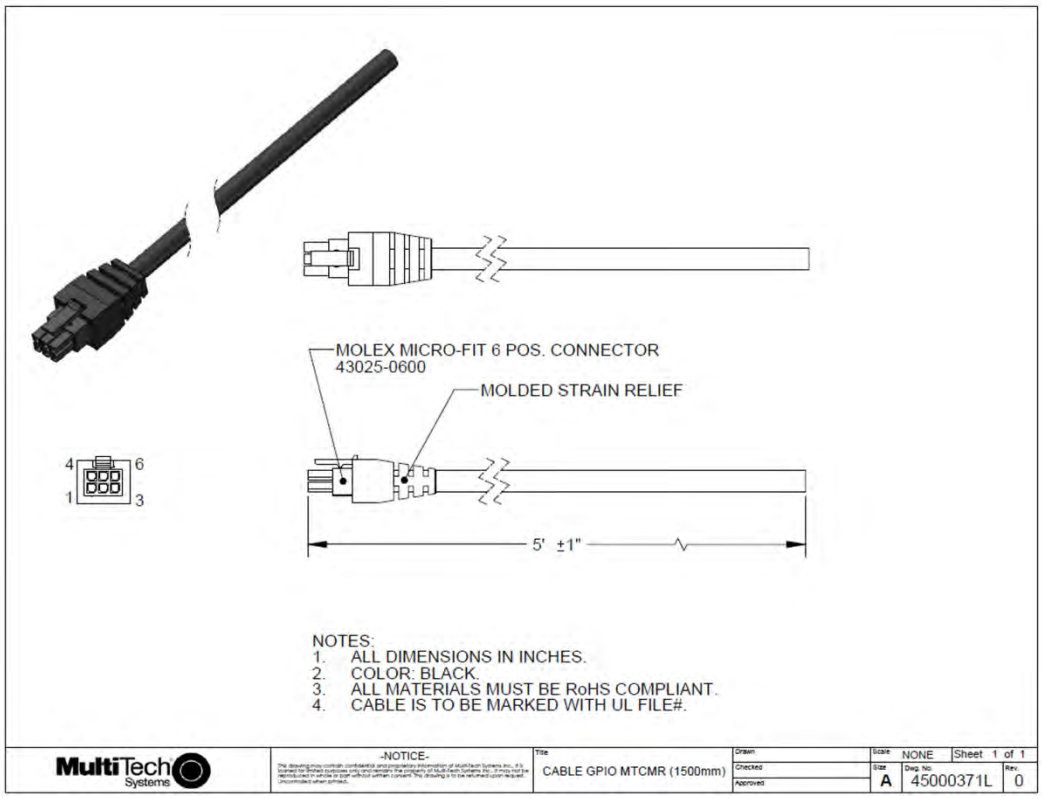
Warning: The device has over-voltage protection. To ensure complete protection, you can add additional filtering to the DC input.
Note: For automotive applications you can use permanent “+” or keyswitched “+” source.

1. Connect the DC power cable to the power connector on the modem.

2. Attach the two wires at the DC power cable's other end to a DC fuse/terminal block where you are mounting the device.
3. Connect red wire to the "+" (positive) terminal and black wire to the "–" (negative) terminal.
4. Verify the ground connection is correct.

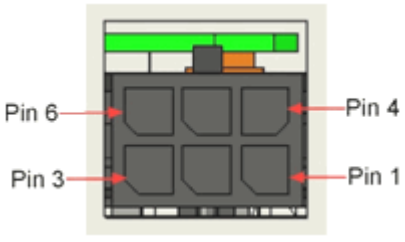
GPIO

GPIO Cable



GPIO Connector

Use Universal IP (UIP) AT Commands to configure GPIO pins. Refer to the Universal IP (UIP) AT Command Reference Guide for more information.

Pin Number	Description	GPIO 6-pin Connector
Pin 1	DIO 0	
Pin 2	DIO 1	
Pin 3	DIO 2/ADC 0	
Pin 4	DIO 3/ADC 1	
Pin 5	ADC2	
Pin 6	Gnd	

You can program GPIO pins independently.

- Pin 1 Digital Input, 24 Volt tolerant.
- Pin 2 Digital Input, 24 Volt tolerant.
- Configure Pin 3 as either Digital Input (5V tolerant TTL/CMOS levels), Digital Output (3.3V High) or as an ADC input (0 to 3.3V rail)
- Configure Pin 4 as either Digital Input (5V tolerant TTL/CMOS levels), Digital Output (3.3V High) or as an ADC input (0 to 3.3V rail)
- Pin 5, ADC input (0 to 3.3V rail)
- Pin 6 is GND and must be connected to the ground of the attached device

GPIO DC Characteristics

Pins 1-5 contain ESD protection.

Pins 1, 2 Input Voltage

Parameter	Min	Max	Units
Input Low-level Voltage	0.3	1.0	V
Input High-level Voltage	3.0	24	V

Pins 1,2 are digital input only.

Pins 3,4 Input Voltage

Parameter	Min	Max	Units
Input Low-level Voltage	-0.3	0.8	V
Input High-level Voltage	2.0	5.5	V

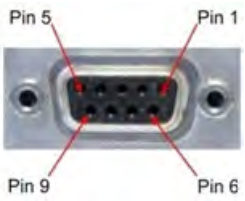
Pins 3,4 Output Voltage

Parameter	Min	Max	Units
Output Low-level Voltage	0.0	0.4	V
Output High-level Voltage	2.9	3.3	V

Pins 3,4 Output Current

Parameter	Min	Max	Units
Output Current	-	2	mA

RS-232 9-Pin Female Connector



Pin	Abbreviation	Description	In/Out
1	CD	Carrier Detect	O
2	RX	Receive	O
3	TX	Transmit	I
4	DTR	Data Terminal Ready	I
5	GND	Ground	--
6	DSR	Data Set Ready	O
7	RTS	Request to Send	I
8	CTS	Clear to Send	O
9	RI	Ring Indicator	O

Device Activation and Installation

Account Activation for Cellular Devices

Some Multi-Tech cellular modems are pre-configured to operate on a specific cellular network, such as Sprint or Verizon Wireless. Before you can use the modem, you must set up a cellular data account with your service provider. Each service provider has its own process for adding devices to their network. Refer to Multi-Tech's Cellular Activation site http://www.multitech.com/activation.go for step-by-step instructions on activating your cellular modem with your service provider.

Device Phone Number

Every device has a unique phone number. Your service provider supplies a phone number when you activate your account, or if your device has a SIM card, the phone number may be on it. Wireless service provider implementation may vary. Consult with your service provider to get the phone number for your device.

Installing and Removing SIM Cards

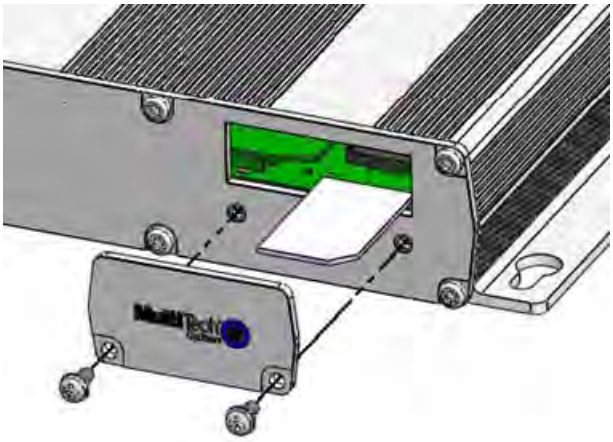
Installing a SIM Card

Some models require a SIM card, which is supplied by your service provider. To install the SIM card:

You need:

- Phillips screwdriver
- SIM card

1. Disconnect power, if it is connected.
2. Use a small Phillips screwdriver to remove the two SIM cover screws and remove the SIM door.



3. Insert the SIM card into the card holder with the contact side facing down as shown.
4. Verify that the SIM card fits into the holder properly and replace the cover.

Removing a SIM Card

To remove the SIM card:

You need:

- Phillips screwdriver
- Needle-nose pliers

1. Disconnect power, if it is connected.
2. Use a small Phillips screwdriver to remove the two SIM cover screws and remove the SIM door.
3. Use a needle-nose pliers to grasp the SIM card and pull it from the card holder. Do not touch the contact with the pliers.

Attaching Power Supply Blades

Power Supply and Blades

If your device shipped with a power cord, attach the blades for your region.



Power Supply No Blades



Power Supply with EU blad



Power Supply with NAM blade



Power Supply with UK blade

Attaching the Blades

To attach a power supply blade:

1. Remove the power supply cover (not shown). To do this, slide the lock down and hold it while you lift off the cover.
2. Insert the latch on the blade into the notch on the power supply.
3. Slide the lock down and hold it while you press the blade in place. Then, release it.



1 - Latch

2 - Notch

3 - Sliding lock

Connecting Antennas, Cables, and Power

To cable your device.

1. Connect your antenna to the SMA connector, labelled ANT.
2. If using a serial interface, connect the RS-232 cable to the RS-232 serial port on the device. Connect the cable's other end to your computer's serial port.
3. If using a USB interface, connect a USB cable to the USB port on the device. Connect the cable's other end to your computer's USB port.
4. Connect the GPIO cable to the I/O connector on the device and the other end to the external device.
5. Connect the power supply or DC power cable to the device. If using the power supply, refer to Attaching Power Supply Blades. If using a DC power cable, refer to Connecting Direct DC Power.
6. Plug the power supply into your power source.

Connecting Direct DC Power accessories

To connect direct DC power in a vehicle:

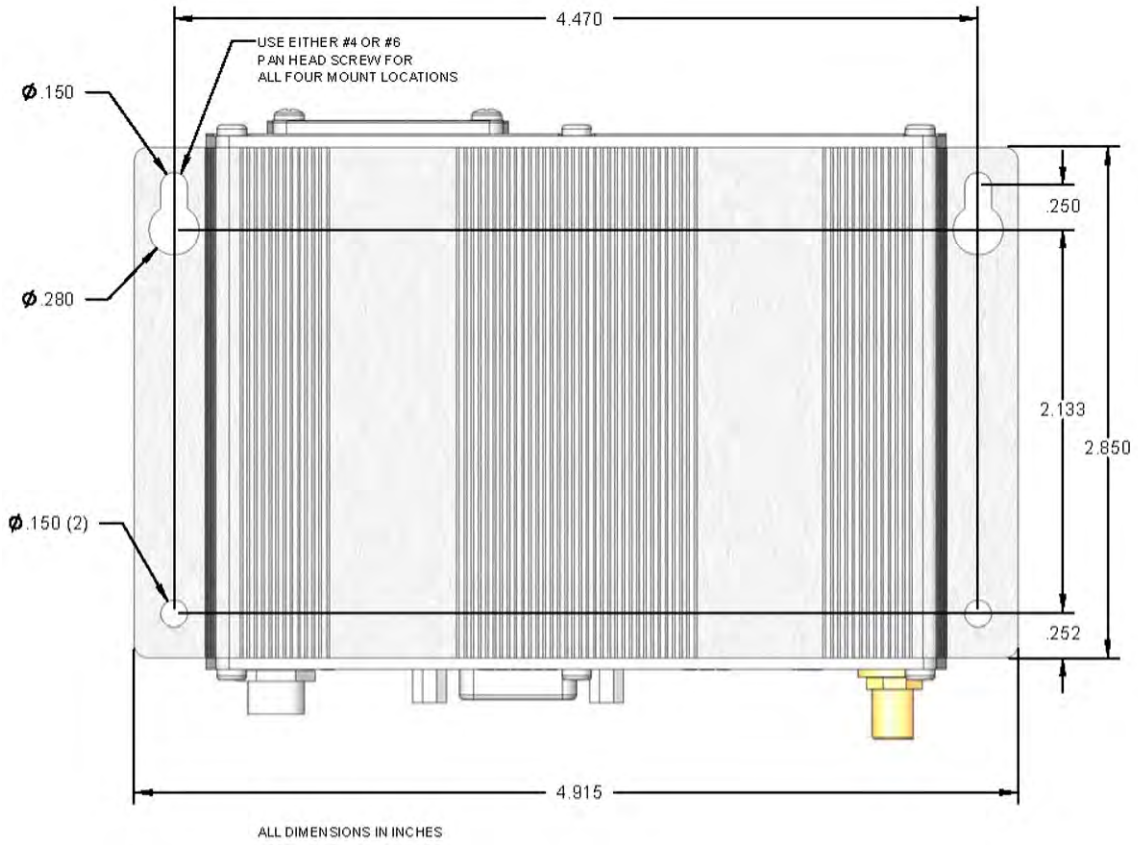
Warning: The device has over-voltage protection. To ensure complete protection, you can add additional filtering to the DC input.
Note: For automotive applications you can use permanent “+” or keyswitched “+” source.

1. Connect the DC power cable to the power connector on the modem.
2. Attach the two wires at the DC power cable's other end to a DC fuse/terminal block where you are mounting the device.
3. Connect red wire to the "+" (positive) terminal and black wire to the "–" (negative) terminal.
4. Verify the ground connection is correct.

Mounting the Device on a Flat Surface

To permanently mounting the device:

- Verify the location has a strong signal strength.
- Position the device so the antenna is always vertical and pointing upward.
- Use the dimensions in the following image to space screw holes.
- Use either #4 or #6 pan head screws.



Installing Drivers

If your device has a SIM card, install it before installing drivers.

For Linux: This device is compatible with kernel 2.6 and higher. It uses the standard CDC-ACM driver.

For Windows: The following installation procedure is compatible with 32 and 64-bit versions of Microsoft Windows 7, 8, Vista, XP, and Server 2003/2008.

Note: If using Windows XP, you need Service Pack 3.

1. Download the driver from **multitech.com/support.go**.
2. Unzip the driver.
   For serial devices, skip to Step 5.
   For USB devices continue with Step 3.
3. Open the **Drivers** folder and run **install.bat.**
4. Connect the USB cable to the computer and your device.
5. In Windows, open **Phone and Modem** from the Control Panel.
6. Click the **Modems** tab and click **Add**.
7. Check **Don't detect my Modem** and click **Next**.
8. Click **Have Disk**.
9. Browse to the **Drivers** folder.
10. Select **MTSMCIP_MTCMRIP.INF** and click **Open**.
11. Select your device from the list and click **Next**.

12. Choose the **COM Port** your device is connected to and click **Next**.
13. Click **Finish** to complete the install.

Verifying that Modem Installed Successfully in Windows

To verify that device installed correctly:

1. In the Phone and Modem Options window, highlight your modem and click **Properties**.
2. Go to the **Diagnostics** tab and click **Query Modem**.

If the device is working, the Command and Response section lists the commands sent and their response. When you are done testing, close the Phone and Modem windows.

Note: If nothing appears in Command and Response, verify that you selected the correct modem. Click Query Modem again and check the device's LEDs. If you selected the correct device, the TR LED lights and the TD and RD LEDs blink.

Basic Operations

Device Phone Number

Every device has a unique phone number. Your service provider supplies a phone number when you activate your account, or if your device has a SIM card, the phone number may be on it. Wireless service provider implementation may vary. Consult with your service provider to get the phone number for your device.

Sending AT Commands

AT commands allow you to configure, operate, and query your device. To send AT commands, use terminal software such as HyperTerminal, TerraTerm, Kermit, or Putty.

Download the AT Command Reference Guide for your model from multitech.com/support.go.

Verifying Signal Strength

To verify the device signal strength, enter:

AT+CSQ

The command indicates signal quality, in the form:

+CSQ: <rssi>,<ber>

Where:

<rssi>	Received signal strength indication.
0	(-113) dBm or less
1	(-111) dBm
2-30	(-109)dBm-(-53)dBm / 2 dBm per step
31	(-51)dBm or greater
99	Not known or not detectable
<ber>	Bit error rate (in percent)
0	Less than 0.2%
1	0.2% to 0.4%
2	0.4% to 0.8%
3	0.8% to 1.6%
4	1.6% to 3.2%
5	3.2% to 6.4%

6	6.4% to 12.8%
7	More than 12.8%
99	Not known or not detectable

Note: Signal strength of 10 or higher for successful packet data sessions.

Example

A example response to AT+CSQ:

+CSQ: 15,1

Checking Network Registration

Before establishing a packet data connection, verify the is device registered on the network. To do this enter the network registration report read command:

AT+CREG?

If the device returns:

+CREG: 0,1

The device is registered.

If the device returns:

+CREG: 0,2

The device is in a network searching state.

Checking Network Registration for EV2 Devices

To verify an EV2 devices is registered on the network, enter:

AT!STATUS

The device returns several lines of modem status information. The second to last line indicates either:

Modem has registered.

or

Modem has NOT registered.

Connecting to the Internet

To access the Internet, establish a dial-up connection.

Note: For HSPA+, EDGE, and GPRS devices, setup your device's Access Point Number before creating the dial-up connections.

Creating a Windows Dial-Up Connection

Each version of the Windows operating system has different steps for creating dial-up Internet connections. Consult Windows Help for the specific steps for your version.

You need the phone number, username, and password for your ISP.

Setting the Access Point Number (APN) in Modem's Properties

Some devices require an Access Point Number. If your service provider supplies an APN number for your account, enter it in the Phone and Modem Operations Window.

1. In Windows, open **Phone and Modem** from the Control Panel.
2. Open the **Properties** window for your modem..
3. On the Advanced tab, enter the following in **Extra initialization.**

AT+CGDCONT=1,"IP","<APN>"

Where <APN> is your Access Point Number, for example, AT+CGDCONT=1,"IP", "ISP.AT&T".

4. Close the Phone and Modem windows.

Creating a Dial-up Connection in Linux

To create a Linux dial-up connection:

1. Disable the IP stack
   Enter:
   AT+WOPEN=0
2. If required by your device, set up the APN.
   Enter:
   AT+CGDONT=1,"IP","<APN>"
   Where <APN> is the Access Point Number supplied by your service provider.
3. Dial the network.
   Enter:
   - For HSPA+, EDGE, or GPRS, use**ATD*99***1#**
   - For CDMA or EV-DO, use**ATD#777**

Setting the Serial Baud Rate

Your device defaults to a serial baud rate of 115200. Use AT+IPR=<baudspeed> to change the device to a higher speed. Options are 230400, 460800, or 921600.

Note: The host serial port must be capable of the new speed.

To reset the speed, change NVRAM settings.

1. Open a terminal program with the following settings:
   19200, 8, NONE, Hardware Flow Control
2. When the modem boots there is a 500ms window to enter the following AT command sequence:
   Enter:

Enter: **M**
Response: MU
Enter: D
Response: M
Enter: S
Response: S<cr><if><OK<cr><if>

Recovery

To do this manually:

1. Shut off the device.
2. Press **Caps Lock** and hold down **M**.
3. Turn on the device. MU displays.
4. Press**D** and **S** quickly.

Regulatory Statements

EMC, Safety, and R&TTE Directive Compliance

CE

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

Council Directive 2004/108/EC of 15 December 2004 on the approximation of the laws of Member States relating to electromagnetic compatibility;
and
Council Directive 2006/95/EC of 12 December 2006 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits;
and
Council Directive 1999/5/EC of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

International Modem Restrictions

Some dialing and answering defaults and restrictions may vary for international modems. Changing settings may cause a modem to become non-compliant with national regulatory requirements in specific countries. Also note that some software packages may have features or lack restrictions that may cause the modem to become non-compliant.

47 CFR Part 15 Regulation Class B Devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada Class B Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement Canadien sur le matériel brouilleur.

This device complies with Industry Canada RSS Appliance radio exempt from licensing. The operation is permitted for the following two conditions:

1. the device may not cause harmful interference, and
2. the user of the device must accept any interference suffered, even if the interference is likely to jeopardize the operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Environmental Notices

Waste Electrical and Electronic Equipment Statement

WEEE Directive

The WEEE Directive places an obligation on EU-based manufacturers, distributors, retailers, and importers to take-back electronics products at the end of their useful life. A sister directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all Multi-Tech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

July, 2005



REACH Statement

Registration of Substances

After careful review of the legislation and specifically the definition of an “article” as defined in EC Regulation 1907/2006, Title II, Chapter 1, Article 7.1(a)(b), it is our current view Multi-Tech Systems, Inc. products would be considered as “articles”. In light of the definition in § 7.1(b) which requires registration of an article only if it contains a regulated substance that “is intended to be released under normal or reasonably foreseeable conditions of use,” Our analysis is that Multi-Tech Systems, Inc. products constitute nonregisterable articles for their intended and anticipated use.

