Kliegman Brothers Site - Operable Unit No.1
Town of Glendale, Queens County, NY
NYSDEC Site Number 2-41-031

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Site Management Plan

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Section 1
Introduction and Description of Remedial Program

1.1 Introduction

This document is required as an element of the remedial program at Kliegman Brothers Site Operable Unit No. 1 (OU1), hereinafter referred to as the "site", under the New York State (NYS) Inactive Hazardous Waste Disposal Site Remedial Program administered by New York State Department of Environmental Conservation (NYSDEC). OU1 covers on-site vapor, soil and groundwater; off-site vapor, soil and groundwater are part of OU2 and are not addressed in this document. They will be addressed in a separate document following the completion of the OU2 remediation activities. The Site is being remediated in accordance with the OU1 Record of Decision dated March 2006.

1.1.1 General

The Gourmet Factory entered into the Voluntary Cleanup Program (VCP) and an agreement with the NYSDEC to remediate a 0.85-acre property located in Glendale, Queen County, New York City, New York. This VCP required the Gourmet Factory to investigate and remediate contaminated media at the site. A map showing the site location and boundaries is provided in Figure 1. The boundaries of the Site are more fully described on Sheet 1 of 1 for the Metes and Bounds site description that accompanies the Environmental Easement and is attached as Appendix A to this plan.

After completing the remedial work for OU1 described in the Remedial Action Work Plan, some contamination will remain in the subsurface soils at this site that is above the cleanup standards. This Site Management Plan (SMP) has been prepared to manage remaining soil contamination at the site in perpetuity or until extinguishment of the Environmental Easement in accordance with ECL Article 71, Title 36.

Remedial action work began at the Site in 2007 and is ongoing at this time with the operation of two soil vapor extraction (SVE) systems to treat contaminated soils beneath the Site. All reports associated with the site can be viewed by contacting the NYSDEC or visiting the document repository at the Town of Glendale public library.

This SMP was prepared by Camp Dresser McKee & Smith (CDM Smith), on behalf of the NYSDEC for the Kliegman Brothers OU1 Site, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation and the guidelines provided by NYSDEC. This SMP addresses the means for implementing the Institutional Controls (ICs) and Engineering Controls (ECs) that are required by the Environmental Easement for the site

1.1.2 Purpose

Soil contamination will remain at the site after completing the OU1 remedial action. Engineering Controls have been incorporated into the site remedy to provide proper management of remaining contamination in the future to ensure protection of public health and the environment. An Environmental Easement will be granted by the NYSDEC and recorded with the Queens County Clerk that provides an enforceable legal instrument to ensure compliance with this SMP and all ECs and ICs

placed on the site. The ICs place restrictions on site use and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP specifies the methods necessary to ensure compliance with all ECs and ICs required by the Environmental Easement for contamination that remains at the site. This plan has been approved by the NYSDEC and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with approval of the NYSDEC.

This SMP provides a detailed description of all procedures required to manage remaining contamination at the site after completion of the Remedial Action, including: (1) implementation and management of all Engineering and Institutional Controls; (2) media monitoring; (3) operation and maintenance of all treatment systems; (4) performance of periodic inspections, certification of results, and submittal of Periodic Review Reports; and (5) defining criteria for termination of treatment system operations.

To address these needs, this SMP includes three plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs, which includes a reporting plan for the submittal of data, information, recommendations, and certifications to NYSDEC; (2) a Monitoring Plan for implementation of site monitoring; and (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems.

It is important to note that:

- This SMP details the site-specific implementation procedures associated with OU1 that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of Environmental Conservation Law and the environmental easement, which is grounds for revocation of the Certificate of Completion;

- Failure to comply with this SMP is also a violation of, 6NYCRR Part 375 and the Record of Decision dated March 2006 for Site #2-41-031 and thereby subject to applicable penalties.

At the time this SMP was prepared, all site documents related to the Remedial Investigation and the Remedial Action for OU1 were maintained at the NYSDEC Headquarters in Albany, New York or the Town of Glendale public library repository.

1.2 Site Background

1.2.1 Site Location and Description

The site is located in the Town of Glendale, Queens County, New York and is identified as Block 3803 and Lot 91 and 92 on the Queens Tax Map. The site is an approximately 0.9-acre area bounded by Long Island Railroad Tracks and Cooper Avenue to the north, 77th Avenue to the south, residential homes and 79th Street to the east, and 76th Street to the west (Figure 1). The boundaries of the site are more fully described in Appendix A – Metes and Boundary Survey.

1.2.2 Site History

1.2.2.1 Operational/Disposal History

The Site was formerly owned by Kliegman Brothers Inc. and used as a warehouse and distribution center for laundry and dry-cleaning supplies from the 1950s through the 1990s. The site contained two

6,000 gallon above ground storage tanks (ASTs) which were used to store tetrachloroethene (PCE) (Figure 2). PCE is also known as perchloroethylene, or PERC. The tanks have since been removed from the property and were presumed to be the source of contamination. It is unknown if, and when, product was released or, whether contamination was due to a singly catastrophic release or a chronic leak problem. Kliegman Brothers ceased operation in 1999. The site was purchased in 2000 by the Gourmet Factory and is currently being used as a warehouse to store imported food inventory. The Gourmet Factory moved their primary operations further out on Long Island.

1.2.2.2 Remedial History

In June 2000, the NYSDEC first listed the site as a Class 2a site in the Registry of Inactive Hazardous Waste Disposal Sites in New York (the Registry). Class 2a is a temporary classification assigned to a site that has inadequate and/or insufficient data for inclusion in any of the other classifications. In November 2000 the NYSDEC listed the site as a Class 2 site in the Registry. 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.

There were at least six previous investigations performed at the Site from 1997 through 2002. The initial investigations were performed in 1997 and 1998 and comprised soil vapor collection and analysis in the area between the building and the railroad, where the PCE storage tanks were located. Additional soil vapor sampling was later performed in 2000 for a prospective site owner and the NYSDEC. All of these investigations revealed the presence of PCE, often at high concentrations.

A fifth investigation was performed in 2001 as part of a voluntary cleanup program (VCP) agreement with NYSDEC and included soil and groundwater sampling as part of a Focused Remedial Investigation/Interim Remedial Measure (FRI/IRM). The objective of the FRI/IRM was to delineate on-site soil contamination to enable design of a soil vapor extraction system or systems to remediate on-site soil. As part of the study, nine borings, SVE-I through SVE-5 and EB-1 through EB-4 and 26 soil samples were collected from beneath the subfloor of the building.

Between October 2000 and August 2001, the New York State Department of Health (NYSDOH) conducted ambient air sampling in 17 residences east, west, and south of the facility. PCE vapors were detected in 16 of the 17 residences tested.

In September 2002, the site owner discontinued his participation in the VCP. Because of documented ongoing PCE vapor exposures to residents in adjacent structures, the NYSDEC tasked a consultant to do an interim remedial measure (IRM) and design and construct an on-site SVE system, which began operation in August 2004.

1.2.3 Geologic Conditions

The regional geology of Queens County consists of Upper Cretaceous and Pleistocene sands, gravels, and clays which overlie southeasterly sloping bedrock. Bedrock in Queens County consists of Precambrian age, crystalline, igneous and metamorphic rocks which outcrop in northwestern Queens County, dip steeply to the southeast at a gradient of 40 to 80 feet per mile and is expected to occur at approximately 500 feet below grade at the site.

The site-specific geology was obtained from boring logs from previous subsurface investigations at the site and activities performed during remedial construction of OU1. In general, beneath a fill layer (concrete or asphalt underlain by reworked native materials) of variable thickness (up to two feet),

brown loose to dense, fine to coarse silty sand to sandy silt with localized sandy clay seams were observed to depths of approximately 10 feet bgs. This was underlain by brown loose to dense, fine to coarse sand with variable amounts of fine to coarse gravel to depths of 148 feet bgs. At some areas the layer could be described as an interbedded silty clay and silty fine sand.

There are six major hydrogeologic units identified in the vicinity of the site. They are in ascending order: I) the Lloyd aquifer; 2) the Raritan confining unit; 3) the Magothy aquifer; 4) the Jameco aquifer; 5) the Gardiners Clay; and 6) the upper glacial (i.e., Pleistocene) deposits. As part of the remedial investigation field activities, only the upper glacial deposits were penetrated. However, in general, the aquifers are laterally extensive and yield significant quantities of water. The most permeable units are the sands and gravels. The two clayey units represent confining units. These are several orders of magnitude less than the sands and gravels.

The regional groundwater table occurs at the site at approximately 70 feet bgs within the upper glacial aquifer. However, perched groundwater was observed in several wells above the clay layer in the eastern portion of the site. Measurements of groundwater elevations were used to develop groundwater contour maps and generally determine the site-specific direction of groundwater flow in the perched groundwater zone, the water table aquifer, and the deeper groundwater zone approximately 30- to 40-feet below the water table. Perched water is present in the eastern portion of the site at depths of 10 to 12 feet bgs.

In the shallow regional groundwater zone, groundwater measurements indicate that the flow direction varies. The overall groundwater flow direction was generally towards the south at a very gentle horizontal hydraulic gradient. In general, the groundwater flow direction in the shallow groundwater zone was determined to be variable, possibly due to the very gentle horizontal hydraulic gradients and seasonal fluctuations in the water table.

In the deeper groundwater zone (approximately 30- to 40-feet below the water table), the groundwater flow direction appears to be towards the southeast. There is little to no discernible vertical hydraulic gradient observed at the paired deep and shallow groundwater wells.

1.3 Summary of Remedial Investigation Findings

An 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:

- November 2001 - Focused Remedial Investigation/Preliminary Interim Remedial Measures
- February 2004 - Remedial Investigation Report

Generally, the RI determined that the main categories of contamination that exceed SCGs are volatile organic compounds (VOCs). Specifically, the primary contaminant of concern is PCE. Other VOCs of concern are the degradation products of PCE: trichloroethene (TCE), cis-l,2-dichloroethene (DCE), and vinyl chloride. Other compounds that were found include carbon tetrachloride, 1,1,1 -trichloroethane (1,1,1- TCA) and chloroform. These particular contaminants effected on-site subsurface soil, groundwater, and soil vapors (OU1), as well as offsite groundwater and soil vapor indoor air (OU2).

Below is a summary of site conditions when the RI was performed in 2004:

1.3.1 Subsurface Soil

Soil contamination in the vicinity of the building was characterized as part of previous investigations and is primarily limited in extent to the area north of the building. Nine borings were installed in the north yard (north parking lot) at the site in 2001 (Figure 2). Soil analytical results showed elevated levels of benzene, toluene, ethylbenzene, xylene (BTEX), tetrachloroethene (PCE), and 1,2-dichloroethene (DCE). PCE was detected most frequently, and at the highest concentrations.

The borings showed a clay layer with perched water in the eastern portion of the north yard and PCE was detected above the clay layer at concentrations above the SCG. However, no samples were collected below the clay layer. A total of 26 soil samples were collected from below the building. Results indicated that concentrations of PCE generally exceeded the SCG only in shallow (less than one foot below the floor) samples. PCE results were in the range from 0.03 ppm to 320 ppm.

In December 2009, CDM Smith conducted a subsurface investigation using the Membrane Interface Probe (MIP) technology to determine if there was a source of PCE contamination under the building and it was contributing to both soil and groundwater contamination. The investigation focused around extraction wells SVE-7S and SVE-7D, the loading dock area and the interior of the building adjacent to both these areas. The investigation revealed that there was no secondary source of PCE contamination beneath the building contributing to contamination at the site. The primary source exists near the loading dock area to the south, southwest and southeast of SVE-7D at a depth of 20 to 35 feet below ground surface supporting previous investigations at the site.

1.3.2 On-Site Groundwater

Groundwater was sampled during two events as part of the remedial investigation. The first event took place in October 2002 when nine wells were sampled. The second event took place after the second phase of field work was completed in April 2003 when seventeen wells were sampled. As part of each phase of the field work, all samples were analyzed of TCL volatiles and miscellaneous natural attenuation parameters. Analytical data summary tables were presented for each groundwater zone. Complete data validation summary table can be found in Appendix F of the RI Report. The following table summarizes the on-site groundwater contamination between the 2002-2005 groundwater sample events and the 2009/2010 sample events showing a significant reduction in PCE concentrations.

On-site Sample Locations	2002-2005 Concentrations	2009/2010 Concentrations	Percent Reduction
MW-10D	55,000 ppb	130 ppb	99%
MW-10H	24,800 ppb	69 ppb	99%
On-site Sample Locations	**2002-2005 Concentrations**	**2009/2010 Concentrations**	**Percent Reduction**
MW-11D	5,900 ppb	24 ppb	99%
MW-02D	15,000 ppb	90 ppb	99%

1.3.3 On-Site Soil Vapor

On-site soil vapor was investigated on six different occasions between 1997 and 2002. All of the investigations revealed the presence of PCE at elevated levels across the entire site.

1.4 Summary of Remedial Actions

The Site soil is being remediated in accordance with the NYSDEC-approved Interim Remedial Measure Work Plan dated June 2006, the ROD dated March, 2006, and the Remedial Design October 2007.

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

1. Excavation of soil/fill exceeding industrial Soil Cleanup Objectives (SCOs) listed in the ROD;
2. Construction and maintenance of a soil cover system consists of asphalt paving or concrete over the entire site to prevent human exposure to remaining contaminated soil/fill remaining at the site;
3. Execution and recording of an Environmental Easement to restrict land use and prevent future exposure to any contamination remaining at the site.
4. Eliminate or reduce to the extent practicable exposures of persons at or around the Site to PCE and its degradation products (TCE, DCE, and vinyl chloride) in contaminated soils;
5. Eliminate or reduce to the extent practicable the release of contaminants from soil vapor into indoor air through vapor intrusion.
6. Attaining to the extent practicable soils SCGs.
7. Development and implementation of the SMP for long term management of remaining contamination as required by the Environmental Easement, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;

Remedial construction activities for OU1 were completed at the site in January 2008 and site management is ongoing.

1.4.1 Removal of Contaminated Materials from the Site

The soil cleanup objectives for the site are to have the Contaminants of Concern (COCs) decreased to a level of non-detect and include PCE and its degradation products TCE, DCE, and vinyl chloride. The total quantity of VOCs removed from the Kliegman site by both the GWTT and URS systems through September 2010 is approximately 50,000 pounds.

1.4.2 On-Site Treatment Systems

As part of the remedial action at the Kliegman site, two SVE systems operate concurrently at the Site. The first system consist of 3 SVE wells was designed by the URS Corporation (URS) and constructed by Envirotrac Environmental Services (Envirotrac), has operated since August 2004. The second system also designed by URS consists of 6 SVE wells and was constructed by Ground/Water Treatment & Technology (GWTT) and has operated since December 2007. The GWTT system is designed to handle about three times the amount of extracted soil vapor as the URS system.

A figure showing each of the systems location can be found in Appendix B. This remedial action does not pertain to groundwater treatment systems that may be necessary for excavation dewatering as part of future development activity.

1.4.3 Remaining Contamination

Site management activities are ongoing at the Site and based on the MIP investigation conducted in December 2009, the highest concentrations of soil contamination appears to be from the eastern edge of the loading dock extending east towards SVE-8S and extending north and south from the north side of the building to the northern property line. The depth of contamination is between 20 to 35 feet below ground surface. This area is most likely reduced due to one year of both SVE units treating these subsurface soils.

The groundwater contamination covers the entire on-site area. Sampling results from 2009/2010 show that the SVE treatment systems are having a significant impact on reducing the on-site soil contaminant contribution to groundwater.

1.4.4 Engineering and Institutional Controls

Since contamination is present in the subsurface soils at this Site, ECs and ICs have been implemented to protect public health and the environment for the applicable future use. The Controlled Property has the following Engineering Controls:

1. A cover system consisting of asphalt pavement, concrete sidewalks, and concrete building slabs.
2. Site fencing to keep the public from coming into contact with the site contamination.
3. Both SVE systems continue to operate and treat soil contamination on-site.

A series of ICs are required to implement, maintain and monitor these ECs. The Environmental Easement requires compliance with these ICs, to ensure that:

- All ECs must be operated and maintained as specified in this SMP;
- All ECs on the Site must be inspected and certified at a frequency and in a manner defined in this SMP;
- Soil vapor and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in this SMP;
- On-site environmental monitoring devices, including but not limited to, groundwater monitoring wells, soil vapor extraction wells, and vapor monitoring points must be protected and replaced as necessary to ensure continued functioning in the manner specified in this SMP.

In addition, the Environmental Easement places the following restrictions on the property:

- Required compliance with the approved SMP;
- Restrict the use of groundwater as a source of potable water, without necessary water quality treatment as determined by the NYSDOH and/or the NYSDEC;

- The property owner is required to complete a periodic certification and submit to the NYSDEC;
- Limit the use and development of the property to commercial, industrial, and/or restricted residential only.

These EC/ICs are designed to:

- Prevent ingestion/direct contact with contaminated soil;
- Prevent inhalation of or exposure to contaminants volatilizing from contaminated soil;
- Prevent ingestion of groundwater with contaminant levels that exceed drinking water standards;
- Prevent contact with or inhalation of volatiles from contaminated groundwater.

Section 2
Engineering and Institutional Control Plan

2.1 Introduction

Remedial activities completed at the Site were conducted in accordance with the OU1 ROD, March 2006 and the NYSDEC-approved remedial design for Kliegman Brothers OU1, April 2007. The remedial goals at a minimum must eliminate or mitigate all significant threats to human health or the environment and include attainment of Standards, Criteria and Guidance values (SCGs) for on-site soils for unrestricted residential use. The SCGs were approved by NYSDEC and are listed in Table 1 of the OU1 ROD provided in Appendix B.

Since remaining contaminated soil and soil vapor exists beneath the site, Engineering Controls and Institutional Controls (EC/ICs) are required to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of all EC/ICs at the site. The EC/IC Plan is one component of the SMP and is subject to revision by NYSDEC.

2.1.1 Purpose

The purpose of this Plan is to provide:

- A description of all EC/ICs on the site;
- The basic operation and intended role of each implemented EC/IC;
- A description of the key components of the ICs created as stated in the Environmental Easement;
- A description of the features that should be evaluated during each periodic inspection and compliance certification period;
- A description of plans and procedures to be followed for implementation of EC/ICs, such as the implementation of an Excavation Plan for the safe handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site;
- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the site remedy, as determined by the NYSDEC; and
- A description of the reporting requirements for these controls.

2.2 Engineering Controls

2.2.1 Engineering Control Systems

2.2.1.1 Asphalt and Concrete Cover System

Exposure to remaining contamination in soil/fill at the site is prevented by an asphalt and concrete cover system placed over the site. Specifically, this cover system is comprised of a minimum of four to six inches of asphalt pavement, concrete-covered sidewalks, and concrete building slabs. The Excavation Plan that appears in Section 2.3.1 outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed, and any underlying remaining

contamination is disturbed. Procedures for the inspection and maintenance of this cover are provided in the Monitoring Plan included in Section 3 of this SMP.

2.2.1.2 Soil Vapor Extraction Systems

The general configuration of the SVE system components at the Kliegman site are presented in the Operation & Maintenance (O&M) Plan provided in Appendix C. The URS system was installed in 2004 and extracts soil gas through three wells, SVE-1, -6S, and -6D. SVE-1 is a one-inch diameter well installed by a previous contractor to URS in anticipation of a future SVE system. SVE-1 is screened from 5 to 25 feet below ground surface (bgs). SVE-6S and -6D are both two-inch diameter wells and were installed by URS as part that SVE system. SVE-6S and -6D are screened from 5 to 25-feet and 30 to 65-feet bgs, respectively.

The second SVE system was installed in 2007 and began operation in January 2008 and extracts soil gas through six (6) four-inch diameter wells (SVE-7S, 7D, 8S, 8D, 9S, and 10S). The shallow 7S and 8S SVE wells are screened from 5 to 25-feet bgs and the deep 7D and 8D wells from 30 to 65-feet bgs. Well SVE-9S is screened 5 to 11-feet bgs and 10-S from 5 to 12-feet bgs. All of these wells are connected through subsurface piping to an extraction blower and from the blower the vapors go through two 2000-pound (lb) carbon adsorbers in a lead/lag configuration (in series). There are two 10-horsepower regenerative blowers installed for use with this system, one of which is on standby for emergency use.

Both SVE systems are operated independently of each other, but work together to remediate the soil vapor. If one of the systems is taken out of service, the piping has been configured for the blower of the other systems to extract vapor from the SVE wells of that system.

Each treatment system is connected to an auto dialer and can notify appropriate personnel in the event of a system failure or shutdown. Both systems are monitored weekly and sampled monthly.

In March 2013, at the request of NYSDEC, CDM Smith performed an air quality impact analysis for the SVE systems at the Site in accordance with substantive regulations put forth in a memorandum from the Division of Environmental Remediation (DER) Director dated February 28, 2003. In these substantive regulations the DER has taken the position that emissions from remedial projects that DER staff oversee require air pollution controls if the emission rate potential exceeds 0.5 pound per hour of total volatile organic compounds. The memorandum also requests an air quality impact analysis using the guidance provided in DAR-1. Combined removal rates of VOCs by both on-site SVE systems have been below the 0.5 pound per hour guideline. Results of the air quality impact analysis for the systems indicated that if the effluent stack heights of the GWTT and URS systems were raised to 33 feet and 20 feet, respectively, then the carbon filtration units could be removed from the systems.

On April 12, 2013, Envirotrac installed a 31 foot utility pole set five feet below grade (final height of 26 feet). The utility pole was installed in between the URS and GWTT systems along the northern fence. The GWTT system effluent piping, consisting of 4-Inch schedule 80 PVC, was then installed along the utility pole to a total height of 33 feet. The URS effluent piping, consisting of 3-Inch schedule 80 PVC, was also installed along the utility pole to a total height of 26 feet to accommodate the rain cap. The effluent stacks were then connected to their respective system utilizing existing flex hose and the systems were restarted. Also on April 12, the carbon was removed from all four carbon vessels and disposed of off-site. The carbon vessels were disconnected from the SVE systems and the empty carbon vessels were removed from the Site by GWTT on January 23, 2014.

As a result of the system upgrades, the monthly O&M activities were modified beginning in April 2013. These modifications are discussed in Sections 3 and 4 of this document. Procedures for operating and maintaining the systems are documented in the O&M Plan (Section 4 of this SMP). Procedures for monitoring the system are included in the Monitoring Plan (Section 3 of this SMP).

2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, the remedial processes will be considered to be completed when effectiveness monitoring indicates that the remedy has achieved the remedial action objectives identified by the OU1 ROD. The specific determination of when the following remedial processes are complete will be made in compliance with Section 6.5 of NYSDEC DER-10, May 2010.

2.2.2.1 Cover System

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

2.2.2.2 Soil Vapor Extraction System

The SVE systems operation will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the SVE systems are no longer required, a proposal to discontinue the system will be submitted by the property owner. Conditions that warrant discontinuing the SVE system include contaminant concentrations in soils that: (1) reach levels that are consistently below SCGs, (2) have become asymptotic to a low level over an extended period of time as accepted by the NYSDEC, or (3) the NYSDEC has determined that the SVE system has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in subsurface soil samples collected from throughout the site. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC.

2.3 Institutional Controls

A series of Institutional Controls is required by the OU1 ROD to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the site to commercial, industrial, or restricted residential. Adherence to these Institutional Controls on the site is required by the Environmental Easement and will be implemented under this Site Management Plan. These Institutional Controls are:

- Compliance with the Environmental Easement by the Grantor and the Grantor's successors and assigns with all elements of this SMP;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Soil vapor and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in this SMP;

- On-site environmental monitoring devices, including but not limited to, SVE wells, vapor monitoring points (VMPs), and SVE treatment systems, must be protected and replaced as necessary to ensure the devices function in the manner specified in this SMP.

Institutional Controls may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The site has a series of ICs in the form of site restrictions. Adherence to these ICs is required by the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming, including cattle and dairy farming, on the property are prohibited;
- The use of the groundwater underlying the property is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the property that will disturb remaining contaminated material are prohibited unless they are conducted in accordance with this SMP;
- The potential for vapor intrusion must be evaluated for any buildings developed on the site, and any potential impacts that are identified must be mitigated;
- The property may only be used for restricted commercial use provided that the long-term EIs and ICs included in this SMP are employed.
- The property may not be used for a less restrictive use, such as unrestricted residential, without additional remediation and amendment of the Environmental Easement by the Commissioner of NYSDEC.
- The site owner or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable.

2.3.1 Soil Vapor Intrusion Evaluation

Prior to the construction of any enclosed structures located over areas that contain remaining contamination, a soil vapor intrusion (SVI) evaluation will be performed to determine whether any mitigation measures are necessary to eliminate potential exposure to volatile organic vapors in the proposed structure. Alternatively, the SVE system will be extended as a sub-slab vapor element of the building foundation. This mitigation system will include a vapor barrier and the SVE system.

Prior to extending the SVE system, a work plan will be developed and submitted to the NYSDEC and NYSDOH for approval. This work plan will be developed in accordance with the most recent NYSDOH "Guidance for Evaluating Vapor Intrusion in the State of New York". Measures to be employed to mitigate potential vapor intrusion will be evaluated, selected, designed, installed, and maintained based on the SVI evaluation, the NYSDOH guidance, and construction details of the proposed structure.

Preliminary (non-validated) SVI sampling data will be forwarded to the NYSDEC and NYSDOH for initial review and interpretation. Upon validation, the final data will be transmitted to the agencies, along with

a recommendation for follow-up action, such as mitigation. Validated SVI data will be transmitted to the property owner within 30 days of validation. SVI sampling results, evaluations, and follow-up actions will also be summarized in the next Periodic Review Report.

2.4 Excavation Plan

The site remedy allows for commercial, industrial or restricted residential use. Any future intrusive work that will penetrate, encounter or disturb the remaining contamination, and any modifications or repairs to the existing cover system will be performed in compliance with this Excavation Plan (EP). Intrusive construction work must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) prepared by the contractor. The HASP is must be in compliance with DER-10, and 29 CFR 1910, 29 CFR 1926, and all other applicable Federal, State and local regulations.

Based on future changes to State and federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP will be updated and re-submitted with the notification provided below. Any intrusive construction work will be performed in compliance with the EP, HASP and CAMP, and will be included in the periodic inspection and certification reports submitted under the Site Management Reporting Plan (See Section 2.6).

The site owner and associated parties preparing the remedial documents submitted to the NYSDEC, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and footings).

The site owner will ensure that site development activities will not interfere with, or otherwise impair or compromise, remedial activities ongoing in this Remedial Action Work Plan. Mechanical processing of historical fill and contaminated soil on-site is prohibited.

2.4.1 Notification

At least 10 days prior to the start of any activity that is reasonably anticipated to encounter remaining contamination, the site owner or their representative will notify the NYSDEC. Currently, this notification will be made to:

Mr. David Chiusano, Project Manager

NYSDEC

Remediation Bureau E, Section A

Division of Environmental Remediation

625 Broadway

Albany, NY 12233-7017

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent, plans for site re-grading, intrusive elements or utilities to be installed below the asphalt and/or concrete cover systems, or any work that may impact an engineering control;

- A summary of environmental conditions anticipated in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work,
- A statement that the work will be performed in compliance with this EP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan, in electronic format;
- Identification of disposal facilities for potential waste streams;
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

2.4.2 Soil Screening Methods

Visual, olfactory and instrument-based soil screening will be performed by a qualified environmental professional during all remedial and development excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal, material that requires testing, material that can be returned to the subsurface, and material that can be used as cover soil.

2.4.3 Stockpile Methods

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points. Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC.

2.4.4 Material Excavation and Disposal

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and disposal of all excavated material. The owner of the property and its contractors are solely responsible for safe execution of all invasive and other work performed under this SMP.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements). Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during

intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

2.4.5 Material Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes will be identified that will: (a) limit transport through residential areas and past sensitive sites; (b) use city-mapped truck routes; (c) minimize off-site queuing of trucks entering the facility; (d) limit total distance to major highways; and (e) promote safety in access to highways. Trucks will be prohibited from stopping and idling in the neighborhood outside the project site. Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Due to limited available space at the site, some off-site queuing of trucks may be necessary. The number and duration of trucks lined up outside the site entrance will be minimized through efficient scheduling and staging at a remote location.

2.4.6 Material Disposal Off-Site

All soil/fill/solid waste excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste pursuant to 6NYCRR Part 360-1.2. Material that does not meet the lower of the SCGs for residential use or groundwater protection will not be taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility) without a beneficial use determination issued by NYSDEC. The United States Environmental Protection Agency (USEPA) generator identification number for this Site is NYR00145284.

2.4.7 Material Reuse On-Site

A qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for re-use on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

2.4.8 Fluids Management

All liquids to be removed from the site, including excavation dewatering and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, but will be managed off-site.

2.4.9 Cover System Restoration

After the completion of soil removal and any other invasive remedial activities the cover system will be restored in a manner that complies with the OU1 ROD. The demarcation layer, consisting of four to six inches of asphalt, concrete sidewalks or concrete building floor slab will be replaced to provide a visual reference to the top of the 'Remaining Contamination Zone', the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this Site Management Plan. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the 'Remaining Contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in any updates to the Site Management Plan.

2.4.10 Backfill from Off-Site Sources

All materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP, applicable regulations (6NYCRR 375-6.7(d)) and guidance (DER-10) prior to receipt at the site. Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the site. All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

2.4.11 Stormwater Pollution Prevention

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Silt fencing or hay bales will be installed around the entire perimeter of the remedial construction area.

2.4.12 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analyte. In this case, a reduced list of analyte will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in daily and periodic electronic media reports.

2.4.13 Community Air Monitoring Plan

The contractor will prepare a CAMP, in accordance with Appendix 1A of DER-10 (see Appendix D), showing the location of air sampling stations based on generally prevailing wind conditions. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations. If a sensitive receptor, such as a school, day care or residential area is adjacent to the site, a fixed monitoring station should be located at that site perimeter, regardless of wind direction, and discussed in the text.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

2.4.14 Odor Control Plan

If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other

complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the property owner's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

2.4.15 Dust Control Plan

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles. Fugitive dust and particulate monitoring shall be conducted in accordance with Appendix 1B of DER-10 (see Appendix D).

2.4.16 Other Nuisances

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work. A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

2.5 Inspections and Notifications

2.5.1 Periodic Inspections

Periodic inspections of all remedial components installed at the site will be conducted at the frequency specified in SMP Monitoring Plan schedule. A comprehensive site-wide inspection will be conducted annually, regardless of the frequency of the Periodic Review Report. 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 SMP and the Environmental Easement;
- 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;

Inspections will be conducted in accordance with the procedures set forth in the Monitoring Plan of this SMP (Section 3). The reporting requirements are outlined in the Site Management Reporting Plan (Section 2.6).

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the site will be conducted within 5 calendar days of the event to verify the effectiveness of the EC/ICs implemented at the site by a qualified environmental professional as determined by NYSDEC. A list of emergency contacts is provided in Appendix E.

2.5.2 Notifications

Notifications will be submitted by the property owner to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the OU1 ROD, 6NYCRR Part 375, and/or Environmental Conservation Law.
- 10-day advance notice of any proposed ground-intrusive activities.
- Notice within 48-hours of any damage or defect to the foundations structures that reduces or has the potential to reduce the effectiveness of other Engineering Controls and likewise any action to be taken to mitigate the damage or defect.
- Notice within 48-hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the site, including a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 calendar days and shall describe and document actions taken to restore the effectiveness of the ECs.

Notifications will be made to:

Mr. David Chiusano, Project Manager

NYSDEC

Remediation Bureau E, Section A

Division of Environmental Remediation

625 Broadway

Albany, NY 12233-7017

In the event that NYSDEC develops a centralized notification system, that system will be used instead.

2.5.3 Evaluation and Reporting

The results of the inspection and site monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- EC/ICs are in place, are performing properly, and remain effective;
- The Monitoring Plan is being implemented;

- Operation and maintenance activities are being conducted properly; and, based on the above items,
- The site remedy continues to be protective of public health and the environment and is performing as designed.

2.6 Reporting Plan

2.6.1 Introduction

A Periodic Review Report will be submitted to NYSDEC every year, beginning one year after approval of the Final Engineering Report. The Periodic Review Report will be prepared in accordance with NYSDEC DER-10 "Technical Guidance for Site Investigation and Remediation". The frequency of submittal of the Periodic Review Report may be modified with the approval of the NYSDEC.

This report will include the following:

- Identification of all EC/ICs required by the Remedial Action Work Plan for the site;
- An assessment of the effectiveness of all Institutional and Engineering Controls for the site;
- An evaluation of the Engineering and Institutional Control Plan and the Monitoring Plan for adequacy in meeting remedial goals;
- Results of the required annual site inspections;
- A compilation of all deliverables generated during the reporting period, as specified in Section 2 EC/IC Plan, Section 3 Monitoring Plan and Section 4 Operation and Maintenance Plan; and
- Certification of the EC/ICs.

2.6.2 Certification of Engineering and Institutional Controls

Inspection of the EC/ICs will occur at the frequency described in Section 3 (Monitoring Plan) and Section 4 (Operation and Maintenance Plan). After the last inspection of the reporting period, a Professional Engineer licensed to practice in New York State will prepare a Periodic Review Report which certifies that:

- On-site ECs/ICs are unchanged from the previous certification;
- They remain in-place and are effective;
- The systems are performing as designed;
- Nothing has occurred that would impair the ability of the controls to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any operation and maintenance plan for such controls;
- Access is available to the site by NYSDEC and NYSDOH to evaluate continued maintenance of such controls; and
- Site use is compliant with the environmental easement.

2.6.3 Periodic Review Report

A Periodic Review Report will be submitted every year, beginning one year after approval of the Final Engineering Report or equivalent document is issued. The report will be submitted within 45 calendar

days of the end of each certification period. Other reports, such as soil vapor monitoring data, will be submitted monthly for the year, and as determined by NYSDEC thereafter. Media sampling results will also incorporated into the Periodic Review Report. The report will include:

- EC/IC certification;
- All applicable inspection forms and other records generated for the site during the reporting period;
- A summary of any discharge monitoring data and/or information generated during the reporting period with comments and conclusions;
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data sufficient for the NYSDEC to evaluate contaminant concentration trends;
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted electronically in a NYSDEC-approved format;
- A performance summary for all treatment systems at the site during the calendar year, including information such as:
    - The number of days the system was run for the reporting period;
    - The contaminant mass removed;
    - A description of breakdowns and/or repairs along with an explanation for any significant downtime;
    - A description of the resolution of performance problems;
    - A summary of the performance and/or effectiveness monitoring; and
    - Comments, conclusions, and recommendations based on data evaluation.
- A site evaluation, which includes the following:
    - The compliance of the remedy with the requirements of the site-specific OU1 ROD;
    - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
    - Evaluation of the integrity of the cover system and site fencing;
    - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;
    - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan; and
    - The overall performance and effectiveness of the remedy.

The Periodic Review Report will be submitted, in hard-copy format, to the NYSDEC Regional Office located closest to the site, and in electronic format to NYSDEC Central Office and the NYSDOH Bureau of Environmental Exposure Investigation.

Section 3
Monitoring Plan

3.1 Introduction

3.1.1 General

The Monitoring Plan describes the measures for evaluating the performance and effectiveness of the implemented ECs to reduce or mitigate contamination at the site. ECs for OU-1 at the Site include two SVE systems that remediate subsurface soils on-site. This Monitoring Plan may only be revised with the approval of NYSDEC.

3.1.2 Purpose and Schedule

This Monitoring Plan describes the methods to be used for:

- Sampling and analysis of appropriate media (e.g., indoor air and soil vapor);
- Assessing compliance with NYSDEC and NYSDOH soil vapor intrusion guidelines;
- Assessing compliance with air discharge limits;
- Assessing achievement of the remedial performance criteria;
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment; and
- 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 (e.g., SVE and VMP well logs);
- Analytical sampling program requirements;
- Reporting requirements;
- Quality Assurance/Quality Control (QA/QC) requirements;
- Inspection and maintenance requirements for SVE and VMP wells; and
- Annual inspection and periodic certification.

Monthly monitoring of the performance of the remedy and overall reduction in contamination on-site will be conducted for the first two years. The frequency thereafter will be determined by NYSDEC. Trends in contaminant levels in air and soil in the affected area will be evaluated to determine if the remedy continues to be effective in achieving remedial goals. Monitoring programs for environmental media are outlined in detail in Section 3.2. As discussed in Section 2, the carbon vessels were disconnected and removed from the SVE systems in April 2013. As a result, the influent and effluent concentrations are expected to be the same. Therefore, only effluent samples are collected monthly from the SVE systems as of May 2013.The following table summarizes the monitoring program for Site.

Table 3-1: Schedule of Monitoring/Inspection Program for OU1

Monitoring Program	Frequency*	Matrix	Analysis
SVE Systems Effluent Sampling	Monthly	Air	EPA Method TO-15
SVE System monitoring including all SVE wells	Semi- Annual (Jan & July)	Air	EPA Method To-15
System Monitoring, SVE Well and VMP monitoring	Monthly	Air	Field Instrument for VOCs and air flow

*Frequency of events will be conducted as specified until otherwise approved by NYSDEC.

3.2 Soil Vapor/SVE System Monitoring Program

Soil vapor monitoring was initially performed on a weekly basis and was reduced to monthly beginning in October 2010. Sampling will be performed on a monthly basis to assess the performance of the remedy for OU-1.

3.2.1 Monitoring System Design

The network of SVE and VMP wells has been installed to remediate the subsurface soils and monitor conditions at the site. The network of on-site wells has been designed based on the following criteria:

- The SVE and VMP well locations are shown on the Record Drawing in Appendix B;
- The shallow wells are screened from a depth of 5 to 12 feet bgs, intermediate wells are screened from 5-25 feet bgs and the deep wells are screened from 30 to 65 feet bgs ;
- VMP wells are screened from 5 to 31 feet bgs and are used to monitor the radius of influence of the SVE systems. Baseline conditions (VOC concentrations) in each SVE well are presented in monthly progress report for December 2010 in Appendix F;
- The SVE wells are sampled semi-annually and the treatment system effluent is sampled monthly; and
- The well construction details are provided in Appendix G.

3.2.2 Monitoring Schedule

The SVE systems were initially monitored on a weekly basis. Monitoring frequency was reduced to monthly beginning in October 2010. Personnel perform monitoring as follows:

- Using a photoionization detector (PID) the VOC concentration of each SVE well is monitored at the treatment system influent;
- VMPs are monitored using a vacuum gauge to measure radius of influence;
- Pressure, temperature and vacuum gauges on both treatment systems are recorded; and
- The knockout tank in each treatment system is checked and if necessary drained by pumping water to the 55-gallon drum for off-site disposal.

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

3.2.3 Sampling Protocol

All monitoring and sampling activities will be recorded in a field book and a daily log found in the Monthly Report (Appendix F) completed for each monthly monitoring event.

3.3 Well Repairs, Replacement and Decommissioning

Repairs and/or replacement of wells (SVE, VMP or groundwater) 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, replacement or decommissioning of SVE or VMP wells and documented in the subsequent monthly report. Well decommissioning without replacement will be done only with the prior approval of NYSDEC. Well abandonment will be performed in accordance with NYSDEC's CP-43: "Groundwater Monitoring Well Decommissioning Policy" dated November 3, 2009. Wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC.

3.4 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 (Appendix H). Main Components of the QAPP include:

- QA/QC Objectives for Data Measurement;
- Sampling Program:
  - Sample containers will be properly cleaned and decontaminated prior to their use by the analytical laboratory.
  - Sample holding times will be in accordance with the NYSDEC ASP requirements.
  - Field QC samples (e.g., trip blanks, coded field duplicates, and matrix spike/matrix spike duplicates) will be collected as necessary.
- Sample Tracking and Chain of Custody;
- Calibration Procedures:
  - All field analytical equipment will be calibrated immediately prior to each day's use. Calibration procedures will conform to manufacturer's standard instructions.
  - The laboratory will follow all calibration procedures and schedules as specified in USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.
- Analytical Procedures;
- Internal QC and Checks;
- QA Performance and System Audits;
- Preventative Maintenance Procedures and Schedules;

- Corrective Action Measures.

3.5 Engineering Control System Monitoring

The URS system was constructed in 2004 and began operation in 2004 and consisted of a blower connected to three SVE wells and two 1,000 pound granular activated carbon (GAC) units in series that treat soil vapors. The system was modified in April 2013 as discussed in Section 2. Modifications included increasing the effluent stack height and the disconnecting and removing the GAC units. This system is still running today and pulling vapors from 1 two-inch well and 2 one-inch wells in the area of the former aboveground PCE storage tanks.

The GWTT SVE system was installed in 2007 and began operation in January 2008. This SVE system consisted of two blowers and two 2,000 pound GAC units. As with the URS system, the GAC units were removed in April 2013 and the effluent stack height was raised as discussed in Section 2. The GWTT system pulls from six 4-inch SVE wells that treat soil vapors across the rest of the site. The record drawing for the SVE systems is provided in Appendix B. Both SVE systems were installed to treat subsurface soils and mitigate soil vapor intrusion into on- and off-site structures.

3.5.1 System Inspection Schedule

Both SVE systems are inspected monthly during the routine monitoring and sampling. The integrity of the asphalt/concrete cover systems and site fencing is also visually inspected during the monthly monitoring. The 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 SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system.

3.5.2 General Equipment Inspection

A visual inspection of both SVE systems and the SVE and VMP wells will be conducted during the monitoring event. SVE system components to be monitored include, but are not limited to, the following:

- For SVE systems:
  - Vacuum blower;
  - Knockout Tanks, pump and piping;
  - Vacuum and pressure gauges;
  - System Enclosures; and
  - SVE and VMP wells and visible piping.

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 will be performed immediately, and the SVE system(s) will be restarted.

3.5.3 System Monitoring Devices and Alarms

Both SVE systems are equipped with alarms for blower failure, high/low level alarms in the moisture separator (knockout tanks), power failure, etc. that connect to an auto dialer that notify staff in the event of a shutdown.

The SVE systems 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 SVE system(s) restarted. Operational problems will be noted in the subsequent Periodic Review Report.

3.5.4 Sampling Event Protocol

Sampling of both SVE Systems is performed on a monthly basis. Samples are collected from the well influents and both treatment effluents after treatment by GAC. Once the weekly system monitoring is completed, the samples are collected using between a 1.5 and 3.0 liter Summa canisters. The canister is connected to tubing and then connected to the sample port at each respective location.

All samples are analyzed for EPA Method TO-15 for VOCs in air. Labeling and chain of custody protocols are followed for each monthly sampling event.

3.6 Monitoring Reporting Requirements

Forms and any other information generated during regular monthly monitoring and sampling events are compiled and included in a monthly report that is submitted to the NYSDEC project manager by the 14th of each month. All forms, laboratory data and daily reports for each site visit are provided in the monthly report. A performance evaluation is provided in summary tables and graphs showing the past months system performance. A copy of the December 2010 Monthly Report is provided in Appendix F.

Table 3-2 Schedule of Monitor/Inspection Reporting

Task	Reporting Frequency*
SVE System Monitoring and Sampling	Monthly
Engineering Controls Monitoring	Monthly
Progress Reports to NYSDEC	Monthly

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

Section 4
Operation and Maintenance Plan

4.1 Introduction

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

- Includes the steps necessary to allow individuals unfamiliar with the site to operate and maintain both 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 SVE systems are operated and maintained.

Information on non-mechanical Engineering Controls is provided in Section 3. A complete copy of the Operation and Maintenance Plan for both SVE systems is included in Appendix C. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this SMP.

N

COOPER AVENUE

CONCRETE

PAVED PARKING

LONG ISLAND RAILROAD

PAVED PARKING

CONCRETE

2 STORY BRICK KLIEGMAN BROTHERS BUILDING

EDSALL AVENUE

77TH AVENUE

75TH STREET

76TH STREET

76TH STREET

75TH STREET

100 0 100 Feet

KLIEGMAN BROTHERS OU-1 SITE #2-41-031
SITE PLAN

CDM

FIGURE 1

J:\33971.01\db\GIS\gisology.apr SITE PLAN
7/31/2002

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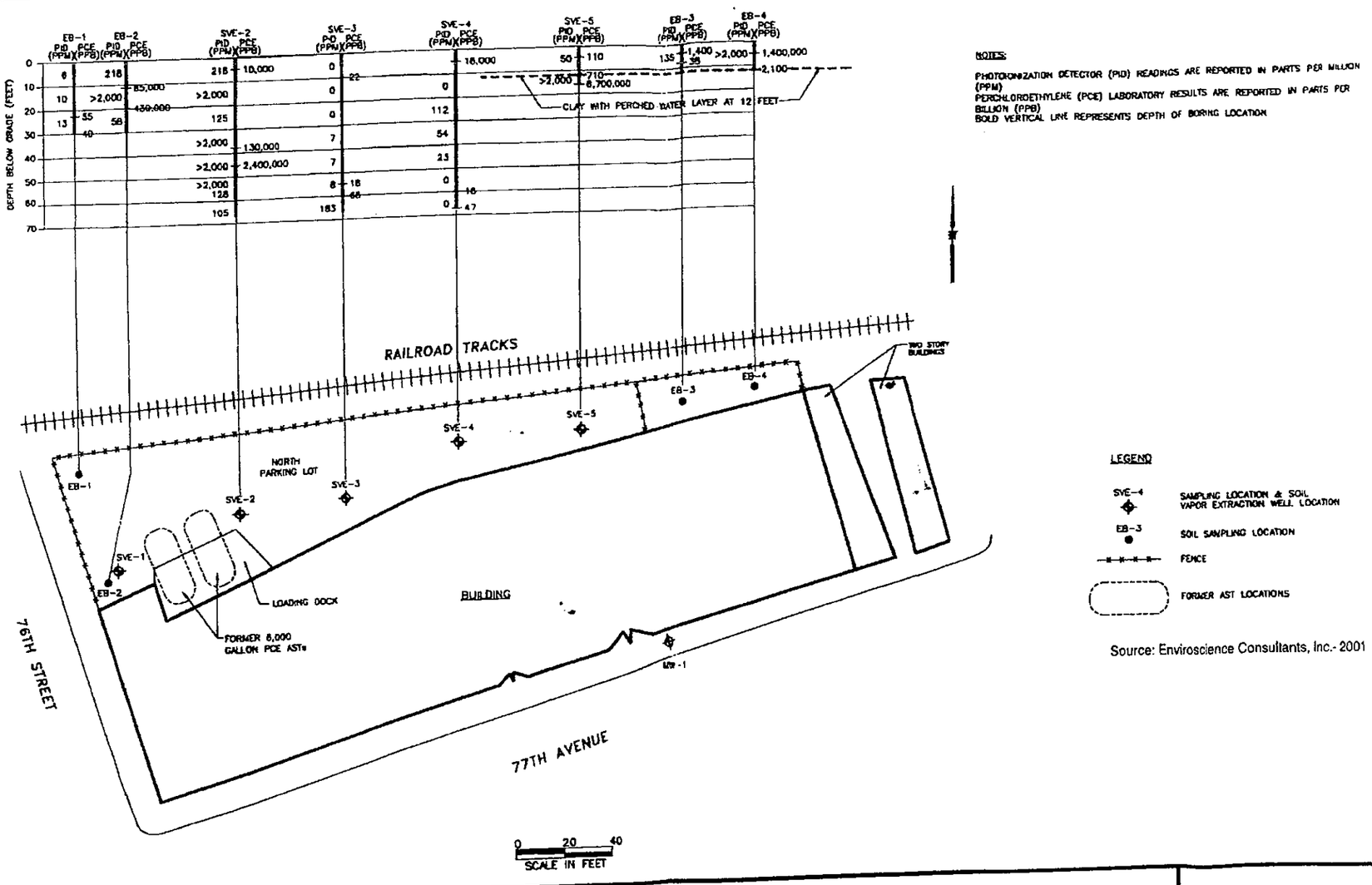


NOTES:

PHOTOIONIZATION DETECTOR (PID) READINGS ARE REPORTED IN PARTS PER MILLION (PPM)
PERCHLOROETHYLENE (PCE) LABORATORY RESULTS ARE REPORTED IN PARTS PER BILLION (PPB)
BOLD VERTICAL LINE REPRESENTS DEPTH OF BORING LOCATION

LEGEND

- SVE-4 — SAMPLING LOCATION & SOIL VAPOR EXTRACTION WELL LOCATION
- EB-3 — SOIL SAMPLING LOCATION
- FENCE
- FORMER AST LOCATIONS

Source: Enviroscience Consultants, Inc.- 2001

CDM	KLIEGMAN BROTHERS OU-1 SITE #2-41-031 ABOVEGROUND STORAGE TANK LOCATIONS AND ON-SITE SOIL BORINGS FROM RI	FIGURE 2

APPENDIX A
Metes and Bounds, ALTA/ACSM Land Title Survey and Title Search

SURVEY METES & BOUNDS DESCRIPTION
NYSDEC SITE 2-41-031 GLENDALE, QUEENS PARCEL
BOROUGH AND COUNTY OF QUEENS
CITE AND STATE OF NEW YORK

ALL THAT CERTAIN PLOT, PIECE OF PARCEL OF LAND, SITUATE, LYING AND BEING IN THE SECOND WARD OF THE BOROUGH AND COUNTY OF QUEENS, CITY AND STATE OF NEW YORK, LOTS 91 AND 92, BLOCK 3803, BEING MORE PARTICULARLY BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNGING AT THE CORNER FORMED BY THE INTERSECTION OF THE NORTHERLY SIDE OF 77TH AVENUE (50 FEET WIDE) (ALSO KNOWN AS VARIAN PLACE) WITH THE EASTERLY SIDE OF 76TH STREET (60 FEET WIDE) (ALSO KNOWN AS SPRAGUE STREET) FORMING AN INTERIOR ANGLE OF 90 DEGREES 00 MINUTES 00 SECONDS.

THENCE FROM SAID POINT OF BEGINNING, EASTERLY, ALONG SAID NORTHERLY SIDE OF 77TH AVENUE 313.65 FEET, WHERE THE SAME IS INTERSECTED BY THE DIVIDING LINE BETWEEN LANDS N/F ARIMAX REALTY, LLC ON THE WEST AND LANDS N/F OF MARIAN CAPALEAN ON THE EAST;

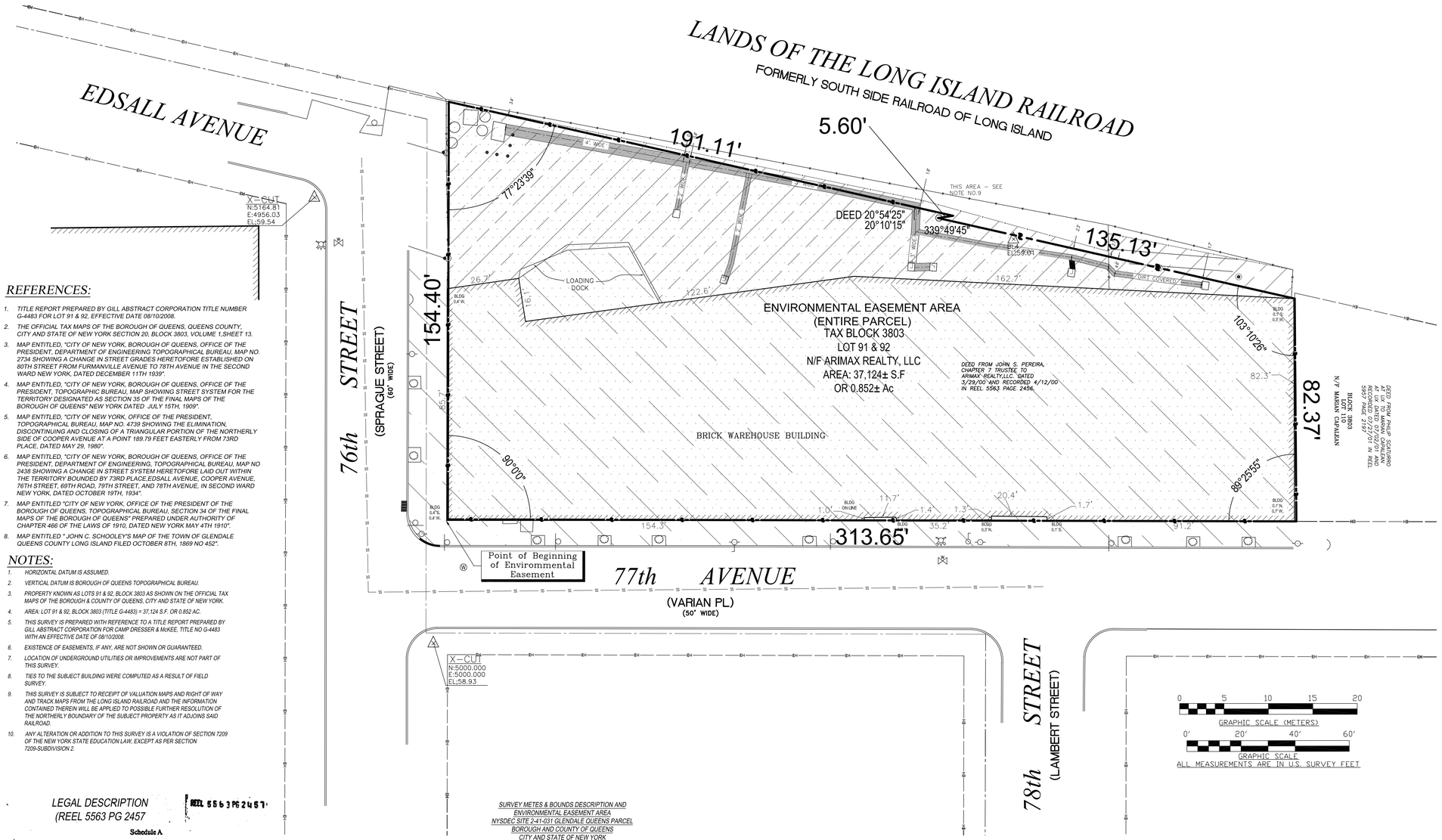
THENCE NORTHERLY ALONG SAID DIVIDING LINE, BEING ANGLE POINT ON SAID LINE OF HEREIN DESCRIBED ALONG A LINE FORMING AN INTERIOR ANGLE OF 89 DEGREES 25 MINUTES 55 SECONDS WITH THE NORTHERLY SIDE OF 77TH AVENUE, 82.37 FEET TO LANDS OF THE LONG ISLAND RAIROAD COMPANY;

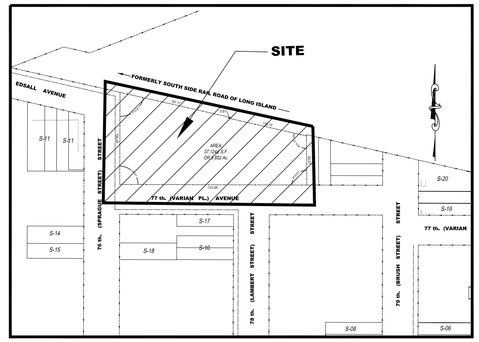
THENCE THE FOLLOWING THREE (3) COURSES ALONG SAID RAIL ROAD LINE

1. WESTERLY ALONG A LINE FORMING AN INTERIOR ANGLE OF 103 DEGREES 10 MINUTES 26 SECONDS WITH SAID DIVIDING LINE BETWEEN LANDS, 135.13 FEET TO AN ANGLE POINT IN SAID RAILROAD LINE;
2. NORTHEASTERLY FORMING AN INTERIOR ANGLE OF 339 DEGREES 49 MINUTES 45 SECONDS, 5.61 FEET TO THE LONG ISLAND RAILROAD COMPANY; AND
3. WESTERLY ALONG A LINE FORMING AN INTERIOR ANGLE OF 20 DEGREES 10 MINUTES 15 SECONDS (20 DEGREES 54 MINUTES 25 SECONDS – DEED) WITH THE PREVIOUS COURSE, A DISTANCE OF 191.11 FEET TO THE EASTERLY SIDE OF 76TH STREET (SPRAGUE STREET);

THENCE SOUTHERLY ALONG SAID EASTERLY SIDE OF 76TH STREET (SPRAGUE) FORMING AN INTERIOR ANGLE OF 77 DEGREES 23 MINUTES 39 SECONDS WITH THE PREVIOUS COURSE, 154.40 FEET TO THE POINT OR PLACE OF BEGINNING.

CONTAINING 37,124 SQUARE FEET OR 0.852 ACRES





VICINITY MAP

REFERENCES:

1. *TITLE REPORT PREPARED BY GILL ABSTRACT CORPORATION TITLE NUMBER G-4483 FOR LOT 91 & 92, EFFECTIVE DATE 08/10/2008.*
2. *THE OFFICIAL TAX MAPS OF THE BOROUGH OF QUEENS, QUEENS COUNTY, CITY AND STATE OF NEW YORK SECTION 20, BLOCK 3803, VOLUME 1,SHEET 13.*
3. *MAP ENTITLED, "CITY OF NEW YORK, BOROUGH OF QUEENS, OFFICE OF THE PRESIDENT, DEPARTMENT OF ENGINEERING TOPOGRAPHICAL BUREAU, MAP NO. 2734 SHOWING A CHANGE IN STREET GRADES HERETOFORE ESTABLISHED ON 80TH STREET FROM FURMANVILLE AVENUE TO 78TH AVENUE IN THE SECOND WARD NEW YORK, DATED DECEMBER 11TH 1939".*
4. *MAP ENTITLED, "CITY OF NEW YORK, BOROUGH OF QUEENS, OFFICE OF THE PRESIDENT, TOPOGRAPHIC BUREAU, MAP SHOWING STREET SYSTEM FOR THE TERRITORY DESIGNATED AS SECTION 35 OF THE FINAL MAPS OF THE BOROUGH OF QUEENS" NEW YORK DATED JULY 15TH, 1909".*
5. *MAP ENTITLED, "CITY OF NEW YORK, OFFICE OF THE PRESIDENT, TOPOGRAPHICAL BUREAU, MAP NO. 4739 SHOWING THE ELIMINATION, DISCONTINUING AND CLOSING OF A TRIANGULAR PORTION OF THE NORTHERLY SIDE OF COOPER AVENUE AT A POINT 189.79 FEET EASTERLY FROM 73RD PLACE, DATED MAY 29, 1980".*
6. *MAP ENTITLED, "CITY OF NEW YORK, BOROUGH OF QUEENS, OFFICE OF THE PRESIDENT, DEPARTMENT OF ENGINEERING, TOPOGRAPHICAL BUREAU, MAP NO 2438 SHOWING A CHANGE IN STREET SYSTEM HERETOFORE LAID OUT WITHIN THE TERRITORY BOUNDED BY 73RD PLACE,EDSALL AVENUE, COOPER AVENUE, 76TH STREET, 69TH ROAD, 79TH STREET, AND 78TH AVENUE, IN SECOND WARD NEW YORK, DATED OCTOBER 19TH, 1934".*
7. *MAP ENTITLED "CITY OF NEW YORK, OFFICE OF THE PRESIDENT OF THE BOROUGH OF QUEENS, TOPOGRAPHICAL BUREAU, SECTION 34 OF THE FINAL MAPS OF THE BOROUGH OF QUEENS" PREPARED UNDER AUTHORITY OF CHAPTER 466 OF THE LAWS OF 1910, DATED NEW YORK MAY 4TH 1910".*
8. *MAP ENTITLED " JOHN C. SCHOOLEY'S MAP OF THE TOWN OF GLENDALE QUEENS COUNTY LONG ISLAND FILED OCTOBER 8TH, 1869 NO 452".*

NOTES:

1. *HORIZONTAL DATUM IS ASSUMED.*
2. *VERTICAL DATUM IS BOROUGH OF QUEENS TOPOGRAPHICAL BUREAU.*
3. *PROPERTY KNOWN AS LOTS 91 & 92, BLOCK 3803 AS SHOWN ON THE OFFICIAL TAX MAPS OF THE BOROUGH & COUNTY OF QUEENS, CITY AND STATE OF NEW YORK.*
4. *AREA: LOT 91 & 92, BLOCK 3803 (TITLE G-4483) = 37,124 S.F. OR 0.852 AC.*
5. *THIS SURVEY IS PREPARED WITH REFERENCE TO A TITLE REPORT PREPARED BY GILL ABSTRACT CORPORATION FOR CAMP DRESSER & McKEE, TITLE NO G-4483 WITH AN EFFECTIVE DATE OF 08/10/2008.*
6. *EXISTENCE OF EASEMENTS, IF ANY, ARE NOT SHOWN OR GUARANTEED.*
7. *LOCATION OF UNDERGROUND UTILITIES OR IMPROVEMENTS ARE NOT PART OF THIS SURVEY.*
8. *TIES TO THE SUBJECT BUILDING WERE COMPUTED AS A RESULT OF FIELD SURVEY.*
9. *THIS SURVEY IS SUBJECT TO RECEIPT OF VALUATION MAPS AND RIGHT OF WAY AND TRACK MAPS FROM THE LONG ISLAND RAILROAD AND THE INFORMATION CONTAINED THEREIN WILL BE APPLIED TO POSSIBLE FURTHER RESOLUTION OF THE NORTHERLY BOUNDARY OF THE SUBJECT PROPERTY AS IT ADJOINS SAID RAILROAD.*
10. *ANY ALTERATION OR ADDITION TO THIS SURVEY IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW, EXCEPT AS PER SECTION 7209-SUBDIVISION 2.*

LEGEND:

INV.=FWD	FILLED WITH DIRT		CATCH BASIN
INV.=N/A	NOT ACCESSIBLE	(S)	SANITARY MANHOLE
(MH)	UNKNOWN MANHOLE		FIRE HYDRANT
(E)	ELECTRIC MANHOLE	X	SPOT ELEVATION
	GAS VALVE	(W)	WATER MANHOLE
	WATER VALVE		UTILITY POLE
—S—S—S—	SANITARY LINE		GUY WIRE
—HB—	HIGHWAY BOUNDARY	—X—X—	CHAIN LINK FENCE
—•—	PROPERTY LINE	—BL—	BASE LINE
F.F. XXX.XX	FINISHED FLOOR ELEV.		CONCRETE WALL
TCXXX.XX / BCXXX.XX	TOP OF CURB / BOTTOM OF CURB		CONCRETE CURB
17.875	SPOT ELEVATION		UTILITY POLE WITH LIGHT
	GUARD RAIL	(S)	SEWER MANHOLE
	SIGN	0.127 mm	TREE
T	TRAFFIC SIGNAL BOX		POLE WITH SIGN
	UTILITY POLE		MONUMENT
	VAPOR WELL LOCATION		DROP CURB
	MONITORING WELL		SOIL SAMPLING WELL

LEGAL DESCRIPTION
(REEL 5563 PG 2457

REEL 5563 PG 2457

Schedule A

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Second Ward of the Borough and County of Queens, City and State of New York, bounded and described as follows:

BEGINNING at the corner formed by the intersection of the Northerly side of 77th Avenue (formerly known as Varian Place) with the Easterly side of 76th Street (formerly Sprague Street);

RUNNING THENCE Easterly along the Northerly side of 77th Avenue 313.65 feet, more or less to an old farm line;

THENCE Northerly along said old farm line and along a line forming an interior angle of 89 degrees 25 minutes 55 seconds with the Northerly side of 77th Avenue 82.37 feet to land of the Long Island Railroad Company;

THENCE Westerly along the land of the Long Island Railroad Company and along a line forming an interior angle of 103 degrees 10 minutes 26 seconds with the preceding course 135.13 feet to another farm line;

THENCE Northeasterly along said farm line 5.61 feet to the Southerly line of the land of the Long Island Railroad Company;

THENCE Westerly along the Southerly line of said land and along a line forming a interior angle of 20 degrees 54 minutes 25 seconds with the preceding cause a distance of 191.11 feet to the Easterly side of 76th Street (Sprague Street); and

THENCE Southerly along the Easterly side of 76th Street (Sprague) 154.40 feet to the corner first mentioned at the point or place of BEGINNING.

SAID PREMISES being known as 76-01 77th Avenue, Glendale, New York.

NOTE:
NO CLOSURE IS POSSIBLE WITH THIS DESCRIPTION DUE TO ± DISTANCES AND MISSING ANGLE.

SURVEY METES & BOUNDS DESCRIPTION AND ENVIRONMENTAL EASEMENT AREA NYSDEC SITE 2-41-031 GLENDALE QUEENS PARCEL BOROUGH AND COUNTY OF QUEENS CITY AND STATE OF NEW YORK

***ALL** THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND, SITUATE, LYING AND BEING IN THE SECOND WARD OF THE BOROUGH AND COUNTY OF QUEENS, CITY AND STATE OF NEW YORK, LOTS 91 AND 92, BLOCK 3803, BEING MORE PARTICULARLY BOUNDED AND DESCRIBED AS FOLLOWS:*

***BEGINNING** AT THE CORNER FORMED BY THE INTERSECTION OF THE NORTHERLY SIDE OF 77TH AVENUE (50 FEET WIDE) (ALSO KNOWN AS VARIAN PLACE) WITH THE EASTERLY SIDE OF 76TH STREET (60 FEET WIDE) (ALSO KNOWN AS SPRAGUE STREET) FORMING AN INTERIOR ANGLE OF 90 DEGREES 00 MINUTES 00 SECONDS .*

***THENCE** FROM SAID POINT OF BEGINNING, EASTERLY, ALONG SAID NORTHERLY SIDE OF 77TH AVENUE 313.65 FEET, WHERE THE SAME IS INTERSECTED BY THE DIVIDING LINE BETWEEN LANDS N/F ARIMAX REALTY, LLC ON THE WEST AND LANDS N/F OF MARIAN CAPALEAN ON THE EAST;*

***THENCE** NORTHERLY ALONG SAID DIVIDING LINE., BEING ANGLE POINT IN SAID LINE OF HEREIN DESCRIBED ALONG A LINE FORMING AN INTERIOR ANGLE OF 89 DEGREES 25 MINUTES 55 SECONDS WITH THE NORTHERLY SIDE OF 77TH AVENUE, 82.37 FEET TO LANDS OF THE LONG ISLAND RAILROAD COMPANY;*

***THENCE** THE FOLLOWING THREE (3) COURSES ALONG SAID RAIL ROAD LINE*

1. *WESTERLY ALONG A LINE FORMING AN INTERIOR ANGLE OF 103 DEGREES 10 MINUTES 26 SECONDS WITH SAID DIVIDING LINE BETWEEN LANDS, 135.13 FEET TO AN ANGLE POINT IN SAID RAILROAD LINE;*
2. *NORTHEASTERLY FORMING AN INTERIOR ANGLE OF 339 DEGREES 49 MINUTES 45 SECONDS, 5.61 FEET TO THE LONG ISLAND RAILROAD COMPANY; AND*
3. *WESTERLY ALONG A LINE FORMING AN INTERIOR ANGLE OF 20 DEGREES 10 MINUTES 15 SECONDS (20 DEGREES 54 MINUTES 25 SECONDS - DEED) WITH THE PREVIOUS COURSE, A DISTANCE OF 191.11 FEET TO THE EASTERLY SIDE OF 76TH STREET (SPRAGUE STREET);*

***THENCE** SOUTHERLY ALONG SAID EASTERLY SIDE OF 76TH STREET (SPRAGUE) FORMING AN INTERIOR ANGLE OF 77 DEGREES 23 MINUTES 39 SECONDS WITH THE PREVIOUS COURSE, 154.40 FEET TO THE POINT OR PLACE OF BEGINNING.*

CONTAINING 37,124 SQUARE FEET OR 0.852 ACRES

ENVIRONMENTAL EASEMENT AREA COVERS THE ENTIRE PARCEL.

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 THE EASEMENT ARE SET FORTH IN MORE DETAIL 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 MAY 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@gw.dec.state.ny.us.

ENGINEERING / INSTITUTIONAL CONTROLS

- *SVE - SOIL VAPOR EXTRACTION SYSTEM WILL REMAIN IN PLACE.*
- *GROUNDWATER RESTRICTION COVERS ENTIRE PARCEL.*
- *RESTRICTED RESIDENTIAL USE COVERS ENTIRE PARCEL*
- *RESTRICTED EXCAVATION COVER ENTIRE TRACT*
- *MAINTAIN SITE SECURITY AND PROTECTION OF REMEDIATION SYSTEMS.*

ENGINEERING CONTROLS LEGEND

	EC-A	*ASPHALT ONLY*
	EC-B	*BUILDING, SIDEWALK & LOADING DOCK*
	EC-C	*SVE SYSTEMS (ENTIRE PARCEL)*
—X—X—	*EC-D*	*CHAIN LINK FENCE*

SURVEYOR'S CERTIFICATION

THE UNDERSIGNED HEREBY CERTIFIES TO CAMP DRESSER & McKEE, ARIMAX REALTY,LLC, NEW STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION AND GILL ABSTRACT CORPORATION AS FOLLOWS:

1. *THE UNDERSIGNED IS A DULY REGISTERED LAND SURVEYOR OF THE STATE OF NEW YORK.*
2. *THE SURVEY "ALTA/ACSM LAND TITLE SURVEY, NYSDEC SITE 2-41-031 GLENDALE QUEENS, LOT 91 & 92, BLOCK 3803, BOROUGH 7 COUNTY OF QUEENS, CITY AND & STATE OF NEW YORK" DATED JANUARY 22ND 2009, WAS AN ON THE GROUND INSTRUMENT SURVEY MADE UNDER MY SUPERVISION.*
3. *THE SURVEY WAS MADE IN ACCORDANCE WITH THE (a) THE MINIMUM STANDARDS ESTABLISHED FOR LAND TITLE SURVEYS AND LAND SURVEYORS IN THE STATE OF NEW YORK AND (b) THE "THE MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS" ,JOINTLY ESTABLISHED AND ADOPTED BY THE AMERICAN LAND TITLE ASSOCIATION AND AMERICAN CONGRESS ON SURVEYING AND MAPPING IN 2005, AND MEETS THE ACCURACY STANDARDS (AS ADOPTED BY ALTA AND ACSM AND IN EFFECT ON THE DATE OF THIS CERTIFICATION) FOR URBAN SURVEYS, AND INCLUDES ITEMS 2,4,5,7,10,11(b),13 AND 14 AS SET FOR IN TABLE A THERETO.*
4. *THE INFORMATION, COURSES AND DISTANCES SHOWN ON THE SURVEY CONFORM TO THE RECORD DESCRIPTION OF THE PARCEL SHOWN ON THE SURVEY. THE LEGAL DESCRIPTION OF THE PARCEL SHOWN ON THE SURVEY IS AN ACCURATE DESCRIPTION OF THE LAND SURVEYED AND REFLECTS BOUNDARY LINES WHICH CLOSE BY ENGINEERING CALCULATION. THE LEGAL DESCRIPTION OF THE PARCEL SHOWN ON THE SURVEY DESCRIBES THE SAME PROPERTY AS THE LEGAL DESCRIPTION SET FORTH IN SCHEDULE A ARIMAX REALTY,LLC,TITLE NUMBER G-4483 WITH AN EFFECTIVE DATE OF AUGUST 10, 2008.*
5. *THE SURVEY CORRECTLY SHOWS THE LOCATION OF (a) BUILDINGS, STRUCTURES AND OTHER VISIBLE IMPROVEMENTS SITUATED ON THE PARCELS SHOWN THEREON,INCLUDING VISIBLE ENCROACHMENTS ONTO ADJOINING PREMISES,STREETS OR ALLEYS BY SUCH BUILDINGS, STRUCTURES OR OTHER IMPROVEMENTS AND ENCROACHMENTS SITUATED ON ADJOINING PREMISES, (b) DRIVEWAYS OR OTHER CUTS IN THE CURBS ALONG STREETS UPON WHICH SUCH PARCELS ABUT.*

C. RICHARD MORAVEC, L.S. NYS LIC. #49917 DATE

NO.	DATE	DESCRIPTION REVISIONS	APPR'D.
3	12/22/2010	REVISED PER NYSDEC COMMENTS	E.A.B.
2	12/17/2010	REVISED PER NYSDEC COMMENTS	E.A.B.
1	10/29/2010	REVISED PER NYSDEC COMMENTS	E.A.B.

DRAWN BY: IGK

CHECK BY: E.A.B.

SCALE: *1" =20'*

HIRANI ENGINEERING & LAND SURVEYING, P.C.
30 JERICHO EXECUTIVE PLAZA, SUITE 200C
JERICHO, NY 11753
T (516) 248-1010 F (516) 248-9018
Hirani Group

OWNER: ARIMAX REALTY, LLC

CLIENT: CAMP DRESSER & McKEE

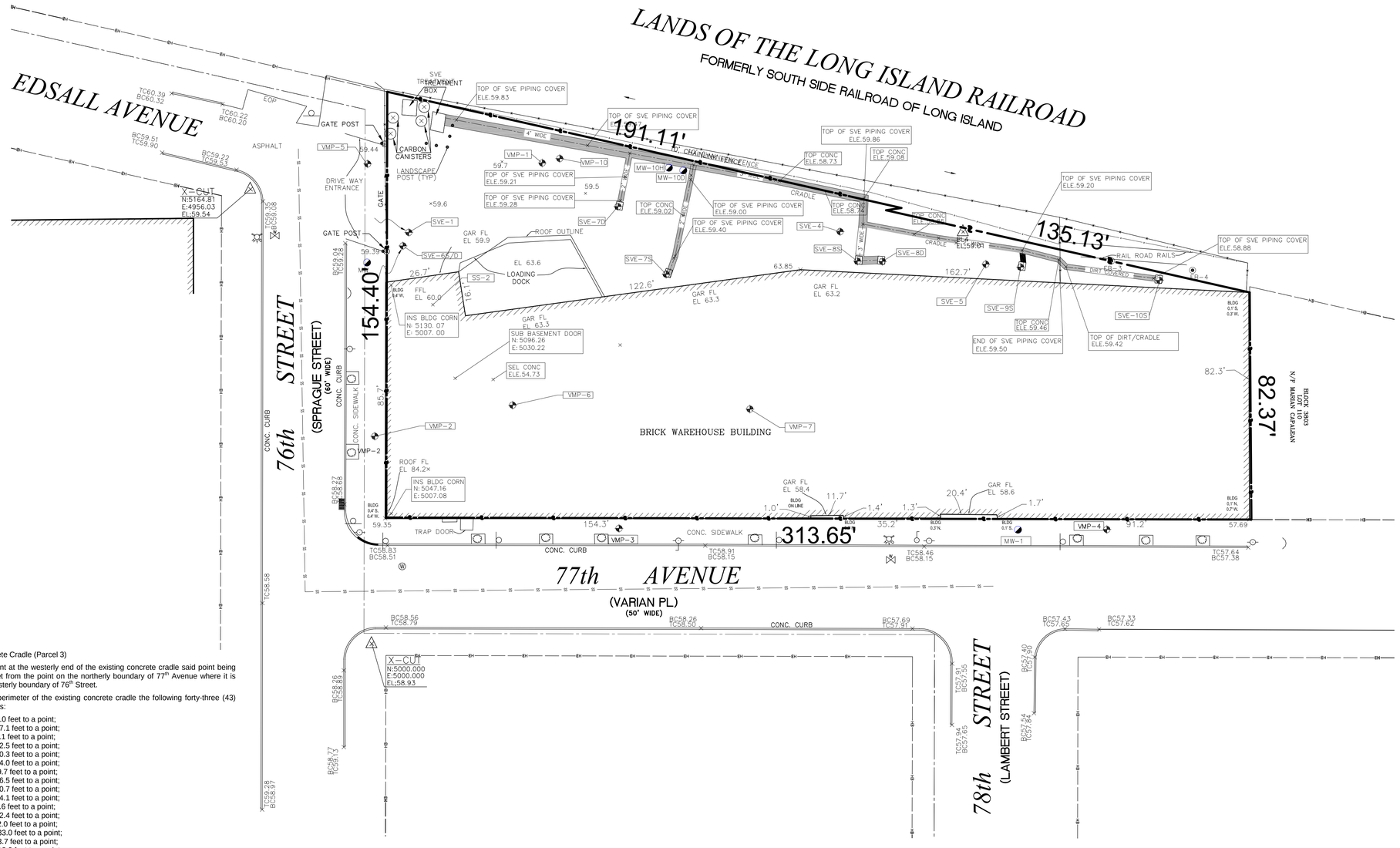
PROJECT: KLIEGMAN BROTHERS OPERABLE UNIT 1
NYSDEC SITE 2-41-031
76-01 77th Ave., Glendale, NY

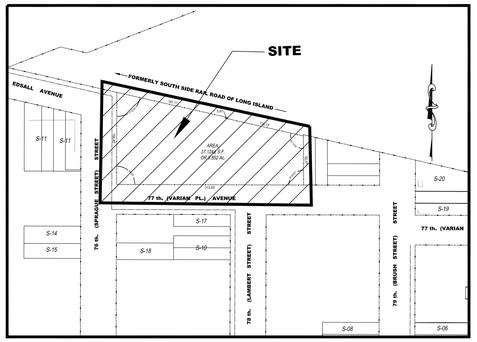
SUBJECT: ALTA/ACSM LAND TITLE SURVEY (SURVEY)

DATE DRAWN: 01/27/2009
DATE SURVEYED: 11/19/2008

JOB #: SU 08-2423A

SHEET NO: 1 OF 2





VICINITY MAP

LEGEND:

INV.=FWD	FILLED WITH DIRT		DROP CURB
INV.=N/A	NOT ACCESSIBLE		CATCH BASIN
MH	UNKNOWN MANHOLE	S	SANITARY MANHOLE
E	ELECTRIC MANHOLE		FIRE HYDRANT
	GAS VALVE	X	SPOT ELEVATION
	WATER VALVE	W	WATER MANHOLE
S S S	SANITARY LINE		UTILITY POLE
HB	HIGHWAY BOUNDARY		GUY WIRE
	PROPERTY LINE	X X	CHAIN LINK FENCE
F.F. XXX.XX	FINISH FLOOR ELEV.	BL	BASE LINE
TCXXX.XX / BCXXX.XX	TOP OF CURB / BOTTOM OF CURB		CONCRETE WALL
× 17.875	SPOT ELEVATION		CONCRETE CURB
	GUARD RAIL		UTILITY POLE WITH LIGHT
	SIGN	S	SEWER MANHOLE
T	TRAFFIC SIGNAL BOX	0.127 mm	TREE
	UTILITY POLE		POLE WITH SIGN
	VAPOR WELL LOCATION		MONUMENT
	MONITORING WELL		DROP CURB
			SOIL SAMPLING WELL

Description of Concrete Cradle (Parcel 3)

BEGINNING at a point at the westerly end of the existing concrete cradle said point being N. 8°26'E. 143.7 feet from the point on the northerly boundary of 77th Avenue where it is intersected by the easterly boundary of 76th Street.

THENCE along the perimeter of the existing concrete cradle the following forty-three (43) courses and distances:

1. N. 07°53'E. 4.0 feet to a point;
2. S. 79°47'E. 67.1 feet to a point;
3. S. 65°28'E. 2.1 feet to a point;
4. S. 79°32'E. 22.5 feet to a point;
5. S. 79°32'E. 30.3 feet to a point;
6. S. 78°11'E. 34.0 feet to a point;
7. S. 02°35'W. 9.7 feet to a point;
8. S. 79°31'E. 26.5 feet to a point;
9. S. 81°41'E. 30.7 feet to a point;
10. S. 75°44'E. 14.1 feet to a point;
11. S. 44°38'E. 3.6 feet to a point;
12. S. 82°28'E. 32.4 feet to a point;
13. S. 07°32'W. 2.0 feet to a point;
14. N. 82°28'W. 33.0 feet to a point;
15. N. 44°38'W. 3.7 feet to a point;
16. N. 75°44'W. 12.0 feet to a point;
17. S. 4°37'E. 3.2 feet to a point;
18. N. 80°47'W. 2.0 feet to a point;
19. N. 05°10'W. 3.3 feet to a point;
20. N. 81°46'W. 29.9 feet to a point;
21. N. 79°25'W. 26.3 feet to a point;
22. S. 06°03'W. 9.6 feet to a point;
23. S. 03°59'E. 0.9 feet to a point;
24. N. 88°01'E. 5.1 feet to a point;
25. S. 5°2'W. 2.9 feet to a point;
26. S. 87°53'W. 5.6 feet to a point;
27. N. 03°27'E. 2.9 feet to a point;
28. N. 84°32'W. 2.4 feet to a point;
29. N. 3°3'W. 0.9 feet to a point;
30. N. 06°03'E. 10.9 feet to a point;
31. N. 02°34'E. 7.9 feet to a point;
32. N. 78°11'W. 31.4 feet to a point;
33. N. 79°32'W. 29.3 feet to a point;
34. S. 11°30'W. 32.3 feet to a point;
35. S. 20°34'W. 8.0 feet to a point;
36. N. 83°43'W. 1.9 feet to a point;
37. N. 19°27'E. 8.3 feet to a point;
38. N. 11°29'E. 32.1 feet to a point;
39. N. 79°32'W. 21.5 feet to a point;
40. S. 11°7'W. 16.5 feet to a point;
41. N. 79°45'W. 2.0 feet to a point;
42. N. 11°7'E. 16.0 feet to a point; and
43. N. 79°47'W. 66.9 feet to the point or place of beginning.

Containing 945± s.f. or 0.022 Ac. more or less.

Description of Existing Warehouse Building (Parcel 1)

BEGINNING at a point at the southwesterly corner of the existing building, said point being S. 45°22'W. 0.6 feet from the point on the northerly boundary of 77th Avenue where it is intersected by the easterly boundary of 76th Street.

THENCE along the perimeter of the existing building the following fifteen (15) courses and distances:

1. N. 00°07'E. 85.7 feet to a point;
2. N. 81°45'E. 26.7 feet to a point;
3. S. 8°55'E. 16.1 feet to a point;
4. N. 82°10'E. 122.6 feet to a point;
5. S. 87°6'E. 162.7 feet to a point;
6. S. 0°12'E. 82.3 feet to a point;
7. N. 89°58'W. 91.2 feet to a point;
8. N. 15°18'W. 1.7 feet to a point;
9. N. 89°28'W. 20.4 feet to a point;
10. S. 01°55'E. 1.3 feet to a point;
11. S. 89°54'W. 35.1 feet to a point;
12. N. 10°30'W. 1.0 feet to a point;
13. S. 89°13'W. 11.7 feet to a point;
14. S. 46°15'W. 1.5 feet to a point; and
15. S. 90°0'W. 153.2 feet to the point or place of beginning

Containing 26456± s.f. or 0.607 ac. more or less

Description of Loading Dock (Parcel 2)

BEGINNING at a point on the northerly edge of the existing building where it is intersected by the existing loading dock said point being N. 16°23'E. 92.9 feet from the point on the northerly boundary of 77th Avenue where it is intersected by the easterly boundary of 76th Street.

THENCE along the perimeter of the existing loading dock the following four (4) courses and distances:

1. N. 10°24'E. 3.3 feet to a point;
2. N. 67°35'E. 18.8 feet to a point;
3. N. 86°41'E. 22.7 feet to a point; and
4. S. 28°55'E. 23.8 feet to a point on the existing building.

THENCE along the last mentioned boundary the following two (2) courses and distances:

1. S. 82°10'W. 50.1 feet to a point; and
2. N. 8°55'W. 16.1 feet to the point or place of beginning.

Containing 1026± s.f. or 0.024 Ac. more or less.

0 5 10 15 20
GRAPHIC SCALE (METERS)
0' 20' 40' 60'
GRAPHIC SCALE
ALL MEASUREMENTS ARE IN U.S. SURVEY FEET

C. RICHARD MORAVEC, L.S. NYS LIC. #49917 DATE

NO.	DATE	DESCRIPTION	APPR'D.
		REVISIONS	
3	12/22/2010	REVISED PER NYSDEC COMMENTS	E.A.B.
2	12/17/2010	REVISED PER NYSDEC COMMENTS	E.A.B.
1	10/29/2010	REVISED PER NYSDEC COMMENTS	E.A.B.

DRAWN BY: IGK
CHECK BY: E.A.B.

SCALE: 1= 20'

HIRANI ENGINEERING & LAND SURVEYING, P.C.
30 JERICHO EXECUTIVE PLAZA, SUITE 200C
JERICHO, NY 11753
T (516) 248-1010 F (516) 248-9018
Hirani Group

OWNER: ARIMAX REALTY, LLC

CLIENT: CAMP DRESSER & McKEE

PROJECT: KLIEGMAN BROTHERS OPERABLE UNIT 1
NYSDEC SITE 2-41-031
76-01 77th Ave., Glendale, NY

SUBJECT: ALTA/ACSM LAND TITLE SURVEY (TOPOGRAPHY)

DATE DRAWN: 01/27/2009
DATE SURVEYED: 11/19/2008
JOB #: SU 08-2423A
SHEET NO: 2 OF 2

ALL ISLAND ABSTRACT, LTD.

81 Scudder Avenue • Northport, NY 11768 • 631-754-1217 • FAX 631-754-1295

January 6, 2011

The People of the State of New York, Acting through
Their Commissioner of the Department of Environmental
Conservation

Re: 76-01 77th Avenue, Queens, NY
Our Title No.: AIA-N-62762-Q

Dear Sir/Madam:

Please be advised that we are prepared to issue a pro-forma policy upon the following:

1. Receipt of the original easements with accompanying transfer tax forms.
2. Receipt of payment of title bill.
3. Title continuation showing no new matters. (To be done on the "closing" day).
4. The final survey.

All other required items have been received.

Please call with any questions.

Very truly yours,

DOREEN HOFFMAN
dhoffman@allislandabstract.com

COMMITMENT FOR TITLE INSURANCE

Issued By

NEW JERSEY TITLE

INSURANCE COMPANY

SINCE 1888

New Jersey Title Insurance Company, a New Jersey corporation ("Company"), for a valuable consideration, commits to issue its policy or policies of title insurance, as identified in Schedule A, in favor of the Proposed Insured named in Schedule A, as owner or mortgagee of the estate or interest in the land described or referred to in Schedule A, upon payment of the premiums and charges and compliance with the Requirements; all subject to the provisions of Schedules A and B and to the Conditions of this Commitment.

This Commitment shall be effective only when the identity of the Proposed Insured and the amount of the policy or policies committed for have been inserted in Schedule A by the Company.

All liability and obligation under this Commitment shall cease and terminate 180 days after the Effective Date or when the policy or policies committed for shall issue, whichever first occurs, provided that the failure to issue the policy or policies is not the fault of the Company.

The Company will provide a sample of the policy form upon request.

This Commitment shall not be valid or binding until countersigned by a validating officer or authorized signatory on Schedule "A" herein.

IN WITNESS WHEREOF, New Jersey Title Insurance Company has caused its corporate name and seal to be affixed by its duly authorized officers on the date shown in Schedule A.

NEW JERSEY TITLE INSURANCE COMPANY

BY: _____
PRESIDENT

BY: _____
SECRETARY

Issuing Agent

ALL ISLAND ABSTRACT, LTD.
81 SCUDDER AVENUE
NORTHPORT, NEW YORK 11768
631-754-1217 FAX 631-754-1295

New Jersey Title Insurance Company

PRIVACY POLICY

We Are Committed to Safeguarding Customer Information
In order to better serve your needs now and in the future, we may ask you to provide us with certain information. We understand that you may be concerned about what we will do with such information – particularly any personal or financial information. We agree that you have a right to know how we will utilize the personal information you provide to us. Therefore we have adopted this Privacy Policy to govern the use and handling of your personal information.

Applicability
This Privacy Policy governs our use of the information which you provide to us. It does not govern the manner in which we may use information we have obtained from any other source, such as information obtained from a public record or from another person or entity. New Jersey Title Insurance Company has also adopted broader guidelines that govern our use of personal information regardless of its source.

Types of Information
Depending upon which of our services you are utilizing, the types of nonpublic personal information that we may collect include:

- Information we receive from you on applications, forms and in other communications to us, whether in writing, in person, by telephone or any other means;
- Information about your transactions with us, our affiliated companies, or others; and
- Information we receive from a consumer reporting agency.

Use of Information
We request information from you for our own legitimate business purposes and not for the benefit of any nonaffiliated party. Therefore, we will not release your information to nonaffiliated parties except: (1) as necessary for us to provide the product or service you have requested of us; or (2) as permitted by law. We may, however, store such information indefinitely, including the period after which any customer relationship has ceased. Such information may be used for any internal purpose, such as quality control efforts or customer analysis. We may also provide all of the types of nonpublic personal information listed above to one or more of our affiliated companies. Such affiliated companies include financial service providers, such as title insurers, property and casualty insurers, and trust and investment advisory companies, or companies involved in real estate services, such as appraisal companies, home warranty companies, and escrow companies. Furthermore, we may also provide all the information we collect, as described above, to companies that perform marketing services on our behalf, on behalf of our affiliated companies, or to other financial institutions with whom we or our affiliated companies have joint marketing agreements.

Former Customers
Even if you are no longer our customer, our Privacy Policy will continue to apply to you.

Confidentiality and Security
We will use our best efforts to ensure that no unauthorized parties have access to any of your information. We restrict access to nonpublic personal information about you to those individuals and entities who need to know that information to provide products or services to you. We will use our best efforts to train and oversee our employees and agents to ensure that your information will be handled responsibly and in accordance with this Privacy Policy.

CONDITIONS

1. The term mortgage, when used herein, shall include deed of trust, trust deed, or other security instrument.

2. If the proposed Insured has or acquired actual knowledge of any defect, lien, encumbrance, adverse claim or other matter affecting the estate or interest or mortgage thereon covered by this Commitment other than those shown in Schedule B hereof, and shall fail to disclose such knowledge to the Company in writing, the Company shall be relieved from liability for any loss or damage resulting from any act of reliance hereon to the extent the Company is prejudiced by failure to so disclose such knowledge. If the proposed Insured shall disclose such knowledge to the Company, or if the Company otherwise acquires actual knowledge of any such defect, lien, encumbrance, adverse claim or other matter, the Company at its option may amend Schedule B of this Commitment accordingly, but such amendment shall not relieve the Company from liability previously incurred pursuant to paragraph 3 of the Conditions.

3. Liability of the Company under this Commitment shall be only to the named proposed Insured and-such parties included under the definition of Insured in the form of policy or policies committed for and only for actual loss incurred in reliance hereon in undertaking in good faith (a) to comply with the requirements hereof, or (b) to eliminate exceptions shown in Schedule B, or (c) to acquire or create the estate or interest or mortgage thereon covered by this Commitment. In no event shall such liability exceed the amount stated in Schedule A for the policy or policies committed for and such liability is subject to the insuring provisions and Conditions and the Exclusions from Coverage of the form of policy or policies committed for in favor of the proposed Insured which are hereby incorporated by reference and are made a part of this Commitment except as expressly modified herein.

4. This Commitment is a contract to issue one or more title insurance policies and is not an abstract of title or a report of the condition of title. Any action or actions or rights of action that the proposed Insured may have or may bring against the Company arising out of the status of the title to the estate or interest or the status of the mortgage thereon covered by this Commitment must be based on and are subject to the provisions of this Commitment.

5. The policy to be issued contains an arbitration clause. All arbitrable matters when the Amount of Insurance is $2,000,000 or less shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties. You may review a copy of the arbitration rules at < http://www.alta.org/ >.

ALL ISLAND ABSTRACT, LTD.

81 Scudder Avenue • Northport, NY 11768 • 631-754-1217 • FAX 631-754-1295

Dear Applicant:

Thank you for placing your title order. As an agent for NEW JERSEY TITLE INSURANCE COMPANY, it is our obligation to make you aware of the following:

Please be advised that the following websites have been developed containing rate information sufficient to inform the insured of the total of the New York premium and all endorsements and fees for each title insurance policy for real property located in the State of New York. The websites can be accessed at www.firstam.com or www.nyrates.fntg.com.

Title No. AIA N-62762-Q

SCHEDULE A - CERTIFICATION

EFFECTIVE DATE: 12/1/10

REDATED:

PROPOSED INSURED:

PURCHASER: THE PEOPLE OF THE STATE OF NEW YORK,ACTING THROUGH THEIR COMMISSIONER OF THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

MORTGAGEE:

FEE INSURANCE: $ 35,000.00

MORTGAGE INSURANCE: $ n/a

THIS COMPANY CERTIFIES that a good and marketable title to the premises described in schedule A, subject to the liens, encumbrances and other matters, if any, set forth in this certificate may be conveyed and/or mortgaged by:

ARIMAX REALTY, LLC who acquired title by virtue of a deed from JOHN S. PEREIRA, CHAPTER 7 TRUSTEE FOR THE BANKRUPTCY ESTATE OF LKIEGMAN BROTHERS, INC. by deed dated 3/29/00 recorded 4/12/00 in Reel 5563 cp 2456.

COUNTY: QUEENS

BLOCK: 3803

LOT: 91 & 92

For information only:

Premises known as: 76-01 77TH AVENUE, QUEENS, NEW YORK

Title No. AIA N-62762-Q

SCHEDULE A - DESCRIPTION

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in

WILL FOLLOW UPON RECEIPT OF FINAL SURVEY

Title No. AIA N-62762-Q

SCHEDULE B

NOTE: THE FOLLOWING EXCEPTIONS FROM COVERAGE WILL APPEAR IN OUR TITLE POLICY, UNLESS DISPOSED OF TO OUR SATISFACTION PRIOR TO CLOSING OR DELIVERY OF SAID POLICY.

DISPOSITION

1. Taxes, tax liens, tax sales, water rates, sewer rents and assessments set forth in schedule herein.

2. Mortgages set forth herein (1). The mortgages set forth in the detailed statement within must be considered and/or disposed of.

3. Any state of facts which an accurate survey might show.

4. Rights of tenants or persons in possession, if any.

5. Covenants, conditions, easements, leases, agreements of record, etc., if any.

6. The identity of the parties at the closing of this title shall be established to the satisfaction of the title closer and the affidavit of title attached to this certificate completed, signed and sworn to.

7. NOTE: Please be advised that the State of New York has a new Statutory Form Durable Power of Attorney that takes effect September 1, 2009. Under New York General Obligations Law Article 5, Title 15 the Power of Attorney must now be signed, dated and duly acknowledged, not only by the principal, but also by the agent. These changes do not affect the validity of any Power of Attorney executed prior to the effective date of this new law. If any of the closing instruments involving the present transaction are to be executed by a Power of Attorney, said Power of Attorney must be presented to this company for consideration prior to closing. At closing, a Full Force and Effect Affidavit must be executed by the agent verifying that the Power of Attorney has not been modified or revoked. The original or certified copy of the Power of Attorney must be presented at closing in recordable form.

8. Payment at closing is to be made by Certified or Bank Check only; Personal checks are only acceptable if prior approval has been given by this Company.

9. Policy excepts any additional meter charges subsequent to the date of the last actual meter reading.

Title No. AIA N-62762-Q

SCHEDULE B

10. Policy excepts any unpaid water/sewer charges, as company makes no searches for same. Bills showing meter readings to date of closing should be presented.

11. Certified Owner(s) ARIMAX REALTY, LLC has/have been run for judgments and liens and the following was disclosed:

NOTHING FOUND

12. **FOR INFORMATION ONLY:** Please be advised that several counties are experiencing unprecedented recording delays. Unfortunately, despite this Company's best efforts to record documents in a timely fashion, we ultimately have no control over the backlog of recordings in each county. Although this commitment reflects accurately the status of the County's records as of its certification date, other documents may have been submitted for recording which do not yet appear in the public record. If you are aware of any documents which are pending for recordation, you must notify this Company as soon as possible, so that additional exceptions may be raises. The failure to notify this Company, may constitute an "act of the insured" thereby voiding in whole or in part, the coverage afforded by this policy. Although this Company will use its best efforts to record instruments promptly, no liability is assumed for penalties and interest under Section 1416 of the Tax Law due to inability to file transfer tax returns or pay transfer taxes within the time required.

13. Policy excepts from coverage any harm, loss or damage (including, but not limited to legal fees and expenses) suffered by the Insured as a result of any filed or recorded notice of violation or enforcement affecting the Land appearing in the public records maintained by the municipality having jurisdiction over the Land: (a) which records the Insured did not specifically in writing request the Company to search or examine prior to the date of closing or (b) which notices of violation or enforcement are filed subsequent to the effective date of such searches specifically requested by the Insured,: or (c) which notices of violation or enforcement do not result in the imposition of a judicially enforceable monetary lien on or against the Land.

SCHEDULE B

14. **For information only:** Municipal, Departmental and Street Report searches or returns as reported herein are furnished for informational purposes only. They are not insured and the Company assumes no liability for the accuracy thereof. They will not be continued to the date of closing.

15. **For Information Only:** Effective September 1st, 2010, the collection of Sales and Use tax on the provision of information services and title products is required pursuant to section 1105 of the New York State Tax Law. Accordingly, said tax will be charged, and reflected on this company's bill, on title products and searches including but not limited to: Certificates of Occupancy, Department of Buildings, Fire Department, Emergency Repair, Street Reports, Highway Department, Health Department, Department of Environmental Protection, Department of Air Resources, Oil Burner, Landmark and Patriot Act (or their variations where applicable).

16. NOTE: This Company requires that the insured/borrower/purchaser sign the attached "Disclosure of Additional Services Note to Insured/Borrower/Purchaser" at closing.

17. **For Information only**: Searches for open bankruptcies against ARIMAX REALTY LLC were made in the EASTERN District Bankruptcy Court and the returns are as follows:

NOTHING FOUND

18. **For Information only:** Patriot searches have been run against ARIMAX REALTY LLC and the following was disclosed:

NOTHING FOUND

19. Sidewalk Violation docketed 3/2/1995 against Block 3803 Lot 92.

20. Proof is required that no proceeding in **BANKRUPTCY** has ever been instituted by or against Certified Owner(s) in any Court or before any Office or any State or of the United States; nor have he/she/they at any time made an assignment for the benefit of creditors, nor any assignment, now in effect, or the rents of said premises or any part thereof. In the event a past or present Bankruptcy Action has taken place, this Office must be advised at or prior to closing. Additional exceptions may apply.

21. Proof is required by affidavit to show that no prior unrecorded or undisclosed mortgages have been made by the parties to the proposed transaction affecting the premises under examination. If any undisclosed or unrecorded mortgages have been made the Company must be notified immediately. Company cannot be held responsible for matters not disclosed and not of the public record.

22. A copy of the Contract in this transaction must be submitted to the Company for consideration.

    Note: If the proposed consideration is $400,000.00 or more City Register of New York City and the Nassau County Clerk will require a copy of the contract to be filed with the deed.

23. Emergency Repair Liens pursuant to the Administrative Code of the City of New York may have attached and not been filed with the County Clerk. No liability is assumed for same.

24. Satisfactory proof by affidavit must be furnished showing whether any work has been done upon the premises described in Schedule A by the City, or any demand made by the City for any such work that may result in charges by the New York City Department of Environmental Protection for water tap closing or any related work, whether or not such charges are liens against which this policy insures.

25. Policy excepts any New York City Department of Environmental Protection (DEP) surcharges resulting from a failure to install a water meter.

26. Effective July 5, 2004, for properties located in the Counties of Kings (Brooklyn), New York (Manhattan), Queens and the Bronx, the City Register will require that the following real property tax forms (hereinafter, "E Tax Forms") must be prepared on-line electronically and must be submitted with the transfer documents which are to be recorded. Otherwise, the transfer documents will be rejected and will not be recorded. The E-Tax Forms are: NYC Real Property Transfer Tax (RPTT) Form, Smoke Detector Affidavit, Property Owners's Registration Form. Water and Sewer Customer Registration Form, NYS Real Estate Transfer Tax (RETT/TP-584) and NYS Real Property Transfer Report (RP-5217/NYC). Unless seller and purchasers provide this Company with completed and correct E-Tax Forms at closing or give this Company authorization to

prepare, complete and submit such E-Tax Forms to the City Register (as set forth in the attached Authorization and Release Form), Company will have no liability and the title policy will not cover any harm, loss or damage which the parties may incur because of or arising from the City's rejection of, or refusal to record, the transfer documents.

NOTE: This company reserves the right to impose additional work charges, if circumstances warrant. In addition, additional charges will be imposed for closings that take longer than two hours or that extend beyond normal business hours.

FOR INFORMATION ONLY:

Chapter 502 of the laws of 1982 (Insurance Law Sec. 440 Subdivision 5, effective 9/11/82) requires that title companies offer, at or prior to closing, an optional (rider) policy to cover a homeowner (defined as the natural owner and resident of a one or two family house, condominium unit or cooperative apartment) for FUTURE market value of the house for an additional premium of 10% of the fee policy.

I have read the above and have decided to/not to accept the Market Value Rider.

_____

_____

FOR INFORMATION ONLY: If the mortgage to be insured is being assigned, the following language is now necessary:
"This assignment is not subject to the requirements of section 275 of the Real Property law because it is an assignment within the secondary mortgage market."

```
USER:  QUEENS   COUNTY CLERKS OFFICE  QUEENS              DATE:  12/23/2010
TERM:  PL53      SIDEWALK LIEN BOOK INQUIRY              TIME:  14:58:32
           CONTROL NUMBER : 000231823 - 01

    *** DOCKETING DATA ***          *** SOURCE DOCUMENT ***
DOCKETING DATE:  03/02/1995              TYPE: SV   SIDEWALK VIOLATION
          TIME:  12:13:00              COUNTY: 41   QUEENS
EFFECTIVE DATE:  03/02/1995               COURT:
          TIME:  12:13:00       TOTAL BLOCKS & LOTS: 01   UPDATED: N
CLERK/SEQ #   :  ROBINSON  014          REFERENCE #: 12631
                      *** PREMISES ***
            BLOCK #: 03803      LOT #: 00092
  ADDRESS   NUMBER:           STREET:
            CITY  :                          ZIP CODE:  00000
                    *** OWNER/CORPORATION ***
 NAME   FORMAT C   : 76-01 77 AVENUE
                    *** CLAIMANT ***
 NAME   FORMAT C   : N Y C DEPARTMENT OF TRANSPORTATION
   ADDRESS   NUMBER: 40       STREET:  WORTH
             CITY  : NEW YORK NEW YORK      ZIP CODE:  10013


ENTER CONTROL NUMBER FOR NEXT INQUIRY
PRESS: PF1- HELP, PF2- CANCEL INQUIRY PF8- 2ND PAGE DATA, ENTER- INQUIRE RECORD
```

Title No. AIA N-62762-Q

MORTGAGE SCHEDULE - 1

Mortgagor: ARIMAX REALTY, LLC

Mortgagee: MASPETH FEDERAL SAVINGS AND LOAN ASSOCIATION

Amount: $750,000.00

Dated: 6/23/00

Recorded: 7/10/00

Reel: 5623 **Page:** 2096

Mortgage Tax Paid:

AS EXTENDED AND MODIFIED by Agreement dated 3/4/03 recorded 9/11/03 in CRFN 2003000347351.