Substances of Very High Concern (SVHC)

Per the candidate list of Substances of Very High Concern (SVHC) published October 28, 2008 we have reviewed these substances and certify the Multi-Tech Systems, Inc. products are compliant per the EU “REACH” requirements of less than 0.1% (w/w) for each substance. If new SVHC candidates are published by the European Chemicals Agency, and relevant substances have been confirmed, that exceeds greater than 0.1% (w/w), Multi-Tech Systems, Inc. will provide updated compliance status.

Multi-Tech Systems, Inc. also declares it has been duly diligent in ensuring that the products supplied are compliant through a formalized process which includes collection and validation of materials declarations and selective materials analysis where appropriate. This data is controlled as part of a formal quality system and will be made available upon request.

Restriction of the Use of Hazardous Substances (RoHS)

Multi-Tech Systems, Inc

Certificate of Compliance

2011/65/EU

Multi-Tech Systems confirms that its embedded products comply with the chemical concentration limitations set forth in the directive 2011/65/EU of the European Parliament (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment - RoHS).

These Multi-Tech products do not contain the following banned chemicals[1]:

- Lead, [Pb] < 1000 PPM
- Mercury, [Hg] < 1000 PPM
- Hexavalent Chromium, [Cr+6] < 1000 PPM
- Cadmium, [Cd] < 100 PPM
- Polybrominated Biphenyl, [PBB] < 1000 PPM
- Polybrominated Diphenyl Ether, [PBDE] < 1000 PPM

Environmental considerations:

- Moisture Sensitivity Level (MSL) =1
- Maximum Soldering temperature = 260C (in SMT reflow oven)

[1]Lead usage in some components is exempted by the following RoHS annex, therefore higher lead concentration would be found in some modules (>1000 PPM);

- Resistors containing lead in a glass or ceramic matrix compound.

Information on HS/TS Substances According to Chinese Standards

In accordance with China's Administrative Measures on the Control of Pollution Caused by Electronic Information Products (EIP) # 39, also known as China RoHS, the following information is provided regarding the names and concentration levels of Toxic Substances (TS) or Hazardous Substances (HS) which may be contained in Multi-Tech Systems Inc. products relative to the EIP standards set by China's Ministry of Information Industry (MII).

Hazardous/Toxic Substance/Elements

Name of the Component	Lead (PB)	Mercury (Hg)	Cadmium (CD)	Hexavalent Chromium (CR6+)	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ether (PBDE)
Printed Circuit Boards	O	O	O	O	O	O
Resistors	X	O	O	O	O	O
Capacitors	X	O	O	O	O	O
Ferrite Beads	O	O	O	O	O	O
Relays/Opticals	O	O	O	O	O	O
ICs	O	O	O	O	O	O
Diodes/ Transistors	O	O	O	O	O	O
Oscillators and Crystals	X	O	O	O	O	O
Regulator	O	O	O	O	O	O
Voltage Sensor	O	O	O	O	O	O
Transformer	O	O	O	O	O	O
Speaker	O	O	O	O	O	O
Connectors	O	O	O	O	O	O
LEDs	O	O	O	O	O	O
Screws, Nuts, and other Hardware	X	O	O	O	O	O
AC-DC Power Supplies	O	O	O	O	O	O
Software /Documentation CDs	O	O	O	O	O	O
Booklets and Paperwork	O	O	O	O	O	O
Chassis	O	O	O	O	O	O

X Represents that the concentration of such hazardous/toxic substance in all the units of homogeneous material of such component is higher than the SJ/Txxx-2006 Requirements for Concentration Limits.
O Represents that no such substances are used or that the concentration is within the aforementioned limits.

Information on HS/TS Substances According to Chinese Standards (in Chinese)

依照中国标准的有毒有害物质信息

根据中华人民共和国信息产业部 (MII) 制定的电子信息产品 (EIP) 标准－中华人民共和国《电子信息产品污染控制管理办法》（第 39 号），也称作中国 RoHS, 下表列出了 Multi-Tech Systems, Inc. 产品中可能含有的有毒物质 (TS) 或有害物质 (HS) 的名称及含量水平方面的信息。

有害/有毒物质/元素

成分名称	铅 (PB)	汞 (Hg)	镉 (CD)	六价铬 (CR6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板	O	O	O	O	O	O
电阻器	X	O	O	O	O	O
电容器	X	O	O	O	O	O
铁氧体磁环	O	O	O	O	O	O
继电器/光学部件	O	O	O	O	O	O
ICs	O	O	O	O	O	O
二极管/晶体管	O	O	O	O	O	O
振荡器和晶振	X	O	O	O	O	O
调节器	O	O	O	O	O	O
电压传感器	O	O	O	O	O	O
变压器	O	O	O	O	O	O
扬声器	O	O	O	O	O	O
连接器	O	O	O	O	O	O
LEDs	O	O	O	O	O	O
螺丝、螺母以及其它五金件	X	O	O	O	O	O
交流-直流电源	O	O	O	O	O	O
软件/文档 CD	O	O	O	O	O	O
手册和纸页	O	O	O	O	O	O
底盘	O	O	O	O	O	O

X 表示所有使用类似材料的设备中有害/有毒物质的含量水平高于 SJ/Txxx-2006 限量要求。
O 表示不含该物质或者该物质的含量水平在上述限量要求之内。

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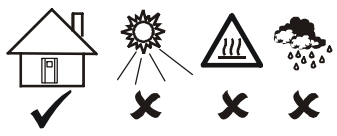
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User Manual Back-UPS® BE350G Series

Safety



This unit is intended for indoor use only.

Do not operate this unit in direct sunlight, in contact with fluids, or where there is excessive dust or humidity.

Connect the Back-UPS power cord directly to a wall outlet. Do not use a surge protector or an extension cord.

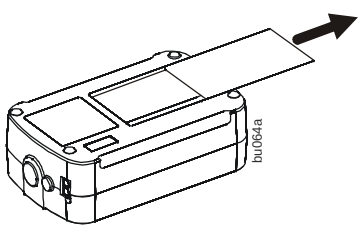
Specifications

Input	Voltage	120 Vac Nominal
	Frequency	60 Hz ± 3
	Brownout Transfers	92 Vac Typical
	Over-voltage Transfer	139 Vac Typical
Output	UPS Capacity (3 outlets)	350 VA, 200 W
	Total Amperage (6 outlets)	8 A (including UPS output)
	Voltage - On Battery	115 Vac ± 8%
	Frequency - On Battery	60 Hz ± 1
	Transfer Time	6 ms Typical, 10 ms maximum
Protection and Filtering	AC Surge Protection	Full time, 340 Joules
	EMI/RFI Filter	Full time
	AC Input	Resettable circuit breaker
Battery	Type	Sealed, maintenance-free, lead acid Replacement battery cartridge RBC35
	Average Life	3 - 5 years depending on the number of discharge cycles and environmental temperature
Physical	Net Weight	9 lb (4 kg)
	Dimensions Length x Width x Height	11 in x 6 in x 3 in 29 cm x 16 cm x 9 cm
	Operating Temperature	32º F to 104º F (0º C to 40º C)
	Storage Temperature	5º F to 113º F (–15º C to 45º C)
	Operating Relative Humidity	0 to 95% non-condensing humidity
	Operating Elevation	0 to 10,000 ft (0 to 3000 m)
EMC Compliance	This device complies with part 68 and part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.	

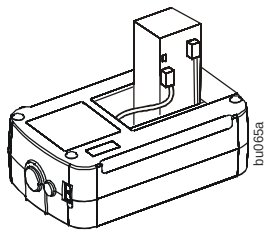
Connect the Battery

The Back-UPS is shipped with one battery cable disconnected. Remove the *"Stop! Connect the Battery"* label that covers the outlets. Prior to connecting any equipment to the unit, connect the battery cable to the unused battery terminal. It is normal for small sparks to be seen when the battery cable is connected to the battery terminal.

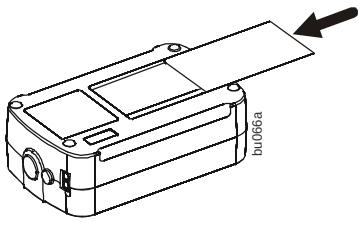
❶ Press the battery compartment cover release tab located on the rear side of the unit. Slide the battery cover off.



❷ Connect the battery cable securely to the battery terminal.



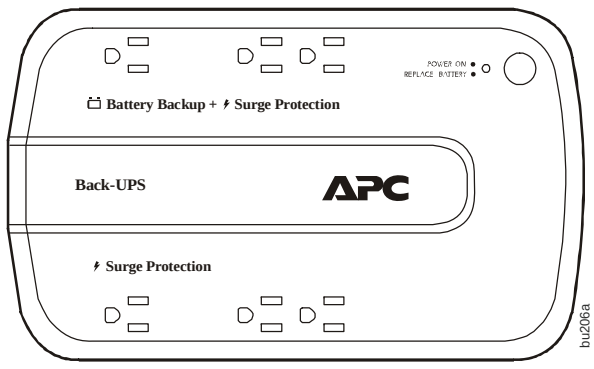
❸ Reinstall the battery compartment cover. Be sure that the release tab locks into place.



Wall Mount Installation

- Horizontal installation, use 2 screws 5.0" (127 mm) apart.
- Vertical installation, use 2 screws 4.3" (110.4 mm) apart.
- Allow 5/16" (8 mm), of the screw to protrude from the wall.

Connect Equipment



Battery Backup + Surge Protection Outlets

Battery backup outlets provide protection to connected equipment when the Back-UPS is turned on and connected to utility power.

Battery backup outlets receive power from the Back-UPS for a limited period of time when a power outage, or brownout condition occurs.

Battery backup outlets provide protection from power surges or spikes.

Connect a computer, monitor and other peripheral devices to the outlets.

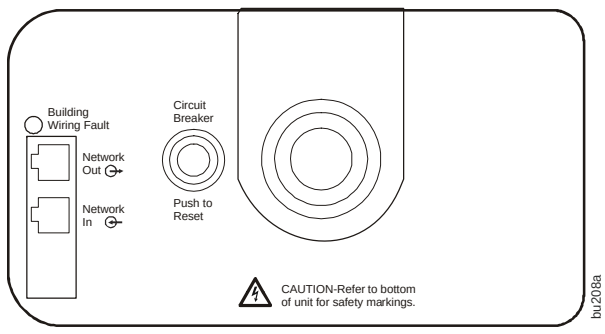
Surge Protection Outlets

Surge protection outlets provide protection to connected equipment when the Back-UPS is connected to utility power, and is switched on or off.

Surge protection outlets provide protection from power surges or spikes.

Connect a printer, scanner or other peripheral devices that do not need to remain on during power outages, or utility problems to the surge protection outlets.

Connect Network



The Back-UPS protects equipment connected to a 10/100 Base-T ethernet, from power surges when connected through the Back-UPS coaxial connectors.

Turn On the Back-UPS

Press the POWER ON button located on the top of the Back-UPS. **The Power On/ Replace Battery** LED will illuminate and a single short beep will be audible to indicate that the Back-UPS is providing protection for connected equipment.

The Back-UPS battery charges fully during the first 16 hours while connected to utility power. The Back-UPS battery will charge while the Back-UPS is switched on or off and is connected to utility power. Do not expect full battery run capability during the initial charge time.

If the red **Building Wiring Fault** LED located on the side of the Back-UPS illuminates, do not operate the Back-UPS. Have a qualified electrician correct the building wiring fault.

Voltage Sensitivity Adjustment (optional)

The Back-UPS detects and reacts to line voltage distortions by transferring to battery backup power to protect connected equipment. In situations where either the Back-UPS or the connected equipment is too sensitive for the input voltage level it is necessary to adjust the transfer voltage.

1. Connect the Back-UPS to a wall outlet. The Back-UPS will be in **Standby** mode, no indicators will be illuminated.
2. Press and hold the ON/OFF button for 10 seconds. The **OnLine** LED will illuminate alternately green-amber-red, to indicate that the Back-UPS is in **Program** mode.
3. The **Power On/Replace Battery** LED will flash either green, amber, or red to indicate the current sensitivity level. Refer to the table for an explanation of the transfer voltage sensitivity levels.
4. To select LOW sensitivity, press and hold the ON/OFF button until the LED flashes green.
5. To select MEDIUM sensitivity, press and hold the ON/OFF button until the LED flashes red.
6. To select HIGH sensitivity, press and hold the ON/OFF button until the LED flashes amber.
7. To exit **Program** mode wait five seconds and all LED indicators will extinguish. **Program** mode is no longer active.

LED Flashes	Sensitivity Setting	Input Voltage Range (Utility Operation)	Recommended Use
Green	LOW	88 Vac to 142 Vac	Use this setting with equipment that is less sensitive to fluctuations in voltage or waveform distortions.
Red	MEDIUM	92 Vac to 139 Vac	Factory default setting. Use this setting under normal conditions.
Amber	HIGH	96 Vac to 136 Vac	Use this setting when connected equipment is sensitive to voltage and waveform fluctuations.

Status Indicators

Status	LED Indicator	Audible Indicator On	Audible Indicator Terminates
Power On The Back-UPS is supplying utility power to connected equipment.	The green LED illuminates.	None	N/A
On Battery Back-UPS supplying battery power to battery backup outlets.	The green LED illuminates.The LED is not illuminated during the beeps.	Back-UPS beeps 4 times every 30 seconds.	Beeping stops when utility power is restored or the Back-UPS is turned off.
Low Battery warning The Back-UPS is supplying battery power to the battery backup outlets and the battery is near a total discharge state.	The green LED illuminates with rapid green flashes.	The Back-UPS emits rapid beeping, every 1/2 second.	Beeping stops when utility power is restored or the Back-UPS is turned off.
Replace Battery • The battery is disconnected. • The battery needs to be charged, or replaced.	• **Replace Battery** LED flashes. • **Replace Battery** and **Power On** LEDs flash alternately.	Constant tone Constant tone	Back-UPS is turned off.
Overload Shutdown While on battery power an overload condition has occurred in one or more of the battery backup outlets while the Back-UPS is operating on battery power.	None	Constant tone	Back-UPS is turned off.
Sleep Mode While on battery power the battery is completely discharged. The Back-UPS will “awaken” once utility power is restored.	None	The Back-UPS beeps once every four seconds.	The beeping stops when: • Utility power is restored • If utility power is not restored within 32 seconds • The Back-UPS is turned off
Building Wiring Fault The building wiring presents a shock hazard that must be corrected by a qualified electrical.	**Building Wiring Fault** LED illuminates red	None	The Back-UPS is unplugged from the wall outlet or is plugged into an improperly wired outlet.

Troubleshooting

Problem and Possible Cause	Solution
The Back-UPS will not turn on	
The Back-UPS has not been turned on.	Press the POWER ON button.
The Back-UPS is not connected to utility power, there is no utility power available at the wall outlet, or the utility power is experiencing a brownout or over voltage condition.	Make sure the power cord is securely connected to the wall outlet, and that there is utility power available at the wall outlet.Where applicable, check that the wall outlet is switched on.
The battery is not connected.	Connect the battery. Refer to “Connect the Battery” on page 1 of this manual. In the event that the Back-UPS receives no utility power and the battery is connected, a cold-start can be initiated. Press and hold the **Power On** button until the Back-UPS emits two beeps.
The Back-UPS is on, the Replace Battery LED flashes and the unit emits a constant tone	
The battery is disconnected.	Refer to the “Connect the Battery” on page 1.
Connected equipment loses power	
A Back-UPS overload condition has occurred.	Remove all nonessential equipment connected to the outlets. One at a time reconnect equipment to the Back-UPS.
The Back-UPS battery is completely discharged.	Connect the Back-UPS to utility power and allow the battery to recharge for eight hours.
PowerChute software has performed a shutdown due to a power failure.	This is normal Back-UPS operation.
Connected equipment does not accept the step-approximated sine waveform from the Back-UPS.	The output waveform is intended for computers and peripheral devices. It is not intended for use with motor driven equipment.
The Back-UPS may require service.	Contact APC Technical Support for more in depth troubleshooting.
The Power On LED is illuminated and the Back-UPS beeps 4 times every 30 seconds	
The Back-UPS is operating on battery power.	The Back-UPS is operating normally on battery power. At this point the user should save all open files, and shutdown the computer. When utility power is restored the battery will recharge.
The Power On LED flashes once every second while the Back-UPS beeps once every second	
The Back-UPS battery has approximately two minutes of remaining runtime.	The Back-UPS battery is near a total discharge state. At this point the user should save all open files, and shutdown the computer. When utility power is restored the battery will recharge.
The Building Wiring Fault LED illuminates	
The building wiring presents a shock hazard that must be corrected by a qualified electrical.	Do not operate the Back-UPS. Call a qualified electrician to correct the building wiring fault.
The Back-UPS has an inadequate battery runtime	
The battery is not fully charged. The battery is near the end of useful life and should be replaced.	Leave the Back-UPS connected to utility power for 16 hours while the battery charges to full capacity. As a battery ages, the runtime capability decreases. Contact APC at the Web site **www.apc.com**, to order replacement batteries.
The connection from the Back-UPS to the internet is lost during a power outage	
The modem has lost power.	Connect the modem cable into one of the Battery Backup + Surge Protection outlets.

Replace Battery

Use only approved APC replacement battery cartridges.

Deliver used batteries to a battery replacement facility in the packaging provided by APC with the replacement battery cartridge.

To order replacement battery cartridges contact APC through the Web site www.apc.com

Warranty

The standard warranty is 3 years in the USA and Canada, 2 years in all other regions from the date of purchase. APC standard procedure is to replace the original unit with a factory reconditioned unit. Customers who must have the original unit back due to assigned asset tags and set depreciation schedules must declare such a need at first contact with APC Technical Support. APC will ship the replacement unit once the defective unit is received by the repair department or cross-ship upon the provision of a valid credit card number. The customer pays for shipping to APC, and APC pays ground freight transportation costs back to the customer.

Service

If the unit requires service, do not return it to the dealer. Follow these steps:

1. Review the *Troubleshooting* section of the manual to eliminate common problems.
2. If the problem persists, contact APC Customer Support.
   a. Note the model number and serial number and the date of purchase. The model and serial numbers are located on the rear panel of the unit and are available through the LCD display on select models.
   b. Call APC Customer Support and a technician will attempt to solve the problem over the phone. If this is not possible, the technician will issue a Returned Material Authorization Number (RMA#).
   c. If the unit is under warranty, the repairs are free.
   d. Service procedures and returns may vary internationally. Refer to the APC Web site for country specific instructions.
3. Pack the unit properly to avoid damage in transit. Never use foam beads for packaging. Damage sustained in transit is not covered under warranty. **Always DISCONNECT THE UPS BATTERY before shipping in compliance with U.S. Department of Transportation (DOT) and IATA regulations.** The battery may remain in the unit.
4. Write the RMA# provided by Customer Support on the outside of the package.
5. Return the unit by insured, pre-paid carrier to the address provided by Customer Support.