Title No. AIA N-62762-Q

MORTGAGE SCHEDULE - 2

Mortgagor: ARIMAX REALTY, LLC

Mortgagee: MASPETH FEDERAL SAVINGS AND LOAN ASSOCIATION

Amount: $1,203,811.59

Dated: 7/27/06

Recorded: 8/30/06

CRFN: 2006000492757

Mortgage Tax Paid:

AS CONSOLIDATED with Mortgage in Reel 5623 pg 2096 by Agreement dated 7/27/06 recorded 8/30/06 in CRFN 2006000492758 to form a single lien of $1,750,000.00.

ASSIGNMENT OF LEASES AND RENTS dated 7/22/06 recorded 8/30/06 in CRFN 2006000492759.

MDS The unpaid taxes, water rates, assessments and other matters relating to taxes which are liens at the date of this certificate are set forth below.

CODE: AL-126
CNTY: QUEENS
SECT: 20 VOL: 1
BLOCK: 3803 LOT: 91
TAX CLASS: 4 RATE: 10.312
BLDG CLASS: V1
VACANT LAND NOT ZONED RESIDENTIAL OR MANHATTAN BELOW 110 STREET

TITLE: AIAN62762Q DATE: 12/23/2010
COMPANY: ALL ISLAND ABSTRACT LTD

TAX MAP ATTACHED

2010/2011

TRANSITIONAL LAND	$153,126.00
TRANSITIONAL TOTAL	$153,126.00
EXEMPT LAND	NONE
EXEMPT TOTAL	NONE
ACTUAL LAND	$153,180.00
ACTUAL TOTAL	$153,180.00
ACTUAL EXEMPT LAND	NONE
ACTUAL EXEMPT TOTAL	NONE

EXEMPTIONS: NO EXEMPTIONS

ASSESSED OWNER: ARIMAX REALTY,
76 STREET

Taxes 2010 /2011 *1ST QTR* *Due Date* *07/01/2010* *REAL ESTATE*

Transaction Date		Charges/Adjustments	Payments/Adjustments
06/11/2010	INITIAL CHARGE	$3,991.23	$.00
07/03/2010	BILL PAYMENT	$.00	$3,991.23
	Amount Due:	*$0.00*	

Taxes 2010 /2011 *2ND QTR* *Due Date* *10/01/2010* *REAL ESTATE*

Transaction Date		Charges/Adjustments	Payments/Adjustments
06/11/2010	INITIAL CHARGE	$3,991.23	$.00
* 09/29/2010	BILL PAYMENT	$.00	$3,991.23
	Amount Due:	*$0.00*	

Taxes 2010 /2011 *3RD QTR* *Due Date* *01/01/2011* *REAL ESTATE*

Transaction Date		Charges/Adjustments	Payments/Adjustments
06/11/2010	INITIAL CHARGE	$3,991.23	$.00
11/19/2010	TAX RATE DECREASE FOR REAL ESTATE REPLACEMENT BILL	-$87.28	$.00
	Amount Due:	*$3,903.95 OPEN*	

NOTE: SECOND HALF TAXES SUBJECT TO CHANGE DUE TO TAX RATE ADJUSTMENT. RESPONSIBILITY LIMITED TO THOSE ITEMS AND INSTALLMENTS THAT ARE LIENS AS OF DATE OF THIS REPORT AND REFLECT ON THE PUBLIC RECORDS. TAX SEARCH DOES NOT COVER ANY PART OF THE STREETS ON WHICH THE PREMISES TO BE INSURED ABUT. RECENT PAYMENTS MAY BE SUBJECT TO COLLECTION. TAX EXEMPTIONS NOTED ABOVE MAYBE RESTORED ON THE DATE OF CONVEYANCE OR UPON DEATH OF RECORD OWNER. TAX SEARCH DOES NOT GUARANTEE AGAINST ANY CLAIMS RESULTING FROM LEVIES OF RESTORED TAXES. ACCURATE WATER METER READING REQUIRED FOR THOSE REPORTED AS MINIMUM, ACTUAL, ESTIMATED AND MULTIPLE READINGS TO AVOID ADDITIONAL CHARGES. TAX SEARCH DOES NOT GUARANTEE AGAINST NEW METERS OR UNBILLED FRONTAGE CHARGES NOT ON RECORD IN THE DEPARTMENT OF ENVIRONMENTAL PROTECTION. THE RETURNS ARE GUARANTEED TO BLOCK AND LOT.
* PLEASE REQUEST THE SELLER OR BORROWER TO HAVE RECEIPTED BILLS AT THE CLOSING *

2791888 9432251

MDS The unpaid taxes, water rates, assessments and other matters relating to taxes which are liens at the date of this certificate are set forth below.

CODE: AL-126
CNTY: QUEENS
SECT: 20 VOL: 1
BLOCK: 3803 LOT: 91

TITLE: AIAN62762Q DATE: 12/23/2010
COMPANY: ALL ISLAND ABSTRACT LTD

Taxes 2010 /2011 4TH QTR Due Date 04/01/2011 REAL ESTATE

Transaction Date		Charges/Adjustments	Payments/Adjustments
06/11/2010	INITIAL CHARGE	$3,991.23	$.00
11/19/2010	TAX RATE DECREASE FOR REAL ESTATE REPLACEMENT BILL	-$87.28	$.00
	Amount Due:	*$3,903.95 OPEN*	

** ALL PAYMENTS SUBSEQUENT TO 09/29/2010 ARE SUBJECT TO COLLECTION.*

NOTE: NO ACCOUNT FOUND IN D.E.P.

NOTE: LOT SUBJECT TO WATER AND SEWER RENT
AND OR METER CHARGES.

PAYMENT INFORMATION

NYC WATER BOARD (DEP)
P.O. BOX 410
NEW YORK, NY 10008
PHONE: 718-595-7000

NYC DEPARTMENT OF FINANCE (DOF)
P.O. BOX 32
NEW YORK, NY 10008
PHONE 212-504-4080

NOTE: A SPECIAL METER READING SHOULD BE OBTAINED ON ALL ACCOUNTS TO AVOID ADDITIONAL CHARGES.

SUBJECT TO CONTINUATION PRIOR TO CLOSING.
NOTHING ELSE FOUND 12/23/2010

2791888 9432251

BBL : 4-03803-0091/0
INT/DISC TO: 01/15/2011 BAD LOCATION ADDRESS
FROM DATE:
CUTOFF DATE:

ACCT TYPE	ACCT ID/DISC	PD BEGIN	PD END	DUE DT	TAX DUE	INTEREST
PROPERTY		01/01/11	03/31/11	01/01/11	3903.95	0.00
PROPERTY		04/01/11	06/30/11	04/01/11	3903.95	0.00

TOTAL AMT DUE : 7,807.90

Bottom of list reached 4900 INTEREST PER ACCOUNT STATEMENT

01-HELP 06-SUSPEND 09-CANCEL 18-RECYCLE

NEXT FUNCTION : DATA :

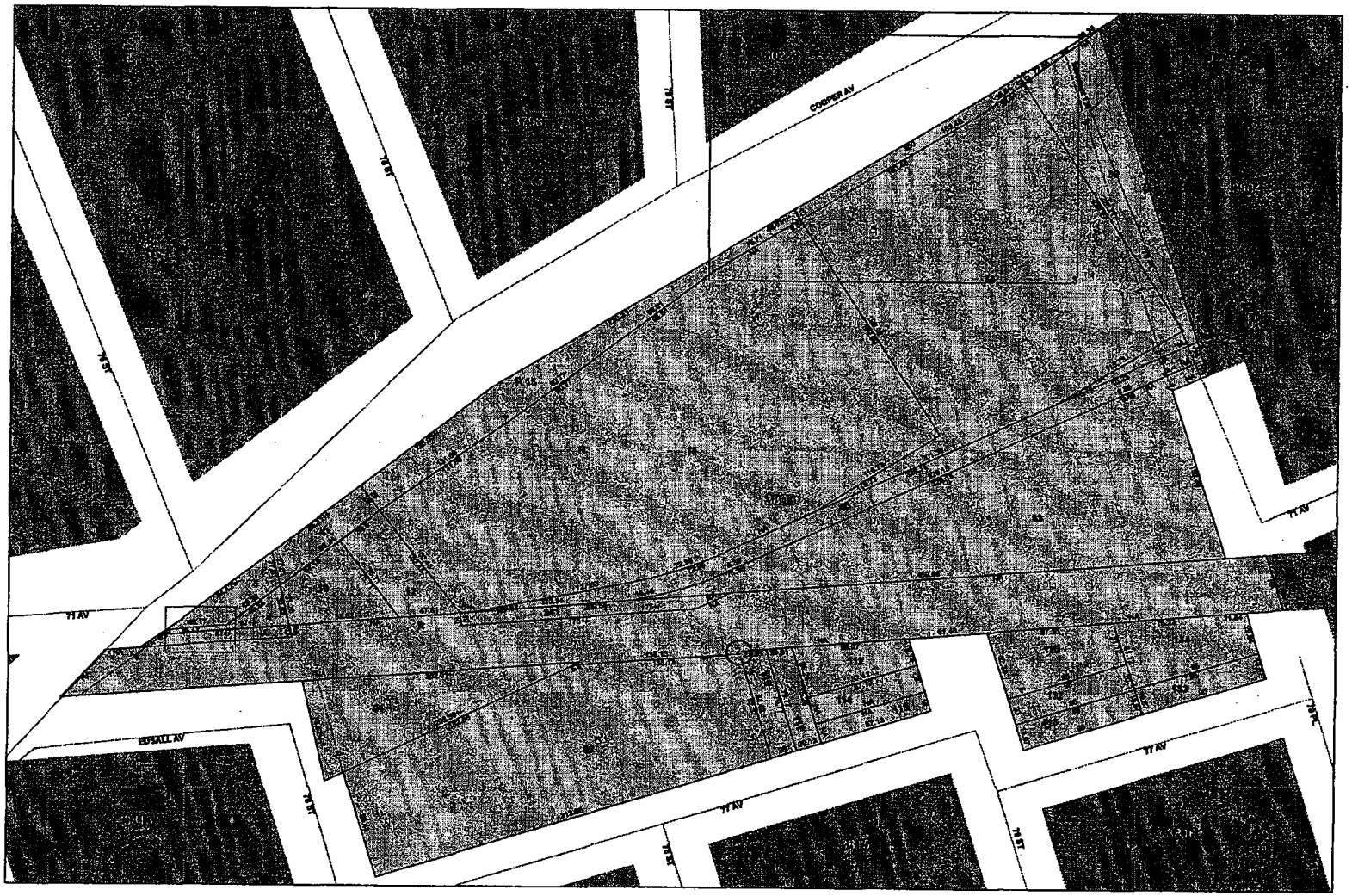
FINANCE
NEW YORK
MARTHA E. STARK
COMMISSIONER

N
W E
S

NYC Digital Tax Map

Effective Date : 12-08-2008 09:05:01
End Date : Current

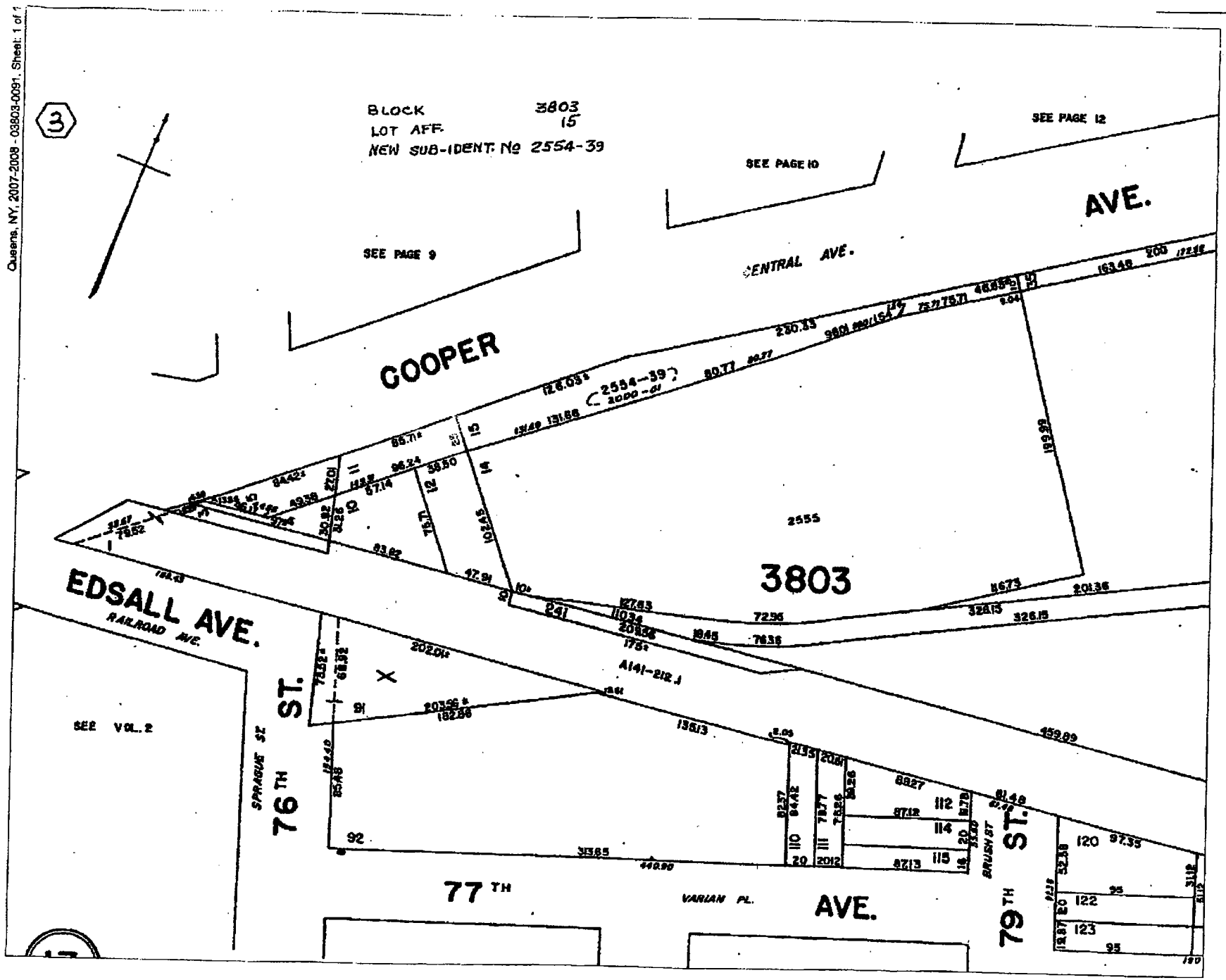
Queens Block: 3803



Legend

- Streets
- Miscellaneous Text
- Possession Hooks
- Boundary Lines
- Lot Face Possession Hooks
- Regular
- Underwater
- Tax Lot Polygon
- Condo Number
- Tax Block Polygon

Feet
0 70182.80



MDS The unpaid taxes, water rates, assessments and other matters relating to taxes which are liens at the date of this certificate are set forth below.

CODE: AL-126
CNTY: QUEENS
SECT: 20 VOL: 1
BLOCK: 3803 LOT: 92
TAX CLASS: 4 RATE: 10.312
BLDG CLASS: E3
WAREHOUSES SEMI-FIREPROOF WAREHOUSE

TITLE: AIAN62762Q/A DATE: 12/23/2010
COMPANY: ALL ISLAND ABSTRACT LTD

TAX MAP ATTACHED

2010/2011

TRANSITIONAL LAND.....	$240,750.00
TRANSITIONAL TOTAL.....	$581,040.00
EXEMPT LAND.....	NONE
EXEMPT TOTAL.....	NONE
ACTUAL LAND.....	$240,750.00
ACTUAL TOTAL.....	$417,600.00
ACTUAL EXEMPT LAND.....	NONE
ACTUAL EXEMPT TOTAL.....	NONE

EXEMPTIONS:
NO EXEMPTIONS

ASSESSED OWNER: ARIMAX REALTY,
7601 77 AVENUE

Taxes 2010 /2011 *1ST HALF* *Due Date* *07/01/2010* *REAL ESTATE*

Transaction Date		Charges/Adjustments	Payments/Adjustments
06/11/2010	INITIAL CHARGE	$21,769.48	$.00
07/03/2010	BILL PAYMENT	$.00	$21,769.48
	Amount Due:	*$0.00*	

Taxes 2010 /2011 *2ND HALF* *Due Date* *01/01/2011* *REAL ESTATE*

Transaction Date		Charges/Adjustments	Payments/Adjustments
06/11/2010	INITIAL CHARGE	$21,769.48	$.00
11/19/2010	TAX RATE DECREASE FOR REAL ESTATE REPLACEMENT BILL	-$476.06	$.00
* 12/23/2010	BILL PAYMENT	$.00	$21,293.42
	Amount Due:	*$0.00*	

** ALL PAYMENTS SUBSEQUENT TO 09/29/2010 ARE SUBJECT TO COLLECTION.*

D.E.P. ACCOUNT #8000609114001

METER #7427 ACTUAL
06/20/2010 TO 09/18/2010 PAID 10/05/2001
ENTERED 09/27/2010 $91.94

NOTE: SECOND HALF TAXES SUBJECT TO CHANGE DUE TO TAX RATE ADJUSTMENT. RESPONSIBILITY LIMITED TO THOSE ITEMS AND INSTALLMENTS THAT ARE LIENS AS OF DATE OF THIS REPORT AND REFLECT ON THE PUBLIC RECORDS. TAX SEARCH DOES NOT COVER ANY PART OF THE STREETS ON WHICH THE PREMISIS TO BE INSURED ABUT. RECENT PAYMENTS MAY BE SUBJECT TO COLLECTION. TAX EXEMPTIONS NOTED ABOVE MAYBE RESTORED ON THE DATE OF CONVEYANCE OR UPON DEATH OF RECORD OWNER. TAX SEARCH DOES NOT GUARANTEE AGAINST ANY CLAIMS RESULTING FROM LEVIES OF RESTORED TAXES. ACCURATE WATER METER READING REQUIRED FOR THOSE REPORTED AS MINIMUM, ACTUAL, ESTIMATED AND MULTIPLE READINGS TO AVOID ADDITIONAL CHARGES. TAX SEARCH DOES NOT GUARANTEE AGAINST NEW METERS OR UNFIXED FRONTAGE CHARGES NOT ON RECORD IN THE DEPARTMENT OF ENVIRONMENTAL PROTECTION. THE RETURNS ARE GUARANTEED TO BLOCK AND LOT.
* PLEASE REQUEST THE SELLER OR BORROWER TO HAVE RECEIPTED BILLS AT THE CLOSING *

2791889 9432252

MDS

The unpaid taxes, water rates, assessments and other matters relating to taxes which are liens at the date of this certificate are set forth below.

CODE: AL-126
CNTY: QUEENS
SECT: 20 VOL: 1
BLOCK: 3803 LOT: 92

TITLE: AIAN62762Q/A DATE: 12/23/2010
COMPANY: ALL ISLAND ABSTRACT LTD

FIRE METER #9997 - SET 01/01/1980

PAYMENT INFORMATION

NYC WATER BOARD (DEP)
P.O. BOX 410
NEW YORK, NY 10008
PHONE: 718-595-7000

NYC DEPARTMENT OF FINANCE (DOF)
P.O. BOX 32
NEW YORK, NY 10008
PHONE 212-504-4080

NOTE: A SPECIAL METER READING SHOULD BE OBTAINED ON ALL ACCOUNTS TO AVOID ADDITIONAL CHARGES.

SUBJECT TO CONTINUATION PRIOR TO CLOSING.
NOTHING ELSE FOUND 12/23/2010

MUNICIPAL DATA SERVICES SHALL BEAR NO LIABILITY FOR ERRONEOUS OR INACCURATE INFORMATION PROVIDED BY THE DEPARTMENT OF FINANCE INCLUDING BUT NOT LIMITED TO ERRORS DUE TO LOADING, KEY ENTRY, PROCESSING, DATA COMMUNICATION,HARDWARE AND SOFTWARE PROBLEMS OR THE BACKDATING OF ANY INFORMATION.

2791889 9432252

12/28/10 15:25 FAIRTAX NYC DOF : ONL BILLING DETL EMDS002 F420 F4M0510

BBL : 4-03803-0092/0
INT/DISC TO: 01/15/2011
FROM DATE:
CUTOFF DATE:

ARIMAX REALTY,
7601 77TH AVE
GLENDALE NY 11385-7516

ACCT TYPE	ACCT ID/DISC	PD BEGIN	PD END	DUE DT	TAX DUE	INTEREST

TOTAL CHARGE : 0.00 TOTAL INTEREST: 0.00
TOTAL CREDITS: 0.00 TOTAL AMT DUE : 0.00
3018 NO UNDRPD OR OPEN PD 3018 NO UNDRPD OR OPEN PD
01-HELP 06-SUSPEND 09-CANCEL 18-RECYCLE

NEXT FUNCTION : DATA :

ACCT 8000609114001 CC BBL 04 03803 0092 RD MR MR BL 09 Q12 SERV START 01/01/80
NAME ARIMOX REALTY,LLC. READ ROUTE 715 STAT ACTIVE L-TRAN 10/05/10
SERVICE 76 01 77 AV SEC 20 CMMBD 405 L-BILL 09
ADDRESS FLUSHING NY 11385-0000 BLDG CLASS E3 MESSAGES N L-CRD ACTION 0
********** 01-01 ACCOUNTS RECEIVABLE ********** 12/28/10 *** 1540 **

DESCRIPTION	09/27/10	06/28/10	03/30/10	12/30/09	TOTAL
	092	183	273	364-OVER	
UTILITY					
TOTALS					

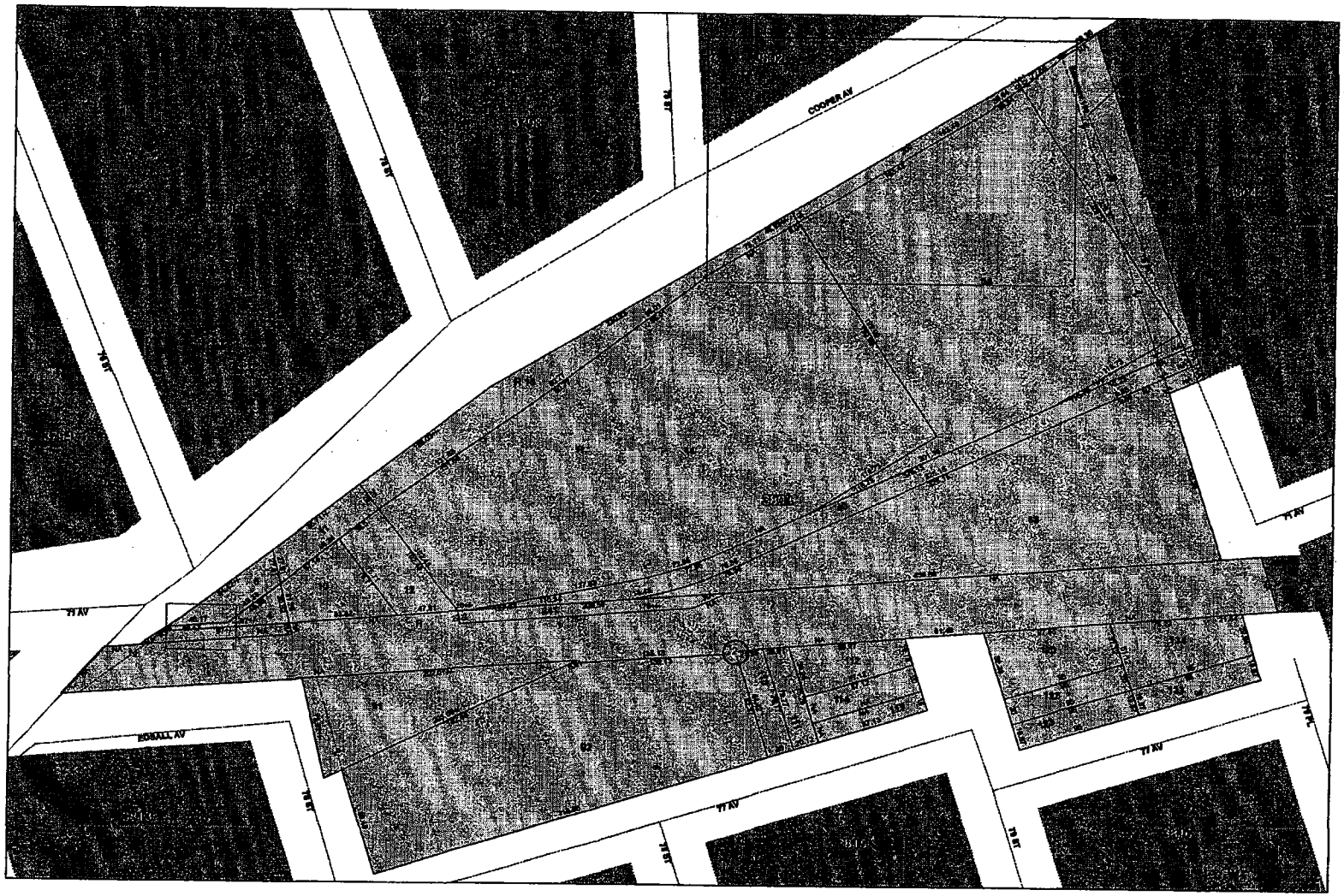
DSPLY 02 KEY TO NEW SS DSPLY KEY

FINANCE NEW YORK MAPPING & PROPERTY CONNECTION

NYC Digital Tax Map

Effective Date : 12-08-2008 09:05:01
End Date : Current

Queens Block: 3803

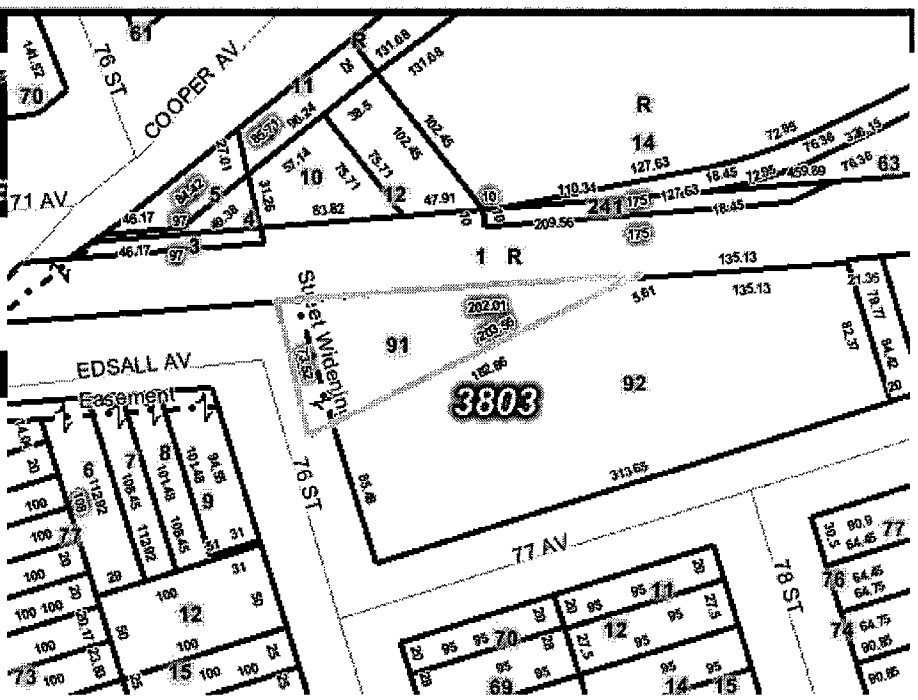


Legend

- Streets
- Miscellaneous Text
- Possession Hooks
- Boundary Lines
- Lot Face Possession Hooks
- Regular
- Underwater
- Tax Lot Polygon
- Condo Number
- Tax Block Polygon

Feet
8,729122.30

NYC Finance



Access Current Tax Map

Search | Legend | Map Info

Search by selecting one of the following options. Click the SEARCH button to map your location.

Search Options

Borough / Block / Lot

Borough / Block / Lot

Borough

Queens

Block

3803

Lot

91

Search

Map Key

STREETS

Boundary Lines

T691—Standard NYB I U Form 8302 Bargain & sale deed, with covenant against grantor's acts—Full or Long Form—Single sheet, 11/98

REEL 5563PG2456

DISTRIBUTED BY Blumberg Excelsior, Inc. NYC 10013

CONSULT YOUR LAWYER BEFORE SIGNING THIS INSTRUMENT—THIS INSTRUMENT SHOULD BE USED BY LAWYERS ONLY

THIS INDENTURE, made on March 29, 2000

BETWEEN John S. Pereira, Chapter 7 Trustee for the Bankruptcy Estate of Kliegman Brothers, Inc., having an address located at 150 East 58th Street, 24th Floor, New York, New York 10155

party of the first part, and

Arimax Realty, LLC, having an office located at 1003 Metropolitan Avenue, Brooklyn, New York

party of the second part,

WITNESSETH, that the party of the first part, in consideration of Ten Dollars and other valuable consideration paid by the party of the second part, does hereby grant and release unto the party of the second part, the heirs or successors and assigns of the party of the second part forever,

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the

SEE SCHEDULE A ATTACHED HERETO AND MADE PART HEREOF

* See Bankruptcy Order Attached hereto and made part hereof. *

Being the same premises described in the deed to the parties of the first part therein by deed dated September 20, 1046, recorded on September 26, 1946, in Liber 5276, page 565.

TOGETHER with all right, title and interest, if any, of the party of the first part in and to any streets and roads abutting the above described premises to the center lines thereof; TOGETHER with the appurtenances and all the estate and rights of the party of the first part in and to said premises; TO HAVE AND TO HOLD the premises herein granted unto the party of the second part, the heirs or successors and assigns of the party of the second part forever.

AND the party of the first part covenants that the party of the first part has not done or suffered anything whereby the said premises have been encumbered in any way whatever, except as aforesaid.
AND the party of the first part, in compliance with Section 13 of the Lien Law, covenants that the party of the first part will receive the consideration for this conveyance and will hold the right to receive such consideration as a trust fund to be applied first for the purpose of paying the cost of the improvement and will apply the same first to the payment of the cost of the improvement before using any part of the total of the same for any other purpose.
The word "party" shall be construed as if it read "parties" whenever the sense of this indenture so requires.

IN WITNESS WHEREOF, the party of the first part has duly executed this deed the day and year first above written.

IN PRESENCE OF:

Ann Marie Spencer
WITNESS

John S. Pereira, Chapter 7 Trustee for the Bankruptcy Estate of Kliegman Brothers, Inc.

John S. Pereira, Trustee

John S. Pereira, Trustee

25×10

Schedule A

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Second Ward of the Borough and County of Queens, City and State of New York, bounded and described as follows:

BEGINNING at the corner formed by the intersection of the Northerly side of 77th Avenue (formerly known as Varian Place) with the Easterly side of 76th Street (formerly Sprague Street);

RUNNING THENCE Easterly along the Northerly side of 77th Avenue 313.65 feet, more or less to an old farm line;

THENCE Northerly along said old farm line and along a line forming an interior angle of 89 degrees 25 minutes 55 seconds with the Northerly side of 77th Avenue 82.37 feet to land of the Long Island Railroad Company;

THENCE Westerly along the land of the Long Island Railroad Company and along a line forming an interior angle of 103 degrees 10 minutes 26 seconds with the preceding course 135.13 feet to another farm line;

THENCE Northeasterly along said farm line 5.61 feet to the Southerly line of the land of the Long Island Railroad Company;

THENCE Westerly along the Southerly line of said land and along a line forming a interior angle of 20 degrees 54 minutes 25 seconds with the preceding course a distance of 191.11 feet to the Easterly side of 76th Street (Sprague Street); and

THENCE Southerly along the Easterly side of 76th Street (Sprague) 154.40 feet to the corner first mentioned at the point or place of BEGINNING.

SAID PREMISES being known as 76-01 77th Avenue, Glendale, New York.

REEL 5563 PG 2458

ACKNOWLEDGMENT IN NEW YORK STATE (RPL §309)

State of New York, County of New York } ss.:

On March 29, 2000 before me, the undersigned, personally appeared John S. Pereira, Chapter 7 Trustee

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

(signature and office of individual taking acknowledgment)

ANN MARIE SINISI
Notary Public, State of New York
No. 41-4705582
Qualified in Queens County
Commission Expires May 31, 2001

ACKNOWLEDGMENT OUTSIDE NEW YORK STATE (RPL §309-a) SO IN ORIGINAL

State of County of

On before me, the undersigned, personally appeared

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument, and that such individual made such appearance before the undersigned in

(insert city or political subdivision and state or county or other place acknowledgment taken)

(signature and office of individual taking acknowledgment)

ACKNOWLEDGMENT BY SUBSCRIBING WITNESS(ES)

State of County of } ss.:

On before me, the undersigned, personally appeared

the subscribing witness(es) to the foregoing instrument, with whom I am personally acquainted, who, being by me duly sworn, did depose and say that he/she/they reside(s) in (if the place of residence is in a city, include the street and street number, if any, thereof);

that he/she/they know(s)

to be the individual(s) described in and who executed the foregoing instrument; that said subscribing witness(es) was (were) present and saw said

execute the same; and that said witness(es) at the same time subscribed his/her/their name(s) as a witness(es) thereto.

(☐ if taken outside New York State insert city or political subdivision and state or country or other place acknowledgment taken) And that said subscribing witness(es) made such appearance before the undersigned in

(signature and office of individual taking acknowledgment)

Bargain and Sale Deed
With Covenant Against Grantor's Acts

TITLE No. Ano 0918

John S. Pereira, Chapter 7 Trustee for the Bankruptcy Estate of Kliegman Brothers, Inc.

TO

Arimax Realty, LLC

SECTION 20
BLOCK 3803
LOT 92
COUNTY OR TOWN Glendale, Queens

RETURN BY MAIL TO:

William Nanis, Esq.
30-97 Steinway St.
Astoria NY
Zip No. 11103

Reserve this space for use of Recording Office.

25×

UNITED STATES BANKRUPTCY COURT
EASTERN DISTRICT OF NEW YORK

----------X

In re

Chapter 7

KLIEGMAN BROTHERS, INC.,

Case No. 199-19300 (353)

Debtor.

----------X

ORDER APPROVING SALE OF REAL PROPERTY LOCATED IN GLENDALE, NEW YORK

Upon the notice of intended sale of certain real property and improvements thereon located at 76-01 77th Avenue, Glendale, New York (the "Real Property"), filed by John S. Pereira, the Chapter 7 Trustee (the "Trustee") of the estate of the Debtor pursuant to Sections 363(b), 363(f) and 506(c) of the Bankruptcy Code, Bankruptcy Rule 6004 and the Rules of this Court, a public sale ("Public Sale") of the Real Property was conducted on February 29, 2000, subject to higher and better offers and free and clear of all liens, claims and encumbrances with any such liens, claims, and encumbrances to attach to the net proceeds of sale after deduction of all allowed expenses pursuant to Section 506(c) of the Bankruptcy Code, including broker's commission, the Trustee's commission and reasonable attorneys' fees, and appropriate notice of the Public Sale having been given to the Office of the United States Trustee, all secured creditors, all unsecured creditors, all parties filing notices of appearance and all parties who have expressed an interest in purchasing the Real Property; and it appearing that said notice is adequate and that no other or further notice need be

(48)

given; and upon the appearances of all interested parties and the record of the Public Sale and the bidding for the Real Property; and it appearing that it is in the best interests of the Debtor's estate and its creditors for the Debtor to sell the Real Property to the highest and best bidder; and sufficient cause appearing therefor, it hereby

FOUND, ADJUDGED AND DECREED AS FOLLOWS:

1. The Trustee has given proper, timely and sufficient notice of the Public Sale.

2. The Public Sale was conducted at 10:00 a.m. on February 29, 2000 in the Courtroom of the Honorable Jerome Feller, United States Bankruptcy Judge and J.F. - Arts Food Imporing, Inc. (the "Purchaser") is the successful bidder J.F. for the Real Property with a final bid of $ 85,000.00 (the "Final Purchase Price"); and

3. The Final Purchase Price was accepted by the Trustee and the Public Sale was thereafter closed; and

4. The Final Purchase Price is fair and reasonable; and

5. The Purchaser is a good faith purchaser within the meaning of Section 363(m) of the Bankruptcy Code.

6. The sale of the Real Property is supported by the exercise of sound business judgment by the Trustee.

7. The sale of the Real Property is in the best interests of the Debtor, its estate and its creditors. Accordingly, it is hereby

ORDERED, that the Trustee is authorized to sell the Real Property to the Purchaser for the Final Purchase Price; and it is further

ORDERED, that the Purchaser is directed to pay the Final Purchase Price to the Trustee at a closing (the "Closing") to be held on a date which is not later than the date which is ten (10) days after the date that this Order becomes final and non-appealable; and it is further

ORDERED, that the Property shall be sold "as is", free and clear of all liens, claims and encumbrances, including, but not limited to, the allowed claim of Sterling National Bank ("Sterling"), the allowed claim of the New York City Department of Finance ("New York City") and all allowed expenses of sale pursuant to Section 506(c) of the Bankruptcy Code ("Section 506(c) Claims"), including real estate broker's commission, the Trustee's commission and reasonable attorneys' fees (collectively, the "Encumbrances") with all Encumbrances to attach to the proceeds of sale; and it is further

ORDERED, that all funds received by the Trustee at the Closing shall be placed in escrow with the Trustee pending resolution by the Court of (1) the allowed claim of Sterling, (2) the allowed claim of New York City, and (3) allowed Section 506(c) Claims and (4) any other issues applicable to the distribution thereof. and it is further

ORDERED, that Section 363(m) of the Bankruptcy Code shall apply to the Purchaser upon consummation of the sale of the Real Property; and it is further

ORDERED, that the Trustee is hereby authorized, empowered and directed to execute, deliver, file, record or otherwise perform all things necessary to effectuate this Order to consummate the transactions contemplated by the Public Sale, and it is further

Dated: Brooklyn, New York
February 29, 2000

JEROME FELLER
UNITED STATES BANKRUPTCY JUDGE

J.F. ← ~~ORDERED~~, that the terms of the Public Sale are in all respects approved; and it is further

J.F. ~~ORDERED~~, that in the event of a default by the Purchaser, the Trustee may proceed to closing with the second highest bidder without further order of the Court.

DATE: 3/2
JOSEPH P. HU[illegible]
BY: [illegible]
DEPUTY [illegible]

Title No.: _____

Premises: _____

_____

Disclosure of Additional Services Notice to Insured/Borrower/Purchaser

Please be advised that the lender and other parties may have requested Title Agent to undertake and perform additional services which are not necessary services in connection with the issuance of the title policy. Such services include, but are not limited to: obtaining copies of Building Permits and of the Certificate of Occupancy, conducting municipal and other departmental searches, conduction highway and street searches to determine whether access of the subject premises is over a public or private street, conducting Patriot searches, conducting Bankruptcy searches and making survey and/or property inspections. The charges for such services are reasonable related to the work performed and are not excessive. The issuance of the title policy is not dependent upon Title Agent performing such additional services.

By signing below, the insureds/borrowers/purchaser acknowledge receipt of this Disclosure Notice.

Date: _____

_____
Borrower/Purchaser/Insured

_____
Borrower/Purchaser/Insured

TITLE AFFIDAVIT

STATE OF NEW YORK
County of _____

I (We), _____ being duly sworn, deposes and say as follows:

1. That I am a(n) owner of real property located at _____ and described in the annexed title report;
2. That I am not a "foreign person" as that term is defined in Section 1445(f) of the Internal Revenue Code: my Social Security Number is _____; I am not subject to withholding;
3. That I have not been known by any other name(s) married or single, during the eleven years past, except: _____
4. The only mortgage, home improvement loan, home equity loan, line of credit or other type of loan or installment contract I currently have open is: _____.
5. In the last year, I have not applied for any mortgage, home improvement loan, home equity loan, line of credit or other type of loan or installment contract EXCEPT as follows: _____
6. The following mortgage, judgment, taxes and/or liens are being paid by the title company on my behalf: _____
   I believe the sums of money taken at closing are the correct amounts to pay these liens in full. In the event a lien or claims that an amount is not sufficient, I agree to pay the deficiency to the title company immediately upon request. I hereby designate ALL ISLAND ABSTRACT. LTD. as my agent to send the payoff funds to the lender. I authorize the lender to send the satisfaction documents to ALL ISLAND ABSTRACT. LTD. for recording.
   I hereby agree to indemnify and hold harmless ALL ISLAND ABSTRACT. LTD. and _____ _____(underwriter) for any loss or damage that it may incur by reason of its agreeing to omit this mortgage from its policy.
7. That there are no Judgment or Federal Tax Liens against me unsatisfied of record in the Courts of this State or of the United States and the Judgments set forth in the annexed title report, if any, are not against me but a person of a similar name and I have never resided or conducted business at the premises listed on said judgments.
8. That no proceedings in bankruptcy have ever been instituted by or against me in any court or before any officer of any State, of the United States, nor have I at any time made an assignment for the benefit of creditors, nor an assignment, now in effect of the rents of said premises or any part thereof;
9. That I have owned and occupied the property now being sod or mortgages by me for _____ years, last past, and my enjoyment thereof has been peaceable and undisturbed and the title to the property has never been disputed or questioned to my knowledge, nor do I know of any facts by reason of which the title to, or possession of said property might be disputed or questions, or by reason of which any claim to any of said property might be asserted adversely to me: my possession was uninterrupted and continuous, open, notorious, hostile and adverse to all others and exclusive of the right of claim of any others person or persons.
10. That there has been no buildings or improvements constructed on the property within the past two years;
11. That there are no present tenants, lessees or other parties in possession of said premises, except (if none, state "none"): _____, and the premises are being used solely for residential purposes; said property is not subject to a land contract of sale.
12. That during the time of ownership of the said premises I have conveyed no portion thereof nor done any act or allowed any act to be done which has changed the boundaries of the premises.
13. That I have allowed no encroachments on the premises by any adjoining land owners nor have I encroached upon any property of any adjoining land owner;
14. That I have allowed no easements, rights of way, continuous driveway usage, drain, sewer, gas or oil pipelines or other rights of passage to others over the premises and have no knowledge of such adverse

rights unless specifically set forth in the annexed title report;

15. That I have no knowledge of any springs, streams, rivers, ponds, or lakes bordering or running through the premises.

16. That I have no knowledge of any violation of any covenants, restrictions, or agreements affecting the premises except as set forth in the annexed title report.

17. That there are no credit line mortgages open affecting the property. In the event that there are any open credit line mortgages affecting the property I hereby cancel my right to draw against said credit line and direct that such mortgages to satisfied of record.

18. That I have knowledge of a certain survey or plot plan of the premises and I certify that no exterior alterations or additions have been made to the building shown on said survey, no additional buildings have been constructed on the premises since the date of said survey, and that said survey reflects the current status of the premises.

19. That there are no actions pending in any court that could affect the title to the premises or cause a lien thereon;

20. That this affidavit is given to the transferee of the property, to All Island Abstract, Ltd. „_____ _____and may be relied on for establishing the truth of all matters set forth herein and for documenting the non-foreign affidavit exemption to the withholding requirements of Section 1445 of the Internal Revenue Code.

21. There are no street vaults adjoining or in front of the premises. No work has been done on the premises by the City of New York nor have any demands been made by the City of New York that may result in liens from the Dept. of Rent and Housing (Emergency Repair or relocation liens), Dept. of Environmental Protection (water tap closings or related), Dept. of Health, Dept. of Building or other NYC agencies and offices.

22. That I have not received a notice to install or repair sidewalks or curbs at the premises.

23. The undersigned borrower(s) do hereby so agree, if requested by Lender or Closing agent for Lender or ALL ISLAND ABSTRACT. LTD. to fully cooperate and adjust for clerical errors, any or all loan closing documentation if deemed necessary or desirable in the reasonable discretion of Lender to enable Lender to seel, convey, seek guaranty or market said loan to any entity, including but not limited to an investor, FNMA, FHLMC, FHA or VA.

24. IF THIS IS A REFINANCE WITHIN TEN YEARS, YOU MAY BE ENTITLED TO A REDUCED PREMIUM. CONTACT THIS COMPANY IMMEDIATELY FOR DETAILS.

25. Deponent states that he has read the foregoing affidavit and knows of his own knowledge that the facts therein states are true.

_____

_____

_____

Subscribed and Sworn before me this _____ day of _____, 20_____

_____
NOTARY PUBLIC

REPORT OF CLOSING

Title closed at office of: _____

By: _____ Date: _____

DEED (Designate Kind)

By:

To:

Dated: Rec'd L. p.

Cons. $ Transfer Tax :

Insured for $

GI-FHA-CONVENTIONAL MORTGAGE (Designate Kind)

By:

To:

Dated: Rec'd L. p.

Amount $ payable in:

Mtg. Tax:

DEED (Designate Kind)

By:

To:

Dated: Rec'd L. p.

Cons. $ Transfer Tax :

Insured for $

MORTGAGE (Designate Kind)

By:

To:

Dated: Rec'd L. p.

Amount $ Mtg. Tax:

ASSIGNMENT OF MORTGAGE

By:

To:

Assigns Mortgage Recorded in L. Mp.

Dated: Rec'd L. p.

By:

To:

Assigns Mortgage Recorded in L. Mp.

Dated: Rec'd L. p.

SATISFACTION OF MORTGAGE

By:

Dated: Rec'd L. p.

Satisfies Mortgage Recorded in L. Mp.

By:

Dated: Rec'd L. p.

Satisfies Mortgage Recorded in L. Mp.

OTHER CLOSING INSTRUMENTS

PARTIES PRESENT AT CLOSING

SELLER(S):

PURCHASER(S):

ATTORNEY FOR SELLER:

Address: Phone number:

ATTORNEY FOR PURCHASER:

Address: Phone number:

ATTORNEY FOR LENDER:

Address: Phone number:

Fee Policy to be sent to (include address):

Address:

Mortgage Policy to be sent to (include address):

Address:

APPENDIX B
Record Drawing and Record of Decision

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
PRAP/ROD ROUTING SLIP

TO: Sal Ervolina, Assistant Division Director

FROM: The attached is submitted for your approval by:

NAME	INITIAL	DATE
Project Manager: Ralph Keating	RK	3/28/06
Section Chief/RHWRE: Jim Quinn	JQ	3/28/6
Bureau Director: P. David Smith	PDS	3/28/06

DATE: 3/27/2006

RE: **Site Name** Kliegman Brothers **Site Code** 241031
City Glendale **County** Queens

☐ **PRAP**

- ☐ Draft PRAP
- ☐ Clean copy of the PRAP
- ☐ Redline/Strikeout version of the PRAP
- ☐ Copies of edits to PRAP (Sal's/Dale's)
- ☐ Site Briefing Report
- ☐ NYSDOH concurrence letter
- ☐ USEPA concurrence letter

PRAP Release Approvals

Ass't Div Director: _____
Sal Ervolina

Division Director: _____
Dale A. Desnoyers

☑ **ROD** $9249 3/17 + 3/28
FINAL

- ☐ Draft ROD
- ☑ Signature-ready copy of the ROD
- ☑ Redline/Strikeout version of the ROD
- ☑ Copies of edits to ROD (Sal's/Dale's)
- ☑ Site Briefing Report
- ☑ NYSDOH concurrence letter
- ☐ USEPA concurrence letter

ROD Signoff

Ass't Div Director: _____
Sal Ervolina 3/29/06

☐ **BRIEFING**
Date: 3/24/06 **Time:** 9:45 AM **Room:** 1220

c: Dale Desnoyers
Other reviewers who are invited to Briefing

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
Site Briefing Report

Site Code	241031	**Site Name**	Kliegman Brothers		
Classification	02	**Address**	76-01 77th Avenue		
Region	2	**City**	Glendale	**Zip**	11385
Latitude	40:42:31:0	**Town**	New York City	**Project Manager**	Ralph Keating
Longitude	73:52:24:0	**County**	Queens		
Site Type	Structure			**Estimated Size**	0.85

Site Description

The Kliegman Brothers site is located in an urban area of Queens County in NYC and was formerly used as a distribution center for laundry and dry cleaning supplies and operated from 1950 through the 1990s. The property is approximately 37,000 square feet in area, of which approximately 26,000 square feet is occupied by a building and the remainder by a paved yard to the north of the building. The site is currently being used as a packaging and distribution facility for imported food products. The area surrounding this property is residential.

Remedial investigation work to date has revealed significant soil contamination from tetrachloroethene (PCE) under the building, in the north yard and in the regional groundwater. An IRM SVE system has been operating since August 2004 and has been effective in removing PCE. As of December 2005, approximately 35,000 pounds of PCE has been removed from on-site soils. Additional groundwater and air sampling was done in 2005. Eight new monitoring wells were installed to further delieate the groundwater plume leaving this site. Also, homes were sampled to determine if sub-slab air and/or indoor air has been impacted. As of December 2005, sub-slab vapor has been sampled at 37 homes and a school in the neighborhood around the Kliegman Brothers site.

PRAP for OU1 remedy was presented to the public in February 2006. Public comment period ended on March 10, 2006 and ROD was written in March 2006.

Materials Disposed at Site	**Quantity Disposed**
TETRACHLOROETHENE	unknown

Analytical Data Available for : Groundwater, Soil

Applicable Standards Exceeded for: Groundwater

Assessment of Environmental Problems

Historic site operations have contaminated soil and groundwater with tetrachloroethene. The site is located within a residential community, and the contaminated groundwater is within a primary aquifer. Based on available information for the subject facility, a consequential amount of hazardous waste has been disposed at the site, and the hazardous waste disposed constitutes a significant threat.

Assessment of Health Problems

Elevated concentrations of tetrachloroethene (PCE) exist in subsurface soil, groundwater, and soil vapor at the site. The area is served by public water, thus it is unlikely that community exposure to contaminated groundwater will occur. Contact with contaminated soils is unlikely as the site is largely occupied by a building, the paved yard to the north of the building is fenced to control trespassing, and the contaminated soils are at depth. The NYSDOH has conducted indoor air sampling at homes in the neighborhood surrounding the site. Corrective measures have been taken to minimize the intrusion of contaminated soil vapor into nearby homes and to reduce the concentration of PCE in the indoor air. A soil vapor extraction (SVE) system is operating on-site to reduce the levels of PCE in the soil vapor. Additional residential indoor air and sub-slab soil vapor sampling will be conducted to further evaluate potential indoor air impacts to homes surrounding the site and the effectiveness of the SVE system at controlling off-site migration of contaminated soil vapor.

Remedy Description and Cost

Remedy Description for Operable Unit 01

A new SVE treatment system would be installed for the additional extraction wells. The new SVE system would be designed to handle about three times the amount of extracted soil gas as the current IRM. The system would include a moisture separator, an approximately 750 SCFM blower, and two 2,000 pound carbon vessels. Extraction wells would be connected to the SVE system by underground pipe.

Development of a site management plan to address residual contamination and any use restrictions.

Imposition of an environmental easement.

Periodic certification of the institutional and engineering controls.

Total Cost	$920,000
Capital Cost	$350,000
OM&M Cost	$132,000

Issues / Recommendations

The PCE contaminated soil vapors have been found in off-site locations and residences near this site. Sub-slab and indoor air sampling that was done in February and March 2005 and more recently (Fall of 2005) have found that several homes have been impacted. Sub-slab depressurization systems have been installed on 5 homes as of the Fall of 2005.

The PRAP was written for the on-site portion of this site only (OU1) and the off-site (OU2) issues will be addressed separately. More specifically, the OU1 portion of the site is for the remediation of on-site vadose zone soil vapor contamination and PCE contaminated soils. The issues inclusive in the OU2 portion of this site, groundwater (on-site and off-site)and remaining off-site soil vapor issues are ongoing concerns that will be addressed through additional investigation work. An additional PRAP for OU2 will be developed at a later date.

The public meeting for the OU1 remedy was held on February 28, 2006 and the public comment period ended on March 10, 2006. Some comments were raised at the public meeting; however, none of the comments warrant a change in the proposed remedy. No written comments were received during the comment period. A ROD was written based upon the PRAP.

It is recommend that this ROD be approved to address the obvious source area of this problem.

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Flanigan Square, 547 River Street, Troy, New York 12180-2216

Antonia C. Novello, M.D., M.P.H., Dr.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

March 27, 2006

Mr. Dale Desnoyers, Director
Division of Environmental Remediation
NYS Dept. of Environmental Conservation
625 Broadway – 12th Floor
Albany, NY 12233-7011

Re: **Record of Decision**
Kliegman Brothers, OU-1
Site #241031
Glendale / Queens County

Dear Mr. Desnoyers:

Staff reviewed the March 2006 *Record of Decision (ROD) for Operable Unit-1* (OU-1) for the Kliegman Brothers site. OU-1 consists of the on-site soils/vadose zone. Based on that review, I understand the remedy will include an additional soil vapor extraction (SVE) system to the existing SVE system. The existing SVE system will remain in place and operational. New soil vapor extraction wells and a treatment system will be constructed and installed to enhance the current SVE system. In addition, the remedy will include a site management plan and institutional controls in the form of an environmental easement to restrict the use of groundwater and future land use to commercial, industrial, and/or restricted residential. The site management plan will include an evaluation of the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified. Periodic certification will be required to confirm that the institutional controls are in place and that the site is in compliance with the institutional controls as outlined in the ROD.

Based on the available information I concur with the remedy and believe it will be protective of public health. If you have any questions, please call Mr. Geoff Laccetti of my staff at (518) 402-7870.

Sincerely,

Steven M. Bates, Assistant Director
Bureau of Environmental Exposure Investigation

cc: G. A. Carlson, Ph.D. / A. Grey, Ph.D.
G. Litwin / G. Laccetti / file
D. Smith / J. Quinn / R. Keating – DEC, Central Office
D. Walsh – DEC, Reg. 2
J. Prudhomme - NYCDOH
B. Devine – NYSDOH, MARO
D. Greeley – NYCDEP

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Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision
Kliegman Brothers Site
Operable Unit No. 1
Glendale, Queens, New York
Site Number 2-41-031

March 2006

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* DENISE M. SHEEHAN, *Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

Kliegman Brothers Inactive Hazardous Waste Disposal Site
Operable Unit No. 1
Glendale, Queens New York
Site No. 2-41-031

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for Operable Unit 1of the Kliegman Brothers site, a Class 2 inactive hazardous waste disposal site. The selected remedial program was chosen in accordance with the New York State Environmental Conservation Law and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for Operable Unit 1of the Kliegman Brothers inactive hazardous waste disposal site, and the public's input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened releases of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and/or the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation and Feasibility Study (RI/FS) for the Kliegman Brothers site and the criteria identified for evaluation of alternatives, the NYSDEC has selected soil vapor extraction (SVE). The components of the remedy are as follows:

- A Remedial Design program will be necessary to provide the details required to implement the remedial program.

- The existing Interim Remedial Measure (IRM) - SVE system will remain in-place and continue to operate.

- New components will be added to the existing IRM remedial system including: 1) additional vapor extraction wells and 2) a SVE Treatment System.

- Development of a site management plan to address residual contamination and any use restrictions.
- Imposition of an environmental easement.
- Periodic certification of the institutional and engineering controls.
- Long term monitoring.

New York State Department of Health Acceptance

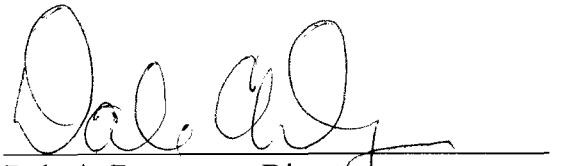
The New York State Department of Health (NYSDOH) concurs that the remedy selected for this site is protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

MAR 2 9 2006

Date



Dale A. Desnoyers, Director
Division of Environmental Remediation

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RECORD OF DECISION

Kliegman Brothers Site
Operable Unit No. 1
Glendale, Queens New York
Site No. 2-41-031
March 2006

SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), has selected this remedy for the on-site soil and soil vapor above the water table (the vadose zone) at the Kliegman Brothers Site, referred to as Operable Unit 1. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this remedy. As more fully described in Sections 3 and 5 of this document, operations of a dry cleaning supply company have resulted in the disposal of hazardous wastes, including tetrachloroethene and associated breakdown chemicals. These wastes have contaminated the soil and soil vapor at the site, and have resulted in:

- a significant threat to human health associated with exposure to contaminated indoor air;
- a significant environmental threat associated with the impacts of soil contamination to groundwater.

To eliminate or mitigate these threats, the NYSDEC has selected the following remedy:

- A Remedial Design program will be necessary to provide the details required to implement the remedial program.
- The existing Interim Remedial Measure (IRM) - SVE system will remain in-place and continue to operate.
- New components will be added to the existing IRM remedial system including: 1) additional vapor extraction wells and 2) a Soil Vapor Extraction (SVE) Treatment System.
- Development of a site management plan to address residual contamination and any use restrictions.
- Imposition of an environmental easement.
- Periodic certification of the institutional and engineering controls.

- Long term monitoring.

The selected remedy, discussed in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Kleigman Brothers Site is located in an urban setting at 76-01 77th Avenue in Queens County, New York City (Figure 1). The site is bordered to the north by the Long Island Railroad. Residences border the site to the east, west and south. This site is an area approximately 37,000 square feet, of which 26,000 is occupied by a building. A basement exists under the western portion of the building.

Operable Unit (OU) No. 1, which is the subject of this document, consists of the on-site portion of the remedy and will address on-site contaminated soils and soil vapor issues only. An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination.

The remaining operable unit (OU 2) for this site will address the groundwater both on-site and off-site as well as the soil vapor impact off-site. A study is ongoing to determine the remedy to address contaminated groundwater and soil vapor off-site.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The site was formerly owned by Kliegman Bros. Inc. This site was used as a warehouse and distribution center for laundry and dry-cleaning supplies from the 1950s through the 1990s. The site contained two 6,000 gallon above ground storage tanks (ASTs) which were used to store tetrachloroethene (PCE) (Figure 2). Tetrachloroethene is also known as perchloroethylene, PERC, or PCE. The tanks have since been removed from the property. Although these tanks are the presumed source of contamination, it is unknown if, and when, product was released or, whether contamination was due to a singly catastrophic release or a chronic leak problem. Kliegman Brothers ceased operation in 1999. The site was purchased in 2000 and is currently being used as a warehouse for an imported food distributor.

3.2: Remedial History

In June 2000, the NYSDEC first listed the site as a Class 2a site in the Registry of Inactive Hazardous Waste Disposal Sites in New York (the Registry). Class 2a is a temporary classification assigned to a site that has inadequate and/or insufficient data for inclusion in any of the other classifications. In November 2000, the NYSDEC listed the site as a Class 2 site in the

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.

There were at least six previous investigations performed at this site from 1997 through 2002. The initial investigations were performed in 1997 and 1998, respectively. These investigations comprised soil vapor collection and analysis in the area between the building and the railroad, where the PCE storage tanks were located. Additional soil vapor sampling was later performed for a prospective site owner and for the NYSDEC in 2000. All of these investigations revealed the presence of PCE, often at high concentrations.

A fifth investigation was performed in 2001 as part of a Voluntary Cleanup Program (VCP) agreement with NYSDEC, and included soils and groundwater sampling as part of a Focused Remedial Investigation/Interim Remedial Measure (FRI/IRM). The objective of the FRI/IRM was to delineate on-site soil contamination to enable design of a soil vapor extraction system or systems to remediate on-site soil. As part of the study, nine borings, SVE-1 through SVE-5 and EB-1 through EB-4 and 26 soil samples were collected from beneath the subfloor of the building, approximately 0-12 inches below the concrete floor/soil interface. (Figure 2)

Between October 2000 and August 2001, the New York State Department of Health (NYSDOH) conducted ambient air sampling in 17 residences east, west, and south of the facility. PCE vapors were detected in 16 of the 17 residences tested.

In September 2002, the site owner discontinued his participation in the VCP. Because of documented ongoing PCE vapor exposures to people in adjacent residences, the NYSDEC tasked a consultant to do an interim remedial measure (IRM) and construct a soil vapor extraction (SVE) system which began operation in August 2004.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The only PRPs for the site documented to date are the Kliegman Brothers, Inc. and, the current property owner, Arimax Realty, LLC.

The PRPs declined to implement the RI/FS at the site when requested by the NYSDEC. After the remedy is implemented, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the NYSDEC will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the state for recovery of all response costs the state has incurred.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between April 2002 to April 2003. The RI focused on both the on-site and off-site portions of this site, but this summary will generally pertain only to the on-site portions of the site (Operable Unit 1). The field activities and findings of the investigation are described in the RI report dated February 2004.

The following activities were conducted during the first phase of the RI from April 2002 to August 2002:

- Research of historical information;
- Geophysical survey to determine depth to bedrock;
- Installation of 9 soil borings and 4 monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;
- Sampling of 4 new monitoring wells;
- A survey of public and private water supply wells in the area around the site;
- Collection of 35 indoor air samples from 17 different residences using PCE badge testing method.

The second phase of the RI field activities were conducted between February 2003 to April 2003 and included:

- Installation of 5 soil borings and 5 monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;
- Sampling of 9 new and existing monitoring wells;

To determine whether the soil, groundwater, and soil vapor contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.
- Soil SCGs are based on the NYSDEC "Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels".
- Concentrations of PCE in air were evaluated using the NYSDOH draft "Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated February 2005."

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI report.

5.1.1: Site Geology and Hydrogeology

The regional geology of Queens County consists of Upper Cretaceous and Pleistocene sands, gravels, and clays which overlie southeasterly sloping bedrock. Bedrock in Queens County consists of Precambrian age, crystalline, igneous and metamorphic rocks which outcrop in northwestern Queens County, dip steeply to the southeast at a gradient of 40 to 80 feet per mile and is expected to occur at approximately 500 feet below grade at the site.

The site-specific geology was obtained from boring logs from previous subsurface investigations at the site and activities performed during this investigation. In general, beneath a fill layer (concrete or asphalt underlain by reworked native materials) of variable thickness (up to two feet), brown loose to dense, fine to coarse silty sand to sandy silt with localized sandy clay seams was observed to depths of approximately 10 feet bgs. This was underlain by brown loose to dense, fine to coarse sand with variable amounts of fine to coarse gravel to depths of 148 feet bgs. At some areas the layer could be described as an interbedded silty clay and silty fine sand.

There are six major hydrogeologic units identified in the vicinity of the site. They are in ascending order: 1) the Lloyd aquifer; 2) the Raritan confining unit; 3) the Magothy aquifer; 4) the Jameco aquifer; 5) the Gardiners Clay; and 6) the upper glacial (i.e., Pleistocene) deposits. As part of the remedial investigation field activities, only the upper glacial deposits were penetrated. However, in general, the aquifers are laterally extensive and yield significant quantities of water. The most permeable units are the sands and gravels. The two clayey units represent confining units. These are several orders of magnitude less than the sands and gravels.

The regional groundwater table occurs at the site at approximately 70 feet bgs within the upper glacial aquifer. However, perched groundwater was observed in several wells above the clay layer in the eastern portion of the site. Measurements of groundwater elevations were used to develop groundwater contour maps and generally determine the site-specific direction of groundwater flow in the perched groundwater zone, the water table aquifer, and the deeper groundwater zone approximately 30- to 40-feet below the water table. Perched water is present in the eastern portion of the site at depths of 10-12 feet bgs. The flow direction in the perched zone was somewhat variable on other dates measured, possibly due to local fluctuations in the perched zone.

In the shallow regional groundwater zone, groundwater measurements indicate that the flow direction varies. The overall groundwater flow direction was generally towards the south at a very gentle horizontal hydraulic gradient. In general, the groundwater flow direction in the shallow groundwater zone was determined to be variable, possibly due to the very gentle horizontal hydraulic gradients and seasonal fluctuations in the water table.

In the deeper groundwater zone (approximately 30- to 40-feet below the water table), the groundwater flow direction appears to be towards the southeast.

There is little to no discernible vertical hydraulic gradient observed at the paired deep and shallow groundwater wells.

5.1.2: Nature of Contamination

As described in the RI report, many soil, soil vapor, and groundwater samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contamination that exceed SCGs are volatile organic compounds (VOCs).

The primary contaminant of concern is PCE. Other VOCs of concern are the degradation products of PCE: trichloroethene (TCE), cis-1,2-dichloroethene (DCE), and vinyl chloride. Other compounds that were found include carbon tetrachloride, 1,1,1-trichloroethane (1,1,1-TCA) and chloroform.

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

Chemical concentrations are reported in parts per billion (ppb) for water, parts per million (ppm) for waste, soil, and sediment, and micrograms per cubic meter ($\mu g/m^3$) for air samples. For comparison purposes, where applicable, SCGs are provided for each medium.

Table 1 summarizes the degree of contamination for the contaminants of concern in soils, groundwater and soil vapor and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

It should be again noted that the focus of this ROD is the on-site contamination and the extent of the on-site impacts. However, due to the interrelated nature of the RI report that investigates both on-site and off-site contamination, the following discussions of the extent of contamination lists both on-site and off-site impacts. The off-site section was added to provide the reader a view of the entire affected area.

On-Site Impacts

Subsurface Soil

Soil contamination in the vicinity of the building was characterized as part of previous investigations and is primarily limited in extent to the area north of the building.

Nine borings were installed in the north yard (north parking lot) at the site in 2001 (Figure 2). Soil analytical results showed elevated levels of benzene, toluene, ethylbenzene, xylene (BTEX), tetrachloroethene (PCE), and 1,2-dichloroethene (DCE). PCE was detected most frequently, and at the highest concentrations. Several detections of PCE were above the SCG value of 1.4 ppm presented in the NYSDEC Technical Administrative Guidance Memorandum (TAGM) #4046. Results from the subsurface soils ranged from 0.018 ppm to 6,700 ppm. The borings showed a

clay layer with perched water in the eastern portion of the north yard. PCE was detected above the clay layer at concentrations above the SCG value in the eastern portion of the north yard; however, samples were not collected below the clay layer.

A total of 26 soil samples were collected from below the building. Results indicated that concentrations of PCE generally exceeded the SCG only in shallow (less than one foot below the floor) samples. PCE results were in the range from 0.03 ppm to 320 ppm.

Groundwater

Although most of the soils are covered by asphalt, groundwater has been adversely impacted by the soil contamination. The contaminated soils near the building represent a continuing source of contamination. The discussions in the section below labeled "Off-Site Impacts" presents the results of the field activities and environmental sampling data for groundwater.

Soil Vapor

An extensive onsite soil vapor survey was performed in 2000. Soil vapor results from onsite and offsite laboratory analysis are summarized in Figure 3. As shown, high concentrations of PCE were detected at all locations on site. The concentrations of PCE in soil vapor ranged from non-detectable to 165,000,000 ug/m^3.

Soil vapor data indicates that contamination is likely widespread and extends throughout the depth of the vadose zone. For example, significant quantities of VOCs have been removed by the deep (screened from 30 to 65 feet bgs) SVE well during the IRM and high PID readings were recorded at depth in some borings. It is inferred that the entire vadose zone onsite is contaminated by VOCs – mainly PCE. The estimated area of the site is 37,000 square feet and the depth to the water table is approximately 70 feet.

Additional discussions in the section below labeled "Off-Site Impacts" presents the results of the field activities and environmental sampling data for soil vapor.

Off-Site Impacts

Contaminants have been found off the Kliegman Brothers site as well. Both groundwater and soil vapor/indoor air were found to be impacted. As was mentioned in Section 2 of this ROD, a separate ROD will be written for the remaining operable unit (OU 2) to address the groundwater both on-site and off-site as well as the soil vapor impacts off-site. A brief description is listed below to provide information of known off-site impacted areas.

Groundwater was found to be contaminated in off-site areas in October 2002 when nine wells were sampled. These wells were located outside, or on the perimeter of, the Operable Unit 1 boundary. The results for PCE ranged from 1,200 ppb to 45,000 ppb and the applicable SCG (Class GA groundwater criteria is 5 ppb.) The deep groundwater aquifer, where most of the samples were taken from, is approximately 65 feet below ground surface.

Soil vapor samples were also found to be contaminated with PCE at different depths. Samples were taken at 10, 18 , and 20 feet below ground surface. Similar to the on-site soil vapor results, the highest concentration were found at 18 feet below ground surface, however, the levels found at 10 feet below ground surface were high as well. This prompted the NYSDEC to perform indoor air and subslab air sampling in residences around the Kliegman Brothers site. Several air sampling events have been conducted since 2002. In response to the sampling results, owners of 10 properties located south and west of the former Kliegman Brothers facility have been offered sub-slab depressurization systems. These systems (similar to radon removal systems) can remove contaminated air under a property preventing it from entering the building. Additional homes may be sampled in the future to determine if more properties may benefit from mitigation systems.

5.2: Interim Remedial Measure

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

A soil vapor extraction (SVE) system was installed at at the Kliegman Bros. Site as an IRM in 2004. The system utilizes three extraction wells (SVE-1, SVE-6S and SVE-6D). SVE-1 is a one-inch diameter well screened from 5 to 25 feet below ground surface (bgs). Wells SVE-6S and 6D are two-inch diameter wells screened from 5 to 25 feet bgs (6S) and 30 to 65 feet bgs (6D). SVE-6S and SVE-6D are separate wells installed at the same location. The three wells are connected through a subsurface trench to the SVE system consisting of a moisture separator, an extraction blower, and vapor phase carbon vessels. Operation of the system began on August 23, 2004. Since operation began, the SVE system has removed over 35,000 pounds of PCE from the vadose zone. Most of this removal occurred in the first three months of operation then the rate of removal dropped off dramatically. The system is presently removing PCE at a rate of between 500 to 1,000 pounds per month.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 6 of the RI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters

or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

There are potential exposure pathways associated with contaminated soil vapor and groundwater from this site.

The area is served by a public water supply, which is derived from reservoirs located in upstate New York. In addition, it is frequently tested to ensure that the water distributed to consumers complies with drinking water standards. No private supply wells have been found in the area; therefore, exposure to contaminated groundwater is not expected. Exposures could potentially occur, if someone were to install a private supply well; however, a permit would be required from the New York City Department of Environmental Protection.

Soil vapor is contaminated with volatile organic compounds. A completed exposure pathway through the inhalation of contaminated indoor air exists on-site. PCE was detected in the basement of the on-site building above the NYSDOH guidance level. Ventilation fans were installed to help circulate fresh air into the basement and lower the PCE levels. In addition, a soil vapor extraction system located on the site is operating continuously to remediate the on-site contamination. These measures minimize the potential for soil vapor intrusion. The potential for soil vapor intrusion to occur in the surrounding neighborhood is being investigated as a separate operable unit.

Exposure to contaminated soil is unlikely since it is located on-site at depth.

5.4: Summary of Environmental Impacts

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

Site contamination has impacted the groundwater resource in the overburden aquifer, however, groundwater near this site is not used as a source of drinking water.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to PCE and its degradation products (TCE, DCE, and vinyl chloride) in contaminated soils;

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

- the release on contaminants from soil vapor into indoor air through vapor intrusion.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient groundwater quality standards and

- soils SCGs.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Kliegman Brothers Site Operable Unit No. 1 were identified, screened and evaluated in the FS report which is available at the document repositories identified in Section 1.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated soils and soil vapor at the site.

Alternative 1 – No Further Action

Present Worth: *$476,000*
Capital Cost: *$0*
Annual OM&M:
(Years 1-5): *$110,000*
(Years 5-30): *$0*

This alternative would leave the site in its present condition. Operation of the existing SVE system would continue and only OM&M would be necessary. This existing SVE system will

continue to treat the western side of this site, but was not designed with an adequate area of influence to treat the eastern side of the site.

Alternative 2 – Soil Vapor Extraction (SVE)

Present Worth: *$920,000*
Capital Cost: *$350,000*
Annual OM&M:
(Years 1-5): *$132,000*
(Years 5-30): *$0*

Under this alternative, the existing IRM would remain in-place and continue to operate. In addition, new components would be added to the remediation including the following:

1. Vapor Extraction Wells: Three new well pairs would be installed in the northern yard (parking lot) near the existing building (Figure 4). The wells would be spaced about 80 feet apart based on an 80-foot radius of influence selected during the IRM design. This spacing and radius of influence provides coverage for the entire OU1 area. Two-inch diameter wells would be installed. A shallow and deep well would be installed at each of the three locations.

2. Treatment System: A new SVE treatment system would be installed for the additional extraction wells. The new system would be designed to handle about three times the amount of extracted soil vapor as the current IRM. Extraction wells would be connected to the SVE system by underground pipe. A carbon filter media would remove PCE from the soil vapors.

It is expected to take approximately 2 to 3 months to implement this alternative. Remediation of soil by SVE typically is accomplished within 2 to 10 years depending on site conditions. For this analysis, the operating phase will cease and remediation will be complete after five years.

Alternative 3 – Enhanced Soil Vapor Extraction (ESVE)

Present Worth: *$1,720,000*

Capital Cost: *$820,000*

Annual OM&M:

(Years 1-5): *$207,000*

(Years 5-30): *$0*

A conventional SVE system, such as Alternative 2, might not completely address the zone of perched water in the eastern portion of the site. Alternative 3 includes Alternative 2 (the existing IRM and additional SVE components) plus a groundwater depression system to address the perched water zone.

The groundwater depression system would operate independently of the SVE system. Its purpose is to both lower the water level in the perched water zone, thus exposing the contaminated soil to venting, and to provide soil vapor extraction from the desaturated zone. The system would extract both water and soil vapor by means of dual-phase extraction wells.

Analysis indicated that the feasibility of implementing this method strongly depends on the unknown factors of recharge and hydraulic conductivity of the perched zone. For the purpose of this description, as well as the cost estimate, it is assumed that extraction wells would be spaced every 25 feet. A pilot test would need to be performed to confirm this spacing.

Forty-eight dual phase extraction wells would be installed. The wells would be 2-inch diameter, PVC, penetrating to the bottom of the clay layer where the perched zone occurs. Wells would be equipped with a 1-foot long screen. Each well would contain a drop tube, whose opening would be placed immediately above the bottom of the screen. Drop tubes would be connected to a header pipe, terminating in a building housing a high-vacuum blower.

An additional dual phase extraction treatment system would also be installed. The system would include a high-vacuum blower, a moisture separator and carbon vessels to treat air and water.

It is expected to take approximately one year to implement this alternative. Remediation of soil by SVE typically is accomplished within 2 to 10 years depending on site conditions. For this analysis, the operating phase would cease and remediation would be complete after five years.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYSDEC has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or

implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectivness. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP have been evaluated. The responsiveness summary (Appendix A) presents the public comments received and the manner in which the NYSDEC addressed the concerns raised.

No significant public comments were received.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based on the Administrative Record (Appendix B) and the discussion presented below, the NYSDEC has selected Alternative 2, Soil Vapor Extraction as the remedy for this site. The elements of this remedy are described at the end of this section.

The selected remedy is based on the results of the RI and the evaluation of alternatives presented in the FS.

Alternative 2 was selected because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It will achieve the remediation goals for the site by removing VOCs that create the significant threat to

public health, it will remove the source of contamination to groundwater, and it will create the conditions needed to restore groundwater quality to the extent practicable.

Alternative 1 would not address the soil vapor throughout the site and thus would not comply with the threshold criteria.

Because Alternatives 2 and 3 satisfy the threshold criteria, the five balancing criteria were particularly important in selecting a final remedy for the site.

Alternatives 2 (Soil Vapor Extraction) and 3 (Enhanced Soil Vapor Extraction) both have short-term impacts. Alternative 2 would have less intrusive impact than Alternative 3 since it would involve installing less wells. In both cases, there are possible impacts to workers or the community from VOCs during drilling; however, these impacts should be easily controlled by a properly administered health and safety program. Construction would be completed in 2- to 3-months for Alternative 2 and in about 1-year for Alternative 3.

Achieving long-term effectiveness is anticipated to be accomplishable by both Alternatives 2 and 3. Alternative 3 might provide an additional level of protection; however, this would not be certain until a pilot test was completed to confirm the effectiveness of the dual-phase extraction wells and the dewatering of the perched groundwater. In both cases, little residual contamination would be expected to be left in the site soils. The monitoring of the soil vapor would continue until the soil vapor does not pose a human health threat. Once the soil sampling results were satisfactory, no further monitoring or controls would be required for OU1 soil.

Both Alternative 2 and 3 would be equally effective at reducing toxicity, mobility and volume. By removing the VOCs from the soils, the toxicity and volume of contaminated soils would be reduced. The mobility of VOCs off-site would also be greatly reduced since the source volume of on-site soils would be removed.

Alternative 3 would be more difficult to implement because much of the construction would occur inside the on-site building which is in use. Significant coordination with the site owner and interruption of the daily business activities would result in increased costs and delays in implementation of the project. Under Alternative 3, there would be increased risks to both the workers conducting the remedial activities and the workers at this business since it would involve much more intrusive work. Alternative 2 would be easier to implement since the work would be done outside the building in the parking lot.

The estimated present worth cost to implement the remedy is $920,000. The cost to construct the remedy is estimated to be $350,000 and the estimated average annual operation, maintenance, and monitoring costs for $132,000 assuming that the SVE system will be in operation for 5-years.

The elements of the selected remedy are as follows:

- A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

- The existing Interim Remedial Measure (IRM) - SVE system will remain in-place and continue to operate.

- An additional SVE treatment system and new extraction wells will be constructed and installed. The new SVE system will be designed to handle about three times the amount of extracted soil vapor as the current IRM. Extraction wells will be connected to the SVE system by underground pipe. (Figure 4)

- Development of a site management plan to: (a) address residual contaminated soils that may be excavated from the site during future redevelopment. The plan will require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) identify any use restrictions; and (d) provide for the operation and maintenance of the components of the remedy.

- Imposition of an institutional control in the form of an environmental easement that will (a) require compliance with the approved site management plan; (b) limit the use and development of the property to commercial, industrial and/or restricted residential only; (c) restrict the use of groundwater as a source of potable water, without necessary water quality treatment as determined by NYSDOH and/or the New York City Department of Environmental Protection; and (d) require the property owner to complete and submit to the NYSDEC a periodic certification.

- The property owner will provide a periodic certification, 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. This submittal will contain certification that the institutional controls and engineering controls, are still in place, allow the NYSDEC access to the site, and that nothing has occurred that will impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan.

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

- Since the remedy results in untreated hazardous waste remaining at the site, a long term monitoring program will be instituted. Monitoring of the extracted soil vapor will continue to confirm the effectiveness of the remedy. This program will allow the effectiveness of the SVE system to be monitored and will be a component of the operation, maintenance, and monitoring for the site.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- Repositories for documents pertaining to the site were established.
- A public contact list, which included nearby property owners, elected officials, local media and other interested parties, was established.
- A public meeting was held on February 28, 2006 to present and receive comments on the PRAP.
- A responsiveness summary (Appendix A) was prepared to address the comments received during the public comment period for the ROD.

TABLE 1

Nature and Extent of Contamination

1997 - 2002 (various sampling events conducted by different consultants)

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	benzene	ND - 200	0.06	2 of 20
	1,2-dichloroethylene	ND-1.2	0.25	1 of 20
	ethylbenzene	ND-65	5.5	1 of 20
	methyl chloride	ND-66	0.10	1 of 20
	tetrachloroethylene	0.018-6,700	1.4	9 of 20
	toluene	ND-39	1.5	2 of 20
	1,2,4-trimethylbenzene	ND-36	13	1 of 20
	1,3,5-trimethylbenzene	ND-14	3.3	2 of 20
	xylenes (total)	ND-191	1.2	1 of 20

SUB FLOOR SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
	1,2-dichloroethylene	ND-0.36	0.25	2 of 35
	methyl chloride	ND-14B	0.10	12 of 35
	tetrachloroethylene	0.03-320	1.4	17 of 35
	toluene	ND-2.2	1.5	1 of 35
	xylenes (total)	ND-8.7	1.2	1 of 35

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	benzene	ND-28J	1	1 of 7
	n-butylbenzene	ND-17J	5	1 of 7
	carbon tetrachloride	ND-140J	5	1 of 7
	2-chlorotoluene	ND-160J	5	3 of 7
	1,1-dichloroethylene	ND-13J	5	1 of 7
	1,2-dichloroethylene	ND-47J	5	2 of 7
	methylene chloride	ND-1,600	5	5 of 7
	n-propylbenzene	ND-110J	5	3 of 7
	tetrachloroethylene	1,200-45,000	5	7 of 7
	toluene	ND-50J	5	2 of 7
	trichloroethane	ND-75J	5	1 of 7
	1,2,4-trimethylbenzene	ND-130J	5	3 of 7
	1,3,5-trimethylbenzene	ND-140J	5	3 of 7
	trichloroethylene	ND-120J	5	1 of 7
	xylenes (total)	ND-11J	5	1 of 7

Soil vapor	Contaminants of Concern	Concentration Range Detected ($\mu g/m^3$)[a]	SCG[b] ($\mu g/m^3$)[a]	Frequency of Exceeding SCG
Compounds (VOCs)	1,1-Dichloroethene	ND-25,000	NA	NA
	cis-1,2-Dichloroethene	ND-26,200	NA	NA
	trans-1,2-Dichloroethene	ND-887,000	NA	NA
	Tetrachloroethene	ND-165,000,000	NA	NA
	Trichloroethene	ND-618,000	NA	NA
	Vinyl chloride	ND-2,1800	NA	NA

Indoor Air (Facility)	Contaminants of Concern	Concentration Range Detected ($\mu g/m^3$)[a]	SCG[b] ($\mu g/m^3$)[a]	Frequency of Exceeding SCG
	Tetrachloroethene	ND-1,587	100	2 of 36
	Trichloroethene	ND-4.2	5	0 of 36
	Vinyl chloride	ND-7	NA	NA

[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;

ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;

ug/m^3 = micrograms per cubic meter

[b] SCG = standards, criteria, and guidance values

NA = none available

Table 2

Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual OM&M (years 1-5)	Total Present Worth
No Further Action	$0	$110,000	$476,000
Soil Vapor Extraction	$350,000	$132,000	$920,000
Enhanced Soil Vapor Extraction	$820,000	$207,000	$1,720,000

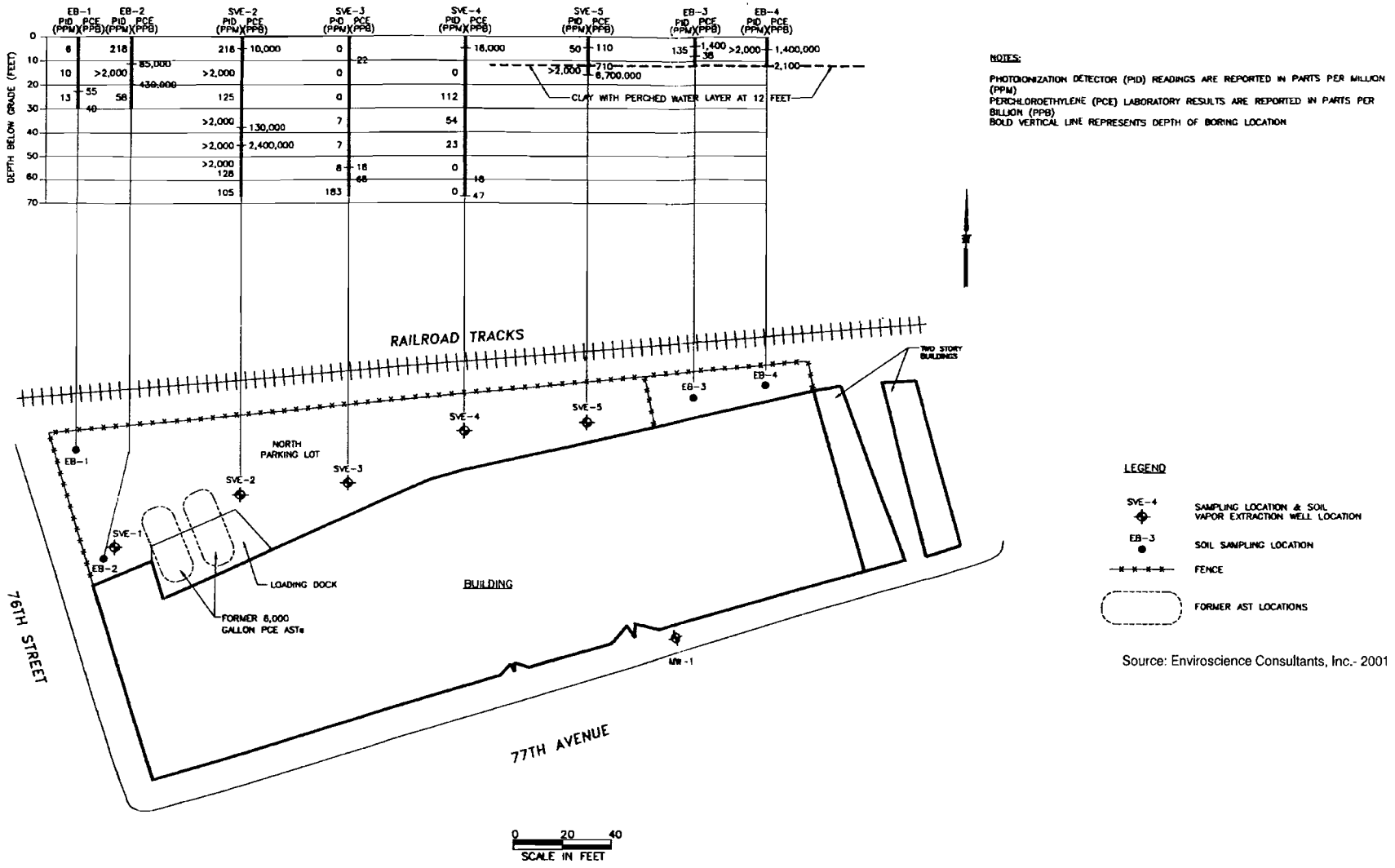
N:\11171964.00000\DB\GIS\site.apr SITE LOCATION
10/7/2005

URS

KLIEGMAN BROTHERS
SITE LOCATION MAP

FIGURE 1

AG18220A-035971-110705-SH



NOTES:

PHOTOIONIZATION DETECTOR (PID) READINGS ARE REPORTED IN PARTS PER MILLION (PPM)
PERCHLOROETHYLENE (PCE) LABORATORY RESULTS ARE REPORTED IN PARTS PER BILLION (PPB)
BOLD VERTICAL LINE REPRESENTS DEPTH OF BORING LOCATION

LEGEND

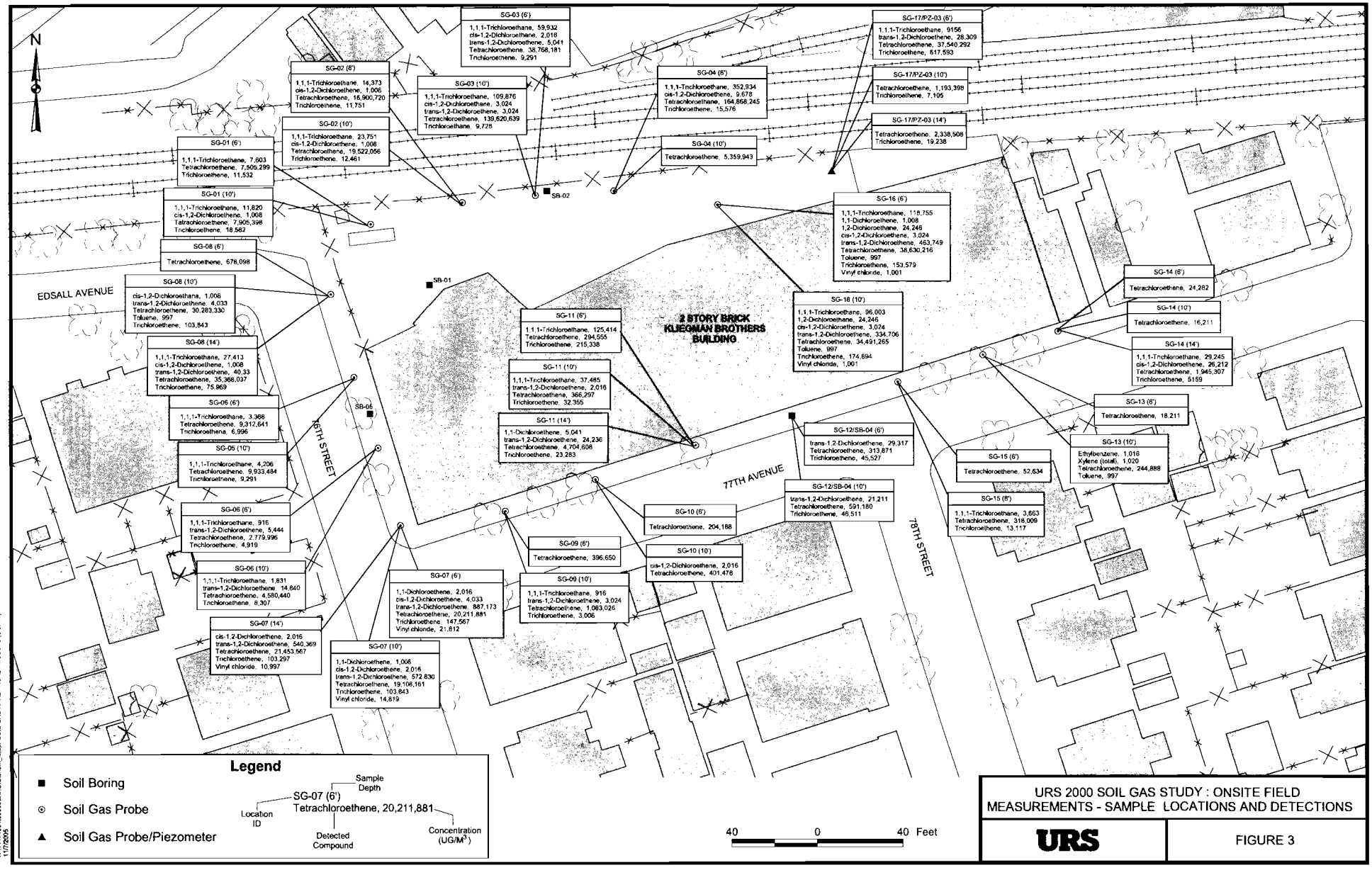
- SVE-4 — SAMPLING LOCATION & SOIL VAPOR EXTRACTION WELL LOCATION
- EB-3 — SOIL SAMPLING LOCATION
- FENCE
- FORMER AST LOCATIONS

Source: Enviroscience Consultants, Inc.- 2001

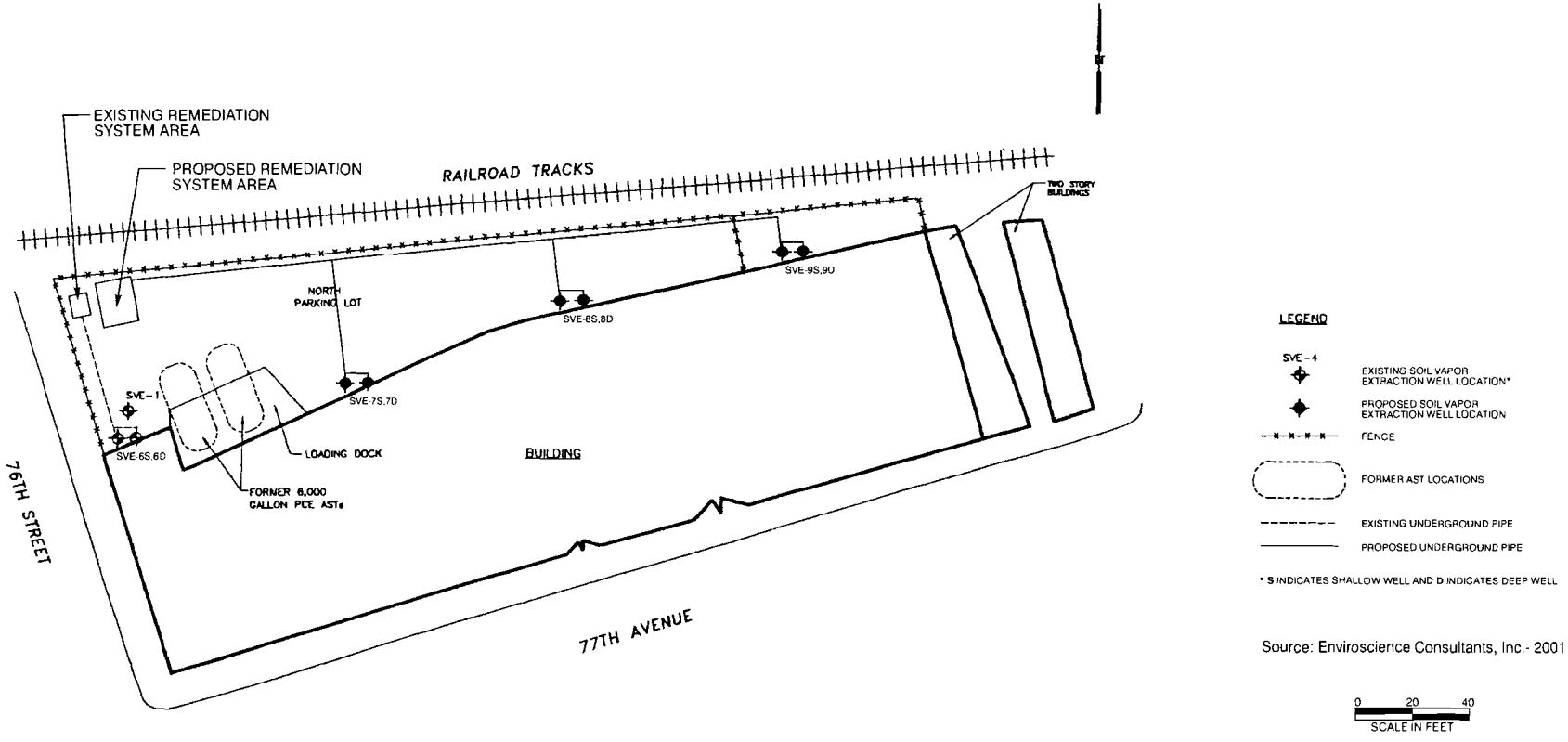
URS

ABOVE GROUND STORAGE TANK LOCATIONS AND ON-SITE SOIL BORINGS

FIGURE 2


N
SG-03 (6')
1,1,1-Trichloroethane, 59,932
cis-1,2-Dichloroethane, 2,016
trans-1,2-Dichloroethene, 5,041
Tetrachloroethene, 38,768,181
Trichloroethene, 9,291
SG-17/PZ-03 (6')
1,1,1-Trichloroethane, 9156
trans-1,2-Dichloroethene, 28,309
Tetrachloroethene, 37,540,292
Trichloroethene, 617,593
SG-02 (8')
1,1,1-Trichloroethane, 14,373
cis-1,2-Dichloroethene, 1,008
Tetrachloroethene, 16,960,720
Trichloroethene, 11,751
SG-03 (10')
1,1,1-Trichloroethane, 109,876
cis-1,2-Dichloroethene, 3,024
trans-1,2-Dichloroethene, 3,024
Tetrachloroethene, 139,620,639
Trichloroethene, 9,728
SG-04 (6')
1,1,1-Trichloroethane, 352,934
cis-1,2-Dichloroethene, 9,678
Tetrachloroethene, 164,868,245
Trichloroethene, 15,576
SG-17/PZ-03 (10')
Tetrachloroethene, 1,193,398
Trichloroethene, 7,105
SG-02 (10')
1,1,1-Trichloroethane, 23,751
cis-1,2-Dichloroethene, 1,008
Tetrachloroethene, 19,522,056
Trichloroethene, 12,461
SG-17/PZ-03 (14')
Tetrachloroethene, 2,338,508
Trichloroethene, 19,238
SG-01 (6')
1,1,1-Trichloroethane, 7,603
Tetrachloroethene, 7,505,299
Trichloroethene, 11,532
SG-04 (10')
Tetrachloroethene, 5,359,943
SB-02
SG-01 (10')
1,1,1-Trichloroethane, 11,820
cis-1,2-Dichloroethene, 1,008
Tetrachloroethene, 7,905,398
Trichloroethene, 18,582
SG-16 (6')
1,1,1-Trichloroethane, 118,755
1,1-Dichloroethene, 1,008
1,2-Dichloroethane, 24,246
cis-1,2-Dichloroethene, 3,024
trans-1,2-Dichloroethene, 463,749
Tetrachloroethene, 38,630,216
Toluene, 997
Trichloroethene, 153,579
Vinyl chloride, 1,001
SG-08 (6')
Tetrachloroethene, 678,098
SB-01
SG-08 (10')
cis-1,2-Dichloroethene, 1,008
trans-1,2-Dichloroethene, 4,033
Tetrachloroethene, 30,283,330
Toluene, 997
Trichloroethene, 103,843
EDSALL AVENUE
SG-11 (6')
1,1,1-Trichloroethane, 125,414
Tetrachloroethene, 294,555
Trichloroethene, 215,338
2 STORY BRICK
KLIEGMAN BROTHERS
BUILDING
SG-18 (10')
1,1,1-Trichloroethane, 96,003
1,2-Dichloroethane, 24,246
cis-1,2-Dichloroethene, 3,024
trans-1,2-Dichloroethene, 334,706
Tetrachloroethene, 34,491,265
Toluene, 997
Trichloroethene, 174,894
Vinyl chloride, 1,001
SG-14 (6')
Tetrachloroethene, 24,282
SG-14 (10')
Tetrachloroethene, 16,211
SG-14 (14')
1,1,1-Trichloroethane, 29,245
cis-1,2-Dichloroethene, 26,212
Tetrachloroethene, 1,945,307
Trichloroethene, 5159
SG-08 (14')
1,1,1-Trichloroethane, 27,413
cis-1,2-Dichloroethene, 1,008
trans-1,2-Dichloroethene, 40,33
Tetrachloroethene, 35,368,037
Trichloroethene, 75,969
SG-11 (10')
1,1,1-Trichloroethane, 37,485
trans-1,2-Dichloroethene, 2,016
Tetrachloroethene, 366,297
Trichloroethene, 32,355
SG-13 (6')
Tetrachloroethene, 18,211
SG-06 (6')
1,1,1-Trichloroethane, 3,368
Tetrachloroethene, 9,312,641
Trichloroethene, 6,996
SB-05
16TH STREET
SG-11 (14')
1,1-Dichloroethene, 5,041
trans-1,2-Dichloroethene, 24,236
Tetrachloroethene, 4,704,608
Trichloroethene, 23,283
SG-12/SB-04 (6')
trans-1,2-Dichloroethene, 29,317
Tetrachloroethene, 313,871
Trichloroethene, 45,527
SG-13 (10')
Ethylbenzene, 1,016
Xylene (total), 1,020
Tetrachloroethene, 244,888
Toluene, 997
SG-05 (10')
1,1,1-Trichloroethane, 4,206
Tetrachloroethene, 9,933,484
Trichloroethene, 9,291
77TH AVENUE
SG-15 (6')
Tetrachloroethene, 52,634
SG-12/SB-04 (10')
trans-1,2-Dichloroethene, 21,211
Tetrachloroethene, 591,180
Trichloroethene, 46,511
SG-15 (8')
1,1,1-Trichloroethane, 3,663
Tetrachloroethene, 318,009
Trichloroethene, 13,117
SG-06 (6')
1,1,1-Trichloroethane, 916
trans-1,2-Dichloroethene, 5,444
Tetrachloroethene, 2,779,996
Trichloroethene, 4,919
SG-10 (6')
Tetrachloroethene, 204,188
78TH STREET
SG-09 (6')
Tetrachloroethene, 396,650
SG-10 (10')
cis-1,2-Dichloroethene, 2,016
Tetrachloroethene, 401,478
SG-06 (10')
1,1,1-Trichloroethane, 1,831
trans-1,2-Dichloroethene, 14,840
Tetrachloroethene, 4,580,440
Trichloroethene, 8,307
SG-07 (6')
1,1-Dichloroethene, 2,016
cis-1,2-Dichloroethene, 4,033
trans-1,2-Dichloroethene, 887,173
Tetrachloroethene, 20,211,881
Trichloroethene, 147,567
Vinyl chloride, 21,812
SG-09 (10')
1,1,1-Trichloroethane, 916
trans-1,2-Dichloroethene, 3,024
Tetrachloroethene, 1,063,026
Trichloroethene, 3,006
SG-07 (14')
cis-1,2-Dichloroethene, 2,016
trans-1,2-Dichloroethene, 540,369
Tetrachloroethene, 21,453,567
Trichloroethene, 103,297
Vinyl chloride, 10,997
SG-07 (10')
1,1-Dichloroethene, 1,008
cis-1,2-Dichloroethene, 2,016
trans-1,2-Dichloroethene, 572,830
Tetrachloroethene, 19,106,161
Trichloroethene, 103,843
Vinyl chloride, 14,819
Legend
Soil Boring
Soil Gas Probe
Soil Gas Probe/Piezometer
Sample Depth
SG-07 (6')
Tetrachloroethene, 20,211,881
Location ID
Detected Compound
Concentration (UG/M3)
40 0 40 Feet
URS 2000 SOIL GAS STUDY : ONSITE FIELD MEASUREMENTS - SAMPLE LOCATIONS AND DETECTIONS
URS
FIGURE 3
N:\11\7\7964.00000\DWG\SVchem_fs.apr SOIL GAS ANALYTICAL RESULTS (UG/M3)
1/7/2005

AG190634-1171964-110705-SH



URS	CONCEPTUAL REMEDY	FIGURE 4

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Kliegman Brothers

Operable Unit No. 1

Glendale, Queens New York

Site No. 2-41-031

The Proposed Remedial Action Plan (PRAP) for the Kliegman Brothers site operable unit 1, was prepared by the New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 9, 2006. The PRAP outlined the remedial measure proposed for the contaminated soil and soil vapor at the Kliegman Brothers site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on February 28, 2006, which included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on March 10, 2006.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the NYSDEC's responses:

COMMENT 1: When did the contamination begin? How long has the contamination been going on?

RESPONSE 1: The Kliegman Brothers operated the dry cleaning supply company at this location from 1950 to 1999 and tetrachloroethene (PCE) could have been released at any time during that period of operations; however, the exact date and time of a release(s) are not known. The NYSDEC does not know if a single large spill event occurred or if there was an ongoing leak of PCE.

COMMENT 2: Did they dump unused PCE in tanks or directly into the soil/water?

RESPONSE 2: As mentioned in the response 1, the NYSDEC does not know exactly how the PCE contamination entered into the environment. The Kliegman Brothers operation may have involved washing equipment that contained residual PCE and dumping the waste onto the ground, but there is no record of this.

COMMENT 3: Can confined PCE explode?