Contact

APC Web site, **www.apc.com**

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990-3950B
7/2011

Product data sheet
Characteristics

ATV61HD18M3X
variable speed drive ATV61 - 18.5kW 25HP - 200...240V - IP20



Product availability: Stock - Normally stocked in distribution facility

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein.
This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications.
It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof.
Neither Schneider Electric Industries SAS nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. *Prices are indicative

Price*: 2943.00 USD



Main

Commercial Status	Commercialised
Range of product	Altivar 61
Product or component type	Variable speed drive
Product specific application	Pumping and ventilation machine
Component name	ATV61
Motor power kW	18.5 kW 3 phases at 200...240 V
Motor power hp	25 hp 3 phases at 200...240 V
[Us] rated supply voltage	200...240 V (- 15...10 %)
Network number of phases	3 phases
Line current	77 A for 200 V 3 phases 18.5 kW / 25 hp 69 A for 240 V 3 phases 18.5 kW / 25 hp
EMC filter	Without EMC filter
Assembly style	With heat sink
Apparent power	28.7 kVA for 240 V 3 phases 18.5 kW / 25 hp
Prospective line Isc	22 kA 3 phases
Maximum transient current	90 A for 60 s 3 phases
Nominal switching frequency	12 kHz
Switching frequency	12...16 kHz with derating factor 1...16 kHz adjustable
Asynchronous motor control profile	Voltage/Frequency ratio, 2 points Voltage/Frequency ratio, 5 points Flux vector control without sensor, standard Voltage/Frequency ratio - Energy Saving, quadratic U/f
Synchronous motor control profile	Vector control without sensor, standard
Communication port protocol	CANopen Modbus
Type of polarization	No impedance for Modbus
Option card	Profibus DP V1 communication card Profibus DP communication card Multi-pump card Modbus/Uni-Telway communication card Modbus TCP communication card Modbus Plus communication card METASYS N2 communication card LonWorks communication card Interbus-S communication card I/O extension card Fipio communication card Ethernet/IP communication card DeviceNet communication card Controller inside programmable card CC-Link communication card BACnet communication card APOGEE FLN communication card

Complementary

Product destination	Asynchronous motors Synchronous motors
Supply voltage limits	170...264 V
Supply frequency	50...60 Hz (- 5...5 %)
Network frequency limits	47.5...63 Hz
Continuous output current	75 A at 12 kHz, 230 V 3 phases
Speed drive output frequency	0.1...1000 Hz
Speed range	1...100 in open-loop mode, without speed feedback
Speed accuracy	+/- 10 % of nominal slip for 0.2 Tn to Tn torque variation without speed feedback
Torque accuracy	+/- 15 % in open-loop mode, without speed feedback
Transient overtorque	130 % of nominal motor torque, +/- 10 % for 60 s
Braking torque	30 % without braking resistor <= 125 % with braking resistor
Regulation loop	Frequency PI regulator
Motor slip compensation	Adjustable Automatic whatever the load Can be suppressed Not available in voltage/frequency ratio (2 or 5 points)
Local signalling	1 LED red presence of drive voltage
Output voltage	<= power supply voltage
Isolation	Between power and control terminals
Type of cable	Without mounting kit: 1-strand IEC cable at 113 °F (45 °C), copper 90 °C XLPE/EPR Without mounting kit: 1-strand IEC cable at 113 °F (45 °C), copper 70 °C PVC With UL Type 1 kit: 3-strand UL 508 cable at 104 °F (40 °C), copper 75 °C PVC With an IP21 or an IP31 kit: 3-strand IEC cable at 104 °F (40 °C), copper 70 °C PVC
Electrical connection	L1/R, L2/S, L3/T, U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB terminal 50 mm² / AWG 1/0 AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR terminal 2.5 mm² / AWG 14
Tightening torque	L1/R, L2/S, L3/T, U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB 106.19 lbf.in (12 N.m) / 106.2 lb.in AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR 5.31 lbf.in (0.6 N.m)
Supply	Internal supply 24 V DC (21...27 V), <= 200 mA for overload and short-circuit protection Internal supply for reference potentiometer (1 to 10 kOhm) 10.5 V DC +/- 5 %, <= 10 mA for overload and short-circuit protection External supply 24 V DC (19...30 V), 30 W
Analogue input number	2
Analogue input type	AI2 software-configurable voltage 0...10 V DC, input voltage 24 V max, impedance 30000 Ohm, resolution 11 bits AI2 software-configurable current 0...20 mA, impedance 242 Ohm, resolution 11 bits AI1-/AI1+ bipolar differential voltage +/- 10 V DC, input voltage 24 V max, resolution 11 bits + sign
Sampling duration	Discrete input LI6 (if configured as logic input)2 ms, +/- 0.5 ms Discrete input LI1...LI5 2 ms, +/- 0.5 ms Analog output AO1 2 ms, +/- 0.5 ms Analog input AI2 2 ms, +/- 0.5 ms Analog input AI1-/AI1+ 2 ms, +/- 0.5 ms
Accuracy	AO1 +/- 1 % for a temperature variation 60 °C AI2 +/- 0.6 % for a temperature variation 60 °C AI1-/AI1+ +/- 0.6 % for a temperature variation 60 °C
Linearity error	AO1 +/- 0.2 % AI2 +/- 0.15 % of maximum value AI1-/AI1+ +/- 0.15 % of maximum value
Analogue output number	1
Analogue output type	AO1 software-configurable logic output 10 V, <= 20 mA AO1 software-configurable voltage, analogue output range 0...10 V DC, impedance 470 Ohm, resolution 10 bits AO1 software-configurable current, analogue output range 0...20 mA, impedance 500 Ohm, resolution 10 bits

Discrete output number	2
Discrete output type	(R2A, R2B) configurable relay logic NO, electrical durability 100000 cycles (R1A, R1B, R1C) configurable relay logic NO/NC, electrical durability 100000 cycles
Response time	R2A, R2B <= 7 ms, tolerance +/- 0.5 ms R1A, R1B, R1C <= 7 ms, tolerance +/- 0.5 ms <= 100 ms in STO (Safe Torque Off)
Minimum switching current	Configurable relay logic 3 mA at 24 V DC
Maximum switching current	R1, R2 on resistive load, 5 A at 30 V DC, cos phi = 1, L/R = 0 ms R1, R2 on resistive load, 5 A at 250 V AC, cos phi = 1, L/R = 0 ms R1, R2 on inductive load, 2 A at 30 V DC, cos phi = 0.4, L/R = 7 ms R1, R2 on inductive load, 2 A at 250 V AC, cos phi = 0.4, L/R = 7 ms
Discrete input number	7
Discrete input type	(PWR) safety input, 24 V DC, voltage limits <= 30 V, impedance 1500 Ohm (LI6) switch-configurable PTC probe, 0...6, impedance 1500 Ohm (LI6) switch-configurable, 24 V DC, voltage limits <= 30 V, with level 1 PLC, impedance 3500 Ohm (LI1...LI5) programmable, 24 V DC, voltage limits <= 30 V, with level 1 PLC, impedance 3500 Ohm
Discrete input logic	LI6 (if configured as logic input)positive logic (source), < 5 V (state 0), > 11 V (state 1) LI6 (if configured as logic input)negative logic (sink), > 16 V (state 0), < 10 V (state 1) LI1...LI5 positive logic (source), < 5 V (state 0), > 11 V (state 1) LI1...LI5 negative logic (sink), > 16 V (state 0), < 10 V (state 1)
Acceleration and deceleration ramps	Automatic adaptation of ramp if braking capacity exceeded, by using resistor Linear adjustable separately from 0.01 to 9000 s S, U or customized
Braking to standstill	By DC injection
Protection type	Motor thermal protection Motor power removal Motor motor phase break Drive thermal protection Drive short-circuit between motor phases Drive power removal Drive overvoltages on the DC bus Drive overheating protection Drive overcurrent between output phases and earth Drive line supply undervoltage Drive line supply overvoltage Drive input phase breaks Drive break on the control circuit Drive against input phase loss Drive against exceeding limit speed
Insulation resistance	> 1 mOhm at 500 V DC for 1 minute to earth
Frequency resolution	Display unit 0.1 Hz Analog input 0.024/50 Hz
Type of connector	Male SUB-D 9 on RJ45 for CANopen 1 RJ45 for Modbus on terminal 1 RJ45 for Modbus on front face
Physical interface	2-wire RS 485 for Modbus
Transmission frame	RTU for Modbus
Transmission rate	9600 bps, 19200 bps for Modbus on front face 4800 bps, 9600 bps, 19200 bps, 38.4 Kbps for Modbus on terminal 20 kbps, 50 kbps, 125 kbps, 250 kbps, 500 kbps, 1 Mbps for CANopen
Data format	8 bits, odd even or no configurable parity for Modbus on terminal 8 bits, 1 stop, even parity for Modbus on front face
Number of addresses	1...247 for Modbus 1...127 for CANopen
Method of access	Slave for CANopen
Marking	CE
Operating position	Vertical +/- 10 degree
Product weight	66.14 lb(US) (30 kg)
Width	9.45 in (240 mm)
Height	16.54 in (420 mm)
Depth	9.29 in (236 mm)

Environment

Noise level	59.9 dB conforming to 86/188/EEC
Dielectric strength	4230 V DC between control and power terminals 2830 V DC between earth and power terminals
Electromagnetic compatibility	Voltage dips and interruptions immunity test conforming to IEC 61000-4-11 Radiated radio-frequency electromagnetic field immunity test conforming to IEC 61000-4-3 level 3 Electrostatic discharge immunity test conforming to IEC 61000-4-2 level 3 Electrical fast transient/burst immunity test conforming to IEC 61000-4-4 level 4 Conducted radio-frequency immunity test conforming to IEC 61000-4-6 level 3
Standards	IEC 60721-3-3 class 3C1 IEC 60721-3-3 class 3S2 UL Type 1
Product certifications	CSA C-Tick DNV GOST NOM 117 UL
Pollution degree	3 conforming to UL 840 3 conforming to EN/IEC 61800-5-1
IP degree of protection	IP54 on lower part conforming to EN/IEC 61800-5-1 IP54 on lower part conforming to EN/IEC 60529 IP41 on upper part conforming to EN/IEC 61800-5-1 IP41 on upper part conforming to EN/IEC 60529 IP21 conforming to EN/IEC 61800-5-1 IP21 conforming to EN/IEC 60529 IP20 on upper part without blanking plate on cover conforming to EN/IEC 61800-5-1 IP20 on upper part without blanking plate on cover conforming to EN/IEC 60529
Vibration resistance	1.5 mm peak to peak (f = 3...13 Hz) conforming to EN/IEC 60068-2-6 1 gn (f = 13...200 Hz) conforming to EN/IEC 60068-2-6
Shock resistance	15 gn for 11 ms conforming to EN/IEC 60068-2-27
Relative humidity	5...95 % without dripping water conforming to IEC 60068-2-3 5...95 % without condensation conforming to IEC 60068-2-3
Ambient air temperature for operation	122...140 °F (50...60 °C) with derating factor 14...122 °F (-10...50 °C) without derating
Ambient air temperature for storage	-13...158 °F (-25...70 °C)
Operating altitude	3280.84...9842.52 ft (1000...3000 m) with current derating 1 % per 100 m <= 3280.84 ft (1000 m) without derating

Ordering and shipping details

Category	22137 - ATV61 460V 7.5 THRU 50 HP DRIVES
Discount Schedule	CP4C
GTIN	00785901525684
Nbr. of units in pkg.	1
Package weight(Lbs)	52.80
Product availability	Stock - Normally stocked in distribution facility
Returnability	Y
Country of origin	CN

Offer Sustainability

Sustainable offer status	Green Premium product
RoHS	Compliant - since 0946 - Schneider Electric declaration of conformity
REACh	Reference contains SVHC above the threshold - go to CaP for more details
Product environmental profile	Available Download Product Environmental
Product end of life instructions	Available Download End Of Life Manual

Contractual warranty

Period	18 months

Altivar® 61

Variable Speed Drives Simplified Manual

0.5–60 hp (0.37–45 kW) / 200–240 V
1–100 hp (0.75–75 kW) / 380–480 V
3–100 hp (2.2–90 kW) / 500–690 V

Instruction Bulletin

30072-451-60C

Retain for future use.

For Use in the United States of America



Schneider Electric

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Hazard Categories and Special Symbols

The following symbols and special messages may appear in this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

A lightning bolt or ANSI man symbol in a “Danger” or “Warning” safety label on the equipment indicates an electrical hazard which, as indicated below, can or will result in personal injury if the instructions are not followed.

The exclamation point symbol in a safety message in a manual indicates potential personal injury hazards. Obey all safety messages introduced by this symbol to avoid possible injury or death.

Symbol	Name
	Lightning Bolt
	ANSI Man
	Exclamation Point

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

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CAUTION
CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result in** property damage.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

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Before you begin

Read and understand these instructions before performing any procedure on this drive[1].

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the Altivar 61 drives. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for conforming to all applicable code requirements with respect to grounding the equipment.
- Many parts in this drive, including printed wiring boards, operate at the line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- DO NOT short across DC bus capacitors or touch unshielded components or terminal strip screw connections with voltage present.
- Before servicing the drive:
  - — Disconnect all power including external control power that may be present before servicing the drive.
  - — Place a “DO NOT TURN ON” label on the drive disconnect.
  - — Lock disconnect in the open position.
  - — WAIT 15 MINUTES for the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure on page 24 to verify that the DC voltage is less than 42 V. The drive LEDs are not indicators of the absence of DC bus voltage.
- Install and close all covers before applying power or starting and stopping the drive.

Failure to follow these instructions will result in death or serious injury.

[1] The word drive as it is used in this manual refers to the controller portion of the adjustable speed drive as per the NEC.

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⚠ WARNING

LOSS OF CONTROL FROM A COMMUNICATION INTERRUPTION

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.[1]
- Each implementation of an Altivar 61 drive must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems."

CAUTION

IMPROPER DRIVE OPERATION

- If, for a prolonged period of time, voltage is not applied to the drive, the performance of its electrolytic capacitors will be reduced.
- If it is stopped for a prolonged period, turn the drive on every two years for at least 5 hours to restore the performance of the capacitors, then check its operation. It is recommended that the drive not be connected directly to the line voltage. The voltage should be increased gradually using an adjustable AC source.

Failure to follow these instructions can result in equipment damage.

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Product Support

For more information, call, fax, or write:

Schneider Electric AC Drives Product Support Group
P.O. Box 27446
Raleigh, NC 27611-7446

For support and assistance, contact the Product Support Group. The Product Support Group is staffed Monday through Friday from 8:00 am until 6:00 pm Eastern time to assist with product selection, start-up, and diagnosis of product or application problems. Emergency phone support is available 24 hours a day, 365 days a year.

Toll free:	1-888-SquareD (1-888-778-2733)
E-mail:	drive.products.support@us.schneider-electric.com
Fax Line:	919-217-6508

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Setting Up the Drive

■ 1 Take delivery of the drive

- Ensure that the catalog number printed on the label is the same as that on the purchase order.
- Remove the drive from its packaging and ensure that it has not been damaged in transit.

■ 2 Check the line voltage

- Ensure that the line voltage is compatible with the voltage range of the drive.

■ 3 Mount the drive (page **20**)

- Mount the drive according to the instructions in this document.
- Install any internal and external options.

Steps 1–4 must be performed with the power off.

■ 4 Wire the drive (page **25**).

- Connect the motor, ensuring that its connections correspond to the voltage.
- With power off, connect the line supply.
- Connect the control wiring.
- Connect the speed reference.



■ 5 Energize drive with no inputs active.

- Removing the control terminal card ensures no active inputs.
- See page 30 for control terminal card removal procedure.

■ 6 Select the language (page **42**),

if the drive is equipped with a graphic display terminal.

■ 7 Configure the menu [SIMPLY START] (SIM-) (page **44**)

- 2-wire or 3-wire control
- Macro configuration
- Motor parameters

☞ Optimize performance

To optimize performance:

- Refer to the auto-tuning section on page 53.
- Motor thermal current
- Acceleration and deceleration ramps
- Speed variation range

■ 8 Start.

NOTE: Ensure that the wiring of the drive is compatible with its configuration.

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Short-Circuit Marking System Applied to Schneider Electric AC Drives

Altivar drives have a prospective short-circuit rating that is based on three performance attributes that affect all drives. The performance attributes are characterized by three rating parameters described below and listed in Tables 1–4 on pages 14–16. The overall maximum rating of the drive is the lowest of the three ratings. Higher ratings can be attained for Altivar drives. Contact Schneider Electric for tested combinations of overcurrent protective devices (OCPD), line reactors, and enclosures or refer to the *Altivar 61and 71 Supplementary Short Circuit Protection Information* bulletin shipped with the drive.

Output Interrupting Rating

The maximum prospective input short-circuit current at which the drive is capable of interrupting a short-circuit at its motor output terminals. The output interrupting rating conforms to the existing short-circuit requirements of UL508C 3rd edition with revisions effective February 15, 2008.

Input Withstand Current Rating (without line reactor or choke)

The maximum prospective input short-circuit current at the drive input terminals with which the drive was designed to operate. The input withstand current rating is an important parameter in determining the maximum thermal and electrical operating limits for the drive. Exceeding the maximum prospective input short-circuit current rating may cause overheating with reduction of drive life expectancy or damage to the drive.

CAUTION

DRIVE OVERHEATING

Ensure the prospective input short-circuit current does not exceed the input withstand current rating.

Failure to follow these instructions can result in equipment damage.

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Drive Containment Rating with OCPD

The maximum prospective input short-circuit current at the drive input terminals with the marked OCPD present at which an internal component breakdown in the drive will not create a shock, flame, fire or expulsion hazard outside the marked enclosure structure. This rating applies to drives with a listed enclosure rating or to drives that have a listed enclosure rating with the addition of conduit box.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Only use the overcurrent protective device marked on the drive or in the manual.
- Do not operate the drive on an input mains line with a prospective input short circuit current greater than the Drive Containment Rating.
- Ensure that the drive has a listed enclosure rating or uses the conduit kit to achieve an enclosure rating.

Failure to follow these instructions will result in death or serious injury.

Use of the drive with different prospective short-circuit currents may be possible. Contact Schneider Electric for tested combinations of OCPD, line reactors, drives and enclosures or refer to the *Altivar 61 and 71 Supplementary Short Circuit Protection Information* bulletin shipped with the drive.

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Three phase motor 200 V to 240 V

For drives with an input line voltage of 200 V to 240 V, a Class J time delay or non-time delay fuse is required.

Table 1 on page 14 shows the maximum available short-circuit current value for each of the rating parameters.

Table 1: 200 V to 240 V 50/60 Hz Single Phase Supply Voltage

Power Indicated on Plate[1]		Altivar 61 Drive				
		Part Number[2]	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW	hp		kA	kA	kA	A
0.37	0.5	ATV61H075M3	100	5	5	15
0.75	1	ATV61HU15M3	100	5	5	25
1.5	2	ATV61HU22M3	100	5	5	25
2.2	3	ATV61HU30M3	100	5	5	40
3	–	ATV61HU40M3[3]	100	5	5	45
4	5	ATV61HU55M3[3]	100	22	5	60
5.5	7.5	ATV61HU75M3[3]	100	22	5	70

1 These power ratings and currents are given for an ambient temperature of 50 °C (122 °F) at the factory-set switching frequency, used in continuous operation.

2 These part numbers are also available without a graphic terminal display by adding a Z to the end of the part number, for example, ATV61H075M3Z.

3 A line choke must be used. Refer to the drives catalog for more information.

Table 2: 200 V to 240 V 50/60 Hz Three Phase Supply Voltage

Power Indicated on Plate[1]		Altivar 61 Drive				
		Part Number[2]	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW	hp		kA	kA	kA	A
0.75	1	ATV61H075M3	100	5	5	15
1.5	2	ATV61HU15M3	100	5	5	25
2.2	3	ATV61HU22M3	100	5	5	25
3	–	ATV61HU30M3	100	5	5	40
4	5	ATV61HU40M3	100	5	5	45
5.5	7.5	ATV61HU55M3	100	22	5	60
7.5	10	ATV61HU75M3	100	22	5	70

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Table 2: 200 V to 240 V 50/60 Hz Three Phase Supply Voltage *(continued)*

Power Indicated on Plate[1]		Altivar 61 Drive				
		Part Number[2]	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW	hp		kA	kA	kA	A
11	15	ATV61HD11M3X	100	22	5	90
15	20	ATV61HD15M3X	100	22	5	110
18.5	25	ATV61HD18M3X	100	22	5	125
22	30	ATV61HD22M3X	100	22	5	150
30	40	ATV61HD30M3X	100	22	5	200
37	50	ATV61HD37M3X	100	22	5	225
45	60	ATV61HD45M3X	100	22	10	300

1 These power ratings and currents are given for an ambient temperature of 50 °C (122 °F) at the factory-set switching frequency, used in continuous operation.

2 These part numbers are also available without a graphic terminal display by adding a Z to the end of the part number, for example, ATV61H075M3Z.

Three phase motor 380 V to 480 V

For drives with an input line voltage of 380 V to 480 V, a Class J time delay or non-time delay fuse is required. Table 3 shows the fuse size required and available short circuit current rating associated with each drive.

Table 3: 380 V to 480 V, 50/60 Hz Three Phase Supply Voltage

Power Indicated on Plate[1]		Altivar 61 Drive				
		Part Number[2]	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW	hp		kA	kA	kA	A
0.75	1	ATV61H075N4	100	5	5	6
1.5	2	ATV61HU15N4	100	5	5	12
2.2	3	ATV61HU22N4	100	5	5	15
3	–	ATV61HU30N4	100	5	5	17.5
4	5	ATV61HU40N4	100	5	5	25
5.5	7.5	ATV61HU55N4	100	22	5	40
7.5	10	ATV61HU75N4	100	22	5	40
11	15	ATV61HD11N4	100	22	5	60

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Table 3: 380 V to 480 V, 50/60 Hz Three Phase Supply Voltage *(continued)*

Power Indicated on Plate[1]		Altivar 61 Drive				
		Part Number[2]	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW	hp		kA	kA	kA	A
15	20	ATV61HD15N4	100	22	5	70
18.5	25	ATV61HD18N4	100	22	5	70
22	30	ATV61HD22N4	100	22	5	80
30	40	ATV61HD30N4	100	22	5	90
37	50	ATV61HD37N4	100	22	5	110
45	60	ATV61HD45N4	100	22	10	150
55	75	ATV61HD55N4	100	22	10	175
75	100	ATV61HD75N4	100	22	10	225

1 These power ratings and currents are given for an ambient temperature of 50 °C (122 °F) at the factory-set switching frequency, used in continuous operation.

2 These part numbers are also available without a graphic terminal display by adding a Z to the end of the part number, for example, ATV61H075M3Z.

Three phase motor 500 V to 690 V

For drives with an input line voltage of 500 V to 690 V, a Class J time delay or non-time delay fuse is required. Table 4 shows the fuse size required and available short circuit current rating associated with each drive.

Table 4: 500 V to 690 V, 50/60 Hz Three Phase Supply Voltage

Power Indicated on Plate[1]			Altivar 61 Drive				
			Part Number	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW (500 V)	hp (600 V)	kW (690 V)		kA	kA	kA	A
2.2	3	3	ATV61HU30Y	100	22	22	10
3	–	4	ATV61HU40Y	100	22	22	15
4	5	5.5	ATV61HU55Y	100	22	22	15
5.5	7.5	7.5	ATV61HU75Y	100	22	22	20
7.5	10	11	ATV61HD11Y	100	22	22	25

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Table 4: 500 V to 690 V, 50/60 Hz Three Phase Supply Voltage *(continued)*

Power Indicated on Plate[1]			Altivar 61 Drive				
			Part Number	Output Interrupting Rating	Input Withstand Current	Drive Containment Rating	Max. Fuse Size
kW (500 V)	hp (600 V)	kW (690 V)		kA	kA	kA	A
11	15	15	ATV61HD15Y	100	22	22	35
15	20	18.5	ATV61HD18Y	100	22	22	45
18.5	25	22	ATV61HD22Y	100	22	22	60
22	30	30	ATV61HD30Y	100	22	22	60
30	40	37	ATV61HD37Y	100	22	22	90
37	45	45	ATV61HD45Y	100	22	22	110
12	55	55	ATV61HD55Y	100	22	22	125
22	75	75	ATV61HD75Y	100	22	22	150
75	100	90	ATV61HD90Y	100	22	22	175

[1] These power ratings and currents are given for an ambient temperature of 50 °C (122 °F) at the factory-set switching frequency, used in continuous operation.

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Receiving, Handling, and Storage

Handling and storage

To help protect the drive prior to installation, handle and store the device in its packaging. Ensure that the ambient conditions are acceptable. Refer to “Dimensions and Weights” on page 22.

⚠ WARNING

DAMAGED PACKAGING

If the packaging appears damaged, it can be dangerous to open it or handle it. Handle with care.

Failure to follow these instructions can result in death or serious injury.

⚠ WARNING

DAMAGED DRIVE EQUIPMENT

Do not operate or install any drive or drive accessory that appears damaged.

Failure to follow these instructions can result in death or serious injury.

Handling during installation



Altivar 61 drives up to 20 hp (see Table 1and Table 2 on page) and 25 hp (table & page) can be removed from their packaging and installed without a handling device.

A hoist must be used for higher ratings and for ATV61H•••Y drives; for this reason the controllers are fitted with handling holes. Attach a spreader bar to the top handling holes on the drive.

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⚠ WARNING

RISK OF TOPPLING

Do not stand the drive upright. Keep the drive on the pallet until it is installed.

Failure to follow these instructions can result in death or serious injury.

Before You Begin

You must observe the following precautions.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Before turning on and configuring the Altivar 61 drive, ensure that the PWR (POWER REMOVAL) input is deactivated (at state 0) in order to help prevent unintended operation.
- Before turning the controller on or upon exiting the configuration menus, ensure that the inputs assigned to the run command are deactivated (at state 0) since they can cause the motor to start immediately.
- Refer to the characteristics and functions table in the Control Terminals section on page 30 for more information about the Power Removal Input.

Failure to follow these instructions will result in death or serious injury.

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CAUTION

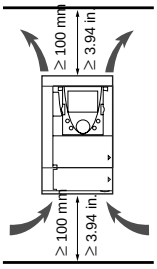
INCOMPATIBLE LINE VOLTAGE

Before turning on and configuring the drive, ensure that the line voltage is compatible with the supply voltage range shown on the drive nameplate. The drive may be damaged if the line voltage is not compatible.

Failure to follow these instructions can result in equipment damage.

NOTE: The Power Removal function takes priority over any run command. For use as an emergency stop, this function requires the use of connection diagrams conforming to category 3 of standard EN 954-1 and safety integrity level 2 according to IEC/EN 61508. Consult the *ATV61 Installation Manual* on the CD-ROM supplied with the drive.

Mounting and Temperature Conditions

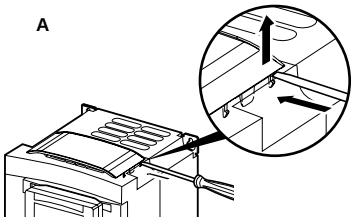


- Install the drive vertically, ±10°.
- Do not place it close to heating elements.
- Leave a minimum of 10 mm (0.39 in.) free space in front of the drive to ensure that the air required for cooling purposes can circulate from the bottom to the top of the unit.
- Where IP20 protection is adequate, we recommend that you remove the cover on top of the drive, as shown below in diagrams A and B.

Removing the top cover

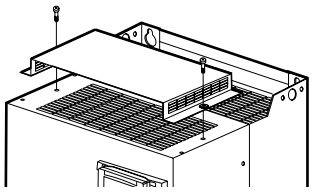
ATV61H 075M3 to D15M3X[1] and ATV61H 075N4 to D18N4[2]

A



ATV61H D18M3X to D45M3X[1], ATV61H D22N4 to D75N4[2], and ATV61H U30Y to D90Y[3]

B

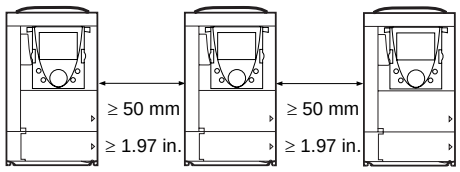


[1] For drive part numbers, see Table 2 on page 14.
[2] For drive part numbers, see Table 3 on page 15.
[3] For drive part numbers, seeTable 4 on page 16.

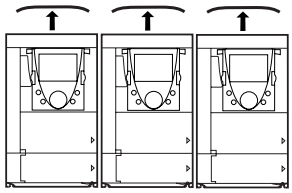
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3 types of mounting are possible:

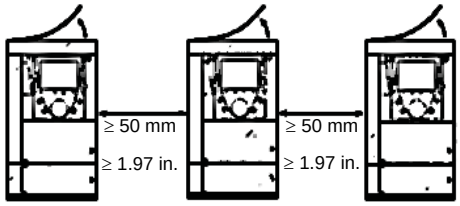
Type A mounting:
Free space ≥ 50 mm (≥ 1.97 in.) on each side, with cover in place.



Type B mounting:
Drives mounted side by side, with the cover removed (the degree of protection becomes IP20).



Type C mounting:
Free space ≥ 50 mm (≥ 1.97 in.) on each side, with cover removed (the degree of protection becomes IP20).



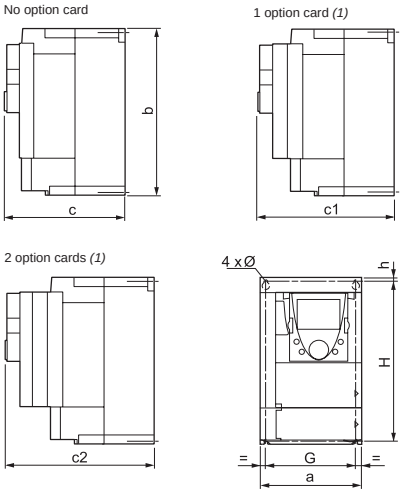
With these types of mounting, the drive can be used without derating up to an ambient temperature of 50°C (122°F), with the factory-set switching frequency. For other temperatures and other switching frequencies, consult the Installation Manual on the CD-ROM supplied with the drive.

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Dimensions and Weights

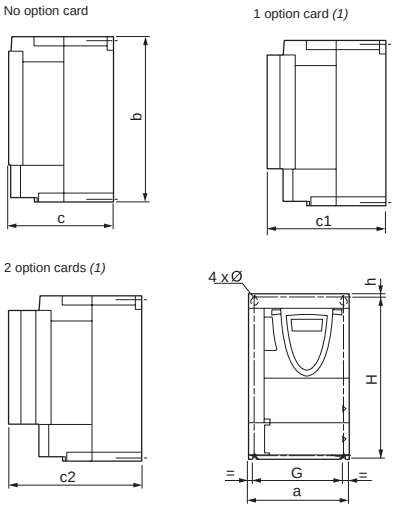
Refer to the Dimensions table on page 23.

With graphic display terminal



(1) For the addition of I/O extension cards, communication cards, or the Controller Inside programmable card.

Without graphic display terminal



For a drive without a graphic display terminal, dimensions c, c1 and c2 are reduced by 26 mm (1.01 in.). The other dimensions are unchanged.

(1) For the addition of I/O extension cards, communication cards, or the Controller Inside programmable card.

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Table 5: Dimensions

ATV61H…	Dimensions, mm (in.)									Screws	Weight
	a	b	c	c1	c2	G	H	h	Ø		kg (lb)
075M3, U15M3, 075N4, U15N4, U22N4	130 (5.12)	230 (9.05)	175 (6.89)	198 (7.80)	221 (8.70)	113.5 (4.47)	220 (8.66)	5 (0.20)	5 (0.20)	M4	3 (6.61)
U22M3, U30M3, U40M3, U30N4, U40N4	155 (6.10)	260 (10.23)	187 (7.36)	210 (8.27)	233 (9.17)	138 (5.43)	249 (9.80)	4 (0.16)	5 (0.20)	M4	4 (8.82)
U55M3, U55N4, U75N4	175 (6.89)	295 (11.61)	187 (7.36)	210 (8.27)	233 (9.17)	158 (6.22)	283 (11.14)	6 (0.24)	5 (0.20)	M4	5.5 (12.13)
U75M3, D11N4	210 (8.27)	295 (11.61)	213 (8.39)	236 (9.29)	259 (10.20)	190 (7.48)	283 (11.14)	6 (0.24)	6 (0.24)	M5	7 (15.43)
D11M3X, D15M3X, D15N4, D18N4	230 (9.05)	400 (15.75)	213 (8.39)	236 (9.29)	259 (10.20)	210 (8.26)	386 (15.20)	8 (0.31)	6 (0.24)	M5	9 (19.84)
D18M3X, D22M3X, D22N4, U30Y to D30Y	240 (9.45)	420 (16.54)	236 (9.29)	259 (10.20)	282 (11.10)	206 (8.11)	403 (15.87)	11 (0.45)	6 (0.24)	M5	30 (66.14)
D30N4, D37N4,	240 (9.45)	550 (21.65)	266 (10.47)	289 (11.38)	312 (12.28)	206 (8.11)	531.5 (20.93)	11 (0.45)	6 (0.24)	M5	37 (81.57)
D30M3X, D37M3X, D45M3X	320 (12.60)	550 (21.65)	266 (10.47)	289 (11.38)	312 (12.28)	280 (11.02)	524 (20.93)	20 (0.79)	9 (0.35)	M8	37 (81.57)
D45N4, D55N4, D75N4 D37Y to D90Y	320 (12.60)	630 (24.80)	290 (11.42)	313 (12.32)	334 (13.15)	280 (11.02)	604.5 (23.80)	15 (0.59)	9 (0.35)	M8	45 (99.21)

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DC Bus Voltage Measurement Procedure

Before working on the drive, turn it off and wait 15 minutes to allow the DC bus to discharge. Then measure the DC bus voltage.

Measuring the DC bus voltage

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

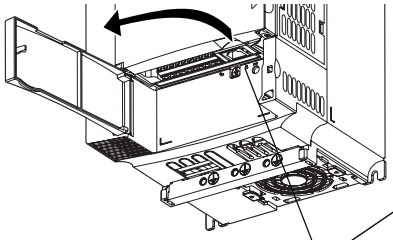
Read and understand the instructions on page 7 before performing this procedure.

Failure to follow these instructions will result in death or serious injury.

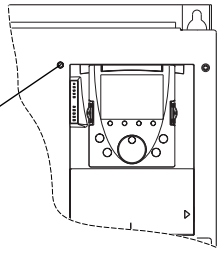
The DC bus voltage can exceed 1,000 V ⎓. Use a properly rated voltage-sensing device when performing this procedure. To measure the DC bus voltage:

1. Disconnect the drive power supply.
2. Wait 15 minutes to allow the DC bus to discharge.
3. Measure the voltage of the DC bus between the PO and PC/– terminals to ensure that the voltage is less than 42 V ⎓.
4. If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive.

ATV61H 075M3 to D15M3X[1] and ATV61H 075N4 to D18N4[2]



ATV61H D18M3X to D45M3X[1] ATV61H D22N4 to D75N4[2], and ATV61H U30Y to D90Y[3]



Red LED indicating that the DC bus is turned on. The drive LEDs are not indicators of the absence of DC bus voltage.

[1] For drive part numbers, see Table 2 on page 14.
[2] For drive part numbers, see Table 3 on page 15.
[3] For drive part numbers, see Table 4 on page 16.

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Wiring

Power

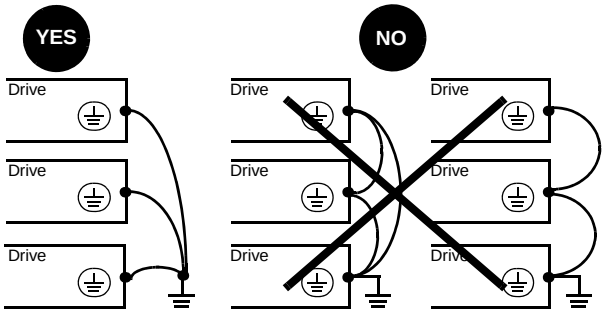
Ground the drive to local and national code requirements. A minimum wire size of 13.29 mm² (6 AWG) may be required to meet standards limiting leakage current.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Ground equipment using the provided ground connecting point as shown in the figure below. The drive panel must be properly grounded before power is applied.

Failure to follow these instructions will result in death or serious injury.



- Ensure that the resistance of the ground is 1 Ω or less.
- If grounding several drives you must connect each one directly, as shown in the figure above.
- Do not loop the ground cables or connect them in series

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⚠ WARNING

IMPROPER WIRING PRACTICES

- The ATV61 controller will be damaged if input line voltage is applied to the output terminals (U/T1,V/T2,W/T3).
- Check the power connections before energizing the ATV61 drive.
- If replacing another drive, verify that all wiring connections to the ATV61 controller comply with all wiring instructions in this manual.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Where local and national codes require upstream protection by means of a residual current device, use a Type A device for single-phase drives and a Type B device for three-phase drives as defined in the IEC 60755. Choose a suitable model integrating:

- Harmonic Frequency (HF) current filtering
- A time delay that helps prevent tripping caused by the load from stray capacitance on power-up. The time delay is not possible for 30 mA devices; in this case, choose devices with immunity against nuisance tripping.

If the installation includes several drives, provide one residual current device per drive.

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⚠ WARNING

INADEQUATE OVERCURRENT PROTECTION

- Overcurrent protective devices must be properly coordinated.
- The Canadian Electrical Code and the National Electrical Code require branch circuit protection. Use the over current protective device recommended on the drive nameplate or in document 30072-451-38_ to achieve published short-circuit current ratings.
- Do not connect the drive to a power feeder whose short-circuit capacity exceeds the controller short-circuit current rating listed on the controller nameplate or in document 30072-451-38_.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

CAUTION

IMPROPER USE OF A BRAKING RESISTOR

Wire the thermal protection contact on the resistor so that the drive power supply is disconnected immediately in the event of a detected fault (refer to the manual supplied with the resistor).

Failure to follow these instructions can result in equipment damage.

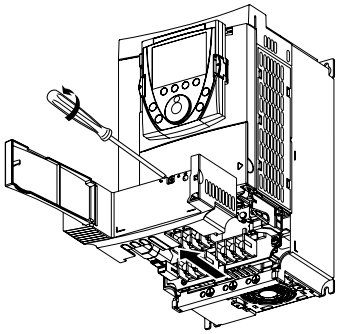
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Power Terminals

Access to the power terminals

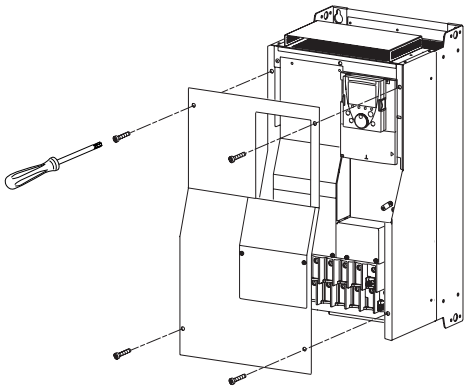
ATV61 H075M3 to HD15M3X[1] and ATV61 H075N4 to HD18N4[2]

Unlock the power-section access flap, and remove it as shown below.



ATV61 HD18M3X to HD45M3X[1], ATV61 HD22N4 to HD75N4[2], and ATV61H U30Y to HD90Y[3]

To access the power terminals, remove the front panel as shown below.



[1] For drive part numbers, see Table 2 on page 14.
[2] For drive part numbers, see Table 3 on page 15.
[3] For drive part numbers, see Table 4 on page 16.

Functions of power terminals

Terminals	Function
⏚	Protective ground connection terminal
R/L1 – S/L2 – T/L3	Power section line supply
PO	DC bus +polarity
PA/+	Output to braking resistor (+polarity)
PB	Output to braking resistor
PC/–	DC bus –polarity
U/T1 – V/T2 – W/T3	Outputs to the motor

NOTE: Remove the link between PO and PA/+ only if a DC choke has been added. The PO and PA/+ terminal screws must always be fully tightened, since a high current flows through the common link. Refer to the table on page 29 for tightening torque.

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Characteristics of power terminals

Table 6: Characteristics of power terminals

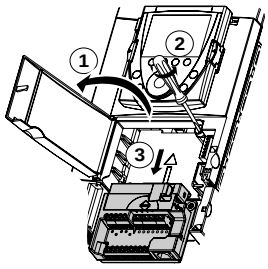
ATV61H...	Maximum wire size			Tightening torque
	mm²	AWG	kcmils	N•m (lb-in)
075M3, U15M3, U22M3, U30M3, U40M3,075N4, U15N4, U22N4, U30N4, U40N4,	4	10		1.4 (12.3)
U55M3, U55N4, U75N4	6	8		3 (26.5)
U73M3, D11N4	16	4		3 (26.5)
D11M3X, D15M3X, D15N4, D18N4	35	2		5.4 (47.7)
D18M3X, D22M3X, D22N4, D30N4, D37N4, U30Y to D30Y[1]	50	1/0		12 (106.2)
D30M3X, D37M3X, D45M3X, D45N4, D55N4, D75N4, D37Y to D90Y[1]	150		300	41 (360)

[1] For drive part numbers, see Table 4 on pages16 and 17.