RESPONSE 3: No, PCE is a nonflammable liquid at room temperature

COMMENT 4: What could happen if PCE is not addressed?

RESPONSE 4: If not addressed, the PCE will continue to seep through the ground and into the groundwater. Also, if the source of PCE contamination on-site is not addressed, PCE vapors will continue to migrate off-site.

COMMENT 5: When will we know test results from specific wells?

RESPONSE 5: The results from sampling the groundwater monitoring wells have been released and were contained in the Remedial Investigation report dated February 2004. A copy of this report is located in the document repository - the Glendale branch of the Queens Borough Public Library. Additional reports will be added to the document repository in the future as they are made available for public release.

COMMENT 6: Will the new system be located inside the former Kliegman Brothers building? How will the new soil vapor extraction (SVE) system be protected from vandals?

RESPONSE 6: The NYSDEC plans to locate the new SVE system inside the property of the former Kliegman Brothers site. The exact location will be determined in the remedial design phase of this project; however, the current conceptualized location for the SVE system is the northern part of the parking lot of the existing business. The existing system is also located inside this property in the western portion of the site. The locations of the existing system and the proposed system are protected from vandals by the fence and security system of the existing business.

COMMENT 7: Why would the enhanced SVE alternative require an increase from 10 wells to 50 to 100 wells on-site?

RESPONSE 7: The enhanced SVE alternative (Alternative 3) would operate separately from the SVE and its purpose is to both lower the water table in the perched water zone, thus exposing the soil to allow soil vapor extraction from this newly desaturated zone. Since the implementation of this alternative depends on unknown factors such as recharge and hydraulic conductivity, the exact number of wells that would be required to dewater the perched zone would be determined by a pilot test. Although we know that many more wells would be necessary to implement this alternative, we do not know the exact number.

COMMENT 8: Did you consider any other alternatives other than SVE system?

What is the effectiveness of the existing SVE system?

RESPONSE 8: Since the existing SVE system is working well at removing PCE contamination from this site, potential site-wide remedial approaches were focused on SVE. There were two alternatives considered in addition to the no action alternative.

The existing SVE system began operation in August 2004. As of December 2005, the system has removed almost 35,000 pounds of PCE. The removal rate was very high

initially, but has dropped to about 500 pounds per month since the areas of highest PCE concentrations were removed. It is expected that the new systems located in other parts of this property will have similar operational characteristics with a higher removal rate initially and a gradual decreasing removal rate.

COMMENT 9: What enforcement action is being taken against the responsible party? Who is responsible and how to contact? Who can I sue for damages or a class action law suit?

RESPONSE 9: The NYSDEC did a search for a viable responsibly party prior to referring the site for investigation using State Superfund money. The former owner of record, Kliegman Brothers, Inc., is listed as a bankrupt business entity. Records indicate that the Kliegman Brothers, Inc. operated a distribution center for laundry and dry cleaning supplies business on this site and is the responsible owner/operator. The current owner is also listed as a potentially responsible party by being the owner of record of this property. After the remediation is complete, the NYSDEC will seek cost recovery, if possible, for costs incurred by the State. If litigation to recover state costs is necessary, the NYSDEC will seek the assistance of the Attorney General to seek cost recovery.

The NYSDEC recommends that parties who think they have been injured by the site to consult with their attorneys regarding legal remedies against any responsible parties.

COMMENT 10: Were there any violations given by NYCDEP or FDNY during the later years (1990's) of operations of the business at this location?

RESPONSE 10: There are no known violations issued by the NYCDEP or the FDNY during operations by Kliegman Brothers, Inc.

COMMENT 11: When will the construction begin of the new SVE systems?

RESPONSE 11: The next steps in this process will be to: begin the remedial design phase which will determine the specific layout of the piping network; design an appropriate sized SVE system to draw out the PCE contamination across the site; and plan the construction of the system. It is planned that the system be constructed within a year from the date of the Record of Decision.

COMMENT 12: How does this problem effect residents trying to sell their homes?

RESPONSE 12: The NYSDEC is not involved in assessing property values or impact to property transactions.

COMMENT 13: What are the reasons given by the current owner of the site to back out of participation of the cleanup process?

RESPONSE 13: The current owner entered into a Voluntary Agreement to investigate the site environmental conditions. There is no State mandate that a Volunteer complete an investigation or remediation. The current owner signed the Voluntary Agreement in

October 2000 and terminated the Agreement in October 2002. The NYSDEC began it's investigation of the on-site conditions in October 2002.

COMMENT 14: Is the NYS Department of Health (NYSDOH) doing any studies of local cancer rates? How many people contracted cancer and from what blocks?

RESPONSE 14: Currently, there are no plans for a cancer study specifically for the area near the Kliegman Brothers site. However, the Department of Health, through the Cancer Surveillance Improvement Initiative, has developed maps that illustrate the rate of certain types of cancer at the zip code level. The maps show the comparison of the actual cancer incidence for individual zip codes with the expected cancer incidence of this type of cancer for the zip code. The maps are available on the NYSDOH website at http://www.health.state.ny.us/nysdoh/cancer/csii/nyscsii.htm. By law, New York State must keep identifying information about individuals with cancer confidential. To protect their privacy, small geographical areas such as a neighborhood or city block where each person with cancer lives is not public information.

COMMENT 15: How do we find out what is present in our bodies? What tests are available to determine we were exposed to PCE?

RESPONSE 15: If you are concerned about exposure to PCE, you should speak with your physician regarding your concerns. There are staff at the Center for Environmental Health that a physician may speak with to determine what tests are available to detect PCE in the body.

COMMENT 16: What are the health hazards of exposure to PCE?

RESPONSE 16: To date, sampling has not shown levels of PCE in air that would be expected to cause health effects. Occupational studies of workers exposed long-term to 50,000 - 80,000 mcg/m^3 of PCE showed reduced scores on behavioral tests and biochemical changes in blood and urine indicative of liver and kidney damage. A non-occupational study included adults living near dry cleaners for 9 - 20 years and the average level of PCE was 5,000 mcg/m^3. This study showed reduced scores on behavioral test, but effects were small. A study conducted with volunteers exposed to PCE at levels of 350,000 and 700,000 mcg/m^3 for four to eight hours, respectively, showed central nervous system symptoms such as dizziness, headache, sleepiness, and lightheadedness. Effects disappeared soon after exposure ended.

COMMENT 17: Could the chemical be absorbed through old lead water mains?

RESPONSE 17: No, water pressure from inside a water supply pipe would prevent vapors or groundwater from entering inside a pipe.

COMMENT 18: Why is there a food storage/processing facility located on the worst part of the site? Why wasn't this prohibited?

RESPONSE 18: This issue was investigated previously by the NYS Department of Agriculture and Markets, which regulates food processing facilities. Samples of cheese and oil were collected and analyzed by the Food and Drug Administration. It was determined that the food processing business is not impacted by the PCE contamination beneath the building.

No written comments were received during the comment period.

APPENDIX B

Administrative Record

Administrative Record

Kliegman Brothers
Operable Unit No. 1
Site No. 2-41-031

1. Proposed Remedial Action Plan for the Kliegman Brothers site, Operable Unit No. 1, dated February 2006, prepared by the NYSDEC.

2. "Remedial Investigation/Feasibility Study Work Plan"; Project Management Work Plan Amendment No. 1, February 2003, prepared by URS Corporate Group Consultants.

3. "Remedial Investigation/Feasibility Study Project"; Remedial Investigation Report, February 2004, prepared by URS Corporation.

4. "Remedial Investigation/Feasibility Study Project"; Focused Feasibility Study Report, October 2005, prepared by URS Corporation.

5. "Operation and Maintenance Manual and As-Built Drawings for Soil Vapor Extraction System"; Kliegman Bros. Site, Queens County, Site #2-41-031, May 12, 2003, prepared by Envirotrac Ltd.

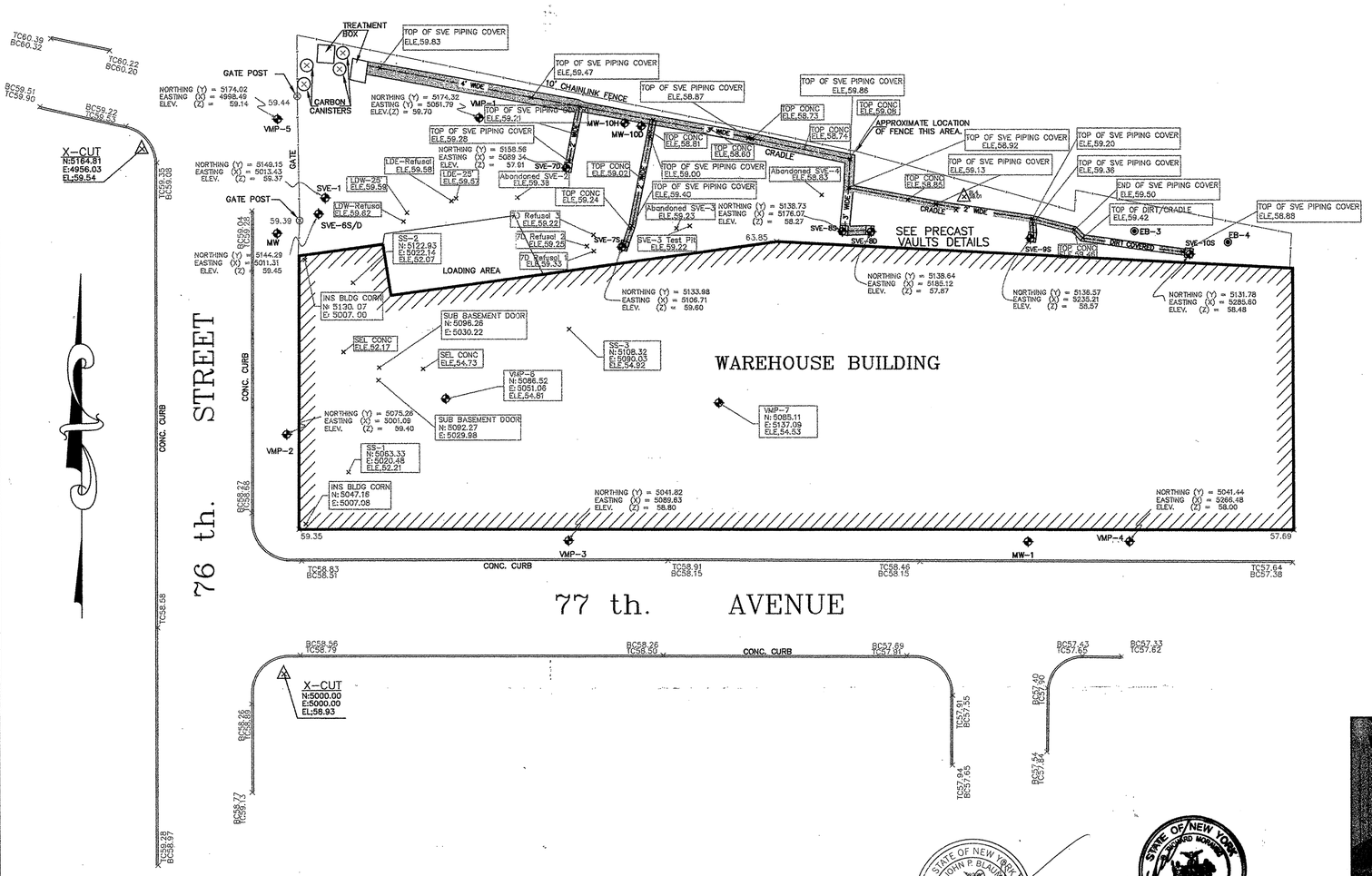
6. "Operation and Monitoring Monthly Report, Soil Vapor Extraction System, Interim Remedial Measure, for the Period November 1, 2005-December 8, 2005"; Kliegman Brothers, prepared by URS Corporation.

Cost Information

7. "Remedial Investigation/Feasibility Study Project - Project Management Work Plan - Rebudget", Work Assignment D003825-37.2A, December 2005, prepared by URS Corporation.

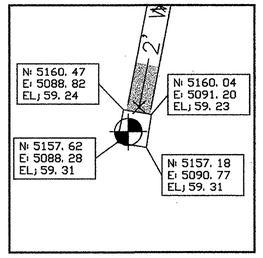
8. "Immediation Response Work Assignment, Project Management Work Plan/Budget Estimate, Amendment No. 2", Work Assignment D003825-39.2, May 2004, prepared by URS Corporation.

9. "Project Management Work Plan/Budget Estimate, Amendment No. 1 for Soil Vapor Extraction, Operaton and Maintenance, Kliegman Bros.", Work Assignment D003825-49, November 2004, prepared by URS Corporation.

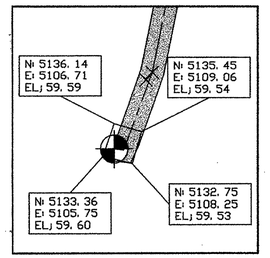


PRECAST VAULTS : DETAILS

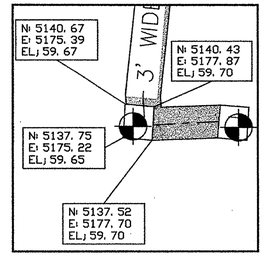
SCALE 1"=6'



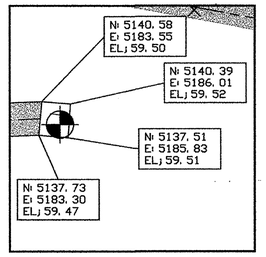
SVE-7D



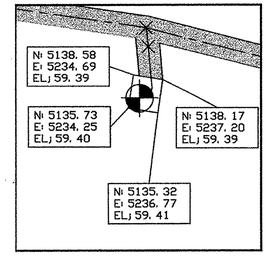
SVE-7S



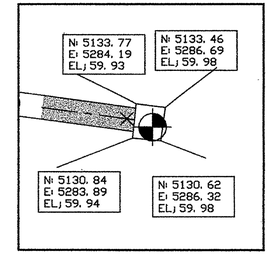
SVE-8S



SVE-8D



SVE-9S



SVE-10S

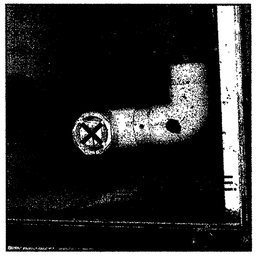
EXISTING CONDITION VIEWS

SCALE 1"=6'

SOUTH VIEW
76th. STREET

EAST VIEW
77th. AVENUE

EAST VIEW
77th. AVENUE



TOP VIEW : EXISTING CONDITIONS
SVE-7S SIMILAR TO ALL

WEST VIEW
GATE ENTRANCE

WEST VIEW
TREATMENT BOX

EAST VIEW
SVE-7S

NOTES:

1.– HORIZONTAL DATUM IS ASSUMED,BASED ON SITE SURVEY CONTROL INDICATED.

2.– VERTICAL DATUM IS BOROUGH QUEENS TOPOGRAPHICAL BUREAU.

3.– ANY ALTERATION OR ADDITION TO THIS SURVEY IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW, EXCEPT AS PER SECTION 7209–SUBDIVISION 2.

REFERENCES:

1.– SYSTEM PIPING LAYOUT GWTT JOB NO: 11–1404, PREPARED FOR GROUND/WATER TREATMENT & TECHNOLOGY, DATED OCT 2007, BY URS CORPORATION.

LEGEND:

SVE ⊕	VAPOR WELL LOCATION
EB ◉	SOIL SAMPLING WELL
═══	CONCRETE CURB
——·—·—·——	CHAINLINK FENCE
TCxx.xxx	TOP OF CURB
BCxx.xxx	BOTTOM OF CURB
× xx.xxx	SPOT ELEVATION
N:xxxx.xx E:xxxx.xx EL:xx.xxx	BASELINE COORDINATES

0′ 20′ 40′ 60′

GRAPHIC SCALE

ALL MEASUREMENTS ARE U.S. SURVEY FEET

STATE OF NEW YORK JOHN P. BLAUM LICENSED PROFESSIONAL ENGINEER No. 085079

2-22-11

STATE OF NEW YORK RICHARD MORANO 049917 LICENSED LAND SURVEYOR

NO.	DATE	DESCRIPTION	APPR'D.
6	7/28/08	CLIENT'S COMMENTS	N.E.B.
5	7/22/08	CLIENT'S COMMENTS	N.E.B.
4	7/10/08	GENERAL COMMENTS & ELEVATIONS	N.E.B.
3	3/05/08	CLIENT'S COMMENTS	N.E.B.
2	2/07/08	CLIENT'S COMMENTS	N.E.B.
1	1/23/08	CLIENT'S COMMENTS	N.E.B.

REVISIONS

DRAWN BY: S.I.P.

CHECKED BY:N.E.B.

SCALE: 1"=20'

HIRANI ENGINEERING & LAND SURVEYING, P.C.
30 JERICHO EXECUTIVE PLAZA, SUITE 200C
JERICHO, NEW YORK 11753
F (516) 248-1010 T (516) 248-9018

HIRANI GROUP

OWNER: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

CONTRACTOR: GROUND/WATER TREATMENT & TECHNOLOGY, INC.

PROJECT: NYSDEC SITE 2–41–031 GLENDALE QUEENS

SUBJECT: MONITORING WELLS SURVEY
KLIEGMAN BROTHERS SITE

DATE DRAWN: 12/14/2007
DATE SURVEYED: 12/12/07–06/24/08

JOB #: ST 07 2399
SHEET NO: 1 OF 1

G:\Projects\Surveying\GROUND WATER TREAT TECH\SENT TO CLIENT 1-18-08\7-28-08\Kliegman Bros site MONITORING.dwg, 8/29/2008 9:34:18 AM, \\pmfp-srv1\HP 1050C Plotter

APPENDIX C
Operation and Maintenance Plan (on CD)

SOIL VAPOR EXTRACTION SYSTEM

Operation and Maintenance Manual

(Revised Sections As Noted)

Kliegman Brothers Site OU#1 Remedial Action
Town of Glendale
Queens County, New York

Prepared For:

Camp, Dresser, McKee, Inc.
15 Cornell Rd
Latham, NY 12110

March 2008

Prepared By:

GROUND/WATER TREATMENT & TECHNOLOGY, INC.

PO Box 1174
Denville, NJ 07834

GWTT Project No.: 11-1404

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LIST OF DRAWINGS

LIST OF ATTACHMENTS

APPENDICES

1.0 PART 1 – SYSTEM BACKGROUND

1.1 Directory for Construction & Maintenance

The personnel, companies and associated responsibilities for the Kliegman Brothers OU#1 SVE system are as follows:

Name	Company/Organization	Contact Information
Jon Sundquist	URS Corporation	jon_sundquist@urscorp.com
David Chiusano	NYSDEC	O: (518) 402-9814 C: (518) 878-4831 F: (518) 402-9819 djchiusa@gw.dec.state.ny.us
Frank Capito	CDM Woodbury	C: (516) 864-3026 capitofd@cdm.com
Frank Robinson	CDM Woodbury	C: (631) 553-5785 robinsonf@cdm.com
Phil Dixon	CDM Woodbury	O: (516) 496-8400 Ext: 3932 F: (516) 496-8864 dixonpj@cdm.com
John Blaum	CDM Lathan	O: (518) 782-4509 C: (518) 369-1733 F: (518) 782-4509 blaumjp@cdm.com
Patrick Hunnewell	GWTT Wharton	O: (973) 983-0901 Ext: 15 F: (973) 983-0903 C: (973) 224-4122 phunnewell@gwttinc.com
Eugene Snyder	GWTT Wharton	C: (973) 477-5753 gsnydergwtt@yahoo.com
Robert Kunzel	GWTT Wharton	O: (973) 983-0901 Ext: 12 C: (973) 476-8293 rkunzel@gwttinc.com
George White	GWTT Wharton	O: (973) 983-0901 Ext: 23 C: (201) 919-2729 gwhite@gwttinc.com

Jon Sundquist from URS Corporation served as the representative for the design team, and answered any technical questions which arose during bidding, submittals and the actual construction process.

David Chiusano from NYSDEC served as the project manager for the DEC on this task, and oversaw the correlation of the design, bidding, construction management and construction/installation of this project.

CDM served as the construction manager for this project. John Blaum was the lead representative for CDM, and handled all primary communications with GWTT on submittal reviews, correspondence, potential change orders (PCOs), etc. Frank Capito and Phil Dixon served as the field engineers and provided construction oversight on behalf of NYSDEC.

GWTT was the contractor selected to complete the installation of the SVE system. Patrick Hunnewell served as the project manager, and was responsible for submittals, primary QA/QC, final deliverables, PCOs, and communication with NYSDEC and CDM. Gene Snyder served as the superintendent, and oversaw the construction and proper implementation of the design, on-site health and safety and security, daily logs, and operation of the system during the 2-week start-up and 10-week operate. George White served as the Sample Compliance Officer for GWTT, and reviewed all analytical requirements and QA/QC provided by the laboratory(s) before final submission to NYSDEC and CDM.

1.2 Purpose & Description of the Treatment System

In accordance with the New York State Department of Environmental Conservation's (NYSDEC) specifications provided by URS Corporation, GWTT has installed a soil vapor extraction (SVE) treatment system for the Kliegman Brothers OU#1 Site (Project Site # 2-31-031) located in Glendale, NY at 76-01 77th Avenue. GWTT has provided a new SVE system that is to serve as an upgrade to the existing SVE system installed by URS in 2003. GWTT has connected the two systems, and they now serve in conjunction with one another for the purpose of remediating the entire vadose zone that is contaminated with VOCs – mainly perchloroethylene (PCE). The new SVE system provided by GWTT is designed to remediate soil gas containing VOC vapors at a maximum of 520-scfm with both new regenerative blowers in operation. This process is accomplished by using these regenerative blowers to create a vacuum within the wells causing the VOCs to "evaporate" and flow through the remediation system. The extracted vapor proceeds through a moisture separator, which is designed to dry the air flow, and is eventually piped to and treated by two (2) 1,000-lb vapor phase carbon units (final system) before being discharged into the atmosphere. The increased airflow through the subsurface can also stimulate biodegradation of some of the less volatile contaminants.

1.3 Operation & Managerial Responsibility

During the two week start-up period, and the subsequent 10-week operation period, GWTT will maintain both the new SVE and the existing URS SVE systems. GWTT will maintain the recorded data in accordance with Table 1 (Progress Monitoring for Both SVE Systems) and present the data for the 2-week start-up and 10-week operate in accordance with Table 2 (Start-Up and Operate Period Monitoring Tables). After one week of operation during the start-up period, GWTT will perform the required radius of influent test. The data tabulated during this test will be presented in Table 3.

During the two week start-up and ten week operate periods, the system will be maintained by a technician from GWTT. Currently, that technician is scheduled to be Gene Snyder. GWTT will notify NYSDEC and CDM of any change in personnel prior to doing so.

After the 10-week operate period is concluded, GWTT will hold a 2-day training seminar for employees of NYSDEC and CDM. After the training is completed, it is anticipated that NYSDEC and/or CDM will take over operation and maintenance activities of both systems.

1.4 Discharge Permits & Operating Standards

Any water that accumulates in the knock-out tank of either the new or existing SVE systems will be manually pumped to a 55-gallon open top steel condensate storage drum, that will be maintained on site. Condensate water is the only liquid that should be generated during the operation of these systems. The condensate water drum will be disposed of off-site as a hazardous waste, in accordance with the approved Waste Disposal Plan. There is no discharge requirement to local storm or sanitary sewer, and therefore no permit requirement. A copy of the final air permit for this system will be provided in Attachment 1 of the final O&M manual.

The performance objectives of the new SVE system are as follows:

- The SVE system extracts and treats soil gas containing VOC vapors.
- The SVE system processes and maintains a minimum of 520-scfm of soil gas with both new regenerative blowers in operation.
- The SVE system produces and maintains a minimum vacuum of 10 inches water column (in. w.c.) at each new extraction well head when all wells are connected to the system.

The performance standards for both systems are as follows:

- Emitted soil gas from both SVE systems complies with the substantive NYSDEC air discharge requirements as identified in "DAR-1 (Air Guide 1) – Guidelines for the Control of Ambient Air Contaminants" before being discharged to the atmosphere. To ensure that the systems meet these requirements, GWTT will monitored the discharge from both vapor phase carbon systems.
- Water (condensate) generated by both SVE systems will be properly disposed of by GWTT in accordance with the approved Waste Disposal Plan.
- GWTT has modified the construction and/or operation of both SVE systems as necessary to meet the performance standards, in accordance with the design drawings and specifications provided by URS.

The following items have been incorporated, or monitored, for noise abatement for the new SVE system:

- Blowers have been equipped with intake and discharge silencers.
- Sound from each new generative blower does not exceed 70 dBA at a distance of 3'- 0" from the blower housing.
- SVE system operation complies with all local noise ordinances, including the provisions of Section 24-216(b) of the Administrative Code of New York City. Devices and activities shall be operated, conducted, constructed, or manufactured without causing a violation of the Administrative Code.
- Sound levels are attenuated to levels that permit work without special hearing protection outside the enclosure.
- Vibration dampening supports are installed between the blowers and the supporting structures, where possible.

1.5 Description of Individual Processes

The well and piping layout for the SVE shown on the URS Site Plan and implemented by GWTT is designed with consideration taken for maximum radius of influent and effective remediation of the site.

The SVE wells are connected to subsurface 4-in SDR11 HDPE piping routed individually from the wells to just east of the hot box enclosure. At each new SVE well, a precast concrete vault with aluminum H20 spring assist door was installed for access to the well. Above ground, the HDPE transitions to Sch 80 PVC pipe using flanges. Above ground, the six individual lines are combined into three different manifolds. Once inside the enclosure, Sch 80 PVC pipe and valves are used on the vacuum side of the blowers for process piping components. On the discharge side of the blowers, Sch 80 CPVC pipe and fittings, with bronze valves, are used for consideration of temperature generated by the blower at the discharge point. Once outside the enclosure, the piping is transitioned back to Sch 80 PVC and eventually 150-psi flexible pressure hose.

The new SVE system consists of the following:

- Two 10-Hp, 208-volt, 3-phase regenerative blowers for well vacuum and vapor extraction.
- One 40-gallon primary knock-out tank for air/moisture separation.
- One 1-Hp, 208-volt, 3-phase progressing cavity pump to drain the knock-out.
- Two 1,000-lb (2,000-lb during the start up and operate periods) vapor phase carbon adsorbers operated in series using interconnecting pipe and hose.

The new SVE system enclosure and systems was fabricated by Product Level Control (PLC) and installed by GWTT (discussed in greater detail below) are used to provide the well vacuum and vacuum extraction for the process of removing VOCs from impacted soils in the vadose zone. Components such as knock-out-tank, air filter, regenerative

blower, condensate pump along with auxiliary valves & instruments are constructed based on specifications provided by URS.

Two Siemens 1,000-lb vapor-phase carbon adsorbers (for permanent system; start up and operate period utilized two GWTT 2,000-lb adsorbers) connected in series in a lead-lag configuration are used to remove VOCs from untreated air stream. Using the 4-in Sch 80 PVC and flexible hose manifold system, the adsorbers can also be operated in parallel, should the operator or NYSDEC or CDM determine it is necessary. The air discharge from the blowers will pass through a down-flow packed-bed VP GAC container prior to discharging to the atmosphere. As these carbon vessels are stationary units, a manifold with manually operated valves is configured to switch the lead-lag configuration of the adsorbers to maximize the life of the carbon.

1.6 Safety Inspections & PPE

Safety inspections are necessary for the safety of operators and the surrounding community and environment. For PPE requirements and selection refer to Attachment 2. Refer to Appendix B for site specific compound information.

1.7 On-Site Safety Facilities

During O&M activities, there are no specific on-site safety facilities available. A first aid kit is kept on-site inside the new hot box enclosure. Any additionally required safety or medical equipment must be supplied by the operator. Examples of safety equipment that may be necessary:

- PID for VOC monitoring
- Safety Glasses
- Safety Vest
- Hearing Protection
- Traffic Cones

Refer to Attachment 3 for on-site safety facilities information and Appendix A for site maps and further site safety information.

1.8 Confined Space Safety

Confined space activities at this site are limited to entering the 1,000-lb vapor phase adsorbers (for final system), if at all necessary. Refer to Attachment 4 for the site-specific confined space entry procedures, and for the Moretrench/GWTT corporate safety policy that must be followed, at a minimum. If you are not an employee of Moretrench/GWTT, you must follow you company specific guidelines and procedures.

2.0 PART 2 – OPERATION & MAINTENANCE INSTRUCTIONS

2.1 Significant Design Criteria

The following is a discussion of items implemented to meet the design specifications and minimum requirements for the new SVE system.

a. General

- GWTT has integrated specific components of the new SVE system with the existing SVE system.

b. Monitoring

- Ports have been provided by GWTT at each SVE well head, as shown in the Process & Instrumentation Drawing (P&ID) and Drawing No. 4 (Well Construction Details), and have been designed for the easy and accurate performance of the following functions: Collection of vapor samples, monitoring of PID readings, reading of pressure/vacuum gauges, connection of portable velocity device (anemometer), and connection of portable temperature device (anemometer).
- Parameters for monitoring pressure, flow, and temperature are described in Tables 1 through 4.

c. Piping and Valves

- Butterfly valves have been provided at each individual well head to allow the soil gas flow rate to be regulated or shut off at each extraction point. The valves were installed in a manner that allows for the full and unimpeded operation of the valve by a person located on the ground outside of the well box.

2.2 List of Equipment

2.2.1 Regenerative Blower

In order to facilitate the well vacuum and vacuum extraction for the VOC removal process of impacted soils within the vadose zone, GWTT has provided two (2) regenerative blowers (as specified). Each blower is an R7 Series 10-hp Regenair® Regenerative Blower which is accessorized with inlet filters, check valves, silencers and relief valve. The silencer is designed to reduce noise by up to 5-dBA and remove high-frequency sounds that are associated with blower operation. The system operation complies with all local noise ordinances, including the provisions of Section 24-216(b) of the Administrative Code of New York City and maintains less than 70dBA at a distance of >3-ft from the housing. See Attachment 5 for Regenerative

Blower cut sheets and related information.

2.2.2 Air Filter

In order to remove particulates from the extracted well vapor GWTT has provided one (1) Solberg Vacuum Filter for each of the regenerative blowers. The filter attaches to the inlet of the blower and is made from a combination of steel and polyester. See Attachment 6 for Air Filter cut sheets and related information.

2.2.3 Vacuum Relief Valve

GWTT has provided the regenerative blower extraction system with vacuum relief valves in order to regulate the vacuum pressure within the system. The vacuum relief valves were manufactured by Kunkle Safety and Relief Products out of bronze, stainless steel, and cast iron parts and are rated for service up to 29-in Hg. The relief set point is 7-in Hg, and was factory set and tested. See Attachment 7 for Vacuum Relief Valve cut sheets and related information.

2.2.4 Moisture Separator and High Water Level Switch

GWTT has provided a 40-gallon, epoxy lined steel moisture separator with a manual drain valve which is designed to protect the regenerative blowers from moisture damage from extracted well vapor. The separator utilizes cyclonic separation for the removal of entrained water from the soil vapor stream and is equipped with level control switches, a liquid level site gauge, automatic vacuum relief, piping, and valves. The vertical, single level high water level switch shuts down the air flow from the regenerative blowers when the separator becomes full. The alarm triggered by the level switch is a non-latching alarm. Once the water level drops below the switch elevation the system will automatically come back on. See Attachment 8 for Moisture Separator and High Water Level Switch cut sheets and related information.

2.2.5 Drain Pump

Recovered water from the air/water separator is directed into a 55-gallon disposal drum through the use of a positive displacement drain pump. GWTT has provided two (2) 300 Series Moyno® 500 Pumps made of cast iron, stainless steel, and NBR and are equipped with 1-Hp motors and ¾ inch suction and discharge ports. One pump is installed in the new SVE system, and one provided as a spare for the existing SVE system. Both pumps are identical and designed for a flow rate in the range of 1-4 gpm. The pumps are equipped with flexible discharge hose, nozzles, manual on/off control switches, and other appurtenances necessary to facilitate the safe and easy pump out and offsite disposal of condensate from the SVE systems. For the

12-wk operation per contract, GWTT initially provides all drums as necessary to accomplish disposal of the condensate. Furthermore, GWTT has provided all ramps, drum dollies, and other equipment necessary to safely handle full drums of condensate. All equipment, with the exception of storage drums, are considered to be part of the SVE system and are to remain at the site, stored within the SVE system housing. See Attachment 9 for Drain Pump cut sheets and related information.

2.2.6 Hot Box

As per the design specifications GWTT has provided a Hot Box ® Model LB3E-D lockable structure to house the SVE system and keep it secure from vandalism, weather, and other factors. The model is manufactured of 18 gauge aluminum exterior, exposed polyisocyanurate insulation interior and less drainage ports. The housing is designed to allow sufficient access for all operation and maintenance requirements. See Attachment 10 for Hot Box cut sheets and related information.

2.2.7 Heating and Ventilation System

GWTT has provided the hot box enclosure with a heating and ventilation system to maintain temperatures in the range of 50-100 °F. This system includes a wall mounted heater (at the base of one regenerative blower) and a guard mounted exhaust fan with a 10-inch diameter propeller both supplied by Grainger. GWTT has also provided a heavy duty aluminum, single phase, motorized, 12-in by 12-in frame wall louver from McMaster-Carr. See Attachment 11 for Heating and Ventilation System cut sheets and related information.

2.2.8 Flowmeters and Pressure/Vacuum Gauges

The SVE system is designed to treat a minimum total vapor flow rate of 520-scfm with both new blowers in operation. In order to monitor and optimize flow rates GWTT has provided seven (7) aluminum flowmeters with metering range of 95-475-scfm (some are spares) and one (1) aluminum flowmeter with a metering range of 120-600-scfm. All flowmeter units are manufactured by AMEMEK® Rotron® Industrial Products. GWTT has also provided four (4) Ashcroft vacuum and (3) pressure gauges inside the enclosure, which are specifically designed for low pressure systems. See Attachment 12 for Flowmeter and Pressure/Vacuum Gauge cut sheets and related information.

2.2.9 Thermometers

GWTT has provided two (2) Dwyer Digital Thermo-Anemometers for portable use and three (3) 0-250 °F stationary thermometers. See Attachment

13 for Thermometer cut sheets and related information

2.2.10 Vapor Phase Carbon Absorption Units

See Attachment 14 for Vapor Phase Carbon Absorption Unit cut sheets and related information.

2.2.11 Auto-dialer

For communication of system alarm conditions, GWTT has extended a communication line from the new main control panel to the auto-dialer in the existing system. All alarm dial-outs will be completed using this auto-dialer.

2.3 Parts List

Refer to Appendix C for parts list including part quantity, description, material composition, and model number. For further information also refer back to List of Equipment.

2.4 Start-up and Standard Operating Procedures

This start-up procedure has been developed by GWTT and Product Level Control, Inc. (PLC), GWTT's selected vendor for the fabrication of the new SVE system enclosure for the Kliegman Brothers OU#1 site. This system start-up procedure was implemented by GWTT in our shop in Wharton, NJ, under the supervision of representatives from CDM, the NYSDEC construction manager for this project.

This start-up procedure was originally provided as a separate document from the operation and maintenance manual. However, to document the proper testing and start-up for future reference, it has been incorporated into this section to assist future operators/technicians with the baseline results from the start-up and operations. The start-up plan is provided as a guidance document for all parties to insure the fabricated system is inspected and tested to meet the satisfaction of NYSDEC that the system was built in accordance with the project drawings and specifications.

2.4.1 Overview

The following is a step-by-step procedure, which will helps ensure thesystem begins its operation successfully. GWTT and PLC have assembled this startup guide to help ensure common mistakes are prevented and to provide knowledge to our customers. This document cannot be expected to cover all possible startup conditions. Follow all standard safety procedures when following these instructions.

a) Startup Date: 11/29/2007.
b) Startup Location: Wharton, NJ.
c) Startup Person: Patrick Hunnewell, GWTT.

d) Startup Date (Site in Glendale, NY): _12/07/2007.
e) Startup Location: Glendale, NY.
f) Startup Person: Gene Snyder, GWTT.

2.4.2 Contact Personnel

If at any time you do not understand this procedure, or you would like additional information, do not hesitate to call GWTT or PLC. When calling, please ask for Pat Hunnewell at extension 15 (973-983-0901) and reference project number 11-1404 Kliegman Brothers; or when calling PLC (952-707-9101), please ask for Bruce at extension 27 and indicate the phone call is in reference to project 07-050.

2.4.3 Tools Required

For start-up, the following tools listed below are required in addition to a typical tool set.

- Voltmeter
- Clamp on amperage meter
- Telephone
- Flashlight

2.4.4 Phone Line Hook-Up

The hook-up of the phone line was completed on-site during re-testing and verification on-site in Glendale. GWTT extended a phone line from the new control panel to the existing auto-dialer on the URS SVE system currently maintained on site. After the new line was run, the following steps were followed:

- Verified the phone service was operating properly by connecting a telephone to the incoming phone line and making a phone call.
- Connected the phone line to the control panel.

2.4.5 Power Hook-Up

For the shop test in Wharton, NJ, GWTT used a generator that could provide 208-volt, 3-phase service to the new system. GWTT ran a temporary SO Chord from the generator to the primary disconnect on the new SVE skid. The generator was used throughout the duration of the shop test.

For the permanent power field, GWTT subcontracted Aurora Electric to run wiring from the power source to the system. The following steps were followed for permanent power.

- The disconnect switch inside of system's control panel remained off.
- Inside of the system's control panel, the electrician verified supplied power agrees with the system's electrical prints and labels inside of the panel. The neutral wire was run from the power source to the proper termination.

- The electrician verified that a high leg was present, and located this is in the center or B phase location in the control panel's termination block. A high leg is a power lead that has a noticeably higher voltage to neutral or to ground than the other power legs.

i) Record voltage readings across all phases
   (1) A – B phase voltage =_____
   (2) A – C phase voltage =_____
   (3) B – C phase voltage =_____
      (a) Above voltages should be within 10% of each other and also within 10% of requirement.
      (b) If (a) is not true, call GWTT or PLC
   (4) Neutral – A phase voltage =_____
   (5) Neutral – B phase voltage =_____
   (6) Neutral – C phase voltage =_____
      (a) Above voltages except (5) should be between 110 and 125 volts.
      (b) If (a) is not true, call GWTT or PLC.

2.4.6 Overload Settings

Normally every motor has an overload relay located inside the control panel. Overloads are designed to trip when a motor draws more amps than the motor is designed for. GWTT verified each overload setting matches each motor's full load amperage as indicated on the motor's nameplate. Most motors are rated for more than one voltage so we made sure we read amperage on the motor nameplate as it relates to the supplied voltage. GWTT and PLC set these overloads correctly during in house testing. The above steps verify settings have not changed during shipment.

2.4.7 External Piping Hook-Up

During start-up, GWTT made sure all inlet and outlet piping assemblies are connected to the system properly and also make sure all valves external to the system are set properly. The connections during the shop test in Wharton were completed using open-ended connections and ambient air. There were no piping connections, since this was only a shop witness test. Once connected in the field in Glendale, GWTT installed the permanent pipe, fittings, and hose. Start-up and prove-out on site were completed using ambient air, but through the dilution port on the regenerative blower inlets. The discharge was vented through the two temporary 2,000-lb vapor phase carbon adsorbers operated in series.

2.4.8 External Switch Hook-Up

For this system, there are no external switches. The existing SVE system installed by URS will run independently of this system, other than the use of the auto-dialer.

2.4.9 Freezing Conditions

Freezing conditions or conditions where freezing has occurred recently can cause problems. Ice in pipes will restrict flow and may cause extreme pressure or vacuum levels that can cause equipment failure. GWTT verified assemblies in the system did not have ice present. GWTT verified piping outside of the system does not have ice present. Ice blockages in exterior piping can cause catastrophic equipment failures.

2.4.10 Valve Settings

For this SVE system with the two regenerative blowers, during start-up testing in Wharton, NJ or Glendale, NY:

- GWTT opened all valves in the system except for sample ports and relief valves. Valves opened included: all ball valves and gate valves including the bleed air dilution valve.
- GWTT did not open manual tank drain valves.
- For the system has bypasses between the new and old systems, GWTT arranged according to CDM's preference in the shop and field.
- For the progressing cavity transfer pump(s), GWTT opened each pump's downstream gate valve 1 full turn from closed. This will allow for a restricted flow, which can be adjusted later according to site conditions. Also, make sure all drain plugs are installed.

2.4.11 Turning Power On

The following steps were implemented during start-up, and should be followed in the future for all subsequent re-starts:

- Position all Hand-Off-Auto (HOA) selector switches to Off position. See HOA descriptions below
  i) Hand, H: motors will run, all operating and safety switches are ignored.
  ii) Off, O: motors will not run, all operating switches are ignored.
  iii) Auto, A: motors will run according to operating switches and system logic.

Power up the control panel by switching the disconnect in the panel to the on position.

2.4.12 Motor Rotation

Correct motor rotation is extremely important. This system was completely tested at PLC and GWTT before arriving on site. When it was tested, all motors were rotating the correct direction. On site, power phasing or wiring may cause the motors to rotate the wrong direction. To re-check rotation during the shop test, field test and all subsequent re-tests:

- Read and understand all operating instructions for each piece of equipment. Follow the manufacturer-supplied instructions to verify all pieces of equipment are ready for operation.
- If you system includes an Emergency Stop button (E Stop), make sure this red knob is pulled out. System will not operate if Emergency Stop is pushed in.
- For three phase power systems:
  i) Select a three-phase motor for which you would like to check rotation. Make sure this motor will not cause damage to the system or itself if it rotates backwards.
  ii) Turn HOA switch to hand momentarily (less than 1 second) to check rotation. This step usually works with more success if there is another person watching the motor as it starts up. Remember to follow proper safety procedures.
  iii) If motor rotation is not correct, your system's phasing is not correct. Turn off power at the source and swap A and C phase incoming power wires. Follow all typical safety procedures when performing this step including locking power off at the source. Record the new voltage values in above Section 2.4.6.
- Verify all motors are rotating in the correct direction by momentarily turning each HOA switch to Hand and watching their rotation.

2.4.13 Heater & Exhaust Fan

GWTT verified the exhaust fan starts when the exhaust fan thermostat is set at a temperature below ambient. GWTT made sure the exhaust fan stops when the thermostat is set at a temperature above ambient. GWTT verified the heater started when the heater thermostat is set at a temperature above ambient, and shut down when the thermostat was set at a temperature below ambient.

2.4.14 Switch Settings

GWTT and CDM located all system switches in system, using the final P&ID to confirm their location/presence. Typically, these are pressure, vacuum, level or temperature switches. GWTT set these switches in positions that we believe to be correct based on anticipated run conditions. These settings can always be changed later. Some level switches include legends at the switch to indicate proper position. GWTT verified these switches are installed according to the legend.

2.4.15 Control Panel Logic

The control panel tells the system how to operate. It is important to understand the logic. Read the attached Alarm Interlock Schedule and Sequence of Operations. It is common for operators to believe the system is malfunctioning while in fact it is operating as designed.

2.4.16 System Operation

The system is now ready to be operated (for future reference). Water transfer pumps will be damaged if ran dry. Before operating transfer pumps, make sure they are primed properly. GWTT will place a small volume of water in the knock-out before field testing in Glendale. No water was used in Wharton, NJ for the shop test.

- Start system by placing all HOA selector switches in Auto and then press and release the Reset button.
- System should now be operating.
- Inspect system as it operates and listen for abnormal noises or vibrations.
- Adjust bleed air dilution valves on sparge and SVE systems to bring pressure levels to desired operating conditions.

2.4.17 Voltage

With a majority of the motors operating including the largest motor, record voltage readings across all phases and document in the chart below. Fluctuating or decreased voltages cause system performance issues and damage to motors.

Shop Test – Wharton, NJ

Date/Time	L1-L2	L1-L3	L2-L3	L1-neutral	L2-neutral	L3-neutral
N/A						
N/A						
N/A						
N/A						
N/A						
N/A						

Field Test – Glendale, NY

Date/Time	L1-L2	L1-L3	L2-L3	L1-neutral	L2-neutral	L3-neutral
12/7/07	217.0	216.3	217.2	124.7	126.8	123.5
1330hrs						

2.4.18 Amperage

While motors are operating, record amperage values from each motor.

- Typically, amperage readings are taken inside of control panel.
- Take amperage readings from each leg of each motor and record in chart below.

- Compare amperage readings to motor nameplates.

Shop Test, Wharton, NJ

Motor	nameplate amps	L1 amps	L2 amps	L3 amps	neutral amps
B 201	35	19	19	19	
B 202	35	19	19	18.75	
PUMP	3.1				

Field Test, Glendale, NY

Motor	nameplate amps	L1 amps	L2 amps	L3 amps	neutral amps
B 201	35	21.9	21.6	20.7	0.2
B 202	35	22.6	22.1	20.4	0.3
PUMP	3.1				

2.4.19 Switch Operation

While the system was operating, GWTT manually adjusted each switch one at a time to cause fault conditions. These switches include pressure, vacuum, temperature and level. GWTT verified the system responds properly according to the system's logic.

2.5 Manufacturer's O&M Manual

Refer to Attachments 5 - 14 for specific manufacturer's and equipment O&M manuals to assist with day to day operations, repairs, and replacement part selection.

2.6 System Trouble-Shooting

As with most mechanical systems, the best means of trouble-shooting specific equipment is referring to the manufacturer's manuals for specific trouble-shooting guidelines. For this manual, these manuals are presented in Attachments 5 - 14. To assist in simplifying the process somewhat, GWTT is presenting the following examples for trouble-shooting the SVE system, which are typical problems that may be encountered.

- No Power or System is off upon arrival.
  - Check the front of the main control panel enclosure. If the alarm light is illuminated, there is either a high level shutdown on the knock-out, or a blower motor failure.
  - If it is a high level on the knock-out, place both blower HOA switches in 'Off.' Run the hose from the manual pump to the 55-gallon condensate storage drum. Turn the drain pump On/Off switch to 'On,' and drain the knock-out tank. Watch the site glass; do not let the pump run dry.
  - If it is a motor failure, turn the main disconnect handle on the outer enclosure door to 'Off.' Open the door, and check the thermal overload.

back in the 'On' position, and the blower(s) should come back on. If the blower trips again, refer to the manual.

- If power is off upon arrival and there are no alarms, check the main disconnect at the power drop, and at the system enclosure, to make sure no one has turned the power off. If both the new and old systems are not running, check to make sure a main breaker has not been tripped or turned off at the main power drop close to the Gourmet Factory building.
- If the disconnects are on, or the existing system is on but the new system is not, check to make sure it isn't a failure of the indicating lights. Turn each blower in 'Hand' using the HOA switch. If they run, there may be an alarm, but the light is out. Check the knock-out tank to see if there is water present. If there is, follow the procedures outlined above for draining the knock-out.
- Any other trouble-shooting may involve working inside the panels with the system 'hot.' This should only be performed by competent personnel familiar with these trouble-shooting procedures, and will not be discussed in this section.

- Vacuum relief valve keeps releasing
  - Check all the valves on the influent and effluent of each blower to make sure they have not been inadvertently closed. If they have open them to the proper position.
  - If the valves are open, check the vacuum or pressure gauges inside the box to see if they are within normal ranges. If they are, then there may be something wrong with the relief valve. Try adjusting the valve to see if the valve reseats. If not, shut the system down, and follow the procedures outlined in the manual presented in Appendix C.
  - If the valve appears to be ok, go to the SVE vaults and make sure no one closed the butterfly valves in each vault. Slowly open them, to see if this stops the relief valve from popping.

- Blower(s) is running normally, but a flow meter(s) or gauge(s) is not responding.
  - First, check all the other gauges to see if they are responding normally. The same goes with the flow meter. If they are, then you may just have a gauge or indicator that needs to be replaced.
  - If none of the gauges are responding, or flow meters, but the blowers are running (a very unlikely scenario), the dilution valve may be opened too far, or you may have a breach in the piping. Check the dilution valve by opening/closing it, and see if there is any gauge/indicator response. If that does not work, inspect all the piping while the blowers are running to determine if you can find the break/leak. Once located, shut the system down and make the necessary repairs.

- When you arrive on site, the system is running but the flow rates and vacuum rates are down, but system pressure and temperature is up.
    - Check the air filter on the blower(s), first by checking the vacuum gauges on the inlet and outlet. If the differential vacuum is higher than normal, or exceeds 10-in w.c., shut the blower(s) down. Open the housing for the filter element, and remove the internal element. The filter elements provided with this system are washable. You will need to containerize the water used for washing the filter in the condensate drum, as a precautionary measure. Using on-site water, or even a 1-gallon bottle of water, run water through the filter element until it is cleaned. Let the element dry out, and then replace it in the housing. Start the system back-up, and see if the differential goes down, and the system vacuum rates and flow rates return to normal.

2.7 Existing URS SVE System Operation & Maintenance Manual

The O&M manual for the existing single blower SVE system installed by URS several years ago is presented in Appendix D of this manual for reference. URS was responsible for O&M of this system up to December 11, 2007 (the last carbon change-out they were responsible for). From the start of the two week operate period, through the completion of the ten week operate period, GWTT will be responsible for the O&M of the existing and new systems. At the completion of the operate period, NYSDEC and/or CDM will take over maintenance of both systems.

The existing system uses much of the same instrumentation and valves incorporated into the new system. There is only one regenerative blower, connected to three existing SVE wells, with a Sch 80 PVC manifold system. There are two existing 1,000-lb carbon adsorbers that will be maintained and monitored by GWTT for the duration of the contract. Carbon change-outs will be handled on these adsorbers by GWTT on an as-needed basis.

The operator or technician should refer to the URS manual in Appendix D for trouble-shooting guidelines on this system, as well as for reference to the manuals.

2.8 Scheduled Preventative Maintenance

The recommended tasks to be performed on system during monthly visits are as follows

- Inspect the overall SVE system integrity, including the hot box enclosure, exposed piping, and the vaults.
- Perform vacuum balance adjustment, as required to maintain a wellhead vacuum of 10-in wc. The wellhead vacuums can be monitored from the sample ports installed at the top of each well. During times of high moisture content, the vacuum should be lowered to reduce the amount of moisture generated.
- Inspect all butterfly, gate and ball (sample) valves, to ensure they are operable
- Measure and record soil vapor flow rate from each extraction well.
- Measure and record vacuum at each extraction well.

- Measure and record total soil vapor flow rate
- Measure and record vacuum on both the influent and effluent air of the filter.
- Measure and record temperature on the effluent of the blower.
- Measure and record pressure of blower discharge.
- Measure and record VOC concentrations at the combined discharge before, in-between, and after the two carbon units.

System individual unit maintenance to be performed on a monthly basis as follows:

Rotron – Regenerative Blower Model GAST-R7100A-3

- Keep air filter clean as described above and below. If foreign material enters the blower, the cover and impeller should be removed and cleaned to avoid further impeller imbalance. Bearings should be changed after 15,000 to 20,000-hours on average. See Attachment 5 for Regenerative Blower cut sheets and further maintenance information.

Solberg – Air Filter Model CSL-851-250HC

- Replace filter element when the differential pressure across the filter is 10-in w.c. above the initial pressure differential. See Attachment 6 for Air Filter cut sheets and further maintenance information.

Vacuum Relief Valve Model Kunkle-215V-H01AQE0007

- There is no monthly maintenance required. However, GWTT recommends popping the spring and checking the operation of this valve twice a year. See Attachment 7 for Vacuum relief Valve cut sheets and further maintenance information.