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Control Terminals

Access to the control terminals



1. To access the control terminals, open the cover on the front panel of the control section.
2. To make it easier to wire the drive control section, remove the control terminal card by loosening the screw until the spring is fully extended.
3. Remove the card by sliding it downwards.

NOTE: For control wiring the maximum wire size is 2.5 mm² (14 AWG). The maximum tightening torque is 0.6 N•m (5.3 lb-in).

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- The accidental grounding of logic inputs configured for Sink Logic can result in unintended activation of drive functions.
- Protect the signal conductors against damage that could result in unintentional conductor grounding.
- Follow NFPA 79 and EN 60204 guidelines for proper control circuit grounding practices.

Failure to follow these instructions will result in death or serious injury.

CAUTION

IMPROPERLY SECURED TERMINAL CARD

When replacing the control terminal card, it is essential to fully tighten the captive screw. Torque the captive screw to 1.1 to 1.7 N•m (9.7 to 15 lb-in).

Failure to follow these instructions can result in equipment damage.

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Table 7: Characteristics and functions of the control terminals

Terminals	Function	Electrical characteristics
R1A R1B R1C	1 relay logic output, one N.C. contact and one N.O. contact with common point (R1A to R1C is N.O.; R1B to R1C is N.C.)	Minimum switching capacity: 3 mA for 24 V ⎓ Maximum switching capacity: • on resistive load (cos φ = 1): 5 A for 250 V a or 30 V V ⎓ • on inductive load (cos φ = 0.4 and L/R = 7 ms): 2 A for 250 V a or 30 V ⎓ Max. response time: 7 ms ±0.5 ms Electrical service life: 100,000 operations
R2A R2C	1 relay logic output one N.O. contact	
+10	+10 V ⎓ power supply for reference potentiometer 1 to 10 kΩ	• +10 V ⎓ (10.5 V ±0.5 V) • 10 mA max.
AI1+ AI1–	Differential analog input AI1	• –10 to +10 V ⎓ (max. safe voltage 24 V) • Reaction time: 2 ms ±0.5 ms, 11-bit resolution + 1 sign bit • Accuracy ±0.6% for Δθ = 60 °C (140 °F), linearity ±0.15% of max. value
COM	Analog I/O common	0 V
AI2	Depending on the software configuration: Analog voltage or current input	• Analog input 0 to +10 V ⎓ (max. safe voltage 24 V), impedance 30 kΩ • Analog input X–Y mA, X and Y programmable from 0 to 20 mA, impedance 250 Ω • Reaction time: 2 ms ±0.5 ms • 11-bit resolution, accuracy ±0.6% for Δθ = 60 °C (140 °F), linearity ±0.15% of max. value
COM	Analog I/O common	0 V
AO1	Depending on the software configuration: Analog voltage or current output or logic output	• Analog output 0 to +10 V c, min. load impedance 50 kΩ • Analog output X–Y mA, X and Y can be programmed from 0 to 20 mA, max. load impedance 500 Ω • 10-bit resolution, reaction time: 2 ms ±0.5 ms • Accuracy ±1% for Δθ = 60 °C (140 °F), linearity ±0.2% of max. value • Logic output: 0 or 10 V, 0 to 20 mA
P24	Input for external +24 V c control power supply	• +24 V ⎓ (min. 19 V, max. 30 V) • Power 30 W
0V	Logic input common and 0 V of external P24 power supply	0 V
LI1 LI2 LI3 LI4 LI5	Programmable logic inputs	• +24 V ⎓ (max. 30 V) • Impedance 3.5 kΩ • Reaction time: 2 ms ± 0.5 ms

SW1 Switch	State 0	State 1
Source (factory setting)	< 5 V ⎓	> 11 V ⎓
Sink Int or Sink Ext	> 16 V ⎓	< 10 V ⎓

LI6	Depending on the position of the SW2 switch: LI (Programmable logic input) or PTC (Input for PTC probes)	SW2 = LI (factory setting): • Same characteristics as logic inputs LI1 to LI5 SW2 = PTC: • Trip threshold 3 kΩ, reset threshold 1.8 kΩ • Short-circuit detection threshold < 50 Ω

NOTE: Δθ = temperature change

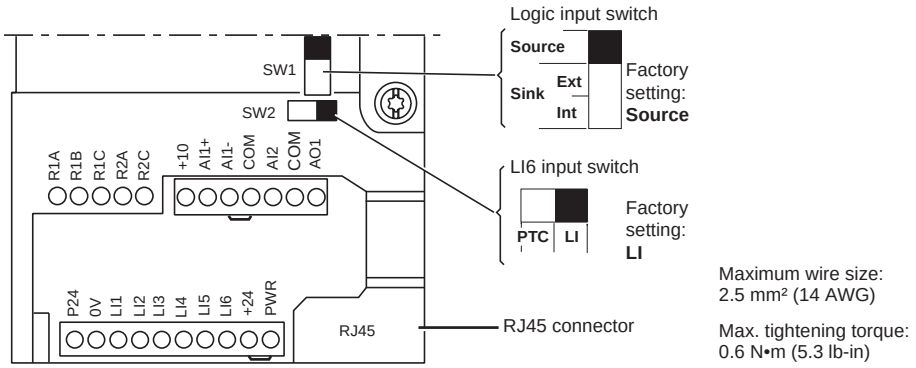
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Table 7: Characteristics and functions of the control terminals *(continued)*

Terminals	Function	Electrical characteristics
+24	Logic input power supply	SW1 switch in Source or Sink Int position: • Internal +24 V ⎓ power supply (min. 21 V, max. 27 V), protected against short-circuits and overloads • 200 mA max. SW1 switch in Sink Ext position: • Input for external +24 V ⎓ power supply for the logic inputs
PWR	Power Removal input.	• 24 V ⎓ (max. 30 V) • Impedance 1.5 kΩ • State 0 if < 2 V, state 1 if > 17 V • Reaction time: 10 ms
	When PWR is not connected to 24 V, the motor cannot be started (compliance with functional safety standard EN 954-1 and IEC/EN 61508).	

NOTE: Δθ = temperature change

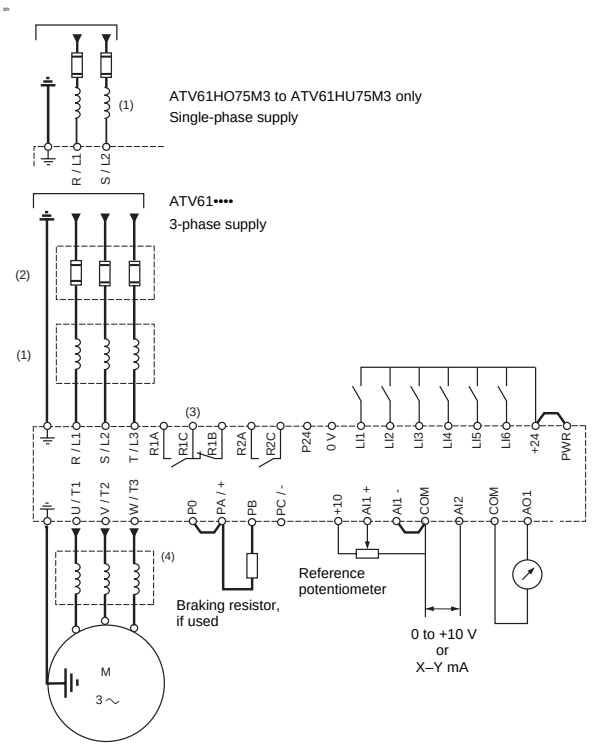
Arrangement of the control terminals



Note: The ATV61 controller is supplied with links between the PWR and +24 terminals and the AI1 and COM terminals.

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Connection diagrams



1 Line reactor, if used (required in single phase operation for ATV61H U40M3 to U75M3 drives). Recommended for 575 V installations.

2 For recommended fuses, refer to Tables 1–4 on pages14–16, the drive nameplate, or the *Altivar 61 and 71 Supplementary Short Circuit Protection Information* bulletin shipped with the drive.

3 R1 relay contacts, for remote signaling of drive status.

4 Installation of a load reactor or motor protecting filter is recommended for all 575 V installations.

NOTE:

- To operate the drive on a single phase supply, you must inhibit the input phase loss detection. If the input phase loss detection is set to its factory configuration, the drive will display a PHF code until the input phase loss is inhibited. For possible drives, see Table 1 on page 14.
- Install interference suppressors on all inductive circuits near the drive or coupled to the same circuit (such as relays, contactors, and solenoid valves).
- Use shielded cable for PWR input connections.
- See page 38 for factory configurations for logic inputs, analog inputs, relays and analog inputs.

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Operation on an Isolated, Impedance Grounded (IT), or Corner Grounded Delta System

Isolated or impedance grounded (IT) neutral system:
Use a permanent insulation monitor compatible with non-linear loads, such as a Merlin Gerin Type XM200 or equivalent. Altivar 61 drives feature built-in common mode RFI (EMC) filters. When any ATV61 drive is operating on an isolated or impedance grounded electrical distribution system, the filters must be isolated (disconnected).

NOTE: The ATV61D22N4 has two jumpers for filter disconnection.

CAUTION

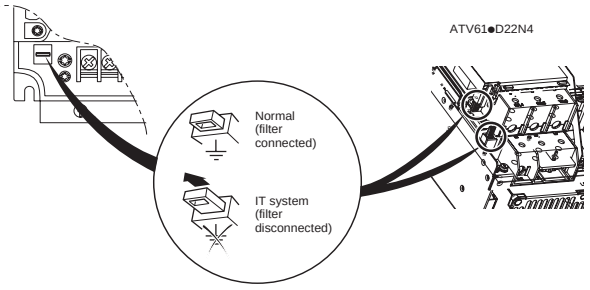
DRIVE DAMAGE

- Do not exceed 4 kHz switching frequency on ATV61H 075N4(Z), U15N4(Z), U22N4(Z), U30N4(Z), U40N4(Z drives if the filters are disconnected.
- Refer to the programming manual on the CD-ROM supplied with the drive to adjust parameter SFr.

Failure to follow these instructions can result in equipment damage.

Disconnecting the filter

For ATV61HO75M3–ATV61HD45M3X[1], ATV61HO75N4–ATV61HD75N4[2], and ATV61HU3OY–ATV61HD30Y[3]



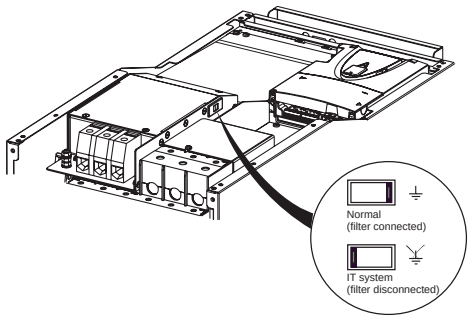
1 For ATV61 part numbers, see Tables 1 and 2 on pages 14 and 15.

2 For ATV61 part numbers, see Table 3 on pages15 and 16.

3 For ATV61 part numbers, see Table4 on pages 16 and 17.

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For ATV61HD37Y, ATV61HD45Y, ATV61HD55Y, ATV61HD75Y, and ATV61HD90Y



⚠ WARNING

RISK OF ELECTRIC SHOCK

ATV61•••Y drives must not be connected to a corner grounded system.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Corner grounded delta systems:
The ATV61HU30Y–ATV61HD90Y drives[1] must **never** be connected on a corner grounded delta electrical distribution system. When any other drive referenced in this manual is connected to a corner grounded delta electrical distribution system the filters must be isolated (disconnected) as shown in the diagram above.

[1] For ATV61 part numbers, see Table 4 on pages16 and 17.

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Electromagnetic Compatibility, Wiring

Principle and precautions

Important: The high frequency equipotential ground connection between the drive, motor, and cable shielding does not eliminate the need to connect the ground (PE) conductors (green-yellow) to the appropriate terminals on each unit. To help accomplish this, the user must follow the following points.

- Grounds between the drive, motor, and cable shielding must have high-frequency equipotentiality.
- When using shielded cable for the motor, use a 4-conductor cable so that one wire will be the ground connection between the motor and the drive. Size of the ground conductor must be selected in compliance with local and national codes. The shield can then be grounded at both ends. Metal ducting or conduit can be used for part or all of the shielding length, provided there is no break in continuity.
- When using shielded cable for the Dynamic Brake (DB) resistors, use a 3-conductor cable so that one wire will be the ground connection between the DB resistor assembly and the drive. Size of the ground conductor must be selected in compliance with local and national codes. The shield can then be grounded at both ends. Metal ducting or conduit can be used for part or all of the shielding length, provided there is no break in continuity.
- When using shielded cable for control signals, if the cable is connecting equipment that is close together and the grounds are bonded together, then both ends of the shield can be grounded. If the cable is connected to equipment that may have a different ground potential, then ground the shield at one end only to prevent large currents from flowing in the shield. The shield on the ungrounded end may be tied to ground with a capacitor (for example: 10 nF, 100V or higher) in order to provide a path for the higher frequency noise.
- Keep the control circuits away from the power circuits. For control and speed reference circuits, use of shielded twisted cables with a pitch of between 25 and 50 mm (0.98 and 1.97 in.) is recommended.
- Ensure maximum separation between the power supply cable (line supply) and the motor cable and also ensure maximum separation between the control cables and any power cables.

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- The motor cables must be at least 0.5 m (20 in.) long.
- Do not use surge arresters or power factor correction capacitors on the variable speed drive output.
- If using an additional input filter, refer to the Installation Guide for more information.
- For installation of the EMC plate provided with the drive and instructions for meeting EN55011 Class A directive, refer to the Installation Guide.

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Setup—Preliminary Recommendations

Drive settings (factory configuration)

The Altivar 61 drive is factory-set for the following operating conditions:

Table 8: Factory configurations

Macro-configuration	Pumps/fans
Motor frequency	50 Hz
Motor control type	Energy-saving variable torque applications
Stop mode	Normal stop mode on deceleration ramp
	Freewheel, in the event of a detected fault
Linear, acceleration, and deceleration ramps	3 s
Low speed	0 Hz
High speed	50 Hz
Motor thermal current	Rated drive current
Standstill injection braking current	0.7 x rated drive current, for 0.5 s
Automatic starts	No automatic starts after a detected fault is cleared
Switching frequency	2.5 kHz to 12 kHz depending on drive rating
Logic inputs	• LI1: forward (1 operating direction), 2-wire control type is transition. See “Starting” on page 39. • LI2: inactive (not assigned) • LI3: switching of 2nd speed reference. If LI3 = 0 the speed reference AI1 is active. If LI3 = 1 the speed reference AI2 is active. • LI4: fault reset • LI5, LI6: inactive (not assigned)
Analog inputs	• AI1: 1st speed reference 0 to 10 V • AI2: 2nd speed reference 0 to 20 mA **NOTE:** For 4–20 mA, go to Menu [1.5 Input/Output CFG], then to [AI2 configuration] and change [AI2 min. value] from 0 to 4.
Relay R1	R1C to R1A contact opens and R1C to R1B contact closes in the event of a detected fault or when the drive is powered off.
Relay R2	R2A to R2C contact closes when the drive is running.
Analog output AO1	0 to 20 mA, motor frequency

For programming instructions, refer to the ATV61 programming manual on the CD-ROM included with the drive.

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Power switching via line contactor

CAUTION

EXCESSIVE LINE CONTACTOR SWITCHING

- Avoid operating the contactor frequently to avoid premature aging of the filter capacitors.
- Do not have cycle times less than 60 s.

Failure to follow these instructions can result in equipment damage.

Starting

Important: The factory setting for the programming parameter [2-wire type] is set to [Transition], when input line power is applied nSt may display as the drive state and the controller will not start. This could indicate that a run command was present before the input line power was applied and a transition or change of state must be made to this command before the drive will start.

If it is desired that the drive starts when the input line power is applied without a transition of the run command, make the following change to the program configuration. Go to the menu [1.5 Inputs/Outputs CFG] and change parameter [2-wire type] from [Transition] to [Level]. When the change is made, the drive can begin running immediately on application of the input line power if a run command is present. For more information, see page 42.

Test on a low-power motor or without a motor, using motors in parallel

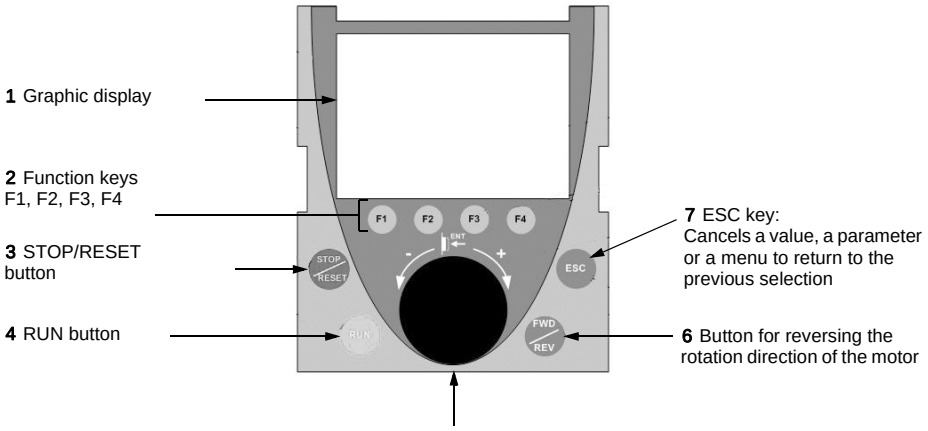
Consult the Programming Manual on the CD-ROM supplied with the drive.

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Display Terminals

Graphic Display Terminal

The graphic display terminal can be disconnected and connected remotely (on the door of an enclosure, for example) using the cables and accessories available as options.



5 Navigation button:

- Press (ENT):
  - To save the current value
  - To enter the selected menu or parameter
- Turn CW/CCW:
  - To increase or decrease a value
  - To go to the next or previous line
  - To increase or decrease the reference if control via the graphic display terminal is activated

NOTE: Buttons 3, 4, 5, and 6 can be used to control the drive directly, if control via the graphic display terminal is activated.

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Drive state codes

Table 9: Drive state codes

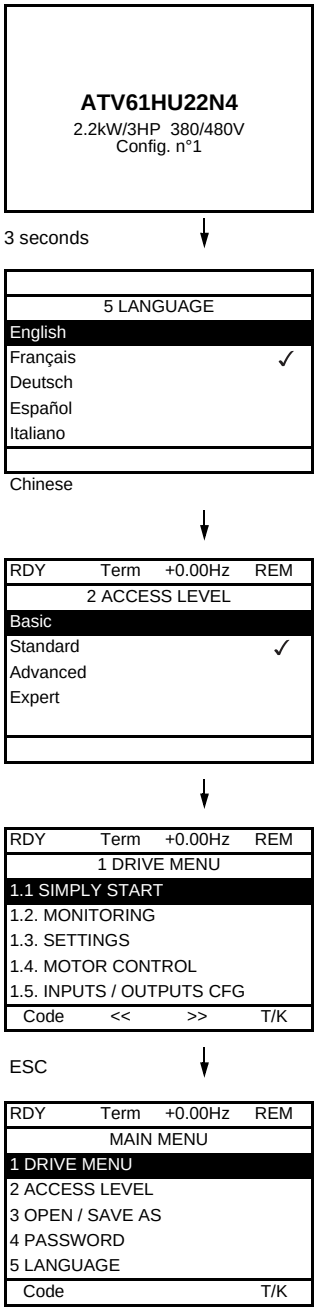
ACC	Acceleration
CLI	Current limiting
CTL	Controlled stop on input phase loss
DCB	DC injection braking in progress
DEC	Deceleration
FLU	Motor fluxing in progress
FRF	Drive at fallback speed
FST	Fast stop
NLP	No line power (no line supply on L1, L2, L3)
NST	Freewheel stop
OBR	Auto-adapted deceleration
PRA	Power Removal function active (drive locked)
RDY	Drive ready
RUN	Drive running
SOC	Controlled output cut in progress
TUN	Auto-tuning in progress
USA	Undervoltage alarm

The first time the drive is powered on, the user is automatically guided through the menus as far as [1. DRIVE MENU].

The parameters in the [1.1 SIMPLY START] submenu must be configured before the motor is started up. To optimize performance, perform an auto-tune (see page page 50).

Only the [1.1 SIMPLY START] menu is described in this document. For more information about the content of the other menus, consult the Programming Manual and the CD-ROM supplied with the drive.

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Displayed for 3 seconds following power-up

Switches to [5 LANGUAGE] menu automatically.

Select the language and press ENT.

Switches to [2 ACCESS LEVEL] menu (consult the Programming Manual on the CD-ROM supplied with the drive)

Select the access level and press ENT.

Switches to [1 DRIVE MENU] (consult the Programming Manual on the CD-ROM supplied with the drive)

Press ESC to return to [MAIN MENU]

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Integrated Display Terminal

The integrated display terminal with a 7-segment 4-digit display is an optional feature for the low-power ATV61 drives. The graphic display terminal described on page 40 is supplied as standard.



Pressing ▲ or ▼ does not store the choices.

Press and hold down (>2 s) ▲ or ▼ to scroll through the data quickly.

Press ENT to save and store the selection.

The display flashes once a value is stored.

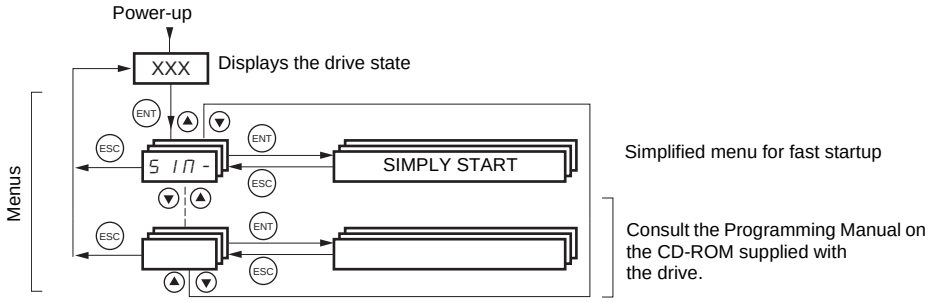
A normal display has no detected fault present and no startup:

- 43.0: Display of the parameter selected in the SUP menu (default selection: motor frequency)
- CLI: Current limit
- CtL: Controlled stop on input phase loss
- dCb: DC injection braking in progress
- FLU: Motor fluxing in progress
- FrF: Drive at fallback speed
- FSt: Fast stop
- nLP: No line power (no line supply on L1, L2, L3)
- nSt: Freewheel stop.
- Obr: Auto-adapted deceleration
- PrA: Power Removal function active (drive locked)
- rdY: Drive ready
- run: Drive running
- SOC: Controlled output cut in progress
- tUn: Auto-tuning in progress
- USA: Undervoltage alarm

The display flashes continuously to indicate the presence of a detected fault.

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Access to Menus



A dash appears after menu and submenu codes to differentiate them from parameter codes.

Example: SIM- menu, ACC parameter

[1.1 SIMPLY START] (SIM-) Menu

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Changes to parameters in other menus may change the [1.1 SIMPLY START] (SIM-) parameter settings.
- Read and understand the ATV61 Programming Manual before configuring parameter values.

Failure to follow these instructions will result in death or serious injury.

The [1.1 SIMPLY START] (SIM-) menu can be used to quickly configure key parameters to get the drive and motor running.

Modifying parameters in other menus may modify the parameter settings in the [1.1 SIMPLY START] (SIM-) menu. As an example, configuration of motor parameters in [1.4 MOTOR CONTROL] (drC-) will be reflected in the [1.1 SIMPLY START] (SIM-) parameters.

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The [1.1-SIMPLY START] (SIM-) menu can be used for quick startup, which is sufficient for many of applications.

NOTE: The parameters of the [1.1 SIMPLY START] (SIM-) menu must be entered in the order in which they appear, as the later ones are dependent on the first ones.

For example [2/3 wire control] (tCC) must be configured before any other parameters.

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Macro configuration

Selecting a macro configuration allows you to quickly configure the drive with settings that are suitable for a specific application.

Input/ output	[Start/Stop]	[Gen. Use]	[PID regul.]	[Network C.]	[Pumps.Fans]
AI1	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel] (PID reference)	[Ref.2 channel] ([Ref.1 channel] = integrated Modbus)	[Ref.1 channel]
AI2	[No]	[Summing ref. 2]	[PID feedback]	[No]	[Ref.1B channel]
AO1	[Motor freq.]	[Motor freq.]	[Motor freq.]	[Motor freq.]	[Motor freq.]
R1	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]
R2	[No]	[No]	[No]	[No]	[Drv running]
LI1 (2-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
LI2 (2-wire)	[Fault reset]	[Reverse]	[Fault reset]	[Fault reset]	[No]
LI3 (2-wire)	[No]	[Jog]	[PID integral reset]	[Ref. 2 switching]	[Ref 1B switching]
LI4 (2-wire)	[No]	[Fault reset]	[2 preset PID ref.]	[Forced local]	[Fault reset]
LI5 (2-wire)	[No]	[Torque limitation]	[4 preset PID ref.]	[No]	[No]
LI6 (2-wire)	[No]	[No]	[No]	[No]	[No]
LI1 (3-wire)	Stop	Stop	Stop	Stop	Stop
LI2 (3-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
LI3 (3-wire)	[Fault reset]	[Reverse]	[Fault reset]	[Fault reset]	[No]
LI4 (3-wire)	[No]	[Jog]	[PID integral reset]	[Ref. 2 switching]	[Ref 1B switching]
LI5 (3-wire)	[No]	[Fault reset]	[2 preset PID ref.]	[Forced local]	[Fault reset]
LI6 (3-wire)	[No]	[Torque limitation]	[4 preset PID ref.]	[No]	[No]

The assignment of inputs LI1 to LI6 differs in 3-wire control.

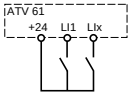
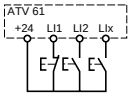
Factory settings

NOTE: All settings listed in the preceding table can be modified, adjusted and reassigned. Consult the ATV61 Programming Manual on the CD-ROM supplied with the drive.

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The following table describes the codes, adjustment range, and factory settings.

Table 10: Codes, adjustment range, and factory settings

Code	Name/Description	Adjustment range	Factory setting
tCC	**[2/3 wire control]**		[2 wire] (2C)
2C 3C	• **[2 wire]** (2C) • **[3 wire]** (3C) **2-wire control** **Maintained control:** Maintained closed to run and maintained opened to stop.  Example of source wiring: LI1: forward LIx: reverse **3-wire control** (Pulse control): A forward or reverse pulse is sufficient to command starting, a stop pulse is sufficient to command stopping.  Example of source wiring: LI1: stop LI2: forward LIx: reverse To change the assignment of [2/3 wire control] (tCC) press and hold the ENT key for 2 s. The [2 wire type] (tCt) function and the functions assigning the logic inputs and analog inputs will return to the factory settings. The selected macro configuration will reset, losing its custom settings. **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** • Ensure that this parameter is configured before configuring the [1.6 COMMAND] (Ctl-) and [1.7 APPLICATION FUNCT.] (FUn-). • Ensure that this assignment change is compatible with the wiring scheme used. For more information, consult the CD-ROM with the drive. **Failure to follow these instructions will result in death or serious injury.**		

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Table 10: Codes, adjustment range, and factory settings *(continued)*

Code	Name/Description	Adjustment range	Factory setting
CFG	**[Macro configuration]**		[Pumps.Fans] (PnF)
STS GEn PId nEt PnF	• **[Start/Stop]** (StS): Start/stop • **[Gen. Use]** (GEn): General use • **[PID regul.]** (PId): PID regulation • **[Network C.]** (nEt): Communication bus • **[Pumps.Fans]** (PnF): Pumps/fans To change the assignment of [Macro configuration] (CFG) press the ENT key for 2 s. **⚠ DANGER** **UNINTENDED EQUIPMENT OPERATION** Ensure that the selected macro configuration is compatible with the wiring scheme used. **Failure to follow these instructions will result in death or serious injury.**		
CCFG	**[Customized macro]**		
YES	Read-only parameter, visible only if at least one macro configuration parameter has been modified. • **[Yes]** (YES)		
bFr	**[Standard mot. freq]**		[50 Hz IEC] (50)
50 60	• [50 Hz IEC] (50): IEC • [60 Hz NEMA] (60): NEMA This parameter modifies the presets of the following parameters: [Rated motor power] (nPr), [Rated motor volt.] (UnS), [Rated mot. current] (nCr), [Rated motor freq.] (FrS), [Rated motor speed] (nSP) and [Max frequency] (tFr), see below; and [Mot. therm. current] (ItH) and [High speed] (HSP), see page 51.		
IPL	**[Input phase loss]**		Varies with the drive rating.
nO YES	• **[Ignore]** (nO): A detected phase loss is ignored. To be used when the drive is supplied via a single phase supply or by the DC bus. • **[Freewheel]** (YES): A detected phase loss with freewheel stop. If one phase is lost, the drive indicates mode [Input phase loss] (IPL); but if 2 or 3 phases are lost, the drive continues to operate until it trips on an undervoltage fault. This parameter is only accessible in this menu on ATV61H037M3 to HU75M3 drives (used with a single phase supply).		
nPr	**[Rated motor power]**	According to drive rating	Varies with the drive rating.
	Rated motor power given on the nameplate, in kW if [Standard mot. freq] (bFr) = [50 Hz IEC] (50), in HP if [Standard mot. freq] (bFr) = [60 Hz NEMA] (60).		

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Table 10: Codes, adjustment range, and factory settings *(continued)*

Code	Name/Description	Adjustment range	Factory setting
UnS	**[Rated motor volt.]** Rated motor voltage given on the nameplate. ATV61•••M3: 100 to 240 V ATV61•••N4: 200 to 480 V ATV61•••Y: 400 to 690 V	According to drive rating	Varies with the drive rating and [Standard mot. freq] (bFr)
nCr	**[Rated mot. current]** Rated motor current given on the nameplate.	0.25 to 1.1 or 1.2 Hz depending on rating	Varies with the drive rating and [Standard mot. freq] (bFr)
FrS	**[Rated motor freq.]** Rated motor frequency given on the nameplate. The factory setting is 50 Hz, or preset to 60 Hz if [Standard mot. freq] (bFr) is set to 60 Hz.	10 to 500 or 1000 Hz depending on rating	50 Hz
nSP	**[Nom motor speed]** Rated motor speed given on the nameplate. 0 to 9999 rpm and 10.00 to 60.00 krpm on the integrated display terminal. If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows: • Nominal speed = Synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$ or • Nominal speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors) or • Nominal speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors)	0 to 60000 rpm	Varies with the drive rating.
tFr	**[Max frequency]** The factory setting is 60 Hz, or preset to 72 Hz if [Standard mot. freq] (bFr) is set to 60 Hz. The maximum value is limited by the following conditions: • It must not exceed 10 times the value of [Rated motor freq.] (FrS) • Values between 500 Hz and 1000 Hz are possible only in V/F control and for powers limited to 37 kW (50 HP) for ATV61H••• and 45 kW (60 HP) for ATV61W•••. In this case configure [Motor control type] (Ctt) before [Max frequency] (tFr).	10 to 1000 Hz	60 Hz

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Table 10: Codes, adjustment range, and factory settings *(continued)*

Code	Name/Description	Adjustment range	Factory setting
tUn	**[Auto tuning]**		[No] (nO)

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- During auto tuning, the motor operates at rated current.
- Do not service the motor during auto tuning.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- The following motor parameters must be correctly configured before starting auto tuning: [Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), and [Rated motor power] (nPr).
- If one or more of these parameters is modified after auto tuning has been performed, Auto tuning (tUn) will be set to [No] and the procedure must be repeated.

Failure to follow these instructions will result in death or serious injury.

nO
YES
dOnE

- **[No]** (nO): Auto-tuning not performed.
- **[Yes]** (YES) : Auto-tuning is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE).
- **[Done]** (dOnE): Use of the values given the last time auto-tuning was performed.

Important:

- It is essential that all motor parameters—[Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current.] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr)—are configured correctly before starting auto-tuning.
  If one or more of these parameters is modified after auto-tuning has been performed, [Auto tuning] (tUn) will return to [No] (nO) and the procedure must be repeated.
- Auto-tuning is performed only if no stop command has been activated. If a freewheel stop or fast stop function has been assigned to a logic input, this input must be set to 1 (active at 0).
- Auto-tuning takes priority over any run or prefluxing commands, which will take effect after the auto-tuning sequence.
- If auto-tuning is unsuccessful, the drive displays [No] (nO) and, depending on the configuration of [Autotune fault mgt] (tnL) (consult the CD-ROM supplied with the drive), may switch to [Auto-tuning] (tnF) detected fault.
- Auto-tuning may last for 1 to 2 seconds. Do not interrupt; wait for the display to change to [Done] (dOnE) or [No] (nO).

NOTE: During auto-tuning the motor operates at rated current.

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Table 10: Codes, adjustment range, and factory settings *(continued)*

Code	Name/Description	Adjustment range	Factory setting
tUS tAb PEnd PrOG FAIL dOnE	**[Auto tuning status]** (for information only, cannot be modified) • **[Not done]** (tAb): The default stator resistance value is used to control the motor. • **[Pending]** (PEnd): Auto-tuning has been requested but not yet performed. • **[In Progress]** (PrOG): Auto-tuning in progress. • **[Failed]** (FAIL): Auto-tuning unsuccessful. • **[Done]** (dOnE): The stator resistance measured by the auto-tuning function is used to control the motor.		[Not done] (tAb)
PHr AbC ACb	**[Output Ph rotation]** • **[ABC]** (AbC): Forward • **[ACB]** (ACb): Reverse This parameter can be used to reverse the rotation direction of the motor without reversing the wiring.		[ABC] (AbC)

Parameters that can be changed while the drive is running or stopped

Table 11: Parameters that can be changed while the drive is running or stopped

Code	Name/Description		Factory setting
ItH	**[Mot. therm. current]**	0 to 1.1 or 1.2 In (1) according to rating	Varies with the drive rating.
	Motor thermal overload current, to be set to the rated current indicated on the nameplate.		
ACC	**[Acceleration]**	0.1 to 999.9 s	3.0 s
	Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 49). Ensure that this value is compatible with the inertia being driven.		
dEC	**[Deceleration]**	0.1 to 999.9 s	3.0 s
	Time to decelerate from the [Rated motor freq.] (FrS) (page 49) to 0. Ensure that this value is compatible with the inertia being driven.		
LSP	**[Low speed]**		0
	Motor frequency at minimum reference, can be set between 0 and [High speed] (HSP).		
HSP	**[High speed]**		50 Hz
	Motor frequency at maximum reference, can be set between [Low speed] (LSP) and [Max frequency] (tFr). The factory setting changes to 60 Hz if [Standard mot. freq] (bFr) = [60 Hz] (60).		

(1) "In" corresponds to the rated controller current indicated in the installation manual and on the controller nameplate.

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Detected Faults and Troubleshooting

Drive does not start, no detected fault code displayed

- If the display does not light up, check the power supply to the drive.
- If the drive displays [Freewheel] (nSt) or [Fast stop] (FSt): The Fast Stop and Freewheel functions help prevent the drive from starting if the corresponding logic inputs are not powered up. This is normal—these functions are active at zero so that the drive will stop if there is a wire break.
- Make sure that the run command input or inputs are activated according to the selected control mode:
  - — [2/3 wire control] (tCC) parameter, described on page 47
  - — [2 wire type] (tCt) parameter, described on page 39 and in the ATV61 programming manual on the CD-ROM supplied with the drive).

Conditions requiring a power reset

⚠ DANGER

LOSS OF PERSONNEL AND EQUIPMENT PROTECTION FEATURES

- Enabling fault inhibition (InH) will disable the drive protection features.
- InH should not be enabled for typical applications of this equipment.
- InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection features poses a greater risk than personnel injury or equipment damage.

Failure to follow these instructions will result in death or serious injury.

Table 12 on page 53 lists the conditions requiring a power reset. A power reset is accomplished by cycling power to the drive after the cause of the condition has been removed.

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AI2F, EnF, SOF, SPF and tnF conditions can also be reset remotely by means of a logic input or control bit (consult the Programming Manual on the CD-ROM supplied with the drive).

EnF, InFA, InFb, SOF, SPF and tnF conditions can be inhibited and cleared remotely by means of a logic input or control bit (consult the Programming Manual on the CD-ROM supplied with the drive).

Table 12: Conditions requiring a power reset

Code	Name	Probable cause	Remedy
AI2F	[AI2 input]	• AI2 signal out of range	• Check the wiring of analog input AI2 and the value of the signal.
bOF	[DBR overload]	• Incorrect DB resistor settings	• Check the size of the resistor and wait for it to cool down. • Check parameters [DB Resistor Power] (brP) and [DB Resistor value] (brU) (consult the CD-ROM supplied with the drive).
bUF	[DB unit sh. Circuit]	• Short-circuit output from braking unit	• Check the wiring of the braking unit and the resistor. • Check the braking resistor.
CrF1	[Precharge]	• Charging relay control condition or charging resistor damaged	• Turn the drive off and then back on again. • Check the internal connections. • Contact Schneider Electric Product Support.
CrF2	[Thyr. soft charge]	• Improper DC bus charging condition (thyristors)	
EEF1	[Control Eeprom]	• Control card Internal memory	• Check the environment (electromagnetic compatibility). • Turn off, reset, return to factory settings. • Contact Schneider Electric Product Support.
EEF2	[Power Eeprom]	• Power card internal memory	
FCF1	[Out. contact. stuck]	• The output contactor remains closed although the opening conditions have been met	• Check the contactor and its wiring. • Check the feedback circuit.
HdF	[IGBT desaturation]	• Short-circuit or grounding at the drive output	• Check the cables connecting the drive to the motor, and the motor insulation. • Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu.
ILF	[internal com. link]	• Communication condition between option card and drive	• Check the environment (electromagnetic compatibility). • Check the connections. • Ensure that no more than 2 option cards (max. permitted) have been installed on the drive. • Replace the option card. • Contact Schneider Electric Product Support.
InF1	[Rating error]	• The power card is different from the card stored	• Check the catalog number of the power card and ensure that it is compatible with the drive.
InF2	[Incompatible PB]	• The power card is incompatible with the control card	• Check the catalog number of the power card and ensure that it is compatible with the drive.
InF3	[Internal serial link]	• Communication condition between the internal cards	• Check the internal connections. • Contact Schneider Electric Product Support.

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Table 12: Conditions requiring a power reset *(continued)*

Code	Name	Probable cause	Remedy
InF4	[Internal MFG area]	• Internal data inconsistent	• Contact Schneider Electric Product Support to have the drive recalibrated.
InF6	[Internal-option]	• The option installed in the controller is not recognized	• Check the catalog reference and compatibility of the option.
InF7	[Internal-hard init.]	• Initialization of the drive is incomplete	• Turn off the drive and reset.
InF8	[Internal-ctrl supply]	• The control section power supply is incorrect	• Check the control section power supply.
InF9	[Internal-I measure]	• The current measurements are incorrect	• Replace the current sensors or the power card. • Contact Schneider Electric Product Support.
InFA	[Internal-mains circuit]	• The input stage is not operating correctly	• Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu. • Contact Schneider Electric Product Support.
InFb	[Internal-th. sensor]	• The drive temperature sensor is not operating correctly	• Replace the temperature sensor. • Contact Schneider Electric Product Support.
InFC	[Internal-time meas.]	• Detected fault on the electronic time measurement component	• Contact Schneider Electric Product Support.
InFE	[internal- CPU]	• Internal microprocessor event	• Turn off the drive and reset. Contact Schneider Electric Product Support.
OCF	[Overcurrent]	• Motor parameters are not set correctly • Excessive inertia or load • Mechanical locking	• Check the motor parameters. • Check the size of the motor, controller, and load. • Check the state of the mechanism.
PrF	[Power removal]	• Detected fault with the drive's Power Removal safety function[1]	• Contact Schneider Electric Product Support.
SCF1	[Motor short circuit]	• Short-circuit or grounding at the drive output • Significant earth leakage current at the controller output if several motors are connected in parallel	• Check the cables connecting the drive to the motor, and the insulation of the motor • Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu. • Reduce the switching frequency. • Connect chokes in series with the motor.
SCF2	[Impedant sh. circuit]		
SCF3	[Ground short circuit]		
SOF	[Overspeed]	• Instability • Overhauling load	• Check the motor, gain and stability parameters. • Add a braking resistor. • Check the size of the motor, controller, and load.
SPF	[Speed Feedback Loss]	• Encoder feedback signal missing.	• Check the wiring between the encoder and the drive. • Check the encoder.
tnF	[Auto-tuning]	• Special motor, or motor power not suitable for the drive • Motor not connected to the drive	• Ensure that the motor and drive are compatible. • Ensure that the motor is present during auto-tuning. • If an output contactor is being used, close it during auto-tuning.