Moisture Separator Model PLC-MDXX-WSD55-XXS

- There is no monthly maintenance required, other than the periodic manual evacuation of the liquid contents in the separator. See Attachment 8 for Moisture Separator cut sheets and further maintenance information.

High Water Level Switch Model PLC-SDA0-TFS163-XXE31

- There is no monthly maintenance required. See Attachment 8 for High Water Level Switch cut sheets and further maintenance information.

Drain Pump Model MOYNO 500-34401

- There is no monthly maintenance required. See Attachment 9 for Drain Pump cut sheets and further maintenance information.

Heating and Ventilation System

- There is no monthly maintenance required. See Attachment 11 for Heating and Ventilation System cut sheets and further maintenance information.

Thermometers

- See Attachment 13 for Thermometer cut sheets and further maintenance information.

Rotron – Direct Flow Meter

- The air flow meter is designed to require minimal maintenance. If the tubes of the meter become plugged, remove and clean them. See Attachment 12 for Air Flow Meter cut sheets and further maintenance information.

2.9 Unscheduled Maintenance & Parts

Periodic adjustments to the system manifold will be required to ensure maintenance of adequate air/soil gas flow through the SVE system. The system has been designed and constructed for a minimum flow rate of 520-scfm and a minimum vacuum of 10 in. w.c. at each well head. Adjustments to the valves of the SVE wells are required when insufficient or excessive vacuum has been detected. The butterfly valves located on each of the manifold legs can be opened or closed to increase or decrease airflow and vacuum. The dilution gate valve can also be utilized to increase or decrease system vacuum.

Actual site conditions are likely to vary as soil moisture content fluctuates. As soil moisture content increases, you are likely to see higher running vacuums and quicker elapsed time to fill the moisture separator. The system has been designed to withstand such fluctuations. If there is too much water entering the system, simply reduced the vacuum by closing the ball valves on the manifold, or opening the dilution valve.

If for any reason there is a system shutdown that requires an unscheduled visit, and it appears it is necessary to replace a piece of equipment or instrumentation, refer to the manuals provided in the appendices for replacement parts, model numbers, etc.

2.10 Maintenance Record Keeping

Refer to Appendix E for maintenance record keeping data sheets and procedures.

2.11 Spare Parts Records

Refer to Appendix C for Parts List and Spare Parts Records.

2.12 Recommended Lubricants

There are no lubricants necessary for the operation of the SVE system.

2.13 Required Tools Cleaning & Maintenance of Exterior

Operators should have handy a basic set of mechanics tools and clean up supplies to be kept within the containment housing at all times. In addition, the tools presented in Section 2.4.3 above would be beneficial to the operator. The exterior of the enclosure should be wiped clean with a standard non-hazardous commercial grade cleaner, similar to Fantastik. Exterior wipe down and cleaning should be completed on a quarterly basis.

3.0 PART 3 – DOCUMENTS & CERTIFICATES

3.1 As-Built Drawings

As-builts for the site plan and well information were prepared by Hirani Associates, the New York State licensed land surveyor utilized for this project. The as-builts are presented with the drawing packets at the end of this manual.

3.2 Air & Water Balance Reports

The balancing of the system during start-up and throughout the 10-week operation of the system is the responsibility of GWTT. The monitoring records are maintained in Tables 2 and 3 of this manual (template only). Copies of the actual records will be maintained on site, and also sent to CDM and NYSDEC.

3.3 Certificates For Materials & Equipment

Copies of the concrete test results for the restoration of the trench at grade, and supporting documentation that all on site diesel equipment was fueled with Ultra Low Sulfur diesel fuel, are presented in Appendix F.

3.4 Photocopies of Warranties

Photocopies of all relevant warranties are presented in Appendix G. GWTT will provide a 1-year warranty on the system from the date of initial start-up in the field, which was December 10, 2007.

TABLES

(Ten week duration for Table 4 has not completed yet)

GROUND/WATER TREATMENT & TECHNOLOGY, INC.
PO BOX 1174
DENVILLE, NJ 07834
KLIEGMAN BROTHERS OU#1
CONTRACT No. D006547, SITE No. 2-41-031

TABLE 1 - PROGRESS MONITORING FOR BOTH SVE SYSTEMS

(Based on URS Table 11301-1 from Specifications)

Location	Matrix	No. of Samples/ Locations per Event	Parameters	Frequency During First 2 Wk Start-up	Frequency During Subsequent 10 weeks	Laboratory TAT for all Samples
Extraction Wells						
SVE-1 to -3	Air	9	VOCs - TO 15	4/Wk: M, Tu, W, Th	Once every 2 weeks	2 weeks
SVE-7S, 7D, 8S	Air	9	Flow/Velocity	Daily	Weekly	Field measure
8D, 9S, 10S	Air	9	Pressure	Daily	Weekly	Field measure
	Air	9	Temperature	Daily	Weekly	Field measure
	Air	9	Total VOCs - PID	Daily	Weekly	Field measure
Filter Inlet						
RB-1, B-201, B-202	Air	3	Pressure	Daily	Weekly	Field measure
Blower Inlet						
RB-1, B-201, B-202	Air	3	Pressure	Daily	Weekly	Field measure
Blower Outlet						
RB-1, B-201, B-202	Air	3	Flow rate	Daily	Weekly	Field measure
	Air	3	Pressure	Daily	Weekly	Field measure
	Air	3	Temperature	Daily	Weekly	Field measure
GAC-Inlet (Lead)						
GAC-1, GAC-201	Air	2	VOCs - TO 15	4/Wk: M, Tu, W, Th	Once every 2 weeks	2 weeks
	Air	2	Flow/Velocity	Daily	Weekly	Field measure
	Air	2	Pressure	Daily	Weekly	Field measure
	Air	2	Temperature	Daily	Weekly	Field measure
	Air	2	Total VOCs - PID	Daily	Weekly	Field measure
GAC-Outlet (Lead)						
GAC-1, GAC-201	Air	2	VOCs - TO 15	Weekly	Weekly	2 weeks
	Air	2	Temperature	Daily	Weekly	Field measure
	Air	2	Total VOCs - PID	Daily	Weekly	Field measure

GROUND/WATER TREATMENT & TECHNOLOGY, INC.
PO BOX 1174
DENVILLE, NJ 07834
KLIEGMAN BROTHERS OU#1
CONTRACT No. D006547, SITE No. 2-41-031
TABLE 2 - 2-WEEK START-UP PERIOD MONITORING TABLE

DATE: _____ **DAY:** _____ **TECHNICIAN:** _____

WEATHER _____

Comment: The first part of this test will involve taking vacuum levels and PID readings from the five new VMP wells, and documenting belowl
The second part of this test will involve isolating all wells except for SVE-7D & -7S. The site technician will obtain and document all the required data in the tables below. The test will be run as long as NYSDEC/CDM require, up to 8-hrs/day. The results will be presented to NYSDEC and CDM within two days of completing this test.

EQUIPMENT INFORMATION

B-201 Status: ON OFF (circle one)

Time	PI 204 in. w.c.	PI 205 in. w.c.	FI 202 cf/min	TI 202 deg F	FI 101 cf/min	FI 102 cf/min	FI 103 cf/min	AP 101		AP 102		AP 103		Comments
								Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	

B-202 Status: ON OFF (circle one)

Time	PI 204 in. w.c.	PI 205 in. w.c.	FI 202 cf/min	TI 202 deg F	FI 101 cf/min	FI 102 cf/min	FI 103 cf/min	AP 101		AP 102		AP 103		Comments
								Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	

DATE: _____ **DAY:** _____ **TECHNICIAN:** _____

WEATHER _____

EQUIPMENT INFORMATION (CON'T)

RB-1 Status: ON OFF (circle one)

Time	SVE-1 in. w.c.	SVE-2 in. w.c.	SVE-3 in. w.c.	F-Inf in. w.c.	F-Eff in. w.c.	SVE-1 cf/min	SVE-2 cf/min	SVE-3 cf/min	P-1 in. w.c.	T-1 deg F	P-1 in. w.c.	AP 103		Comments
												Velocity ft/min	Temp deg F	

GAC Adsorbers - GWTT System

Time	TI 203 deg F	FI 203 cf/min	PI 210 in w.c.	GAC Lead Inf ppm	GAC Lead Eff ppm	GAC Lag Eff/Stack ppm	Comments

System notes: _____
System run time today: _____
Cumulative total to date: _____
Condendate in K/O?: _____
Amount collected in on-site drum to date: _____
Which is the lead adsorber? No. 1 or No. 2? _____

GAC Adsorbers - Existing URS System

Time	Lead Inf ppm	Lead Eff ppm	Lag Eff ppm

System notes: _____
System run time today: _____
Cumulative total to date: _____
Condendate in K/O?: _____
Amount collected in on-site drum to date: _____
Which is the lead adsorber? No. 1 or No. 2? _____

DATE: _____ DAY: _____ TECHNICIAN: _____

WEATHER _____

NEW SVE WELL INFORMATION

SVE-7S

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

SVE-7D

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

SVE-8S

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

SVE-8D

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

SVE-9S

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

SVE-10S

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

Air Sampling Information

Was sampling completed today:

YES **NO** (circle one)

If yes, complete the following:

Time	ID	Location/Sample ID & Serial No.

Typical sample locations are for the six new SVE wells and the three original URS wells, the influent and effluent of the lead carbon adsorber for the new system and the old system. If samples are taken at all locations, you should have a total of 13 6-liter Suma canisters that are going back to the lab. All samples must be to the lab within 24-hrs of the sample time.

DATE: _____ DAY: _____ TECHNICIAN: _____

WEATHER _____

EXISTING WELL INFORMATION

URS SVE-1

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

URS SVE-2

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

URS SVE-3

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

Overall log notes/comments:

WH: Well Head

WH VC: Well head vacuum

WH AP: Well Head Anemometer Point (velocity)

VOC: Volatile Organic Compound concentration

in. w.c.: inches of water column

ppm: parts per million

SVE: Soil Vapor Extraction

VMP: Vapor Monitoring Point

Inf: Influent

Eff: Effluent

GAC: Granular Activated Carbon

cf/min: Cubic feet per minute (flow rate)

ft/min: Feet per minute (velocity rate)

deg F: degrees Fahrenheit

AP: Anemometer point (at manifold)

GROUND/WATER TREATMENT & TECHNOLOGY, INC.
PO BOX 1174
DENVILLE, NJ 07834
KLIEGMAN BROTHERS OU#1
CONTRACT No. D006547, SITE No. 2-41-031
TABLE 3 - One Week Radius of Influence Test

DATE: _____ **DAY:** _____ **TECHNICIAN:** _____

WEATHER _____

Comment: The first part of this test will involve taking vacuum levels and PID readings from the five new VMP wells, and documenting belowl
The second part of this test will involve isolating all wells except for SVE-7D & -7S. The site technician will obtain and document all the required data in the tables below. The test will be run as long as NYSDEC/CDM require, up to 8-hrs/day. The results will be presented to NYSDEC and CDM within two days of completing this test.

EQUIPMENT INFORMATION

B-201 Status: ON OFF (circle one)

Time	PI 204 in. w.c.	PI 205 in. w.c.	FI 202 cf/min	TI 202 deg F	FI 101 cf/min	FI 102 cf/min	FI 103 cf/min	AP 101		AP 102		AP 103		Comments
								Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	

B-202 Status: ON OFF (circle one)

Time	PI 204 in. w.c.	PI 205 in. w.c.	FI 202 cf/min	TI 202 deg F	FI 101 cf/min	FI 102 cf/min	FI 103 cf/min	AP 101		AP 102		AP 103		Comments
								Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	

DATE: _____ DAY: _____ TECHNICIAN: _____

WEATHER _____

EQUIPMENT INFORMATION (CON'T)

RB-1 Status: ON OFF (circle one)

Time	SVE-1 in. w.c.	SVE-2 in. w.c.	SVE-3 in. w.c.	F-Inf in. w.c.	F-Eff in. w.c.	SVE-1 cf/min	SVE-2 cf/min	SVE-3 cf/min	P-1 in. w.c.	T-1 deg F	P-1 in. w.c.	AP 103 Velocity ft/min	AP 103 Temp deg F	Comments

GAC Adsorbers - GWTT System

Time	TI 203 deg F	FI 203 cf/min	PI 210 in w.c.	GAC Lead Inf ppm	GAC Lead Eff ppm	GAC Lag Eff/Stack ppm	Comments

System notes: _____
System run time today: _____
Cumulative total to date: _____
Condendate in K/O?: _____
Amount collected in on-site drum to date: _____
Which is the lead adsorber? No. 1 or No. 2? _____

GAC Adsorbers - Existing URS System

Time	Lead Inf ppm	Lead Eff ppm	Lag Eff ppm

System notes: _____
System run time today: _____
Cumulative total to date: _____
Condendate in K/O?: _____
Amount collected in on-site drum to date: _____
Which is the lead adsorber? No. 1 or No. 2? _____

DATE: _____ DAY: _____ TECHNICIAN: _____

WEATHER _____

NEW SVE WELL INFORMATION

SVE-7S

Time	WH VOC ppm	WH VC in w.c.	WH AP ft/min	WH AP deg F

Comments: _____

SVE-7D

Time	WH VOC ppm	WH VC in w.c.	WH AP ft/min	WH AP deg F

Comments: _____

SVE-8S

Time	WH VOC ppm	WH VC in w.c.	WH AP ft/min	WH AP deg F

Comments: _____

SVE-8D

Time	WH VOC ppm	WH VC in w.c.	WH AP ft/min	WH AP deg F

Comments: _____

SVE-9S

Time	WH VOC ppm	WH VC in w.c.	WH AP ft/min	WH AP deg F

Comments: _____

SVE-10S

Time	WH VOC ppm	WH VC in w.c.	WH AP ft/min	WH AP deg F

Comments: _____

Air Sampling Information

Was sampling completed today:

YES **NO** (circle one)

If yes, complete the following:

Time	ID	Location/Sample ID & Serial No.

Typical sample locations are for the six new SVE wells and the three original URS wells, the influent and effluent of the lead carbon adsorber for the new system and the old system. If samples are taken at all locations, you should have a total of 13 6-liter Suma canisters that are going back to the lab. All samples must be to the lab within 24-hrs of the sample time.

DATE: _____ DAY: _____ TECHNICIAN: _____

WEATHER _____

EXISTING WELL INFORMATION

URS SVE-1

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

URS SVE-2

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

URS SVE-3

Time	WH VOC	WH VC	WH AP	
	ppm	in w.c.	ft/min	deg F

Comments: _____

DATE: _____ DAY: _____ TECHNICIAN: _____

WEATHER _____

NEW VMP WELL INFORMATION

VMP-1

Time	WH VOC ppm	WH VC in w.c.

Comments: _____

VMP-2

Time	WH VOC ppm	WH VC in w.c.

Comments: _____

VMP-3

Time	WH VOC ppm	WH VC in w.c.

Comments: _____

VMP-4

Time	WH VOC ppm	WH VC in w.c.

Comments: _____

VMP-5

Time	WH VOC ppm	WH VC in w.c.

Comments: _____

Overall log notes/comments:

WH: Well Head

WH VC: Well head vacuum

WH AP: Well Head Anemometer Point (velocity)

VOC: Volatile Organic Compound concentration

in. w.c.: inches of water column

ppm: parts per million

SVE: Soil Vapor Extraction

VMP: Vapor Monitoring Point

Inf: Influent

Eff: Effluent

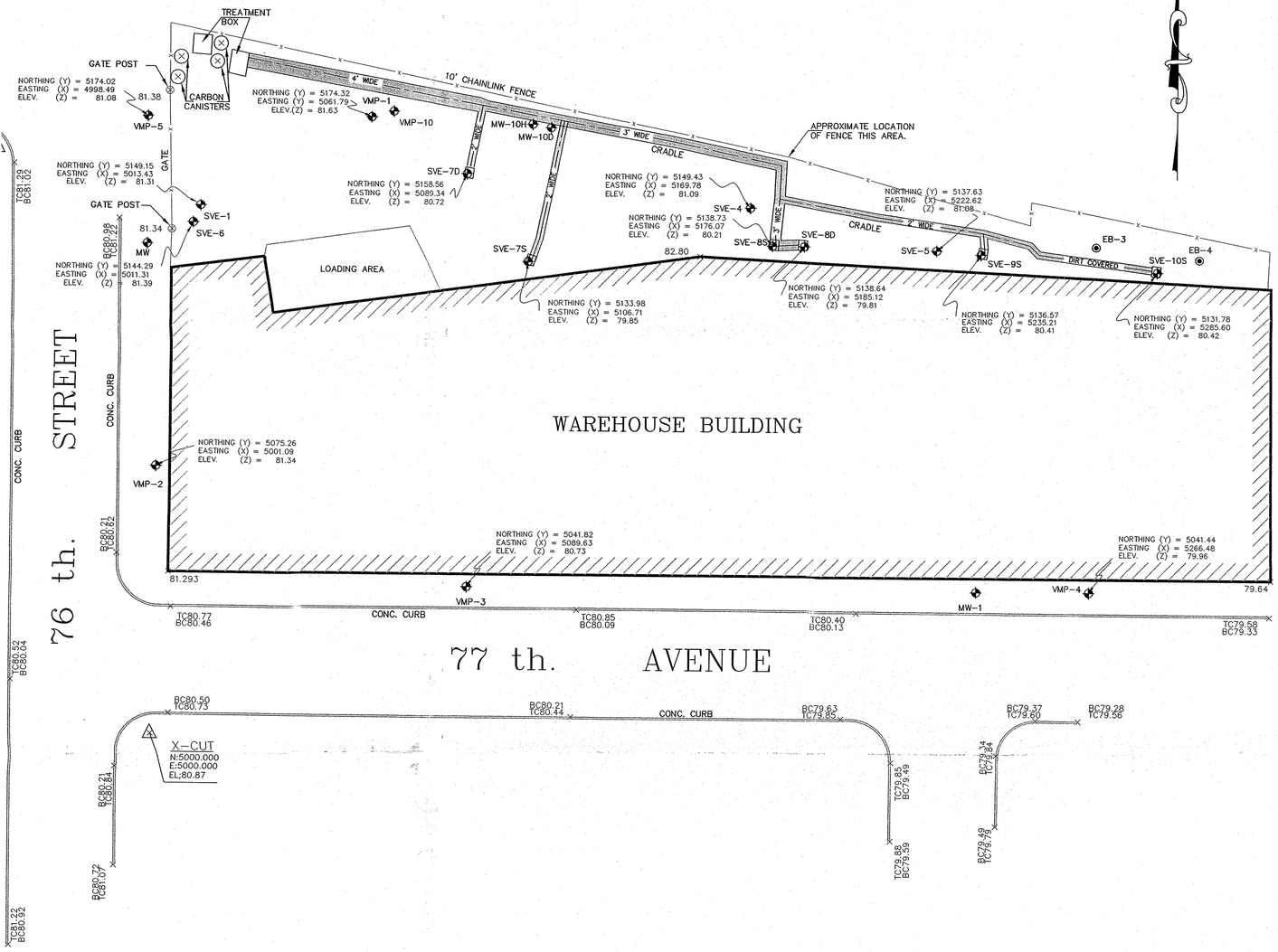
GAC: Granular Activated Carbon

cf/min: Cubic feet per minute (flow rate)

ft/min: Feet per minute (velocity rate)

deg F: degrees Fahrenheit

AP: Anemometer point (at manifold)



LEGEND:

SVE ⊕	VAPOR WELL LOCATION
EB ◉	SOIL SAMPLING WELL
═══	CONCRETE CURB
——— x ———	CHAINLINK FENCE
TCxx.xxx	TOP OF CURB
BCxx.xxx	BOTTOM OF CURB
× xx.xxx	SPOT ELEVATION
N:xxxx.xxx E:xxxx.xxx EL:xx.xxx	COORDINATES BASELINE

0′ 20′ 40′ 60′

GRAPHIC SCALE

ALL MEASUREMENTS ARE U.S. SURVEY FEET

TUM IS ASSUMED.

M IS BOROUGH QUEENS TOPOGRAPHICAL BUREAU.

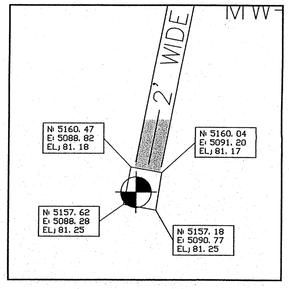
N OR ADDITION TO THIS SURVEY IS A VIOLATION OF OF THE NEW YORK STATE EDUCATION LAW, EXCEPT N 7209–SUBDIVISION 2.

ES:

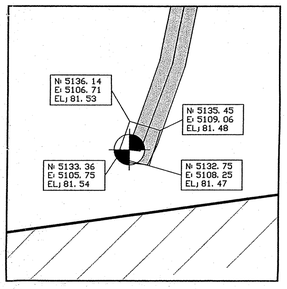
LAYOUT GWTT JOB NO: 11–1404, PREPARED FOR TREATMENT & TECHNOLOGY, DATED OCT 2007, RATION.

PRECAST VAULTS - DETAILS

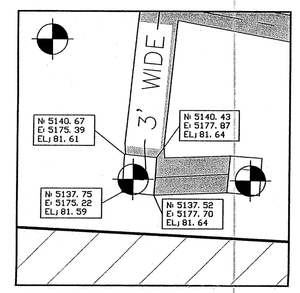
SCALE 1"-6'



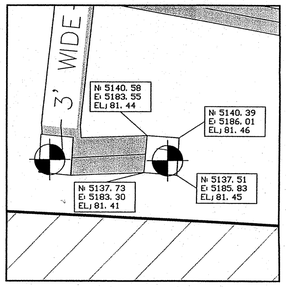
SVE-7D



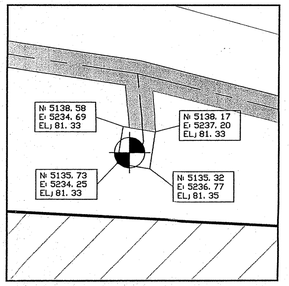
SVE-7S



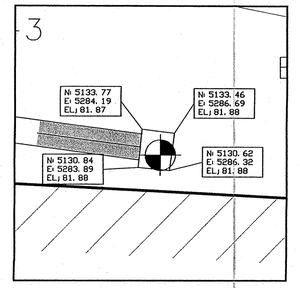
SVE-8S



SVE-8D



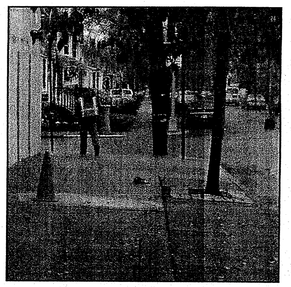
SVE-9S



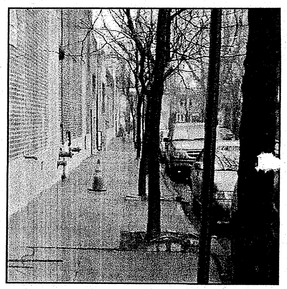
SVE-10S

EXISTING CONDITION VIEWS

SCALE 1"-6'

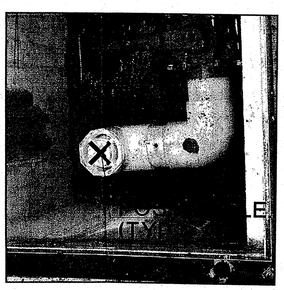


SOUTH VIEW
76th. STREET

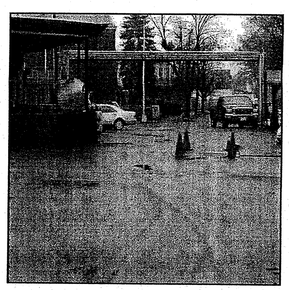


EAST VIEW
77th. AVENUE

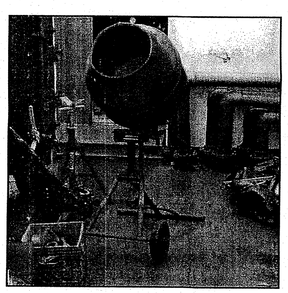
EAST VIEW
77th. AVENUE



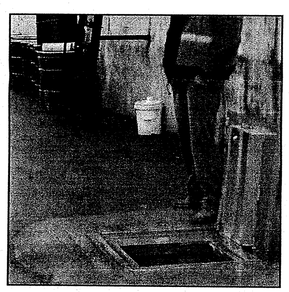
TOP VIEW - EXISTING CONDITIONS
SVE-7S SIMILAR TO ALL



WEST VIEW
GATE ENTRANCE



WEST VIEW
TREATMENT BOX



EAST VIEW
SVE-7S

		DRAWN BY: S.I.P.	SCALE: 1"=20'	HIRANI ENGINEERING & LAND SURVEYING, P.C. 30 JERICHO EXECUTIVE PLAZA, SUITE 200C JERICHO, NEW YORK 11753 F (516) 248-1010 T (516) 248-9018	HIRANI GROUP	OWNER: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION CONTRACTOR: GROUND WATER TREATMENT & TECHNOLOGY
OMMENTS	N.E.B.					
OMMENTS	N.E.B.					
IPTION	APPR'D.	CHECKED BY:N.E.B.				
SIONS						

PROJECT: NYSDEC SITE 2–41–031 GLENDALE QUEENS

SUBJECT: MONITORING WELLS SURVEY

DATE DRAWN: 12/14/2007

DATE SURVEYED: 12/12/07–02/01/08

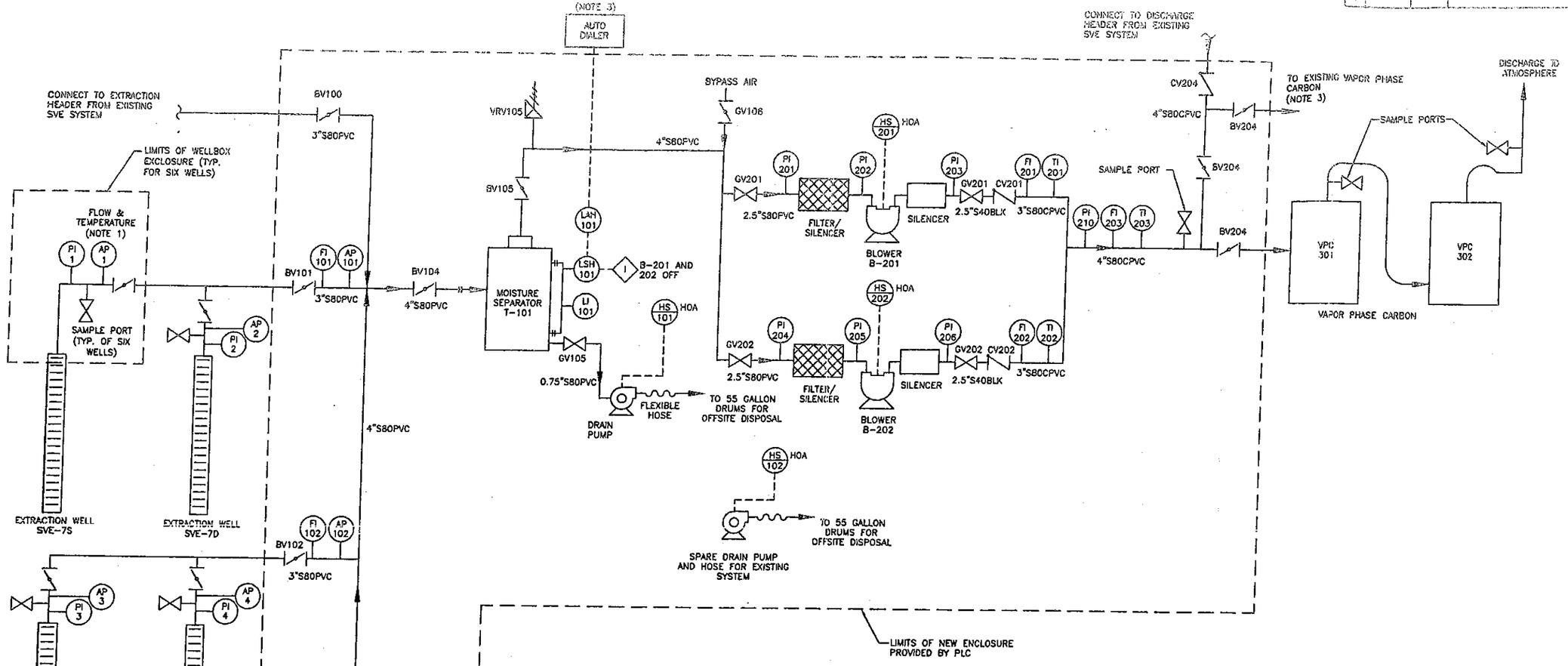
JOB #: ST 07 2399

SHEET NO: 1 OF 1

G:\PROJECTS\SURVEYING\GROUND WATER TREAT TECH\SENT TO CLIENT 1–18–08\MONITORING 02–07–08.DWG

DRAWINGS

GWTT P&ID – Soil Vapor Extraction (SVE) System
GWTT/PLC Electrical Schematics – Electrical Schematics
GWTT Site Plan – Final As-Built Survey – Hirani Assoc.



SOIL VAPOR EXTRACTION (SVE) SYSTEM

REVISIONS			
NO.	DATE	BY	DESCRIPTION
0			
1			
2			
3			
4			

DESIGNED BY:	DMc
DRAWN BY:	RAL
CHECKED BY:	CWP
PROJ. ENGR.	DMc

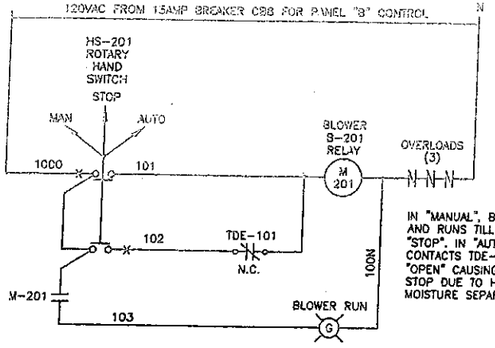
URS Corporation
Group Consultants
77 Goodell Street, Buffalo, New York 14203
(716)856-5636 - (716)856-2545 fax
JOB No. 11171964.00000

NYSDEC SITE 2-41-031
GLENDALE, QUEENS
KLIEGMAN BROTHERS SITE
OPERABLE UNIT NO. 1
GLENDALE, QUEENS NEW YORK

CONTRACT D006547
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 BROADWAY, ALBANY, NEW YORK

PRODUCT LEVEL CONTROL, INC.
ENVIRONMENTAL EQUIPMENT & CONTROLS
11929 Portland Ave S.
Burnsville, MN 55377
Phone: 952-707-9101
Fax: 952-707-1075

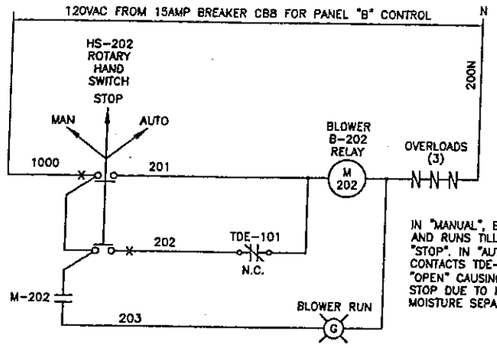
Customer	GWTT
Site Reference	KLIEGMAN BROTHERS UNIT 1
	GLENDALE, QUEENS
Cust. No.	PLC Job No. 07-050
Tolerance NA	Rev. 0
Drawing No.	PID
Sheet No. Sheet 1 of 1	Scale NA
Drawn By BGG	Drawn Date 9-21-07
Title	PID



IN "MANUAL", B-201 STARTS AND RUNS TILL SWITCHED TO "STOP". IN "AUTO", RELAY CONTACTS TDE-101 WILL "OPEN" CAUSING B-201 TO STOP DUE TO HIGH-LEVEL IN MOISTURE SEPARATOR T-101.

BLOWER B-201 CONTROL CIRCUITS

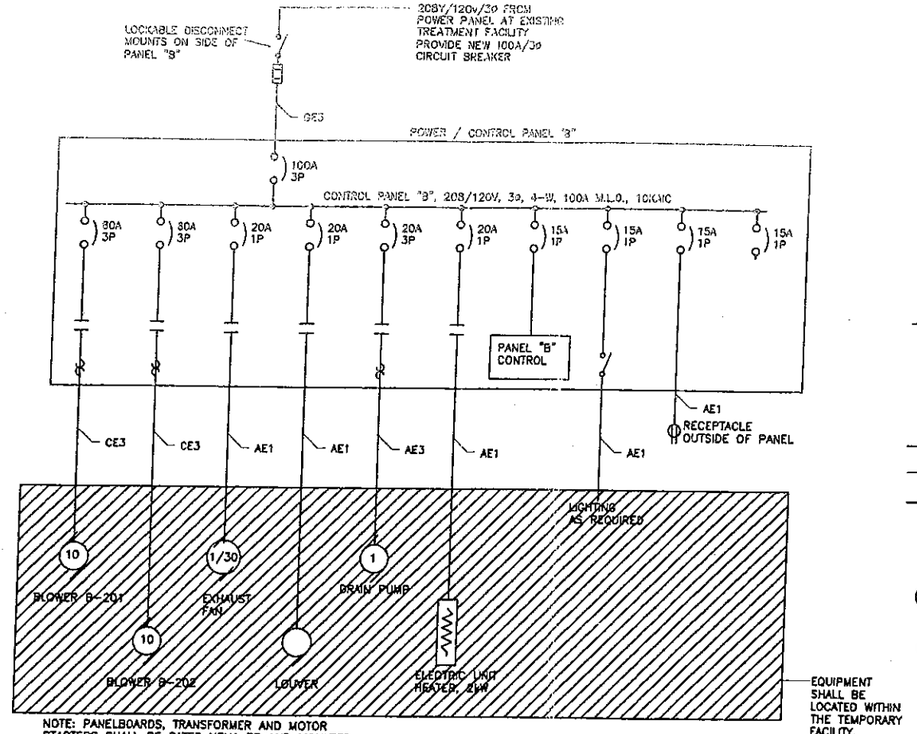
NOT TO SCALE



IN "MANUAL", B-202 STARTS AND RUNS TILL SWITCHED TO "STOP". IN "AUTO", RELAY CONTACTS TDE-101 WILL "OPEN" CAUSING B-202 TO STOP DUE TO HIGH-LEVEL IN MOISTURE SEPARATOR T-101.

BLOWER B-202 CONTROL CIRCUITS

NOT TO SCALE



NOTE: PANELBOARDS, TRANSFORMER AND MOTOR STARTERS SHALL BE RATED NEMA 3R AND MOUNTED ON THE EXTERIOR OF THE TREATMENT BUILDING.

SINGLE LINE DIAGRAM

NO SCALE

LEGEND

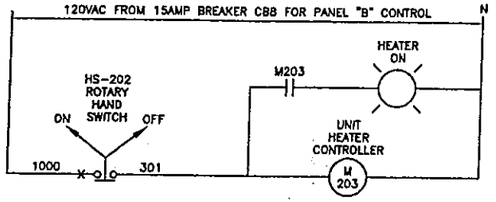
- ELECTRIC METER
- TRANSFORMER
- GROUND
- CIRCUIT BREAKER
- NODE
- PILOT LIGHT (R- RED)
- SWITCH/DISCONNECT
- FUSE
- CONTACT, N.O.
- CONTACT, N.C.
- COIL, MOTOR STARTER
- THERMAL MOTOR OVERLOAD
- MOTOR LOAD, # INDICATES H.P.
- FIELD TERMINAL BLOCKS

FEEDER SCHEDULE

	OVERCURRENT DEVICE RATING	CONDUCTORS +NEUTRAL *75°C	EGC (E)	SGC (THWHN) (S)	CONDUIT 1 PHASE (1)	CONDUIT 3 PHASE (3)
A	20	#12	#12	-	1/2"	1/2"
B	30	#10	#10	-	1/2"	1/2"
C	50	#8	#10	-	3/4"	1"
D	70	#6	#8	-	1"	1"
E	80	#4	#8	-	1 1/2	1 1/2"
F	90	#4	#8	-	1 1/2"	1 1/2"
G	100	#2	#8	#8	1 1/2"	1 1/2
H	125	#2	#6	#8	1 1/2"	1 1/2
I	150	#1/0	#6	#6	1 1/2"	2"
J	175	#2/0	#6	#4	2"	2"
K	200	#3/0	#6	#4	2"	2 1/2"
L	225	#3/0	#4	#4	2"	2 1/2"

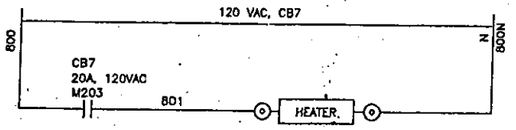
NOTES:

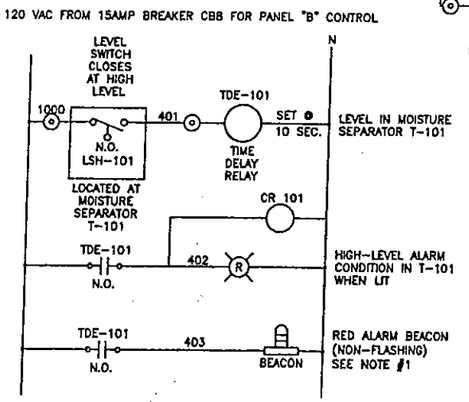
1. MOUNT RED ALARM BEACON IN A CONSPICUOUS LOCATION OUTSIDE TRAILER.
2. THE INPUT SIGNALS TO THE AUTODIALER CAN BE "DRY" CONTACTS, ANALOG, OR DIGITAL LOGIC. "DRY" CONTACTS ARE SHOWN IN WIRING SCHEMATIC. THE WIRING CONNECTIONS SHOWN ARE FOR A RACO "GUARD-II" AUTODIALER.
3. PURCHASE AUTODIALER WITH A.C. TO D.C. TRANSFORMER OR D.C. POWER SUPPLY.



ELECTRIC UNIT HEATER

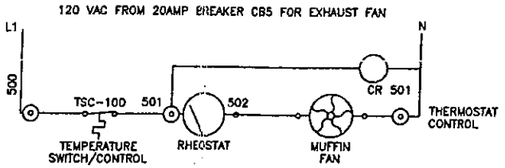
NOT TO SCALE

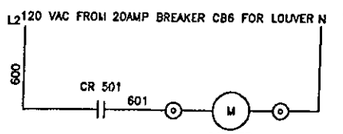




CONTROL PANEL "B" ALARM CIRCUITS

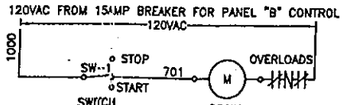
NOT TO SCALE





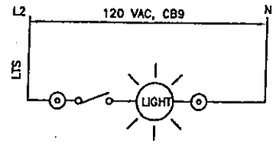
EXHAUST FAN DETAIL

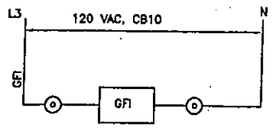
NOT TO SCALE

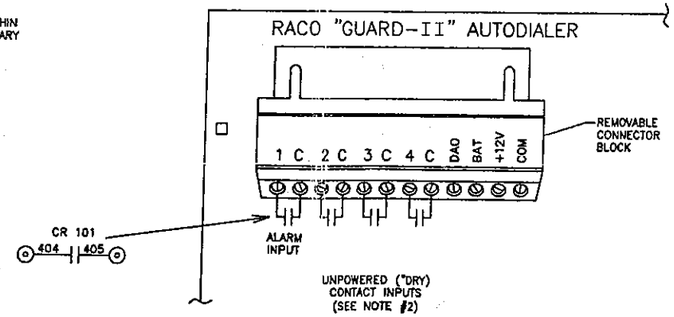


DRAIN PUMP WIRE DETAIL

NOT TO SCALE







AUTODIALER DETAIL (EXISTING)

NOT TO SCALE

REVISIONS

Rev	Date	By	Description
0			
1			
2			
3			
4			

DESIGNED BY:	DML
DRAWN BY:	DML
CHECKED BY:	CWP
PROJ. ENGR.	DMc

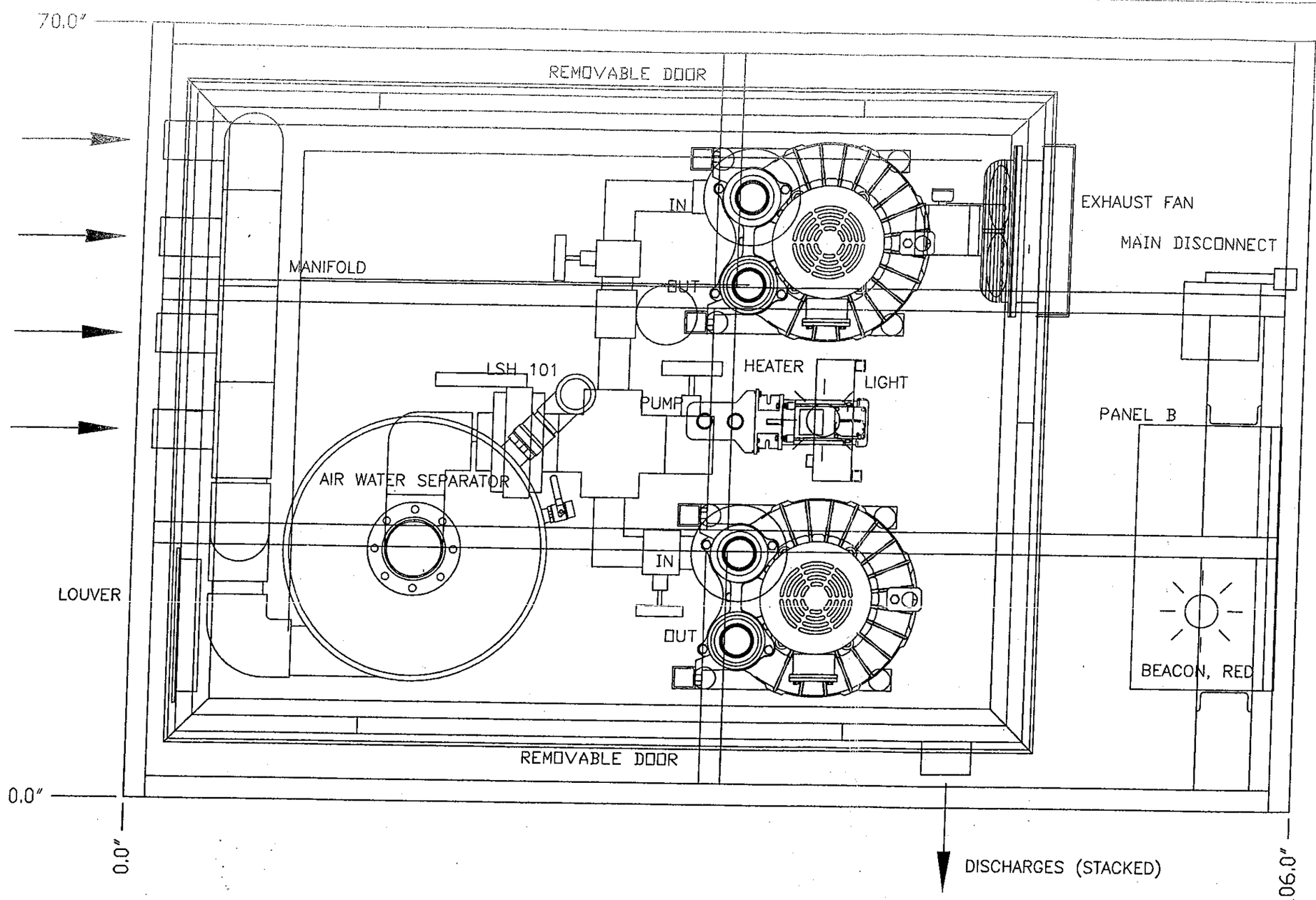
URS Corporation
Group Consultants
77 Goodell Street, Buffalo, New York 14203
(716)856-5636 · (716)856-2545 fax
JOB No. 11171964.00000

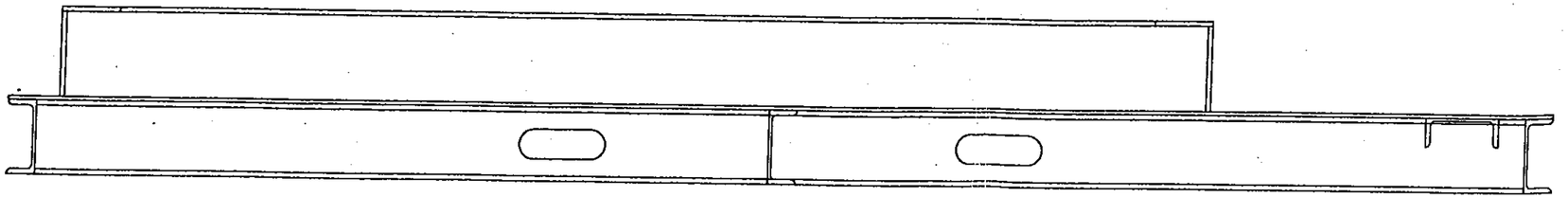
NYSDEC SITE 2-41-031
GLENDALE, QUEENS
KLIEGMAN BROTHERS SITE
OPERABLE UNIT NO. 1
GLENDALE, QUEENS NEW YORK

CONTRACT D006547
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 BROADWAY, ALBANY, NEW YORK

PRODUCT LEVEL CONTROL, INC.
ENVIRONMENTAL EQUIPMENT & CONTROLS
11929 Portland Ave S.
Burnsville, MN 55377
Phone: 952-707-9101
Fax: 952-707-1075

Customer	GWIT
Site Reference	KLIEGMAN BROTHERS UNIT 1
	GLENDALE, QUEENS
Cust. No.	PLC Job No. 07-050
Tolerance	NA
Rev.	0
Drawing No.	ELECTRICAL SCHEMATICS
Sheet No.	Sheet 1 of 1
Scale	NA
Drawn By	BGG
Drawn Date	9-26-07
Title	Electrical Schematics





REVISIONS			
Rev	Date	By	Description
0			
1			
2			
3			
4			

NOTES
- –PLACE VIBRATION DAMPENERS UNDER BLOWERS
- –INSTALL ¼" ISOLATION VALVES AT ALL PIs
- –INSTALL EQUIPMENT TO ALLOW FOR REMOVAL OF HOTBOX ENCLOSURE
- –INSTALL HOTBOX ON 6" HIGH CURB FROM SKID
- –ALLOW FOR POSSIBLE INSTALLATION OF ACOUSTIC HOODS ON EXHAUST FAN AND PASSIVE VENT
- –HEATER AND LIGHT MOUNTED TO FLOOR BRACKET
- –BOLT ALL MOUNTING BRACKETS TO FLOOR TO ALLOW FOR EASY REMOVAL
- --VERIFY ADEQUATE MAINTENANCE CLEARANCES (GREASE)
- --MAXIMIZE MANIFOLD HEADER HEIGHT (MANIFOLD HEADER IS HIGHER THAN AWS INLET)
- --NOISE LIMITATION: 70 dBA AT 3' FROM ENCLOSURE
- --TAKE NOISE READINGS AT PLC
- --NON CLASSIFIED SYSTEM
- --USE RIGID CONDUIT

PRODUCT LEVEL CONTROL, INC.
ENVIRONMENTAL EQUIPMENT & CONTROLS
11929 Portland Ave S.
Burnsville, MN 55377
Phone: 952-707-9101
Fax: 952-707-1075

Customer	GWTT
Site Reference	KLIEGMAN BROTHERS UNIT 1
	GLENDALE, QUEENS
Cust. No.	PLC Job No. 07-050
Tolerance ±4'	Rev. 0
Drawing No.	Plan
Sheet No. Sheet 1 of 1	Scale 1:10
Drawn By BGG	Drawn Date 9-26-07
Title	Plan

ATTACHMENT 1

AIR PERMIT

ATTACHMENT 2

PPE

WORK CLOTHING AND LEVELS OF PERSONNEL PROTECTION

Recommended appropriate levels of protective clothing to be worn in the event that hazardous materials are encountered are included below. The levels of protection planned for this project are identified in the Table. In general, typical work clothing will be worn on this project for O&M activities

The level of protection to be worn by field personnel will be defined and controlled by the O&M technician and/or their respective safety officer. Below is a list of tasks and the respective levels of protection when working on the project site.

Personal Protection Levels

TASK	PPE LEVEL OF PROTECTION			
	Initial	**Contingent**		**Comments**
Start-up & O&M activities, including carbon change-outs	Modified D	C		Dust masks, outer gloves
General Site Activity	D	C		

Definition of Levels of Protection:

Level D:
Normal work clothing
Work gloves, hard hat, safety glasses
A respirator is not required
Appropriate work boots

Modified Level D:
See Table 6-1 for task specific PPE
Chemical-resistant disposable coveralls or apron
Chemical-resistant outer gloves
Dust masks

Level C:
Full or Half face, Air Purifying Respirator (APR) with combination HEPA - P,O,N 100 (dusts, fumes, aerosols) and chemical cartridge as appropriate for hazard – at least two full face APRs will be maintained on-site by the SO during all field activities
Chemical-resistant disposable coveralls
Chemical-resistant outer gloves
Chemical-resistant inner gloves
Appropriate leather work boots with chemically resistant outer boots or chemically resistant rubber boots

	Safety glasses with side shields or splash goggles as needed
Level B:	Supplied air - air line or self-contained breathing apparatus (SCBA) Chemical-resistant disposable coveralls Chemical-resistant outer gloves Chemical-resistant inner gloves Appropriate leatherwork boots with chemically resistant outer boots or chemically resistant rubber boots

Additional PPE requirements:

Hard hats will be required onsite at all times within the limits of the site area affected by construction operations. High visibility safety vests will be required on-site whenever The Gourmet Factory is operating fork lifts or receiving deliveries.

Eye and face protection such as safety glasses will be required at all times. Eye and face protection such as goggles or face shield will be worn as needed to protect from chemical or physical hazards including the handling of corrosive chemicals and the use of power or impact tools.

Hand protection with gloves is not normally required. Gloves will be worn as needed to protect from chemical and physical hazards including the handling of corrosive chemicals, contact with contaminated ground water, and abrasion or laceration hazards.