[1] Safety function as defined by IEC61508.

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Auto-Reset Conditions (customer configured)

⚠ DANGER

LOSS OF PERSONNEL AND EQUIPMENT PROTECTION FEATURES

- Enabling the fault inhibition (InH) will disable the drive protection features.
- InH should not be enabled for typical applications of this equipment.
- InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection features poses a greater risk than personnel injury or equipment damage.

Failure to follow these instructions will result in death or serious injury.

Table 13 lists the conditions that can be reset with the automatic restart function after the cause has been removed. These conditions can also be reset by turning the drive off then on again, or by means of a logic input or control bit (consult the Programming Manual on the CD-ROM supplied with the drive).

The following conditions can be inhibited and cleared remotely by means of a logic input or control bit: APF, CnF, COF, EPF1, EPF2, FCF2, LFF2, LFF3, LFF4, nFF, ObF, OHF, OLC, OLF, OPF1, OPF2, OSF, OtF1, OtF2, OtFL, PHF, PtF1, PtF2, PtFL, SLF1, SLF2, SLF3, SPIF, SSF, tJF, and ULF (consult the Programming Manual on the CD-ROM supplied with the drive).

Table 13: Auto-Reset Conditions (customer configured)

Code	Name	Probable cause	Remedy
APF	[Application fault]	• Controller Inside card	• Check the card programming. Refer to the card documentation.
CnF	[Com. network]	• Communication interruption	• Check the environment (electromagnetic compatibility). • Check the wiring. • Check the time-out. • Replace the option card. • Contact Schneider Electric Product Support.

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Table 13: Auto-Reset Conditions (customer configured) *(continued)*

Code	Name	Probable cause	Remedy
CAn	[CAN com.]	• Interruption in communication on the CANopen bus	• Check the communication bus. • Check the time-out. • Refer to the CANopen user's manual.
EPF1	[External flt-LI/Bit]	• An external device, depending on user	• Correct the device and reset the drive.
EPF2	[External fault com.]	• A communication network	• Correct the communication network and reset the drive.
FCF2	[Out. contact. open.]	• The output contactor remains open although the closing conditions have been met	• Check the contactor and its wiring. • Check the feedback circuit.
LCF	[input contactor]	• The drive is not turned on even though [Mains V. time out] (LCt) has elapsed.	• Check the contactor and its wiring. • Check the time-out. • Check the line/contactor/controller connection.
LFF2 LFF3 LFF4	[AI2 4-20mA loss] [AI3 4-20mA loss] [AI4 4-20mA loss]	• Loss of the 4 to 20 mA reference on analog input AI2, AI3 or AI4	• Check the connection on the analog inputs.
nFF	[No Flow Fault]	• Zero fluid	• Check and correct the cause of the low flow. • Check the zero fluid detection parameters (consult the Programming Manual on the CD-ROM supplied with the drive).
ObF	[Overbraking]	• Braking ramp too short • Overhauling load	• Increase the deceleration time. • Install a braking resistor if necessary. • Activate the [Dec ramp adapt.] (brA) function (consult the Programming Manual on the CD-ROM supplied with the drive), if it is compatible with the application.
OHF	[Drive overheat]	• Ambient temperature too high • Drive ventilation blocked • Drive cooling fan failure	• Check the motor load, the drive ventilation, and the ambient temperature. Wait for the controller to cool down before restarting.
OLC	[Proc.Overload Flt]	• Process overload (consult the programming manual on the CD-ROM)	• Check and remove the cause of the overload. • Check the parameters of the [PROCESS UNDERLOAD] (OLd-) function (consult the CD-ROM supplied with the controller).
OLF	[Motor overload]	• Motor power rating too small for the application • Overload setting incorrect for the motor full-load rating • Output phase loss (see OPF1)	• Check the setting of the motor thermal current parameter. Check the motor load. Wait for the motor to cool down before restarting.

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Table 13: Auto-Reset Conditions (customer configured) *(continued)*

Code	Name	Probable cause	Remedy
OPF1	[1 motor phase loss]	• Loose connection causing loss of one phase at controller output	• Check the connections from the drive to the motor.
OPF2	[3 motor phase loss]	• Motor not connected or motor power too low • Output contactor open • Instantaneous instability in the motor current	• Check the connections from the drive to the motor. • If an output contactor is being used, consult the Programming Manual on the CD-ROM supplied with the drive. • Test on a low-power motor or without a motor: In factory settings mode, motor phase loss detection is active [Output Phase Loss] (OPL) = [Yes] (YES). To check the drive in a test or maintenance environment without having to switch to a motor with the same rating as the drive (particularly useful in the case of high-power drives), deactivate motor phase loss detection [Output phase loss] (OPL) = [No] (nO). • Check and optimize the parameters [Rated motor volt.] (UnS) and [Rated mot. current.] (nCr) and perform an [Auto tuning] (tUn).
OSF	[Mains overvoltage]	• Line voltage too high • Disturbances in the line supply	• Check the line voltage.
OHF1	[PTC1 overheat]	• Overheating of the PTC1 probes detected	• Check the motor load and motor size. • Check the motor ventilation. • Wait for the motor to cool before restarting. • Check the type and state of the PTC probes.
OHF2	[PTC2 overheat]	• Overheating of the PTC2 probes detected	
OHFL	[PTC=LI6 overheat]	• Overheating of PTC probes detected on input LI6.	
PHF1	[PTC1 probe]	• PTC1 probes open or short-circuited	• Check the PTC probes and the wiring between them and the motor/controller.
PHF2	[PTC2 probe]	• PTC2 probes open or short-circuited	
PHFL	[LI6=PTC probe]	• PTC probes on input LI6 open or short-circuited	
SCF4	[IGBT short circuit]	• Power component	• Perform a test via the [1.10 DIAGNOSTICS] menu. • Contact Schneider Electric Product Support.

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Table 13: Auto-Reset Conditions (customer configured) *(continued)*

Code	Name	Probable cause	Remedy
SCFS	[Motor short circuit]	• Short-circuit at drive output	• Check the cables connecting the controller to the motor, and the motor insulation. • Perform a test via the [1.10 DIAGNOSTICS] menu. • Contact Schneider Electric Product Support.
SLF1	[Modbus com.]	• Interruption in communication on the Modbus bus	• Check the communication bus. • Check the time-out. • Refer to the Modbus User's Manual
SLF2	[PowerSuite com.]	• Communication with PowerSuite™ software	• Check the PowerSuite -connecting cable. • Check the time-out.
SLF3	[HMI com.]	• Communication with the graphic display terminal	• Check the terminal connection. • Check the time-out.
SPIF	[PI Feedback]	• PID feedback below the lower limit	• Check the PID function feedback. • Check the PID feedback supervision threshold and time delay (consult the Programming Manual on the CD-ROM supplied with the drive).
SSF	[Torque/current lim]	• Switch to torque limitation	• Check if there are any mechanical problems. • Consult the Programming Manual on the CD-ROM supplied with the drive.
tJF	[IGBT overheat]	• Drive overheated	• Check the size of the load, motor, and controller. • Reduce the switching frequency. • Wait for the drive to cool before restarting.
ULF	[Proc. Underload Flt]	• Process underload	• Check and remove the cause of the underload. • Consult the Programming Manual on the CD-ROM supplied with the drive.

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Auto-Reset Conditions

⚠ DANGER

LOSS OF PERSONNEL AND EQUIPMENT PROTECTION

- Enabling the fault inhibition parameter (InH) will disable the drive protection features.
- InH should not be enabled for typical applications of this equipment.
- InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection features poses a greater risk than personnel injury or equipment damage.

Failure to follow these instructions will result in death or serious injury.

Table 14 on page 60 lists the conditions that can be reset as soon as the cause of the condition has been removed. The USF condition can be inhibited and cleared remotely by means of a logic input or control bit ([Fault inhibit assign.] (InH), consult the CD-ROM supplied with the drive).

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Table 14: Auto Reset Conditions

Code	Name	Probable cause	Remedy
CFF	[Incorrect config.]	• Option card changed or removed • The current configuration is inconsistent	• Check that there are no card errors. • If the option card was changed or removed deliberately, consult the Programming Manual on the CD-ROM supplied with the drive. • Return to factory settings or retrieve the backup configuration, if it is valid (consult the Programming Manual on the CD-ROM supplied with the drive).
CFI	[Invalid config.]	• Invalid configuration. The configuration loaded in the controller via the bus or network is inconsistent.	• Check the configuration loaded previously. • Load a compatible configuration.
HCF	[Cards pairing]	• The [CARDS PAIRING] (PPI-) function has been configured and a drive card has been changed	• Consult the Programming Manual on the CD-ROM supplied with the drive.
PHF	[Input phase loss]	• Controller incorrectly supplied or a fuse blown • Loss of one phase • 3-phase ATV61 used on a single phase line supply • Unbalanced load Monitors only with the drive on load.	• Check the power connection and the fuses. • Use a 3-phase mains supply • Disable [Input phase loss] (IPL) = [No] (nO).
PrtF	[Power Ident]	• The [Power Identification] (Prt) parameter is incorrect. • Control card replaced by a control card configured on a drive with a different rating	• Enter the correct parameter (reserved for Schneider Electric product support). • Check that there are no card errors. • If the control card was changed deliberately, consult the Programming Manual on the CD-ROM supplied with the drive.
USF	[Undervoltage]	• Line supply too low • Transient voltage dip • Damaged pre-charge resistor	• Check the voltage and the voltage parameter (consult the Programming Manual on the CD-ROM supplied with the drive). • Replace the pre-charge resistor. • Contact Schneider Electric Product Support.

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Altivar® 61 Variable Speed Drive Controllers Simplified Manual and Supplementary Instructions
Instruction Bulletin

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www.Schneider-Electric.us

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09/2008

Counting Instruments

Technical Data 211

Electronic Hour Meter, AC Hour Meter

T50 Series





T50A2, T50B2

ENM's Series T50 electronic AC hour meter is a low cost reliable hour meter incorporating the latest state-of-the-art in electronics. It's quartz-crystal time base insures accurate long term time-keeping. A reliable electromechanical wheel-type indicator is used to store accumulated hours.
This compact tamperproof meter is sealed against the environment to provide years of service.
The T50 elapsed time indicator was designed for use on test and recording equipment, for providing maintenance control, for establishing warranty programs, for measuring machine utilization and production time, or for any application where time-in-use is to be determined.

Features

- Low Power Consumption
- Solid State Electronic Drive Circuit
- Quartz-Crystal for Accurate Timing
- Non-reset
- UL/cUL Recognized, CE & RoHS Compliant
- High Impact, Tamperproof Plastic Case
- IP65
- Indicates Operating Time in Hours and Tenths
- No Battery Back-Up Required
- Quiet operation
- MADE IN THE U.S.A.

Specifications

Time Scale:	6-digits 99,999.9 Hours Automatic recycle to zero
Figures:	Hours - White on black Tenths - Red on white Height - 0.140"
Operation Voltage:	230, 115, 48, 24 VAC ±10% 50/60 Hz Other voltage available
Power Consumption:	Less than 0.4 Watts
Accuracy:	Better than ±0.02% over entire range
Temperature:	-40°F to +185°F (-40°C to +85°C)
Vibration Resistance:	Withstands 10-80 Hz at 20g's max. (SAE J1378)
Shock:	55g at 9-13 ms (SAE J1378)
Humidity:	95% (SAE J1378)
Terminations:	1/4" male blade terminals
Configuration:	Round SAE Bezel with new push-on retaining ring Round 3-Hole Bezel

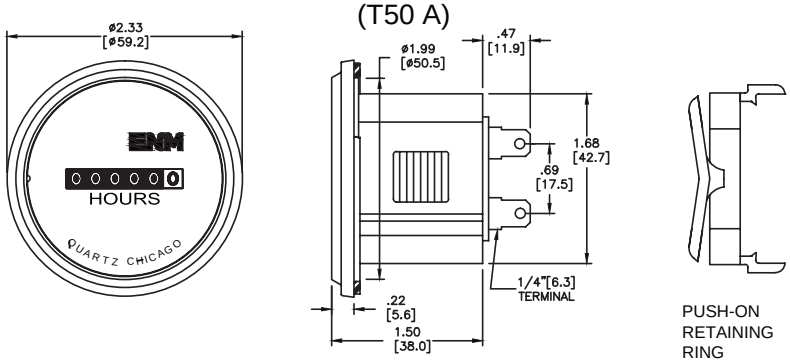
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Counting Instruments

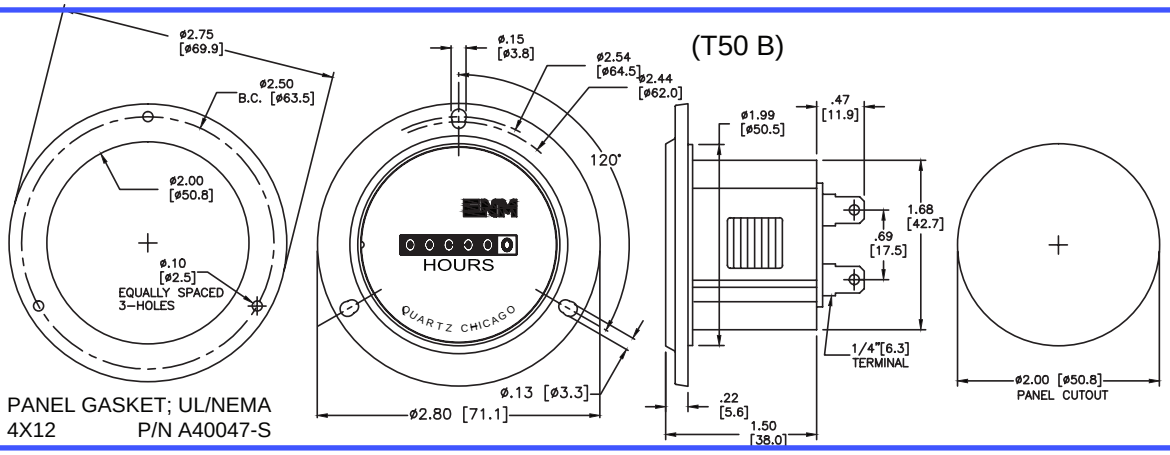
ENM Company
5617 Northwest Highway, Chicago, IL 60646-6135
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(T50 A)



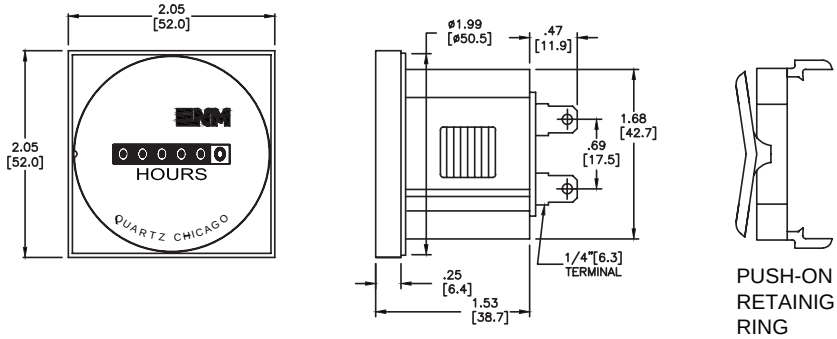
(T50 B)



PANEL GASKET; UL/NEMA 4X12 P/N A40047-S

PANEL GASKET; UL/NEMA 4X12 WITH MTG HARDWARE; P/N B20017

(T50 E)



2013 ENM Co.®

LIMITED WARRANTY

ENM Company resettable electromechanical counters are warranted to the consumer to be free from defects in material and workmanship for a period of 3 years. All ENM products which fall within the warranty period due to defects in material or workmanship will be repaired or replaced, at ENM's option, without charge to the consumer when returned with proof of purchase to any authorized ENM dealer in the United States, transportation charges prepaid, provided there is no evidence of improper installation, tampering, or other abuse. All implied warranties, including any implied warranty of merchantability or fitness for a particular purpose, shall be limited in duration to the express warranty period specified above. ENM disclaims any liability for consequential damages due to breach of any written or implied warranty on its products. Datasheet information subject to change.

Counting Instruments

ENM Company
5617 Northwest Highway, Chicago, IL 60646-6135
(773) 775-8400 • Fax: (773) 775-5968 • Toll Free (888) 372-0465
e-mail: customerservice@enmco.com
ISO 9001:2000 **web site: www.enmco.com**

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RHINO PSC Series Power Supplies Specifications



PSC-05-012, PSC-12-015, PSC-24-015



PSC-12-030, PSC-24-030

NEC Class 2 Compliant Supplies

The **RHINO PSC** series power supplies are plastic low-profile housed switching supplies available in 5, 12 and 24 VDC adjustable output models. There are 8 models with power ratings from 12W to 90W. They have an integral DIN rail mounting adapter and feature universal 85 to 264 VAC input voltage, adjustable DC output, DC-OK LED indication, and output current limitation.

The **RHINO PSC** series of switching power supplies provide tightly regulated output voltage for sensitive loads in industrial, commercial and residential environments. The plastic housing is lightweight and low-profile, designed to fit in shallow depth control panels often used in the building automation industry. Screw terminals are provided for simple and speedy wiring terminations.

The **RHINO PSC** series is both UL508 listed for demanding industrial applications and UL1310 recognized for NEC Class 2 compliance in industrial, commercial and residential applications.

Features

- Low-profile housing - only 2.15 inches (55mm) deep (MCB form factor)
- 5, 12, 24VDC adjustable outputs
- Output power ratings from 12 to 90W
- Integral DIN rail mouting adapter
- Universal input voltage range 85-264VAC
- Tight output voltage regulation
- DC-OK LED indication
- UL508 Listed
- UL1310 Recognized for NEC Class 2 compliance
- CE compliant
- RoHS compliant



PSC-12-060, PSC-24-060



PSC-24-090

Input Specifications						
Part Number	Input Voltage Range	Input Frequency Range	Input Current (Typical) at full load		Efficiency (Typ.)	C-Curve Circuit Breaker or Slow-blow Fuse
			115 VAC	230 VAC		
PSC-05-012	100-240VAC - Nominal 85 to 264VAC - Universal (output power derating 5% / V for operation below 90 VAC)	47-63 Hz	0.25A typ.	0.17A typ.	73%	6.0 A
PSC-12-015			0.29A typ.	0.20A typ.	79%	
PSC-24-015					81%	
PSC-12-030			0.57A typ.	0.39A typ.	81%	
PSC-24-030					83%	
PSC-12-060			1.00A typ.	0.68A typ	83%	
PSC-24-060			1.10A typ.	0.70A typ.	85%	
PSC-24-090			1.60A typ.	1.07A typ.	86%	

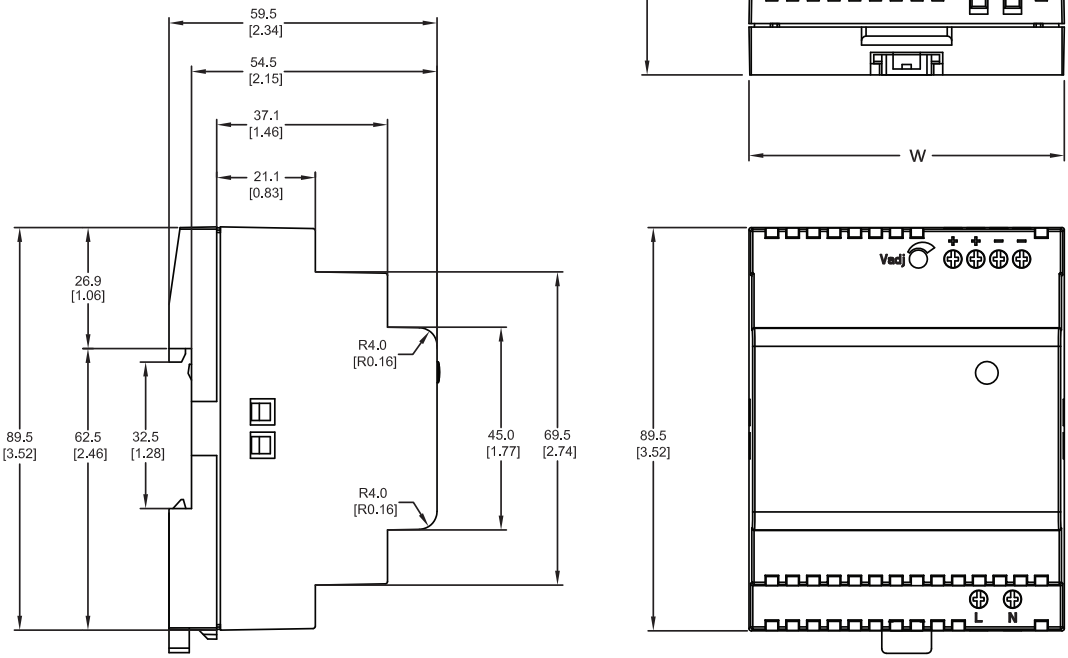
Output Specifications								
Part Number	Price	Output Voltage	Output Volt. Adjust. Range	Output Current (Max.)	Output Power (Max.)	Hold-Up Time		MTBF (IEC 1709 @ 25°C)
						115 VAC	230 VAC	
PSC-05-012	$45.00	5.0VDC	5.0 to 5.2VDC	2.4A	12 Watt	minimum 10 ms	minimum 20 ms	1,600,000 hours
PSC-12-015	$45.00	12.0VDC	12.0 to 16.0VDC	1.25A	15 Watt			
PSC-24-015	$45.00	24.0VDC	24.0 to 28.0VDC	0.63A				
PSC-12-030	$57.00	12.0VDC	12.0 to 16.0VDC	2.5A	30 Watt			1,300,000 hours
PSC-24-030	$57.00	24.0VDC	24.0 to 28.0VDC	1.25A				
PSC-12-060	$69.00	12.0VDC	12.0 to 16.0VDC	4.5A	54 Watt			2,100,000 hours
PSC-24-060	$69.00	24.0VDC	24.0 to 28.0VDC	2.5A	60 Watt			
PSC-24-090	$87.00	24.0VDC		3.75A	90 Watt			1,300,000 hours

RHINO PSC Series Power Supplies Specifications and Dimensions

General Specifications		
Temperature	**Operating:** -25°C (-13°F) to +60°C (+140°F) max at nominal load, above +60°C (+140°F) 2.5% / °C derating up to +70°C (+185°F) **Storage:** -25°C (-13°F) to +85°C (+185°F) max	
Humidity	95% (non-condensing) relative humidity max.	
Output Regulation	1%	
Safety Standards	UL508, UL1310, Class 2 IEC/EN 60950-1, UL60950-1, EN50178 EN60204, EN61558-2-8	
Output Voltage Ripple	<100 mV peak-to-peak	
Output Protection	Current limitation at 100 - 150% typ. (automatic recovery)	
Electromagnetic Compatibility (EMC)	Emissions - EN61000-6-3 Conducted RI suppression on input - EN55022 class B Radiated RI suppression - EN55022 class B	Immunity - EN61000-6-2 EN61000-4-X
Enclosure Rating	IP 20 (IEC 60529)	
Enclosure Material	Plastic FR2010-110C (UL 94V- 0 rated)	
Mounting	DIN-rails as per EN50022-35x15/735 (snap-on with self-locking springs)	
Connection	Screw terminals with combi-type screw heads for wire size 24 to 12 AWG (0.20 to 3.30mm²)	
Agency Approvals	UL508 Listed, file #E197592 UL1310 Class 2 Recognized, file #E198298	

Dimensions		
Part No.	***Width (W) - mm [inches]***	***Weight oz [g]***
PSC-05-012	26.3 [1.04]	3.53 [100]
PSC-12-015	26.3 [1.04]	3.53 [100]
PSC-24-015	26.3 [1.04]	3.53 [100]
PSC-12-030	52.5 [2.07]	5.64 [160]
PSC-24-030	52.5 [2.07]	5.64 160]
~~***PSC-12-060***~~	~~70.0 [2.76]~~	~~8.11 [230]~~
PSC-24-060	70.0 [2.76]	8.11 [230]
~~***PSC-24-090***~~	~~105.0 [4.13]~~	~~12.0 [340]~~

Wiring		
Input/Output	***Description***	***Wire size***
AC Input	all models: L, N only (2 pin terminal)	24 -12 AWG / 3.30mm² max
DC Output	15 -30 Watt models: single + and - terminals	24 -12 AWG / 3.30mm² max
DC Output	60 - 90 Watt models: double + and - terminals	24 -12 AWG / 3.30mm² max



TOLERANCE +/- 0.5mm [0.02"]

Product Data Sheet

ZB5AS54

MUSHROOM PB



List Price	$78.00 USD
Availability	**Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

Bezel Material	Black Plastic
Approvals	UL Listed File Number E164353 CCN NKCR - CSA Certified File Number LR44087 Class 321103 - CE Marked
Color	Red
Enclosure Rating	NEMA 1/2/3/4/4X/13
Degree of Protection	IP 65
Operator Type	Non-Illuminated
Markings	Unmarked
Style	Mushroom Button: 40mm
Operator Action	Maintained - Turn-to-Release
Shape of Head	Round
Size	22mm
Type	XB5

Shipping and Ordering

Category	22467 - Push Buttons, Plastic, 22mm, ZB5, XB5
Discount Schedule	I
GTIN	00785901354819
Package Quantity	1
Weight	0.08 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	FR

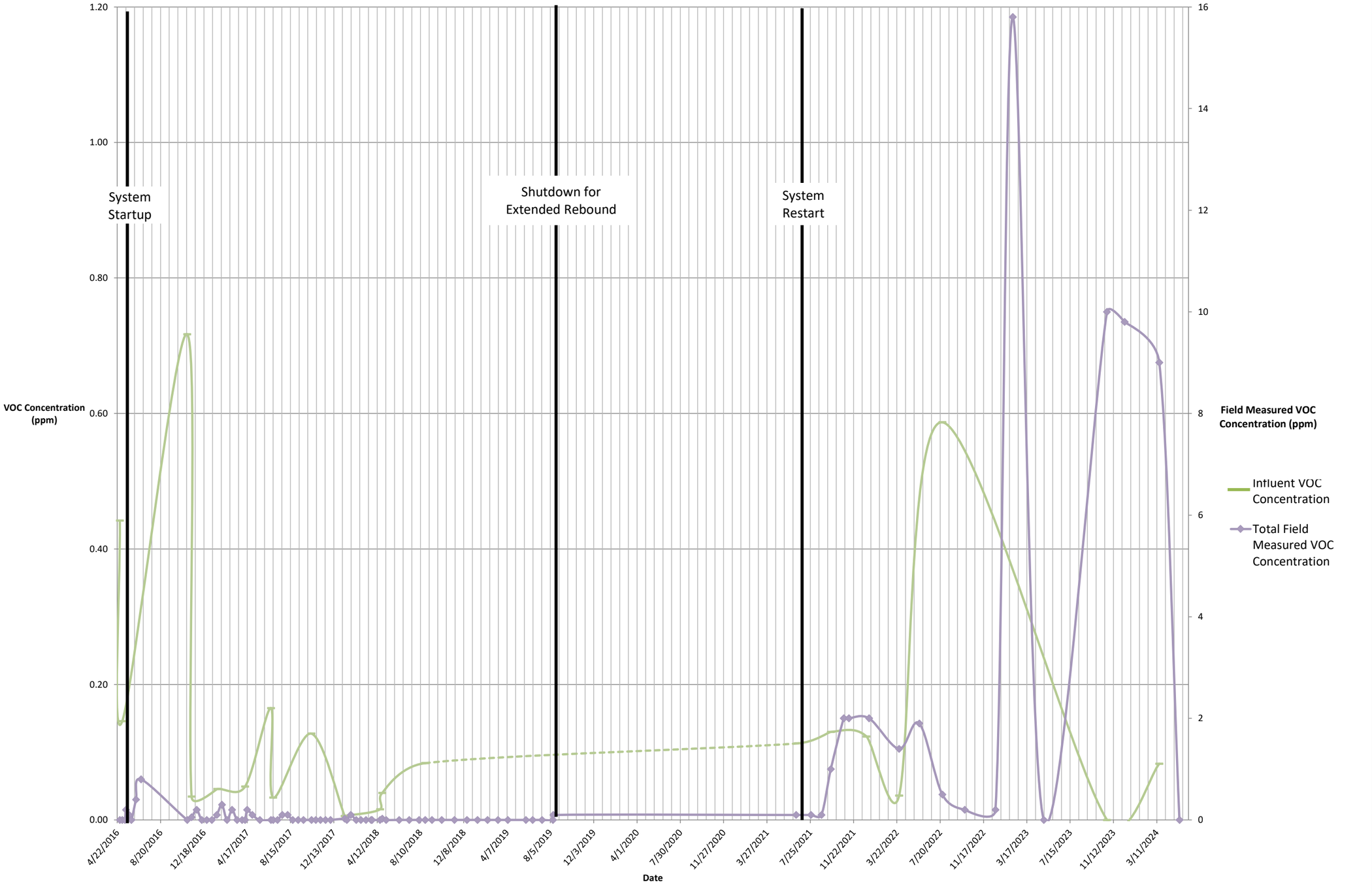
As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

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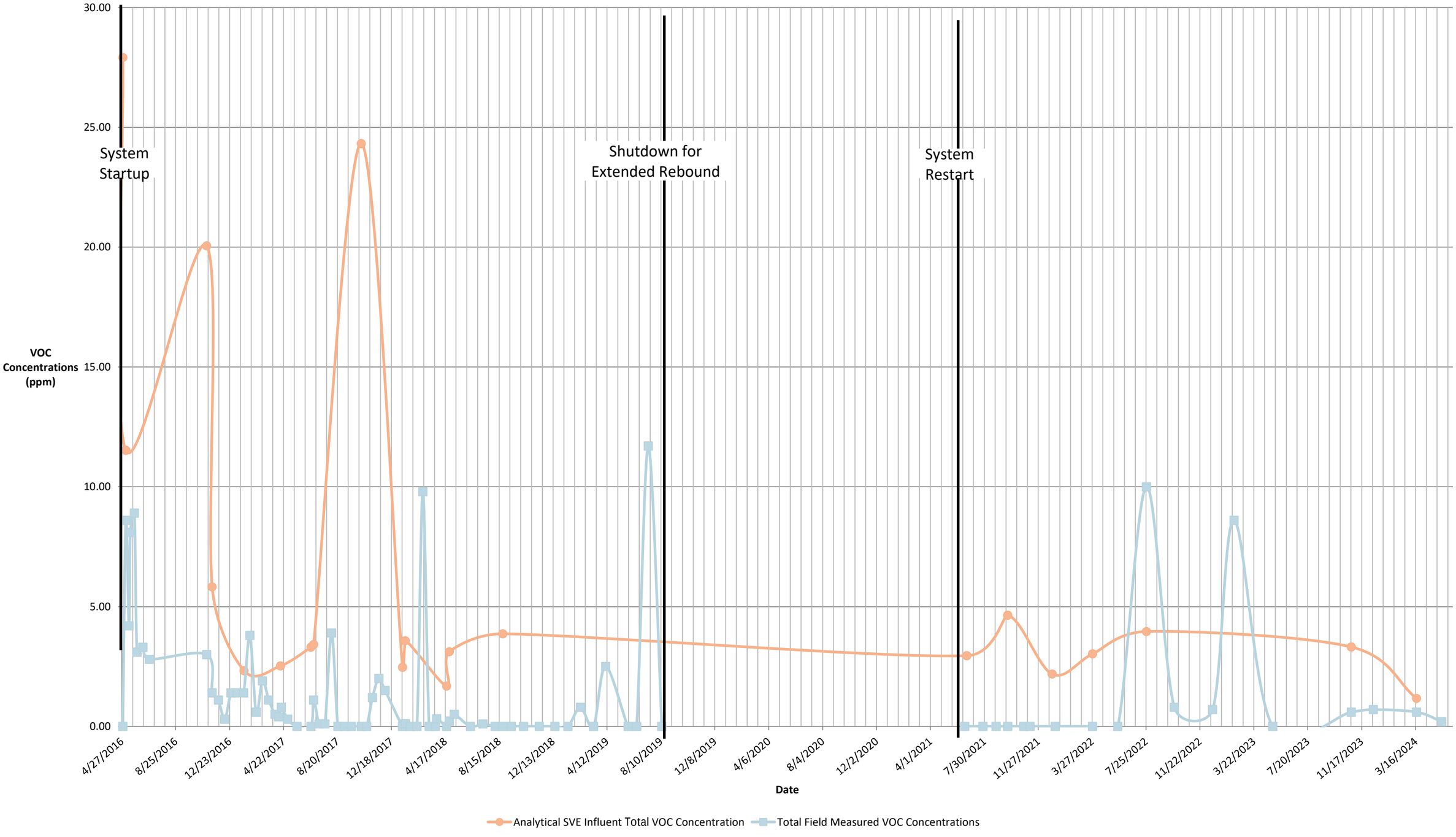
APPENDIX N

Graphs depicting VOCs Screening and Lab Results – SSD and SVE Systems

Influent SSD VOC Concentrations (ppm) - Field Screening and Laboratory Results



Influent SVE Total VOC Concentrations (ppm) - Field Screening and Laboratory Results



APPENDIX O

August 2024 Sampling Field Sheets

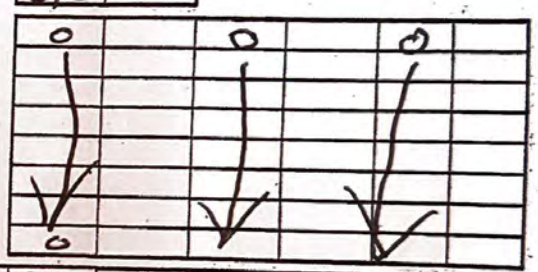
SSD & MW - O&M System Data Sheet

Client/Location: Endzone/101-37 99th St, Ozone Park, NY 11416 AECOM JOB #: 60270935 Date: 8/20/24

Sub Slab Depression System/Monitoring Wells

Status On Arrival: Up / Down / Off — Status On Departure: Up / Down / Off

System ID	Valve Position (% Open) Arrival	Valve Position (% Open) Depart	Pressure ("H_2O) Arrival	Pressure ("H_2O) Depart	Temperature (°F) Arrival	Temperature (°F) Depart	Soil Vapor Velocity (ft/min) Arrival	Soil Vapor Velocity (ft/min) Depart	Δ Pressure ("H_2O) Arrival	Δ Pressure ("H_2O) Depart	VOCs (ppm) Arrival	VOCs (ppm) Depart	O_2 (%) Arrival	O_2 (%) Depart	LEL (%) Arrival	LEL (%) Depart
SSD-SP01	100		(PI-108) 8		(TI-109) 78				(DPT-210) 1.6		(SP-01) 0.1					
SSD-SP02			(PI-214) 20						(DPT-213) 3.4							
Dilution	0															
SSD-SP03			(PI-217) 32		(TI-218) 122				(DPT-219) 1.1							
SSD-SP04			(PI-221) 12		(TI-223) 118						(SP-04) 0.1					
											(SP-05) 0.0					
											(SP-06) 0.0					
SSD-1	100		3.3		87		289.4									
SSD-2			3.2		86		301.0									
SSD-3			3.4		85		998.0									
SSD-4			3.8		85		2977.0									
SSD-5			3.8		85		2010.0									
SSD-6			3.7		86		378.0									
SSD-7			3.6		86		3190.0									
SSD-8			3.5		86		895.0									



Bay ID	MP ID	Pressure ("H_2O)	VOCs (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)
Bay 8B	MP-1S	0.1	0.0				
	MP-1D	0.1	0.0				
Bay 8A	MP-2S	0.2	0.0				
	MP-2D	0.3	0.0				
Bay 9	MP-3S	0.2					
	MP-3D	0.3					
	MP-4S	0.2					
	MP-4D	0.3					
Bay 10	MP-5S	0.1	0				
	MP-5D	0.2	0				
	250	0.2	6				
	MP-6D	0.2	0				
Bay 11	MP-7S	0.2	0				
	MP-7D	0.3	0				
	MP-8S	0.0	0				
	MP-8D	0.1	0				

Bay ID	MP ID	Pressure ("H_2O)	Pressure ("H_2O)	VOCs (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	C (pp
Bay 12	MP-9S	0.3		0				
	MP-9M	0.2		0				
	MP-9D	0.8		0				
	MP-10S	0.4		0				
	MP-10M	0.4		0				
	MP-10D	0.9		0				
Bay 13	MP-11S	0.2		0				
	MP-11D	0.1		0				
	MP-12S	0.3		0				
	MP-12D	0.1		0				
Bay 14	MP-13S	0.2		0				
	MP-13D	0.3		0				
	MP-14S	0.2		0				
	MP-14D	0.6		0				
Bay 15	MP-15S	0.2		0				
	MP-15D	0.6		0				
	MP-16S	0.2		0				
	MP-16D	0.4		0				

Motor ID	Amps A	Amps B	Frequency (Hz) A	Frequency (Hz) B	Hour Meter Readings (hours) A	(time) A	(hours) B	(time) B
SVE (B-01)	52.1		60.0		35787.8		@	
SSD (B-02)	15.5		59.9		47595.2		@	
Electric Meter Reading (kWh)			346520				@	
Load (kW)			1.38					

TECHNICIAN COMMENTS: Air Canister sampled at Bays and one ambient air outside.

TECHNICAL REVIEW:

Office Copy - White, Field Copy - Yellow

SVE - O&M System Data Sheet

Client/Location: Endzone/101-37 99th St, Ozone Park, NY 11416 AECOM JOB #: 60270935 Date: 8/20/24

SOIL VAPOR EXTRACTION SYSTEM

Status On Arrival: (Up) Down Off Status On Departure: (Up) Down Off

System ID	Valve Position (% Open)		Pressure ("H_2O)		Temperature (°F)		Soil Vapor Velocity (ft/min)		Δ Pressure ("H_2O)		VOCs (ppm_v)		O_2 (%)		LEL (%)	
	Arrival	Depart	Arrival	Depart	Arrival	Depart	Arrival	Depart	Arrival	Depart	Arrival	Depart	Arrival	Depart	Arrival	Depart
SVE-8																
SVE-7																
SVE-11	70		2.6		77.0		1220				0.3					
SVE-10	↓		4.1		77.0		597				0.3					
SVE-15			3.6		76.7		1550				0.3					
SVE-13			2.6		76.0		2330				0.3					
SVE-14			2.8		77.0		1132				0.4					
SVE-16			2.5		78.0		1240				0.9					
SVE-18			1.3		78.0		609				24.8					
SVE-17			3.6		77.0		1734				2.7					
SVE-12			2.6		76.0		987				0.3					
SVE-9	↓		6.6		75.0		599				0.2					
SVE-21			2.7		76.0		1150				0.3					
SVE-3	70		8.8		75.0		607				0.3					
SVE-1																
SVE-4																
SVE-2																
SVE-5																
SVE-20	70		8.0		27.0		2769				0.4					
SVE-19	70		1.6		79.0		1110				0.2					
SVE-23	70		0.9		79.0		887				0.5					
SVE-22	70		0.1		79.0		351				0.2					
SVE-25																
SVE-26																
SVE-27																
SVE-24																
SVE-6																

SVE-SP01	100	(PI-108) 20	(TI-109) 65	
SVE-SP02		(PT-114) 33		
Dilution	0			
SVE-SP03		(PI-112) 38	(TI-118) 144	
SVE-SP04		(PI-121) 18	(TI-123) 136	

(DPT-110)	0.4	(SP-01) 0.9
(DPT-119)	1.2	
SVE Carbon Influent	0.7	(PI-121)
SVE Carbon Midfluent	0.5	(SP-05)
SVE Carbon Effluent	0.7	(SP-06)

TECHNICIAN COMMENTS:

TECHNICAL REVIEW:

Office Copy - White, Field Copy - Yellow