ATTACHMENT 3

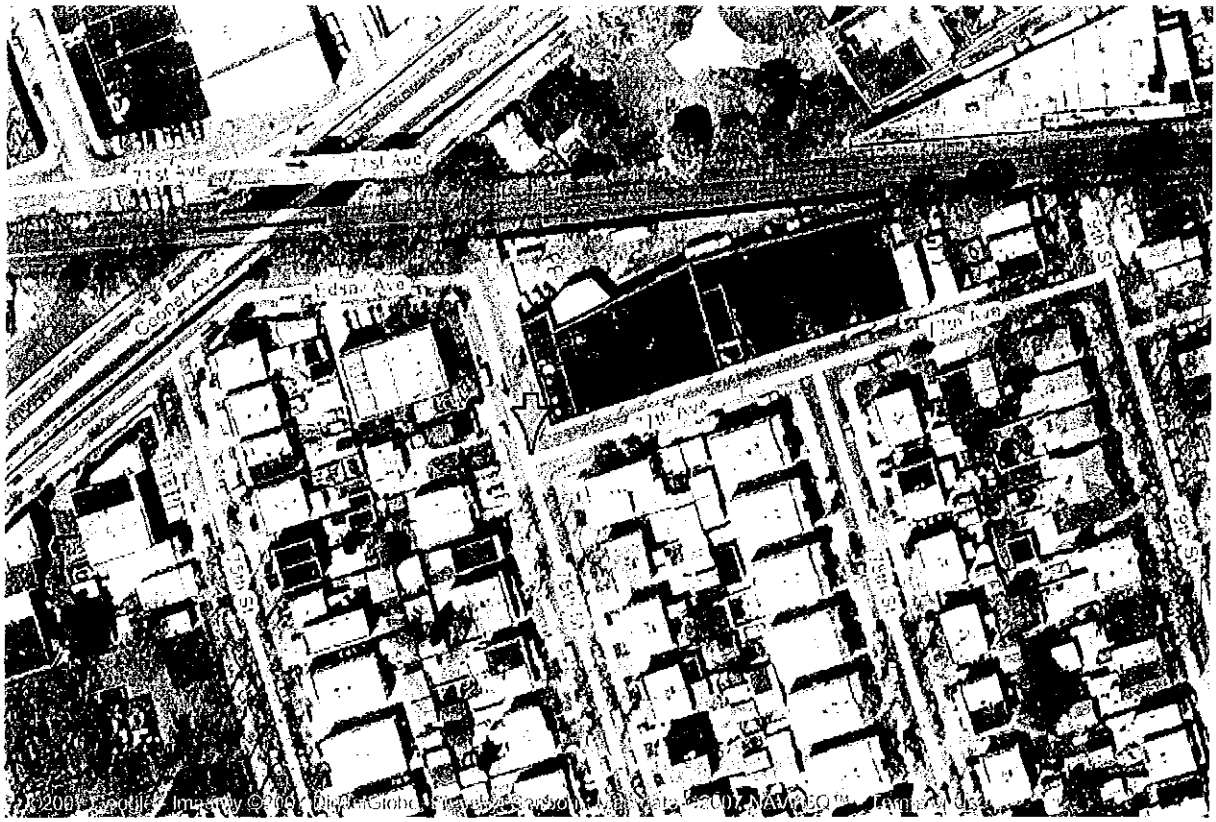
ON-SITE SAFETY FACILITIES

NOTE: A FIRST AID KIT IS MAINTAINED INSIDE THE HOT BOX ENCLOSURE AS REFERRED TO IN SECTION 1.7 OF THIS O&M MANUAL.

Google

Address

76-01 77th Ave
Ridgewood, NY 11385



ATTACHMENT 4

CONFINED SPACE SAFETY

NOTE: THE CONTENTS OF THIS ATTACHMENT ONLY REFER TO WORK INSIDE THE VAPOR PHASE CARBON ADSORBERS AT THIS SITE.

2008
CONFINED SPACE ENTRY PERMIT

1. All copies of this permit will remain at job site until job is completed. If hot work will be done, so indicate and complete that permit and attach it to this permit.
   Hot Work Required Yes ☐ No ☐
2. Location & identity of confined space _____
3. Description of work (purpose) _____
4. Most recent contents of confined space _____ Hazardous materials _____
5. MSDS requiring review _____

6.

Test(s) Required to Maintain Safe Environment	SAFE		RECHECK	
	Yes	No	Date	Time
Oxygen between 19.5 - 23.5%				
Flammable Vapor - Below 10% LEL				
Toxic Vapor CO_2 <50ppm				
Toxic Vapor H_2S <20ppm				
Toxic Vapor				

7.

Instruments Used to Test Atmosphere	Serial #

Please use T.W.A values above, as well as oxygen range, when determining safe conditions.

8. Persons Testing Confined Space Atmosphere — Title — Phone — Signature

9. Supervisors Eligible to be in Charge of Work — Title — Phone

10. Authorized Entrants — Last Confined Space Training Date
    1. _____
    2. _____

11. Authorized Attendants — Last Confined Space Training Date
    1. _____
    2. _____

12. Emergency Phone Numbers
    Plant Office _____
    Ambulance _____
    Fire Dept. _____
    Other _____

13. Potential Hazards

	Yes	No		Yes	No
Agitator startup	☐	☐	Oxygen deficiency	☐	☐
Toxic vapor	☐	☐	Oxygen enrichment	☐	☐
Unknown chemical content	☐	☐	Heat	☐	☐
Flammable vapor	☐	☐	Chemical input lines	☐	☐
Flammable mist	☐	☐	Steam input lines	☐	☐
Flammable gas	☐	☐	Water input lines	☐	☐
Poor ventilation	☐	☐	Chemical reaction/cleaning	☐	☐
Corrosive Materials	☐	☐	Sludge	☐	☐
Inadequate light	☐	☐	Falling objects	☐	☐
Dust	☐	☐	Attendant can't see worker	☐	☐
Electrical shock	☐	☐	Poor communication	☐	☐
Difficult to exit	☐	☐	Sharp, unguarded objects	☐	☐

Other Hazards _____

14. Precautions Taken Before Entry

	Yes	No		Yes	No
Lockout (isolate) agitator	☐	☐	Test for toxic vapor	☐	☐
Block/bleed all input lines	☐	☐	Lockout all valves into tanks	☐	☐
Provide continual ventilation	☐	☐	Purge with air before entry	☐	☐
Purge with water before entry	☐	☐	Purge with steam before entry	☐	☐
Test oxygen	☐	☐	Wear supplied air respirator	☐	☐
SCBA immediately available	☐	☐	Wear hearing protection	☐	☐
Read MSDSs	☐	☐	Complete hot work permit	☐	☐
Trained attendant available	☐	☐	Rescue harness and lifeline	☐	☐
Winch attached for rescue	☐	☐	Rescue team ready	☐	☐
Use non-sparking tools	☐	☐	Chemical goggles	☐	☐
Safety helmet	☐	☐	Consult lab or dept chief	☐	☐
Fire extinguisher	☐	☐	Lighting (explosion proof)	☐	☐
Protective coveralls	☐	☐	Gloves for the hazards	☐	☐
Ground fault	☐	☐	Circuit interrupter	☐	☐

15. Supervisor's signature authorizing entry indicates the confined space is safe to enter and all necessary precautions have been taken.

Supervisor Authorizing Entry (Print Name) — Title — Phone — Signature

Time/Date/Year Permit Issued ____/____/____ Time start work _____ Time/Date/Year Permit expires ____/____/____

Supervisor Canceling Entry Permit — Title — Phone — Signature

Copy to:

CONFINED SPACE ENTRY STATEMENT

In recognition of the special hazards posed to workers and rescuers that enter into confined spaces, MORETRENCH AMERICAN instituted a "Confined Space Entry" Policy and Procedures.

CONFINED SPACE ENTRY POLICY

NO EMPLOYEE WILL BE PERMITTED TO ENTER A "CONFINED SPACE" WITHOUT BEING MADE AWARE OF THE HAZARD(S) RELATED TO THE WORK IN THE "CONFINED SPACE", TRAINING AND WITHOUT THE APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT.

WORK IN A "CONFINED SPACE" WILL NOT START UNTIL DOCUMENTATION HAS BEEN RECEIVED THAT THE FIRE DEPARTMENT AND THE FIRST AID SQUAD IS TRAINED AND EQUIPPED TO PERFORM "CONFINED SPACE ENTRY RESCUE". IN THE EVENT THAT THE FIRE DEPARTMENT AND THE FIRST AID SQUAD CANNOT PERFORM A "CONFINED SPACE ENTRY RESCUE" A TRAINED AND EQUIPPED RESCUE TEAM ON SITE WILL BE PROVIDED IN ACCORDANCE WITH THE PROCEDURES OUTLINED ON PAGE SIX (6) OF THIS PROGRAM.

IN ADDITION, UNTIL THE "COMPETENT PERSON" IS ON-SITE NO ENTRY SHOULD BE MADE.

DEFINITIONS APPLICABLE TO PROCEDURE

CONFINED SPACE has the following characteristics:

Its size and shape allow a person to enter it.
It has limited openings for workers to enter and exit.
It is not designed for continuous occupancy.

PERMIT REQUIRED CONFINED SPACE is a space such as a tank, process or treatment vessels, manholes or bin which has limited opening for entry and exit and has potential for containing a serious hazard.

Any space is a permit required confined space if it:

* is not designed for **continuous** human occupancy.
* is large enough and configured so that bodily entry can be performed.
* has a limited or restricted entry or access.
* contains some type of **serious** hazard.

Some specific examples of a confined space are:

storage vessels - vats - tanks - railroad tank cars - tunnels - pipelines
sewers - trenches - furnaces - bins - underground utility vaults, manholes

PERMIT - Tells what hazards are in the Permit Required Confined Space and how to control them.
ATMOSPHERIC TESTING - Testing the air in all areas and levels of the space before entry. Monitoring continuously or re-testing periodically for as long as the space is occupied and for what is appropriate for the hazard involved.
OXYGEN CONTENT - Safe oxygen content must measure between 19.5% and 23.5%.
FLAMMABILITY - < 10% LEL/LFL
ENTRY SUPERVISOR - The person that verifies that the permit form is filled out completely, that all safety steps listed on permit are taken and then signs the form. The Entry Supervisor is responsible for removing unauthorized people, canceling permit and concluding the operation.
ATTENDANT - The person that remains continuously at his post at the entry point to observe conditions and support the entrant(s).
ENTRANT(s) - Person(s) entering confined space. Entrant(s) knows the hazards of the confined space and the signs of exposure. Entrant(s) stays in periodic or constant contact with the attendant.

RESPONSIBILITIES OF ALL EMPLOYEES

All employees must:

a. Be made aware of the appropriate procedure and controls for entry if they may be exposed to confined space in the course of work.
b. Be made aware that unauthorized entry into a confined space is absolutely **forbidden.**
c. Be told that the consequences of unauthorized entry into a confined space can be fatal and that their senses are not enough to detect and evaluate the severity associated with atmospheric hazards in a confined space.
d. Be provided the opportunity to observe any monitoring and testing of permit spaces.

DUTIES OF THE ENTRY SUPERVISOR

1. To assure that the pre-entry portions of the "Confined Space Entry Permit" are completed before any entry.

2. To verify that the pre-entry condition exist, but does not actually conduct any of the testing.

3. To verify that a certified rescue team, equipped with retrieval equipment and trained in "Confined Space Entry Rescue" from the area's First Aid Squad and Fire Department is available. In the event that the local Fire Department and/or First Aid is not trained and/or equipped, **A CERTIFIED RESCUE TEAM MUST BE ON STANDBY, WITH ALL OF THE NECESSARY PERSONAL PROTECTIVE EQUIPMENT AND RETRIEVAL EQUIPMENT.**

4. To notify the local Fire Department and First Aid, prior to an entry, of the time, location and duration of work in a "Confined Space." This confirms that they are alerted and should be prepared for a possible rescue.

5. To confirm that appropriate means of communication are in place and operable for the entry team. Communication can be verbal, hand signals, radio or telephone.

6. To confirm that the proper isolation of the "Confined Space" is in order. Blocking, securing parts, tagout/lockout & posting of area.

7. The Entry Supervisor may also serve as an attendant.

DUTIES OF AN ATTENDANT

1. The Attendant must remain outside the confined space entry at all times. THE ATTENDANT MUST NOT LEAVE HIS POST UNATTENDED AT ANY TIME FOR ANY REASON. If the Attendant needs to leave his position, then the Attendant must call the entry team out of the "Confined Space" or have another qualified Attendant take his place.

2. The Attendant is responsible for the "Confined Space Entry Permit."

   THE ATTENDANT WILL:

   a. Confirm that correct names of the entry team are posted on the "Confined Space Entry Permit."

   b. Ensure that all applicable parts of the permit are checked off and completed before allowing anyone from the entry team to enter into the "Confined Space."

   c. Ensure that all equipment going into the "Confined Space" is in safe operating condition, such as monitors, detectors, tools, retrieval lines & protective equipment.

   d. Ensure that the entry team has received any special instructions for the work to be performed before entering into "Confined Space."

   e. Take monitor/detector readings before entry, and at hourly intervals. Obtain monitor/detector readings hourly from the Lead person of the entry team.

   f. Keep constant contact either, verbally, hand signals or radio with all of the members of the entry team while they are in the "Confined Space."

   g. Call out any or all of the entry team if he feels that an immediate hazard exists, when any signs of stress or fatigue are noticed or when he (attendant) needs to leave his post and can not be replaced by another qualified attendant.

   h. Call out any or all of the entry team when any outside situation could pose a hazard to workers or when any change in the integrity of the exit exist.

   i. Summon rescue and other services during an emergency.

DUTIES OF ATTENDANT - continued

j. MAKE SURE THAT THE ENTRY TEAM UNDERSTANDS THAT WHEN THE ATTENDANT CALLS THEM OUT FOR ANY OF THE ABOVE REASONS, THAT THEY WILL IMMEDIATELY LEAVE WITHOUT ANY QUESTIONS.

k. Warn any unauthorized persons not to enter or tells them to leave if they have entered a permitted confined space and also alerts workers in the "Confined Space" of an unauthorized entry.

DUTIES OF THE ENTRANT OR ENTRY TEAM

1. All entrants must know the emergency action plan and be able to recognize the potential and real hazard associated with the "Confined Space Entry Permit."

2. Each entrant must know how to use the proper personal protective equipment required for the entry or rescue and the proper use of protective barriers and shields.
   - Each entrant shall use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point.
   - Wristlets may be used in lieu of the chest or full body harness if it is determined that it is the safest and most effective alternative.

3. Each entrant must know how to exit the confined space as rapidly as possible without help whenever:
   a. The Attendant orders an evacuation
   b. Any alarm from a monitor/detector sounds
   c. The entrant(s) recognizes the warning signs of exposure to substances that could be found in the confined space.

4. All entrants must be aware of the toxic effects or symptoms of hazardous materials that could be encountered in the confined space.

5. All entrants must know how to relay an alarm to the attendant and to attempt self-rescue immediately upon becoming aware of hazardous conditions.

6. All entrants must know any modification of normal work practices that are necessary for permit entry confined space work.

PRE-PLANNED "CONFINED SPACE" EMERGENCY EVACUATION

1. Evacuation is determined by the Attendant who has direct communication at all times with the Lead Entrant Person.

2. Lead Entrant Person must communicate the procedure being used for evacuation to the Attendant.

3. The Lead Person is responsible for ensuring that all other workers under his command are evacuated.

4. Self-rescue of all workers will be visually observed by Lead Entrant Person.

5. Establishing a Buddy System in order to assist in the responsibility of the Lead Entrant Person.

6. The Attendant will decide whether or not the Rescue Team is to be utilized and how.

DUTIES OF THE ON-SITE RESCUE TEAM

The on-site rescue team must:

1. Be equipped with all rescue and retrieval equipment supplied to them.

2. Be trained for confined space entry rescue work, including the proper wearing of and use of any personal protective equipment, including respirator, which may me needed during an actual rescue.

3. Practice drill of a rescue, simulating removal through a representative opening or portal, which has the same size, configuration and accessibility as the confine space where an actual rescue would be required.

4. Have at least one member of the rescue team certified in basic First Aid and CPR.

5. In the event that First Aid and/or CPR is to be rendered, *UNIVERSAL PRECAUTIONS must be adhered to in accordance with the Bloodborne Pathogen Standard. (29 CFR 1910.1030)
   *<u>UNIVERSAL PRECAUTIONS:</u> Is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are created as if known to be infectious for HIV, Hepatitis B and other Bloodborne pathogens.

GUIDELINES FOR RESCUE AND EMERGENCY SERVICES SELECTION

It is important to select rescue services or teams that are equipped and capable of minimizing harm to both entrants and rescuers if the need arises.

Initial Evaluation

Determine the following when using outside rescue services:

1. What are the needs with regards to response time (time for the service to receive notification, arrive at the scene, and set up and be ready for entry)? Arrange for the emergency rescue services to see the operations.

2. How quickly can the rescue team or service get from its location to the permit spaces from which rescue may be necessary?

3. What is the availability of the rescue service?

4. Does the rescue service meet the following requirements:
   - Provide affected employees with the personal protective equipment (PPE) needed to conduct permit space rescues safely and train affected employees so they are proficient in the use of that PPE, at no cost to those employees;
   - Request copies of training certificates;
   - Train affected employees in basic first-aid and cardiopulmonary resuscitation (CPR). The employer shall ensure that at least one member of the rescue team or service holding a current certification in first aid and CPR is available; and
   - Request when most recent "practice drill" was completed. Ensure that affected employees practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces. Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

5. Is an adequate method for communications between the attendant, employer and prospective rescuer available so that a rescue request can be transmitted to the rescuer without delay? How much sooner after notification can a prospective rescuer dispatch a rescue team to the entry site?

GUIDELINES FOR RESCUE AND EMERGENCY SERVICES SELECTION - continued

Performance Evaluation

During a performance evaluation, determine, after observing the rescue service perform a practice rescue whether the service's training or preparedness is adequate.

HAZARDS OF PERMIT REQUIRED CONFINED SPACE

The following are all to be addressed prior to any entry of the Permit Required Confined Space:

1. Identify and evaluate permit space hazards before allowing employee entry. The following are areas to be identified:

   * Hazardous Atmosphere - Engulfment - Machinery Movement Tagout/Lockout - Heat Stress - Wedging

2. Test condition in the permit space before entry operation and monitor the space during entry.

3. Perform, in the following sequence, appropriate testing for atmospheric hazards: oxygen, combustible gases or vapors, and toxic gases or vapors.

4. Implement necessary measures to prevent unauthorized entry such as keeping the attendant always at the entrance, proper posting of permit, blocking the "Permit Required" entrance with barrier tape, listing only "**AUTHORIZED**" PERSONS on the permit.

5. Entry into the permit required confined space shall only be permitted when there are acceptable entry conditions, isolating the permit space, providing barriers, verifying acceptable entry conditions, purging, flushing or ventilating the permit space. Gas hazards must be eliminated or controlled as necessary for safe permit space entry operation.

6. Clearly define each employees job duties following this procedure.

7. All of the personal protective equipment and any other equipment necessary for safe entry shall be provided, maintained and required for all employees. Examples: testing, monitoring, ventilation, communications, lighting equipment, barriers, shields and ladders.

HAZARDS OF PERMIT REQUIRED CONFINED SPACE - continued

8. One attendant shall be stationed outside the permit space for the duration of the entry operation.

9. Coordinate entry operations when employees of more than one employer are to be working in the permit space.

10. Review this procedure prior to any work in a permit required confined space or confined space entry.

11. When an attendant is required to monitor multiple spaces, that are permit required, the procedures to be followed shall be that of an emergency.

NON-PERMIT CONFINED SPACES

A non-permit confined space is a confined space that does not contain atmospheric hazard or have the potential to contain any hazard capable of causing death or serious physical harm.

NON-PERMIT CONFINED SPACES MUST BE REEVALUATED WHEN THERE ARE CHANGES IN THEIR USE OR CONFIGURATION AND WHERE APPROPRIATE, MUST BE RECLASSIFIED.

ATMOSPHERIC TESTING

The confined space must be checked for both oxygen and combustible gases/vapors before every entry. Due to instrument sensitivity and calibration requirements, several monitors may be needed to ensure that one is always operable. Only properly trained employees should be allowed to use monitoring equipment. The atmosphere must be checked periodically during work activities or monitored continuously.

VENTILATION

Continuous mechanical ventilation is advised throughout the entire confined space entry. Placing an air powered ventilator at the top of an opening which forces air from the top opening is an efficient means of providing fresh air.

PRE-ENTRY PROCEDURES

1. All sections on the "Confined Space Entry Permit" must be completed and checked by the issuer, attendant and entry supervisor.

2. All possible egress routes must be explained to workers before entering "Confined Space" and recorded in the special instructions section of permit.

3. Confirm that all individual names of entry team are correctly listed on the permit prior to entry.

4. IF TESTING AND INSPECTION DATA PROVE THAT A PERMIT REQUIRED CONFINED SPACE NO LONGER POSES HAZARDS, THAT SPACE MAY BE RECLASSIFIED AS A NON- PERMIT CONFINED SPACE.

5. The employer will document the basis for determining that all hazards in a confined space have been eliminated, through a certification that contain the date, the location of the space and the signature of the person making the determination. If requested, the certification shall be made available to each employee entering the space.

6. A space that is reclassified as a Non-Permit Confined Space shall be periodically air monitored to insure that there has been no change in atmospheric conditions.

7. Standard procedures may now be followed to allow a Non-Permit Required Confined Space entry.

8. If hazards arise within a Confined Space that has been classified as a Non-Permit Required Confined Space, each employee will immediately exit the space. The employer shall then reevaluate the space and determine whether if must be reclassified às a Permit Required Confined Space.

9. All documentation must be maintained for one (l) year after the completion of the job. This is to enable the employer to conduct an annual review of all permits that were issued.

10. An annual review will also be used to determine if procedures need to be updated, changed or eliminate.

PERMITS FOR HOT WORK

Hot work permits must be issued whenever the following operations are to take place in a "Confined Space":

a. Welding, burning, grinding, use of powder actuated tools, soldering and work involving open flames, high temperatures or sparks.

b. Use of electrically powered tools or other equipment that contain non-explosion proof motors or parts.

SUB-CONTRACTORS & SUPPLIERS

1. All sub-contractors and suppliers must also meet any of the requirements set forth in these procedures in order to protect themselves and the TEAM involved in the work of "Confined Space."

PERSONAL PROTECTIVE EQUIPMENT & SPECIAL EQUIPMENT

1. **Retrieval equipment** - If a vertical rescue may be required from the confined space and the depth of the space is more than 3 to 4 feet, a mechanical lifting device is needed. The following should be considered when choosing retrieval equipment:
   a. The size of the space and its opening.
   b. The location of the opening to the space.
   c. Obstacles within the space.
   d. The number of workers entering the space.
   e. The type of retrieval equipment available.
   f. Whether or not a rescue of the workers would be vertical or horizontal.

2. **Fall Protection** - Barricades or covers must be placed at the entrance to the confined space if a potential exists for workers or objects falling into the confined space. When appropriate, workers themselves should wear fall arresting equipment when entering the confined space.

3. **Entry & Exit** - Special equipment may be required in order to enable workers to safely enter and exit the confined space. Most often this will be a ladder, however, in some cases, a winch device or similar equipment may be needed.

4. **Warning Signs & Symbols** - Dikes, excavations and valve pits are not easily recognized as confined spaces, these types of areas must have legible signs placed on or near them warning others that a permit is required before entry.

REQUIREMENTS FOR PERMIT

The permit to be used must include the following:

* Number sequence to identify permit
* Specific permit space identification
* Purpose and date of entry
* Duration of authorization
* Authorized entrants by name
* Names of authorized attendant and entry supervisor
* Actual hazards of the identified space
* Control and isolation methods to be used
* Acceptable entry conditions
* Results of initial and periodic atmospheric testing
* Rescue and emergency services to be summoned
* Communication procedures authorized between attendant and entrants
* Equipment to be provided
* Other information as necessary
* Other permits, such as hotwork
* **ALL CANCELED ENTRY PERMITS SHALL BE KEPT ON RECORD BY THE EMPLOYER FOR ONE (1) YEAR.**

TRAINING AND EDUCATION

1. Before initial work assignments begin, proper training shall be provided for all workers who are required to work in permit spaces.
2. Upon completing this training, employers must ensure that employees have acquired the understanding, knowledge and skills necessary for the safe performance of their duties.
3. Additional training is required when: the job duties change, there is a change in the permit space program or the permit space operation presents a new hazard or when an employee's job performance shows deficiencies.
4. Training is also required of rescue team members, including cardiopulmonary resuscitation (CPR) and first aid training. Employers must certify that training has been accomplished and up to date.
5. It shall also be ensured that all employees who are part of the confined space entry team are trained in their assigned duties.
6. Upon completion of training, employees shall receive a certificate of training that includes the employee's name, signature or initials of trainer and dates of training. The certification must be made available for inspection by employees and their authorized representatives.

SPECIFIC CONFINED SPACE ENTRY POLICY FOR NEW CONSTRUCTION

In accordance with the Code of Federal Regulations 29 Part 1926 the aforementioned Confined Space Entry Procedures will be applied when the work being conducted is identified as new construction.

The following are OSHA Standards, which apply to Confined Space Entry:

Safety Training and Education; 29 CFR 1926.21(b)(6)(i) & .21(b)(6)(ii):

1. All employees required to enter into confined or enclosed spaces shall be instructed as to the nature of the hazard(s) involved, the necessary precautions to be taken and in the use of protective and emergency equipment required. The employer shall comply with any specific regulations that apply to work in dangerous or potentially dangerous areas.

2. For the purpose of the above statement "confined or enclosed space" means any space having a limited means of egress, which is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere. Confined or enclosed spaces include, but are not limited to: **Storage Tanks, Process Vessels, Bins, Boilers, Ventilation or Exhaust Ducts, Sewers, Underground Utility Vaults, Pump Stations, Tunnels, Pipelines, and Open Top Spaces more than four (4) feet in depth such as Pits, Tubs, Vaults and Vessels, Manholes, etc.**

Welding, Cutting, and Heating in a Confined Space; 29 CFR 1926.353(b),(c),(d),(e):

1. Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.

2. General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits.

SPECIFIC CONFINED SPACE ENTRY POLICY FOR NEW CONSTRUCTION

Welding, Cutting, and Heating in a Confined Space; 29 CFR 1926.353(b),(c),(d),(e):

3. Local Exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration within safe limits in the breathing zone.

4. Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.

5. Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust from clothing, or for cleaning the work area.

6. When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators in accordance with the requirements of Subpart E - Personal Protective Equipment and Life Saving Equipment. An employee shall be stationed outside of such a confined space to maintain communication with those working within it and to aid them in case of an emergency.

7. Where a welder must enter a confined space through a manhole or other small opening, means shall be provided for quickly removing him in case of emergency. A full body harness and lifeline shall be used for this purpose. An employee shall be designated as the attendant for the purpose of maintaining communication with those working within the confined space, so that they are able to observe the welder and should be capable of putting rescue operations into effect.

SPECIFIC CONFINED SPACE ENTRY POLICY FOR NEW CONSTRUCTION

Trenching/Excavation; 29 CFR 1926.651(g)(1), (2):

1. Where oxygen deficiency (atmospheres containing less than 19.5% oxygen) or a hazardous atmosphere exist or could reasonably be expected to exist, the atmospheres in the excavation shall be tested before employees enter excavation greater than four (4) feet in depth.

2. Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less that 19.5% oxygen and other hazardous atmospheres. **These precautions include proper respiratory protection or ventilation in accordance with the General Confined Space Entry Policy as outlined on pages 1 through 11 of this Program.**

3. Adequate precautions shall be taken to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20% of the lower flammable limit or the gas.

4. When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

5. Emergency Rescue Equipment, such as breathing apparatus, a safety harness with lifeline, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation.

6. Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

SPECIFIC CONFINED SPACE ENTRY POLICY FOR NEW CONSTRUCTION

Power Transmission and Distribution; 29 CFR 1926. 950(a), (b):

1. Appropriate warning signs shall be promptly placed when covers of manholes, handholes or vaults are removed. The appropriate warning sign depends upon the nature and location of the hazards involved.

2. Before an employee enters a street opening, such as a manhole or an unvented vault, it shall be promptly protected with a barrier, temporary cover, or other suitable guard.

3. When work is to be performed in a manhole or unvented vault:

   a. No entry shall be permitted unless forced ventilation is provided or the atmosphere is found safe by testing for oxygen deficiency and the presence of explosive gases or fumes;

   b. Where unsafe conditions are detected, by testing or other means, the work area shall be ventilated and otherwise made safe before entry;

   c. Provisions shall be made for an adequate continuous supply of forced air.

4. While work is being performed in manholes, an employee shall be available in the immediate vicinity to render emergency assistance as may be required. This shall not preclude the employee in the immediate vicinity from occasionally entering a manhole to provide assistance other than emergency. This requirement does not preclude a qualified employee, working alone, from entering for brief periods of time, a manhole where energized cable or equipment are in service, for the purpose of inspection, housekeeping, taking readings or similar work if such work can be performed safely.

5. Before using open flames in a manhole or excavation in an area where combustible gases or liquids may be present, such as near a gasoline service station, the atmosphere of the manhole or excavation shall be tested and found safe or cleared of the combustible gases or liquid.

SPECIFIC CONFINED SPACE ENTRY POLICY FOR NEW CONSTRUCTION

MANHOLE ENTRY

1. Appropriate warning signs shall be promptly placed when covers of manholes, handholes or vaults are removed. The appropriate warning sign is dependent upon the nature and location of the hazards involved.

2. Before an employee enters a street opening, such as a manhole or an unvented vault, it shall be promptly protected with a barrier, temporary cover, or other suitable guard.

3. When work is to be performed in a manhole or unvented vault:

   a. No entry shall be permitted unless forced ventilation is provided or the atmosphere is found safe by testing for oxygen deficiency and the presence of explosive gases or fumes;

   b. Where unsafe conditions are detected, by testing or other means, the work area shall be ventilated and otherwise made safe before entry;

   c. Provisions shall be made for an adequate continuous supply of forced air.

4. While work is being performed in manholes, an employee shall be available in the immediate vicinity to render emergency assistance as may be required. This shall not preclude the employee in the immediate vicinity from occasionally entering a manhole to provide assistance other than emergency. This requirement does not preclude a qualified employee, working alone, from entering for brief periods of time, a manhole, for the purpose of inspection, housekeeping, taking readings or similar work if such work can be performed safely.

5. Before using open flames in a manhole or excavation in an area where combustible gases or liquids may be present, such as near a gasoline service station, the atmosphere of the manhole or excavation shall be tested and found safe or cleared of the combustible gases or liquid.

6. **SMOKING IN ANY MANHOLE IS STRICTLY FORBIDDEN.**

SPECIFIC CONFINED SPACE ENTRY POLICY FOR NEW CONSTRUCTION

MANHOLE ENTRY - continued

7. Ladders used in Manholes shall extend 36 inches above the surface landing.

8. Job made single ladders 30 feet or longer shall not be used.

9. Ladders shall be visual inspected prior to each use to insure that they are free from oil, grease and other slipping hazards.

10. Ladders that have been found to be defective or show signs of structural defects i.e., missing/broken rungs, split rails, missing cleats shall be tagged as defective and immediately taken out of service.

11. Fixed ladders in use where the total length of the climb equals or exceed 24 feet, the fixed ladder will be equipped with one of the following:

    a. Ladder Safety Device

    b. Self-retracting lifelines and rest platforms at intervals not to exceed 150 feet.

    c. A cage or well and multiple ladder sections, each ladder section not to exceed 50 feet in length. Ladder sections shall be offset from adjacent sections and landing platforms shall be provided at a maximum interval of 50 feet.

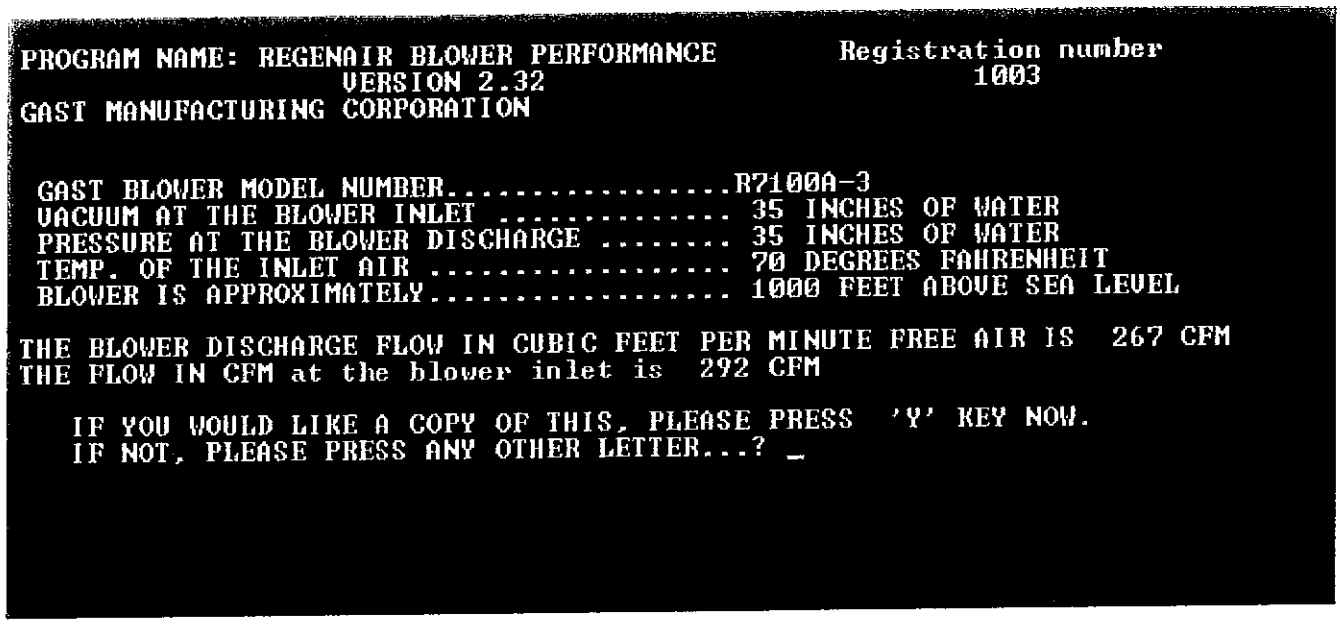
12. Employees shall face the ladder when ascending or descending.

13. Each employee shall use at least one (1) hand to grasp the ladder when progressing up and/or down the ladder.

14. An employee shall not carry any object or load that could cause the employee to lose balance and fall.

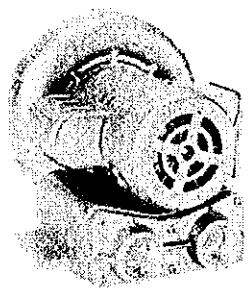
ATTACHMENT 5

REGENERATIVE BLOWER CUT SHEETS AND RELATED INFORMATION

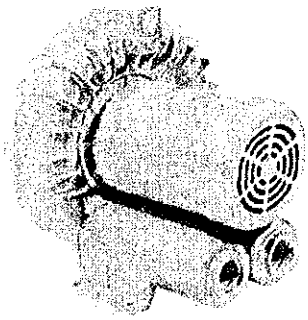

PROGRAM NAME: REGENAIR BLOWER PERFORMANCE
VERSION 2.32
Registration number
1003
GAST MANUFACTURING CORPORATION
GAST BLOWER MODEL NUMBER.....R7100A-3
VACUUM AT THE BLOWER INLET ..... 35 INCHES OF WATER
PRESSURE AT THE BLOWER DISCHARGE ..... 35 INCHES OF WATER
TEMP. OF THE INLET AIR ..... 70 DEGREES FAHRENHEIT
BLOWER IS APPROXIMATELY..... 1000 FEET ABOVE SEA LEVEL
THE BLOWER DISCHARGE FLOW IN CUBIC FEET PER MINUTE FREE AIR IS 267 CFM
THE FLOW IN CFM at the blower inlet is 292 CFM
IF YOU WOULD LIKE A COPY OF THIS, PLEASE PRESS 'Y' KEY NOW.
IF NOT, PLEASE PRESS ANY OTHER LETTER...? _

STANDARD REGENAIR BLOWER

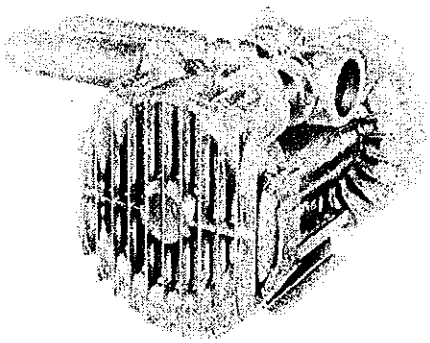
OPERATION & MAINTENANCE MANUAL



Model R1 Shown



Model R6P350A Shown



Model R7P Shown

Thank you for purchasing this Gast product. It is manufactured to the highest standards using quality materials. Please follow all recommended maintenance, operational and safety instructions and you will receive years of trouble free service.

IMPORTANT: PLEASE READ THIS MANUAL AND SAVE FOR FUTURE REFERENCE.

General information

This manual does not apply to:

- SDR Series blowers without motors
- Blowers powered with Explosion Proof Motors

Product Use Criteria:

- Pump only clean, dry air.
- Operate at 32°F - 104°F (0°C - 40°C).
- Protect unit from dirt & moisture.
- Do not pump flammable or explosive gases or use in an atmosphere that contains such gases.
- Protect all surrounding items from exhaust air. This exhaust air can become very hot.
- Corrosive gases and particulate material will damage unit. Water vapor, oil-based contaminants or other liquids must be filtered out.
- The blower must be installed with the properly sized inlet and inline filters, gauges and relief valves to protect the product from dirt and over-heating.
- Consult your Gast Distributor/Representative before using at high altitudes.

GAST

A Unit of IDEX Corporation

ISO 9001 & 14001 CERTIFIED

www.gastmfg.com

Your safety and the safety of others is extremely important.

We have provided many important safety messages in this manual and on your product. Always read and obey all safety messages.

This is the safety alert symbol. This symbol alerts you to hazards that can kill or hurt you and others. The safety alert symbol and the words "DANGER" and "WARNING" will precede all safety messages. These words mean:

⚠ DANGER

You will be killed or seriously injured if you don't follow instructions.

⚠ WARNING

You can be killed or seriously injured if you don't follow instructions.

All safety messages will identify the hazard, tell you how to reduce the chance of injury, and tell you what can happen if the safety instructions are not followed.

INSTALLATION

⚠ WARNING

Electrical Shock Hazard

Disconnect electrical power at the circuit breaker or fuse box before installing this product.

Install this product where it will not come into contact with water or other liquids.

Install this product where it will be weather protected.

Electrically ground this product.

Failure to follow these instructions can result in death, fire or electrical shock.

Correct installation is your responsibility. Make sure you have the proper installation conditions and that installation clearances do not block air flow.

Blocking air flow over the product in any way can cause the product to overheat.

The blower must be installed with the properly sized inlet filter, gauge and relief valve to protect the product from dirt and over-heating.

Mounting

The single impeller blower should be oriented with the shaft in a horizontal position, unless the model's product features state otherwise. The dual impeller models must be mounted with the shaft in a horizontal position. Mounting the product to a stable, rigid operating surface and using shock mounts will reduce noise and vibration.

Rotation

From the motor side of the blower, check that the blower is rotating clockwise. (The motor side is marked with an arrow on most models.) Proper rotation can also be checked by the air flow at the IN and OUT ports. On blowers powered by a 3-phase motor, incorrectly connecting any two power lines can reverse direction.

Plumbing

Remove any foreign material (burrs, chips, welding drops, slag, pipe cuttings, excess sealant, sand or lime) from plumbing.

Check motor mounting and rotation before connecting to plumbing. Inlet and outlet ports are not designed to support plumbing.

Remove plugs from the IN and OUT ports. Use a small amount of pipe thread lubricant when connecting plumbing to protect the aluminum blower threads. Connect with pipe and fittings that are the same size or larger than the product's threaded ports. When installing two blowers in parallel, use plumbing that is two whole pipe sizes larger in diameter than that of the blower. Be sure to connect the intake and exhaust plumbing to the correct inlet and outlet ports.

Plumbing to remove the hot discharge air of larger blowers may be required to help maintain proper room ambient temperature. Use a relief valve to discharge excess air into the atmosphere. If the blower will be operated at 125mbar (50" H_2O) or higher, metal pipe is required for hot exhaust air.

Accessories

Install two vacuum gauges, one before and one after filter, to monitor restriction through filters. As filters become clogged, performance efficiency will be reduced. Filters should be checked periodically and replaced when necessary. See page 7 for installation.

Install a relief valve to avoid changes in pressure or vacuum that can cause overloading of large blowers. Install an intake filter with a relief valve to prevent foreign material from entering blower if blower is used in a vacuum application in a dirty environment. In applications where there is high humidity or liquids being used in the process, install a moisture separator.

See Recommended Accessories on pages 7-9 or consult your Gast Distributor/Representative for additional filter and accessories recommendations. Do Not install check valves that close with a strong spring. The recommended check valves (page 7) provide minimal pressure drop, positive sealing and are resistant to the high discharge temperatures of large blowers.

Motor Control

It is your responsibility to contact a qualified electrician and assure that the electrical installation is adequate and in conformance with all national and local codes and ordinances.

Select fuses, motor protective switches or thermal protective switches to provide protection. Fuses act as short circuit protection for the motor, not as protection against overload. Incoming line fuses must be able to withstand the motor's starting current. Motor starters with thermal magnetic overload or circuit breakers protect motor from overload or reduced voltage conditions. Motors without automatic restart require thermal protection or magnetic over-current cutout to prevent motor overloading from one phase in a 3-phase circuit, high starting frequency or jammed blower.

The power required will rise as differential pressure increases. The wiring diagram attached to the product or on page 6 of this manual provides required electrical information. Large motors have two diagrams, one for 50Hz wiring specifications and the other for 60Hz wiring specifications. Check that the power source is correct to properly operate the dual-voltage motor. If additional information is required, please consult your Gast Distributor/Representative.

Electrical Connection

⚠ WARNING

Electrical Shock Hazard

This product must be properly grounded.

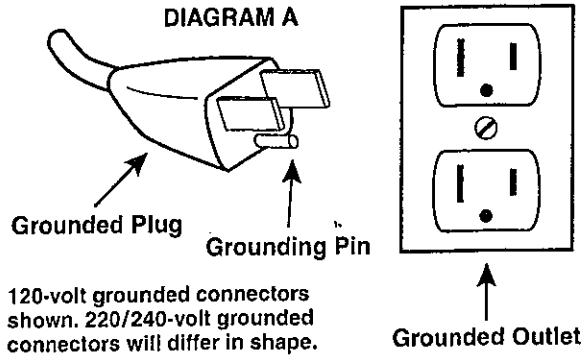
Do not modify the plug provided. If it will not fit the outlet, have the proper outlet installed by a qualified electrician.

If repair or replacement of the cord or plug is necessary, do not connect the grounding wire to either flat blade terminal. The wire with insulation that is green or green with yellow stripes is the grounding wire.

Check the condition of the power supply wiring. Do not permanently connect this product to wiring that is not in good condition or is inadequate for the requirements of this product.

Failure to follow these instructions can result in death, fire or electrical shock.

DIAGRAM A



120-volt grounded connectors shown. 220/240-volt grounded connectors will differ in shape.

Model with a power supply cord:
This product must be grounded. For either 120-volt or 220/240-volt circuits connect power supply cord grounding plug to a matching grounded outlet. Do not use an adapter. (See DIAGRAM A)

In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current. This product may be equipped with a power supply cord having a grounding wire with an appropriate grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

Check with a qualified electrician or serviceman if the grounding instructions are not completely understood, or if you are not sure whether the product is properly grounded. Do not modify the plug provided. If it will not fit the outlet, have the proper outlet installed by a qualified electrician.

Model that is permanently wired:
This product must be connected to a grounded, metallic, permanent wiring system, or an equipment grounding terminal or lead on the product.

Power supply wiring must conform to all required safety codes and be installed by a qualified person. Check that supply voltage agrees with that listed on product nameplate.

Extension cords:
Use only a 3-wire extension cord that has a 3-blade grounding plug. Connect extension cord plug to a matching 3-slot receptacle. **Do not use an adapter.** Make sure your extension cord is in good condition. Check that the gage wire of the extension cord is the correct size wire to carry the current this product will draw.

An undersized cord is a potential fire hazard, and will cause a drop in line voltage resulting in loss of power causing the product to overheat. The following table indicates the correct size cord for length required and the ampere rating listed on the product nameplate. **If in doubt, use the next heavier gage cord. The smaller the gage number, the heavier the wire gage.**

Minimum gage for extension cords

Amps	Volts	Length of cord in feet								
	120v	25	50	100	150	200	250	300	400	500
	240v	50	100	200	300	400	500	600	800	1000
0-2		18	18	18	16	16	14	14	12	12
2-3		18	18	16	14	14	12	12	10	10
3-4		18	18	16	14	12	12	10	10	8
4-5		18	18	14	12	12	10	10	8	8
5-6		18	16	14	12	10	10	8	8	8
6-8		18	16	12	10	10	8	6	6	6
8-10		18	14	12	10	8	8	6	6	4
10-12		16	14	10	8	8	6	6	4	4
12-14		16	12	10	8	6	6	6	4	2
14-16		16	12	10	8	6	6	4	4	2
16-18		14	12	8	8	6	4	4	2	2
18-20		14	12	8	6	6	4	4	2	2

OPERATION

⚠ WARNING

Injury Hazard

Install proper safety guards as needed to prevent any close contact with blower suction area.

Keep fingers and objects away from openings and rotating parts.

Product surfaces become very hot during operation, allow product surfaces to cool before handling.

Air stream from product may contain solid or liquid material that can result in eye or skin damage, wear proper eye protection.

Wear hearing protection. Sound level from some models may exceed 85 dBA.

Failure to follow these instructions can result in burns, eye injury or other serious injury.

It is your responsibility to operate this product at recommended pressures or vacuum duties and room ambient temperatures. Do not operate R4P or larger size blowers without air flowing through the blower. Do not throttle discharge or suction pipe to reducer capacity. Throttle will increase differential pressure causing increasing power absorption and working temperatures.

Start Up

Operate blower for an hour and then check:

1. **Ambient temperature** – Check room and discharge air temperatures. Increased room temperatures may require stronger ventilation especially for larger blowers. Exhaust air should not exceed 215°F (102°C) for all blowers less than 3.5 Hp. Exhaust air should not exceed 275°F (135°C) for all blowers above 3.5 Hp.
2. **Working pressure and vacuum values** – Adjust relief valve pressure or vacuum setting, if needed.
3. **Motor current** – Check that supply current matches recommended current rating on product nameplate.
4. **Electrical overload cutout** – Check that current matches rating on product nameplate.

If motor fails to start or slows down significantly under load, shut off and disconnect from power supply. Check that the voltage is correct for motor and that motor is turning in the proper direction.

MAINTENANCE

⚠ WARNING

Electrical Shock Hazard

Disconnect electrical power supply cord before performing maintenance on this product.

If product is hard wired into system, disconnect electrical power at the circuit breaker or fuse box before performing maintenance on this product.

Failure to follow these instructions can result in death, fire or electrical shock.

⚠ WARNING

Injury Hazard

Product surfaces become very hot during operation, allow product surfaces to cool before handling.

Air stream from product may contain solid or liquid material that can result in eye or skin damage, wear proper eye protection.

Failure to follow these instructions can result in burns, eye injury or other serious injury.

It is your responsibility to regularly inspect and make necessary repairs to this product in order to maintain proper operation. Make sure that pressure and vacuum is released from product before starting maintenance.

Check filter elements and noise absorbing foam used in mufflers and clean motor and blower after first 500 hours of operation. Replace filter elements and determine how frequently mufflers should be checked during future operation. This one procedure will help assure the product's performance and service life.

When there is an increase in the differential pressure across the inlet filter it is beginning to clog with dirt. Replace the cartridge when the filter will not come clean.

Small motor bearings (less than 5.5 Hp) never need to be greased. Larger motor bearings (greater than 5.5 Hp) have alemite grease fittings. Use a grease gun and apply one or two strokes of Exxon POLYREX® grease to the fittings to lubricate larger motor bearings.

Hours of Service Per Year	Relubrication Intervals
5,000	3 years
Continual Normal Service	1 year
Seasonal Service (motor idle for 6 months or more)	1 year at beginning of season
Continuous-high ambients, dirty or moist applications	6 months

Check that all external accessories such as relief valves and gauges are not damaged before re-operating product.

WARRANTY

Gast finished products, when properly installed and operated under normal conditions of use, are warranted by Gast to be free from defects in material and workmanship for a period of twelve (12) months from the date of purchase from Gast or an authorized Gast Representative or Distributor. In order to obtain performance under this warranty, the buyer must promptly (in no event later than thirty (30) days after discovery of the defect) give written notice of the defect to Gast Manufacturing Incorporated, PO Box 97, Benton Harbor Michigan USA 49023-0097 or an authorized Service Center (unless specifically agreed upon in writing signed by both parties or specified in writing as part of a Gast OEM Quotation). Buyer is responsible for freight charges both to and from Gast in all cases.

This warranty does not apply to electric motors, electrical controls, and gasoline engines not supplied by Gast. Gast's warranties also do not extend to any goods or parts which have been subjected to misuse, lack of maintenance, neglect, damage by accident or transit damage.

THIS EXPRESS WARRANTY EXCLUDES ALL OTHER WARRANTIES OR REPRESENTATIONS EXPRESSED OR IMPLIED BY ANY LITERATURE, DATA, OR PERSON. GAST'S MAXIMUM LIABILITY UNDER THIS EXCLUSIVE REMEDY SHALL NEVER EXCEED THE COST OF THE SUBJECT PRODUCT AND GAST RESERVES THE RIGHT, AT ITS SOLE DISCRETION, TO REFUND THE PURCHASE PRICE IN LIEU OF REPAIR OR REPLACEMENT.

GAST WILL NOT BE RESPONSIBLE OR LIABLE FOR INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, however arising, including but not limited to those for use of any products, loss of time, inconvenience, lost profit, labor charges, or other incidental or consequential damages with respect to persons, business, or property, whether as a result of breach of warranty, negligence or otherwise. Notwithstanding any other provision of this warranty, BUYER'S REMEDY AGAINST GAST FOR GOODS SUPPLIED OR FOR NON-DELIVERED GOODS OR FAILURE TO FURNISH GOODS, WHETHER OR NOT BASED ON NEGLIGENCE, STRICT LIABILITY OR BREACH OF EXPRESS OR IMPLIED WARRANTY IS LIMITED SOLELY, AT GAST'S OPTION, TO REPLACEMENT OF OR CURE OF SUCH NONCONFORMING OR NON-DELIVERED GOODS OR RETURN OF THE PURCHASE PRICE FOR SUCH GOODS AND IN NO EVENT SHALL EXCEED THE PRICE OR CHARGE FOR SUCH GOODS. GAST EXPRESSLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE WITH RESPECT TO THE GOODS SOLD. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTIONS SET FORTH IN THIS WARRANTY, notwithstanding any knowledge of Gast regarding the use or uses intended to be made of goods, proposed changes or additions to goods, or any assistance or suggestions that may have been made by Gast personnel.

Unauthorized extensions of warranties by the customer shall remain the customer's responsibility.

CUSTOMER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF GAST PRODUCTS FOR CUSTOMER'S USE OR RESALE, OR FOR INCORPORATING THEM INTO OBJECTS OR APPLICATIONS WHICH CUSTOMER DESIGNS, ASSEMBLES, CONSTRUCTS OR MANUFACTURES.

This warranty can be modified only by authorized Gast personnel by signing a specific, written description of any modifications.

ELECTRICAL WIRING DIAGRAMS

Models
R1102, R2103, R2105, R3105-1, R3105-12, R4110-2, R4P115, R5125-2, R6125-2

Low Voltage Single Phase			High Voltage Single Phase	
Blue	P1	Line	P1	Line
Brown	P2		P2	Insulate
Black	5	Tie together & Insulate	5	
Orange	3		3	Tie together & Insulate
White	2		2	
Yellow	4	Tie together Line	4	Line

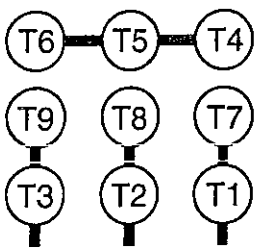
Model
R1S103

	Volt High	Volt Low
Line A	1	1, 3, 5
Line B	4	4
Join	2, 3, 5	–
Join	J, 8	2, J, 8

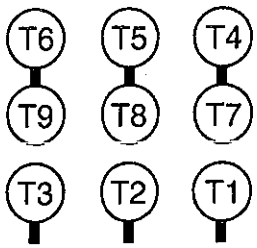
Models
R2303A, R3305A-1, R3305A-13, R4310A-2, R4P315A, R6350A-2, R6P350A, R6PP3110M, R6PS3110M, R7100A-3, R7P3180M, R7S3180M, R93150A

Note: Model R6P355A has two additional leads labeled "J" for an external thermal motor protection circuit.

Connections for 3-Phase, 9 Leads

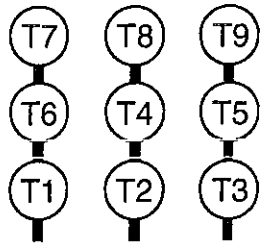


Line
Low Voltage

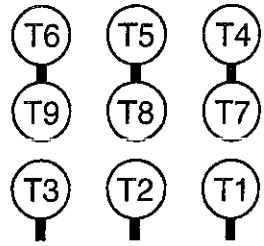


Line
High Voltage

Model R9P3300M Only

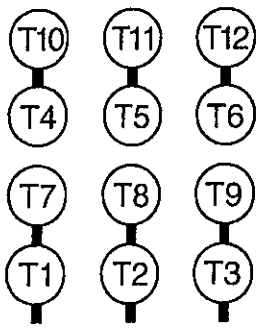


Line
Low Voltage

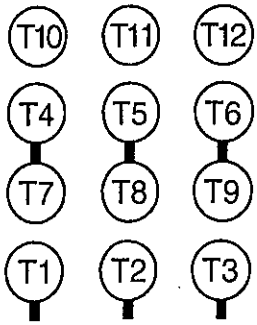


Line
High Voltage

Connections for 3-Phase, 12 Leads
Models R6335A-2, R6P335A

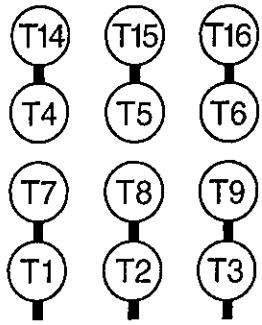


Line
Low Voltage

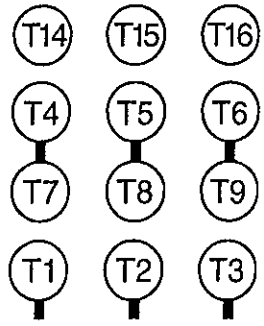


Line
High Voltage

Models R5325A-2, R6325A-2



Line
Low Voltage



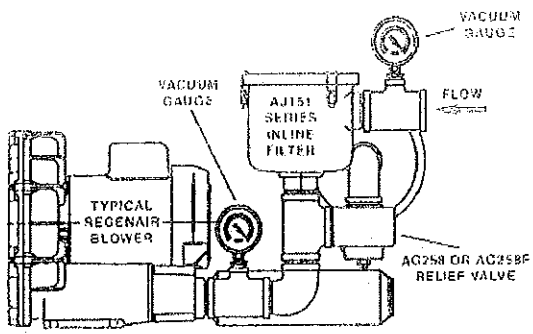
Line
High Voltage

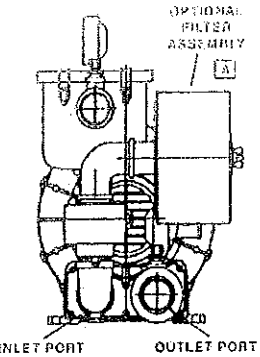
To reverse rotation on any 3-Phase motor, interchange any two external motor line connections to any two line leads.

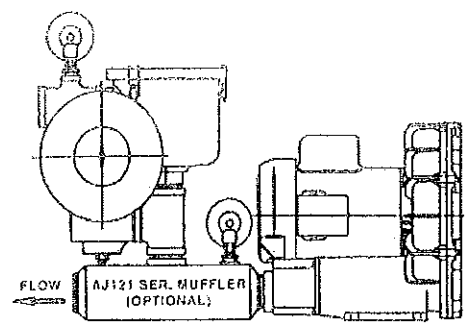
RECOMMENDED ACCESSORIES

The following diagrams are only suggested configurations for these accessories. These accessory configurations may vary depending upon a particular unit's application.

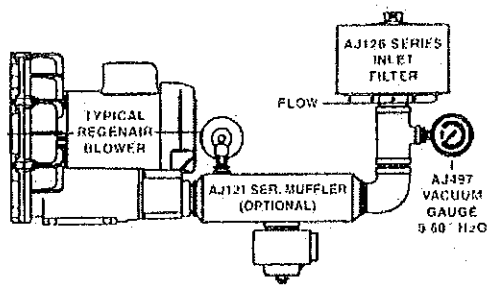
VACUUM ACCESSORIES

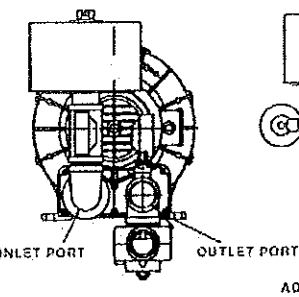


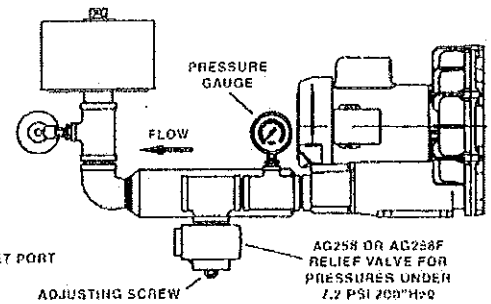




PRESSURE ACCESSORIES





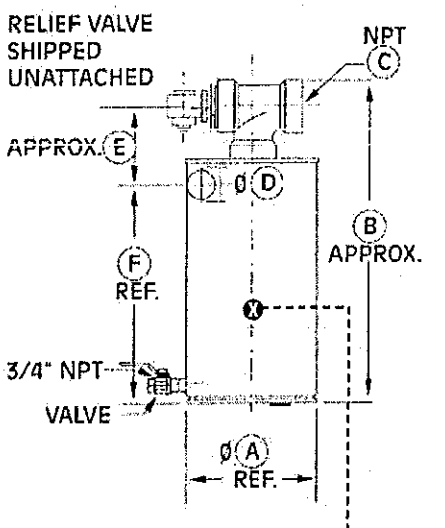


MOISTURE SEPARATOR (FOR VACUUM)

This moisture separator removes liquids from the gas stream in a vacuum process. This helps protect the blower from corrosion and the build up of mineral deposits.

For Model Number	R3, R4, R5	R4, R4H, R4P, R5	R4H, R4M, R5, R6, R6P, R6PS, R7H	R4M, R6, R6P, R6PP, R7, R7H, R7P, R7S, R9, R9S
Part Number	**RMS160**	**RMS200**	**RMS300**	**RMS400**
CFM capacity	160	200	300	400
Liquid capacity (gal.)	10	19	19	40
Diameter (A)	14.8"	19.7"	19.7"	24"
Dimension (B)	37.5"	35"	35"	44"
NPT outlet (C)	2"	2"	2.5"	3"
Inlet diameter (D)	2"	2"	2.5"	3"
Dimension (E)	7.5"	7.5"	7.5"	9.7"
Dimension (F)	26.6"	26.6"	26.6"	29"

Maximum vacuum allowed: 22" Hg.

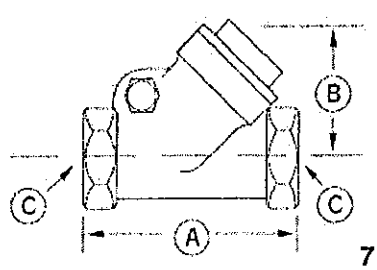


Explosion-proof, high level float switch AJ213 (optional).

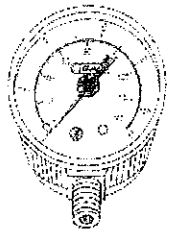
HORIZONTAL SWING TYPE CHECK VALVE

This check valve prevents backwash of fluids from entering the blower and air back-streaming. The check valve can be mounted to discharge or inlet either vertically or horizontally. The check valve will open with 3" of water pressure or vacuum.

Model Number	R1, R2	R3	R4, R5, SDR4, SDR4, R4P	R6, R6P, SDR6P, SDR6, R6PS	R7, R7S
Part Number	**AH326B**	**AH326C**	**AH326D**	**AH326F**	**AH326G**
Dimension (A)	3.57"	4.19"	4.50"	5.25"	8.00"
Dimension (B)	2.32"	2.69"	2.94"	3.82"	5.07"
Dimension (C)	1.00" NPT	1.25" NPT	1.50" NPT	2.00" NPT	2.50" NPT

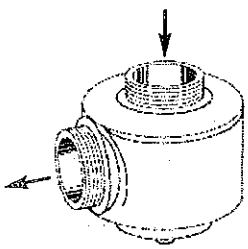


RECOMMENDED ACCESSORIES



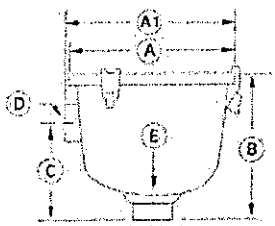
PRESSURE – VACUUM GAUGE

Pressure/Vacuum Gauges				
AJ496	2.50" Dia.	Pressure	1/4" NPT	0-60 in. H_2O and 0-150 mbar
AE133	2.50" Dia.	Pressure	1/4" NPT	0-160 in. H_2O and 0-400 mbar
AE133A	2.50" Dia.	Pressure	1/4" NPT	0-200 in. H_2O
AE133F	3.50" Dia.	Pressure	1/4" NPT	0-15 PSI
AJ497	2.50" Dia.	Vacuum	1/4" NPT	0-60 in. H_2O and 0-150 mbar
AE134	2.50" Dia.	Vacuum	1/4" NPT	0-160 in. H_2O and 0-400 mbar
AE134F	3.50" Dia.	Vacuum	1/4" NPT	0-15 in. HG



PRESSURE – VACUUM RELIEF VALVE

Pressure/Vacuum Relief Valves		
AG258	1.50" NPT	Adjustable 30-200 in. H_2O; 200 cfm max
AJ121D		Silencer for AG258 Relief Valve
AG258F	2.50" NPT	Adjustable 25-200 in. H_2O; 560 cfm max
AJ121G		Silencer for AG258F Relief Valve



INLINE FILTERS (FOR VACUUM)

The impeller of a blower passes very closely to the housing. It is recommended to have an inlet or in-line filter to ensure a trouble-free service life.

MPT = Male Pipe Thread
FPT = Female Pipe Thread

Model Number	R1	R2	R3	R4	SDR4, R4P, R4H, R5	SDR5, SDR6, R6, R6P, R7H, R7M	R6PP, SDR6P, R6PS, R7, R7S	R7S, R9, R9P, R9S
Part Number	AJ151A	AJ151B	AJ151C	AJ151D	AJ151E	AJ151G	AJ151H	AJ151M
Dimension (A)	5.88"	7.38"	7.38"	7.38	8.75	8.75"	14.00"	18.50"
Dimension (A1)	–	–	–	–	–	–	16.25"	20.75"
Dimension (B)	4.50"	6.81"	6.81"	6.81"	10.25"	10.50"	27.13"	28.13"
Dimension (C)	2.75"	4.62"	4.62"	4.62"	5.00"	5.50"	18.50"	19.50"
Dimension (D)	1.00" FPT	1.00" FPT	1.25" FPT	1.50" FPT	2.00" FPT	2.50" FPT	3"MPT	5" MPT
Dimension (E)	1.00" FPT	1.00" FPT	1.25" FPT	1.50" FPT	2.00" FPT	2.50" FPT	3"MPT	5" MPT
Replacement Element	AJ135D	AJ135E	AJ135E	AJ135E	AJ135F	AJ135G	AJ135C	AJ135H
Micron	10	10	10	10	10	10	10	10

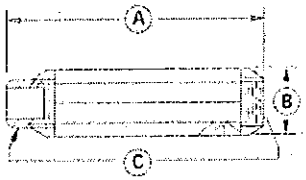
RECOMMENDED ACCESSORIES

INLET FILTERS (FOR PRESSURE)

All filters are heavy duty for high-particulate service. Inlet filters for Regenair blowers are drip-proof when mounted as shown..

MPT = Male Pipe Thread
FPT = Female Pipe Thread

Model Number	R1, R2	R3	R4, R4H, R4P SDR4, R5	SDR5, R6, SDR6, R5P, R6PP, R6PS	SDR6P, R7, R7H, R7P, R7S	R9, R9P, R9S
Part Number	AJ126B	AJ126C	AJ126D	AJ126F	AJ126G	AJ126M
Dimension (A)	6.00"	6.00"	7.70"	10.62"	10.00"	16.00"
Dimension (B)	4.62"	7.12"	7.12"	4.81"	13.12"	14.62"
Dimension (C)	1.00" MPT	1.25" MPT	1.50" MPT	2.00" FPT	2.50" MPT	5" MPT
Replacement Element	AJ134B	AJ134C	AJ134E	AG340	AJ135A	AJ135H
Micron	10	10	10	10	10	10



MUFFLERS

Designed to reduce noise by up to 5 dbA and remove high-frequency sound associated with all blowers.

Model Number	R1, R2	R3	R4, SDR4, R4P, R5	R4H, R6, R6P, R6PS SDR6P, SDR6	R7, R7S R7H	R6PP, R9 Exhaust	R7P Exhaust	R9P Exhaust	R7 Exhaust
Part Number	AJ121B	AJ121C	AJ121D	AJ121F	AJ121G	AJ121H	AJ121M	AJ121N	AJ121GE
Dimension (A)	7.46"	7.94"	12.75"	17.05"	17.44"	20.30"	33.60"	39.00"	17.63"
Dimension (B)	2.38"	2.62"	3.25"	3.63"	4.25"	4.75"	6.00"	7.00"	4.26
Dimension (C)	1.00" NPT	1.25" NPT	1.50" NPT	2.00" NPT	2.50" NPT	3" NPT	4"NPT	5"NPT	2.50" NPT

PARTS & ORDERING INFORMATION

Please reference the exploded view on Page 11 for the following model and parts table.

REF#	ITEM	QTY	R1102 R1102C R1102K	R1S103	R2103 R2303A	R2105	R2305B	R3105-1 R3305A-1 R3305B-1
1	COVER	1	AJ101A	AJ101AS	AJ101B	AJ101B	AJ101B	AJ101C
2	LOCK NUT	1	BC187	BC187	BC187	BC181	BC181	BC181
3	IMPELLER	1	AJ102A	AJ102A	AJ102BQ	AJ102B	AJ102B	AJ102C
4	SQUARE KEY	1	AH212C	AH212C	AH212	AB136A	AB136A	AB136A
5	SHIM SPACER	Δ	AE686-5	–	AE686-3	AJ109	AE686-3	AJ109
6	RETAINING RING	1	AJ145	–	AJ145	AJ149	AJ145	AJ149
7	HOUSING	1	AJ103A	AJ103AS	AJ103BQ	AJ103B	AJ103B	AJ103C
8	–	–	–	–	–	–	–	–
9	–	–	–	–	–	–	–	–
10A	FOAM	Δ	AJ112A(4)	–	AJ112BQ(6)	AJ112BQ(6)	AJ112BQ(6)	AJ112C(4)
10B	FOAM	2	–	–	–	–	–	AJ112CQ
11	MUFFLER EXTENSION	1	AJ106A	–	AJ106BQ	AJ106BQ	AJ106BQ	AJ106CQ

Δ As required.

Parts listed are for stock models. For specific OEM models, please consult the factory.
When corresponding or ordering parts, please give complete model and serial numbers.

PARTS & ORDERING INFORMATION

Please reference the exploded view on the next page for the following model and parts tables.

REF#	ITEM	QTY	R3105-12 R3305A-10	R4110-2 R4310A-2 R4310B-1	R4P115 R4P315A†	R5125-2 R5325A-2 R5325B-1	R6125-2 R6150J-2 R6325A-2 R6335A-2 R6335B R6350A-2 R6350B-2	R6P335A R6P350A R6P350B	R6135J-10
1	COVER	1	AJ101C	AJ101D	AJ101L	AJ101EQ	AJ101FB	AJ101K	AJ101FB
2	LOCK NUT	1	BC181	BC181	BC181	AJ259	AJ259	AJ259	AJ259
3	IMPELLER	1	AJ102CA	AJ102D	AJ102L	AJ102E	AJ102FR	AJ102K	AJ102FR
4	SQUARE KEY	1	AB136A	AB136D	AB136D	AB136	AB136	AB136	AB136
5	SHIM SPACER	Δ	AJ109	AJ109	AJ109	AJ109	AJ109	AJ109	AJ260A
5†	SHIM SPACER†	1	–	–	AJ109A†	–	–	–	–
6	RETAINING RING	1	AJ149	AJ149	AJ149	–	–	–	–
7	HOUSING	1	AJ103C	AJ103DR	AJ103L	AJ103EQ	AJ103FQ	AJ103K	AJ103FQ
8	MUFFLER BOX	1	–	–	–	–	–	AJ104K	–
9	SPRING	2	–	AJ113DR	AJ113DQ	AJ113DQ	AJ113FQ	AJ113FQ	AJ113FQ
9A	SCREEN	2	–	–	AJ123EQ	AJ123EQ	AJ123FB	–	AJ123FB
10A	FOAM	Δ	AJ112C(4)	AJ112DS(4)	AJ112ER(6)	AJ112ER(6)	AJ112FC(6)	AJ112K(8)	AJ112FC(6)
10B	FOAM	2	AJ112CQ	AJ112DR	–	–	–	–	–
11	MUFFLER EXTENSION	1	AJ106CQ	AJ106DQ	AJ106EQ	AJ106EQ	AJ106FR	–	AJ106FR

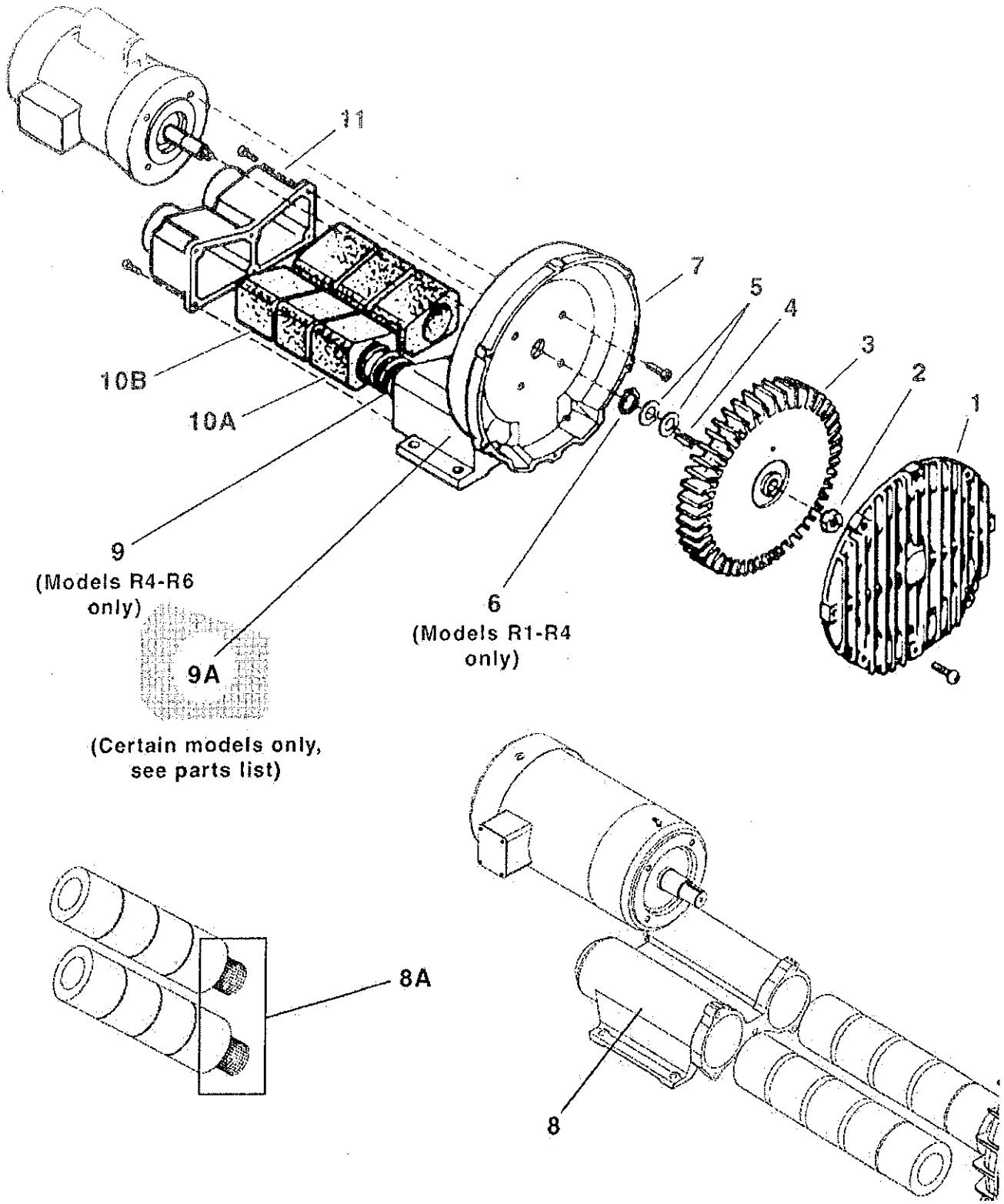
REF#	ITEM	QTY	R6P355A R6P350A R6P350B	R6PP3110M*	R6PS3110M*	R7100A-3	R7100B-1
1	COVER	1	AJ101K	AJ101KA(2)	AJ101KA(2)	AJ101G	AJ101G
2	LOCK NUT/BOLT	1	AJ259	BB750(2)	BB750(2)	BB750	BB750
3	IMPELLER	1	AJ102K	AJ102KA(2)	AJ102KA(2)	AJ102GZ	AJ102GA
4	SQUARE KEY	1	AB136	AB136(2)	AB136(2)	AC628	AC628
5	SHIM SPACER	Δ	AJ109	AJ169F	AJ169F	AJ110	AJ110
6	RETAINING RING	1	–	–	–	–	–
7	HOUSING	1	AJ103K	AJ103KD(2)	AJ103KD(2)	AJ103GA	AJ103GA
8	MUFFLER BOX	1	AJ104K	–	–	AJ104GA	AJ104GA
8A	SCREEN	2	–	–	–	AJ998G	AJ998G
9	SPRING	2	AJ113FQ	–	–	–	–
10A	FOAM	Δ	AJ112K(8)	–	–	AJ112GA(8)	AJ112GA(8)
10B	FOAM	2	–	–	–	–	–
11	MUFFLER EXTENSION	1	–	–	–	–	–
12 **	O-RING	2	–	AJ175	–	–	–
13	GASKET	4	–	AJ107F	AJ107F	–	–

REF#	ITEM	QTY	R7P3180M*	R7S3180M*	R9P3300M*	R9S3300M*	R93150A
1	COVER	1	AJ101G(2)	AJ101G(2)	AJ100M(2)	AJ100M(2)	AJ101M
2	LOCK NUT/BOLT	1	BB750(2)	BB750(2)	BB707(2)	BB707(2)	BB707
3	IMPELLER	1	AJ102GZ(2)	AJ102GZ(2)	AJ102M(2)	AJ102M(2)	AJ102M
4	SQUARE KEY	1	AC628(2)	AC628(2)	AE130A(2)	AE130A(2)	AE130A
5	SHIM SPACER	Δ	AJ110	AJ110	BJ110	BJ110	BJ110A
6	RETAINING RING	1	–	–	–	–	–
7	HOUSING	1	AJ103GA(2)	AJ103GA(2)	AJ103M(2)	AJ103M(2)	AJ103M
8	MUFFLER BOX	1	–	–	–	–	AJ104MP
8A	SCREEN	2	–	–	–	–	AJ998M
9	SPRING	2	–	–	–	–	–
10A	FOAM	Δ	–	–	–	–	AJ112M(10)
10B	FOAM	2	–	–	–	–	–
11	MUFFLER EXTENSION	1	–	–	–	–	–
12 **	O-RING	2	AJ175G	–	AJ175G	–	–

† R4P315A only.
* Dual models.
** Not shown.
Δ As required.

Parts listed are for stock models. For specific OEM models, please consult the factory.
When corresponding or ordering parts, please give complete model and serial numbers.

EXPLODED PRODUCT VIEW



TROUBLESHOOTING CHART

Problem	Reason	Remedy
Increased sound.	Noise absorbing foam is damaged. Impeller rubbing inside.	Replace foam. Send unit to a Gast Authorized Service Facility.
Excessive vibration.	Damaged impeller. Motor and/or impeller are dirty.	Replace impeller. Clean motor and impeller periodically.
Ambient and exhaust temperature increases.	Motor and/or blower are dirty. Filters dirty.	Clean motor and blower periodically. Replace filters.
Decreased inlet air pressure	Inlet air filter is clogged.	Clean inlet filter. Replace cartridge.
Unit is very hot.	Wrong wiring. Low voltage. Inlet air filter is clogged. Motor and/or blower are dirty. Operating at too high a pressure or vacuum.	Check wiring. Supply proper voltage. Clean inlet filter. Replace cartridge. Clean motor and blower periodically. Install a relief valve and pressure or vacuum gauge.
Unusual sound.	Impeller is damaged or dirty. Bearing going bad.	Clean or replace impeller. Send unit to a Gast Authorized Service Facility.
Motor overload	Low voltage.	Check power source. Check wire size and wire connections.
Unit does not start.	Incorrect electrical connection or power source. Impeller is damaged.	Check wiring diagram, circuit fusing and circuit capacity. Clean or replace impeller. Install proper filtration.

AUTHORIZED SERVICE FACILITIES

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13824 Bentley Place
Cerritos, CA 90701
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FAX: 310-404-7975

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FAX: 514-697-3070

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A Unit of IDEX Corporation

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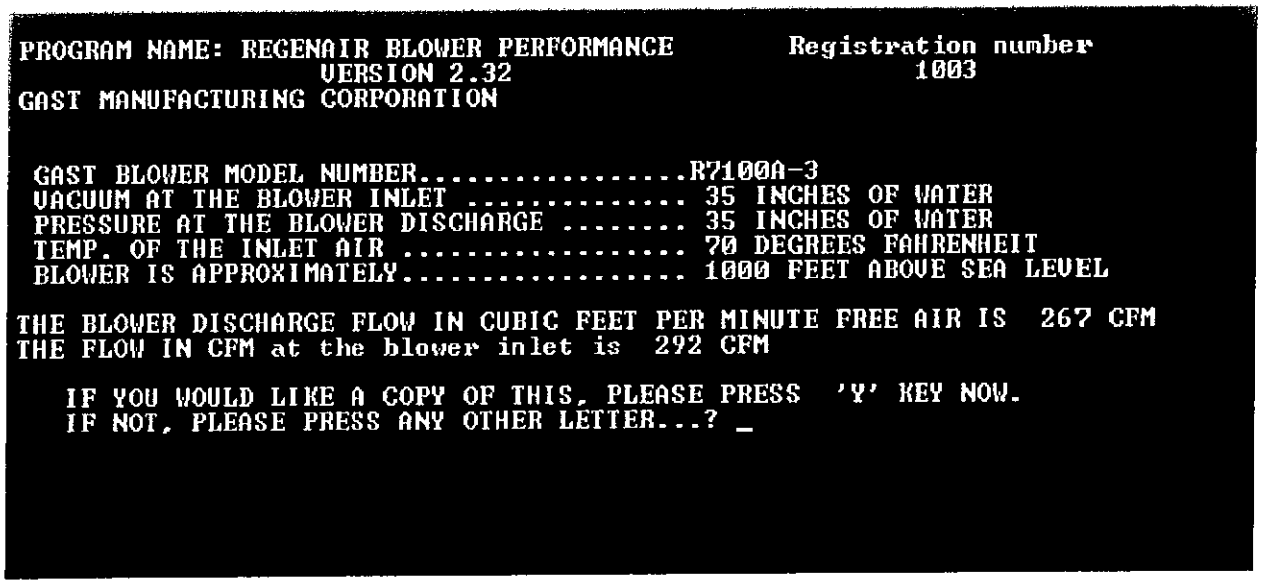
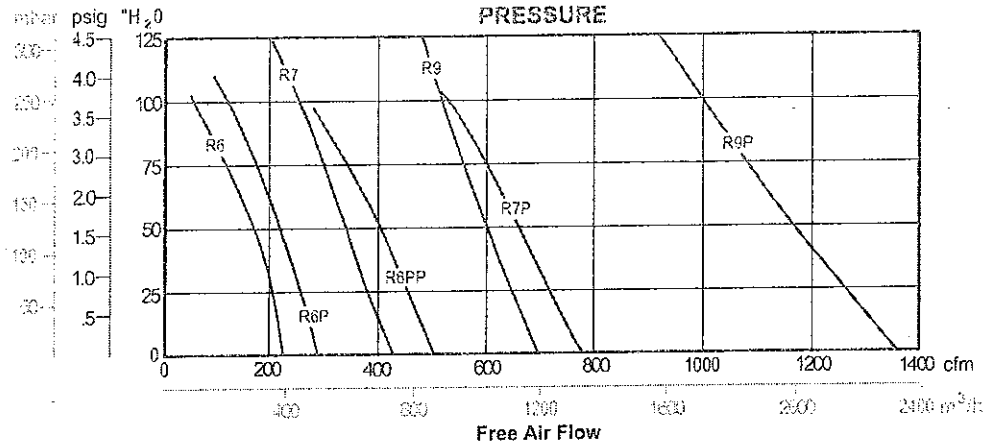
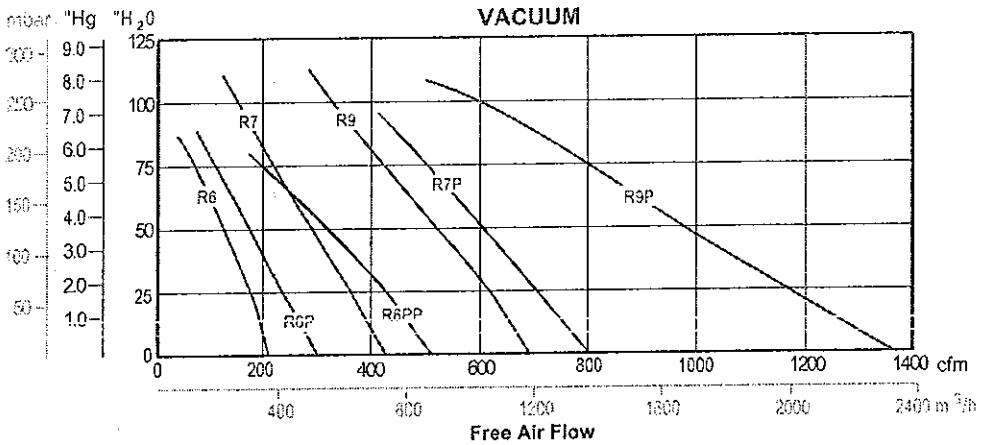

PROGRAM NAME: REGENAIR BLOWER PERFORMANCE
VERSION 2.32
Registration number
1003
GAST MANUFACTURING CORPORATION
GAST BLOWER MODEL NUMBER.....R7100A-3
VACUUM AT THE BLOWER INLET ..... 35 INCHES OF WATER
PRESSURE AT THE BLOWER DISCHARGE ..... 35 INCHES OF WATER
TEMP. OF THE INLET AIR ..... 70 DEGREES FAHRENHEIT
BLOWER IS APPROXIMATELY..... 1000 FEET ABOVE SEA LEVEL
THE BLOWER DISCHARGE FLOW IN CUBIC FEET PER MINUTE FREE AIR IS 267 CFM
THE FLOW IN CFM at the blower inlet is 292 CFM
IF YOU WOULD LIKE A COPY OF THIS, PLEASE PRESS 'Y' KEY NOW.
IF NOT, PLEASE PRESS ANY OTHER LETTER...? _

Performance Curves - Mid Range for Pressure/Vacuum

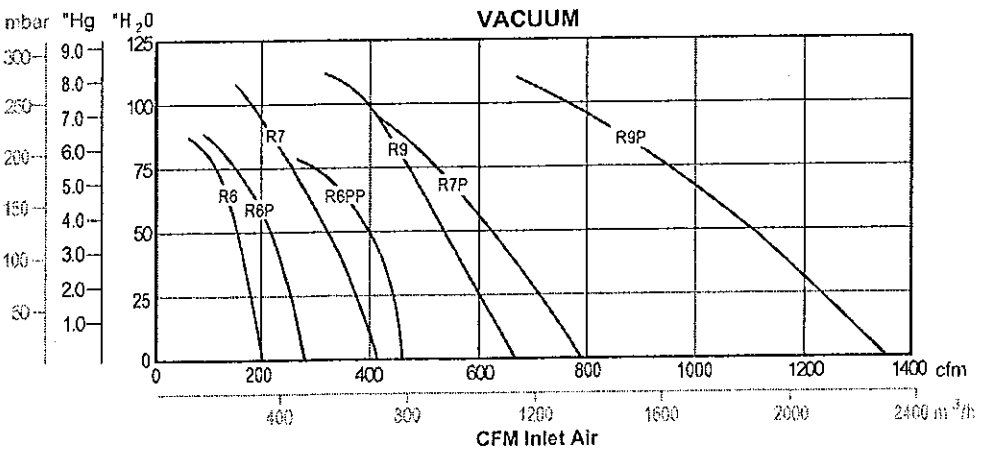
Motor mounted series R6, R6P, R6PP, R7, R7P, R9, R9P

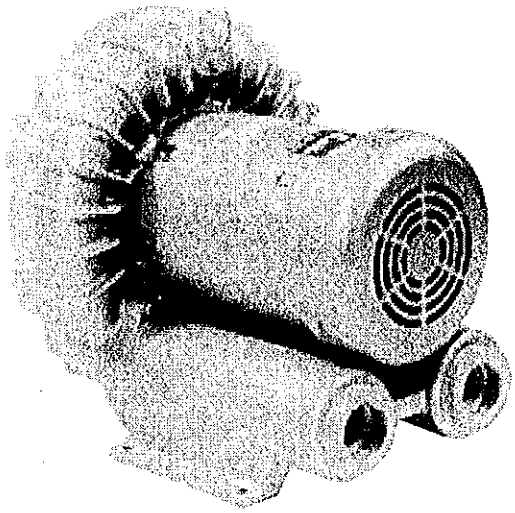
Performance at 60 Hz





Gast advertises blower performance in Free Air Flow, or air subjected to only atmospheric pressure. (See above curves)
Some blower manufacturers advertise vacuum performance in CFM Inlet Air - measurement of the suction of air at a specific temperature at the inlet port and a specific discharge pressure at the exhaust port, which can be perceived as enhanced performance over Free Air Flow rated blowers. Therefore, we are also providing the following vacuum performance for Gast blowers in CFM Inlet Air for comparison to other blower manufacturer's advertising.





R7 SERIES

MODELS R7100A-3, R7100B-1

MAX. PRESSURE – 125" H_2O (60 Hz), 115" H_2O (50 Hz)
MAX. VACUUM – 110" H_2O (60 Hz), 90" H_2O (50 Hz)
MAX. AIR FLOW – 420 CFM (60 Hz), 350 CFM (50 Hz)

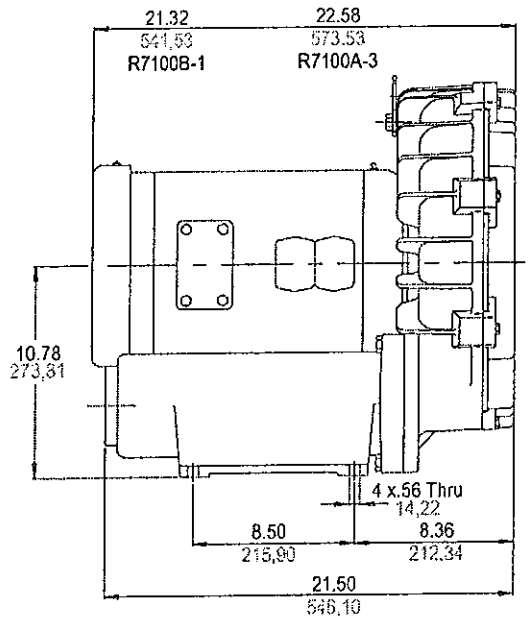
PRODUCT FEATURES

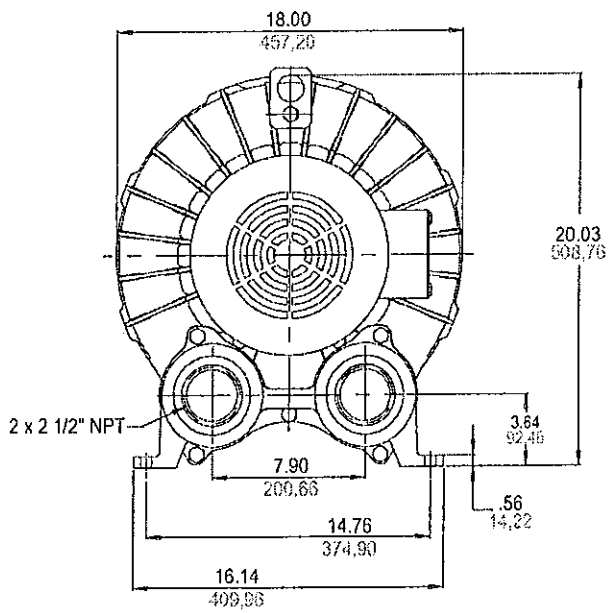
- Rugged construction, low maintenance
- Oilless operation
- UL and CSA approved TEFC motors with permanently sealed ball bearings
- IP54 rated enclosure on motors
- Aluminum impeller; cast iron cover and housing
- Can be mounted in any plane
- Inlet and outlet have internal muffling

RECOMMENDED ACCESSORIES

- Pressure gauge AE133A
- Inlet filter AJ126G (pressure)
- Vacuum gauge AE134
- Vacuum gauge for monitoring inlet filter restriction AJ497
- Pressure/vacuum relief valve AG258
- Silencer for vacuum relief valve AJ121D
- Inline filter AJ151H (vacuum)
- External muffler for additional silencing AJ121G
- Liquid separator RMS400 (vacuum)

Product Dimensions (in. mm)

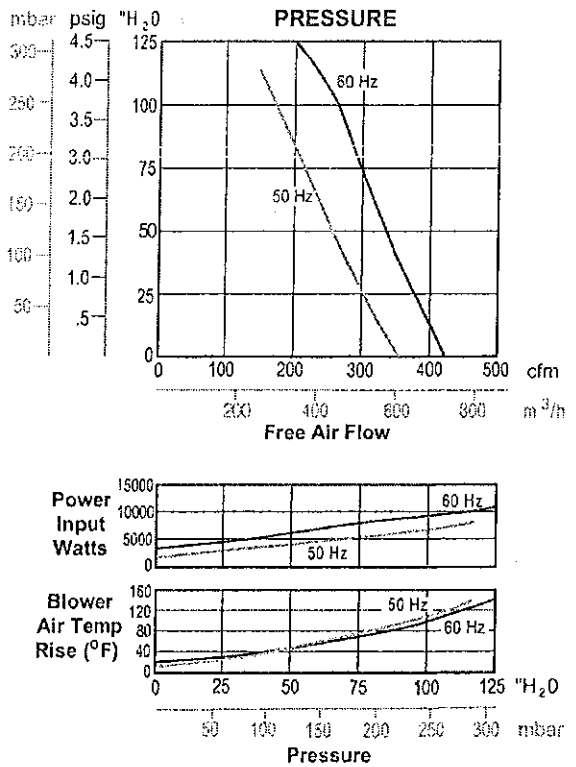


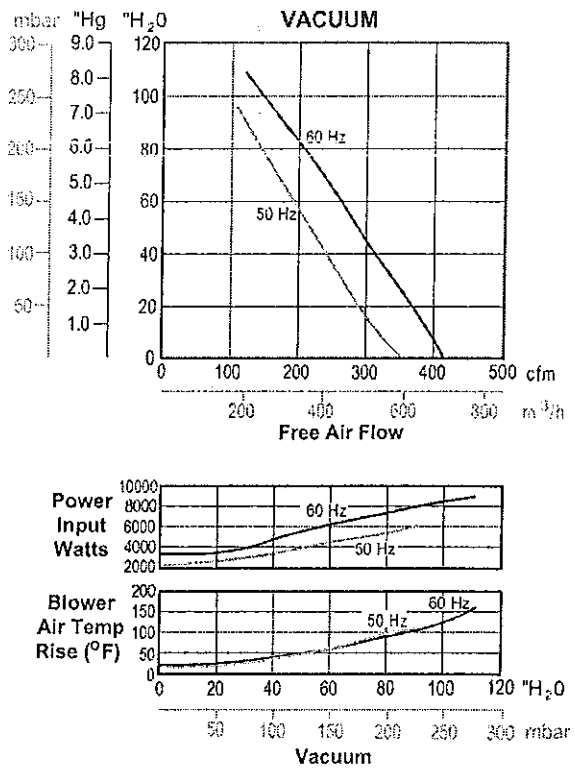


Product Specifications

MODEL NUMBER		R7100A-3	R7100B-1
Motor Enclosure		TEFC	TEFC
HP/kW	60 Hz	10/7,5	10/7,5
	50 Hz	8/6	-
Voltage	60 Hz	208-230/460-3	575-3
	50 Hz	190-220/380-440-3	-
Amps	60 Hz	35-29.5/15	9.6
	50 Hz	27-23/13.5-12.3	-
Starting Amps	60 Hz	120 @ 460V	84 @ 575V
	50 Hz	143 @ 380V	-
Insulation Class		F	F
Recommended NEMA Starter Size		2/1	1
Net Weight (lbs/kg)		293/133	290/131

Product Performance





Q. What happens to the noise when I locate two blowers close together?

A. If the blowers are of the same design they produce sound frequencies that are close together. These may cause a "beating" change in volume of the blower noise. This is because the units are not synchronized. If two small blowers are needed this change in volume can be reduced by moving tham further apart. With larger blowers a dual blower with two blowers on one motor will solve this problem.

Q. What causes the noise relief valves make?

A. Air rush through the valve.

Q. How do I control relief valve or bleed off valve noise?

A. Attach AJ121 series silencer on the port of the relief valve that is open to atmosphere.

Contact Gast at 616-926-6171 or www.gastmfg.com with any further questions you may have on reducing blower noise in your application.

Noise Reduction and Absorption Coefficients for Common and Specialty Noise Reduction Materials

	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	NRC
Brick, unglazed	.03	.03	.03	.04	.05	.07	.04
Carpet							
1/4 in pile height	.05	.10	.15	.30	.50	.55	.26
Fabric							
Heavy Velour							
18 oz per sq. yd							
draped to 1/2 area	.14	.35	.55	.72	.70	.65	.62
Hardwood							
Plywood Paneling							
1/4 in thick							
wood frame	.58	.22	.07	.04	.03	.07	.09
Tecnifoam*							
TFP4							
Pyramind shape	.39	.60	1.21	1.14	1.16	1.13	1.05
Tecnifoam*							
TFW4000							
Anaechoic							
Wedge shape	.64	1.10	1.34	1.23	1.24	1.21	1.25

Source: Mechancial Engineering Reference Manual

*TFP4 and TFW4000 are products of Tecnifoam, Inc., 7145 Boone Avenue North, Minneapolis, MN., 55428

Blower Sound Levels of Gast Blowers

Data is highest sound level out of 4 places around the blower at 1 meter.

Data represents average of several units run at nominal voltage.

Lowest to highest maximum dba level throughout performance range is shown.

Readings at other than the maximum around the blower at 1 meter may be from 2 to 10 dba less than data shown.

Readings taken in a laboratory sound room that does not reflect much noise.

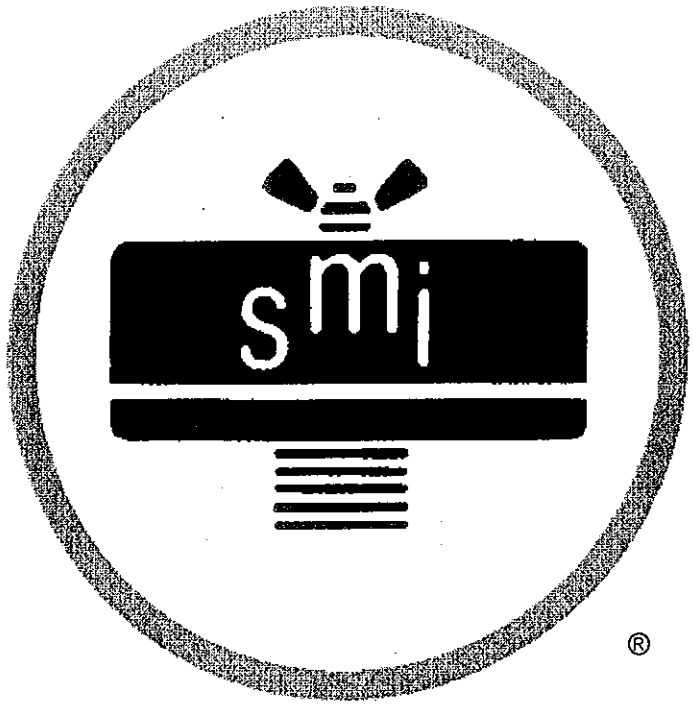
Note: For comparison purposes, some blower manufacturers show sound data from 1–1/2 meters instead of from 1 meter; also, some blower manufacturers show an "average" sound level across performance instead of the full range between minimum and maximum sound levels; either of these methods will provide different and usually lower sound levels compared to Gast's sound level method.

60Hz	dBa at Pressure	50Hz	dBa at Pressure
R1	59-67	R1	59-64
R2	66	R2	61-63
R3	67-70	R3	63-68
R4	69-73	R4	64-69
R4P	69-75	R4P	64-71
R5	73-77	R5	71-77
R6	73-79	R6	70-79
R6P	82-83	R6P	77-80
R6PP	77-79	R6PP	73-76
R6PS	76-77	R6PS	72-75
R7	82-84	R7	77-79
R7P	77-80	R7P	74-79
R7S	75-77	R7S	72-76
R9	82-85	R9	78-85
R9P	81-88	R9P	79-86
R9S	79-81	R9S	77-81
R4H	80-82	R4H	75-81
R4M	82-83	R4M	78-79
R7H	83	R7H	79-81

60Hz	dBa at Vacuum	50Hz	dBa at Vacuum
R1	58-63	R1	54-60
R2	67	R2	63-64
R3	67-71	R3	64-69
R4	70-72	R4	66-70
R4P	73-74	R4P	68-71
R5	75-76	R5	71-73
R6	78-80	R6	74-77
R6P	81-85	R6P	79-81
R6PP	81-83	R6PP	78-79
R6PS	79-81	R6PS	76-77
R7	85-87	R7	79-84
R7P	84-86	R7P	80-83
R7S	82-83	R7S	78-80
R9	85-90	R9	83-84
R9P	88-90	R9P	84-87
R9S	87-88	R9S	83-86
R4H	82-89	R4H	79-88
R4M	85-89	R4M	80-85
R7H	82-91	R7H	80-90

ATTACHMENT 6

AIR FILTER CUT SHEETS AND RELATED INFORMATION



SOLBERG

Vacuum Filters
Maintenance Manual
CSL, CT, VS, VL,
SM-CT, CSS, and CBL Series

www.solbergmfg.com

Solberg Manufacturing, Inc., 1151 West Ardmore Itasca, IL 60143
Ph: 630/773-1363 Fax: 630/773-0727 Email: sales@solbergmfg.com Web: www.solbergmfg.com
Vacuum Inlet Filters March, 2000

Maintenance Manual

SOLBERG Vacuum Filters

CSL, CT, VS, VL, SM-CT, CSS and CBL

CONTENTS

**For Further Information Please Call: 630-773-1363*

Section A

INTRODUCTION

The purpose of this manual is instruction on the proper assembly and care of Solberg vacuum inlet 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 vacuum inlet air filters should have an identification label/nameplate that gives the following information:

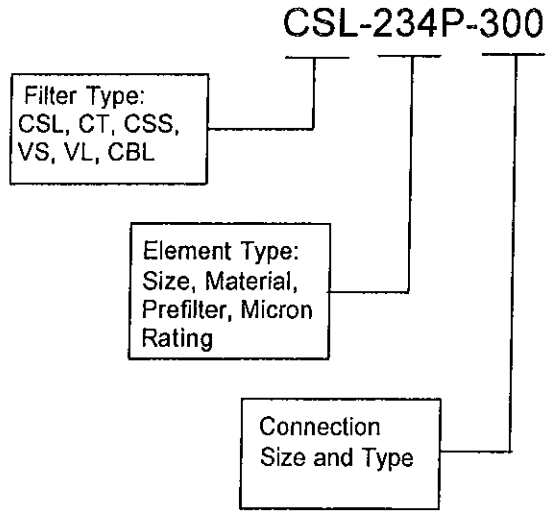
Assembly Model #
Replacement Element #

(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):

No.	Filter Model Number	Replacement Element
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

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 234 element with prefilter and 3" NPT connection size:



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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 5-micron filter is misleading because no efficiency rating has been specified. A 5-micron filter at 97-% efficiency can be less efficient than a 10-micron filter at 99.7% efficiency. For proper air system performance in light and industrial duty environments, a filter with a minimum of 99.7% filtration efficiency at 10 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	Light Duty (clean, office/warehouse-like)	30 CFM/ft^2
	Industrial Duty (workshop, factory-like)	15 CFM/ft^2
	Severe Duty (Foundry, Construction-like)	10 CFM/ft^2
Industrial Grade 5-micron **Polyester**	Light Duty (clean, office/warehouse-like)	50 CFM/ft^2
	Industrial Duty (workshop, factory-like)	40 CFM/ft^2
	Severe Duty (Foundry, Construction-like)	25 CFM/ft^2
Industrial Grade 4-micron **Polyester**	Industrial Duty (workshop, factory-like)	25 CFM/ft^2
	Severe Duty (Foundry, Construction-like)	15 CFM/ft^2
Industrial Grade 1-micron **Polyester**	Severe Duty (Foundry, Construction-like)	10 CFM/ft^2
Industrial Grade 0.3-micron **HEPA** Glass	Light Duty (clean office/warehouse-like)	10 CFM/ft^2
	Industrial Duty (workshop, factory-like)	7 CFM/ft^2
	Severe Duty (Foundry, Construction-like)	5 CFM/ft^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 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" 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 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	1 ¼"	60 CFM	6"	1100 CFM
3/8"	8 CFM	1 ½"	80 CFM	8"	1800 CFM
1/2"	10 CFM	2"	135 CFM	10"	3300 CFM
3/4"	20 CFM	2 ½"	195 CFM	12"	4700 CFM
1"	35 CFM	3"	300 CFM	14"	6000 CFM
		4"	520 CFM		
		5"	800 CFM		

**Note: This information is for general use only. A qualified engineer must properly design each system.*

3. Element Specifications

Media	Micron Rating	Temperature Range	Filter Change-Out Differential
Standard Paper	99+% @ 5 micron	-15 to 220 F	10"-15" H_2O Over Initial Delta P
Standard Polyester	99+% @ 2 micron	-15 to 220 F	10"-15" H_2O Over Initial Delta P
"N" Series	99+% @ 4 micron	-15 to 220 F	10"-15" H_2O Over Initial Delta P
"Z" Series	99+% @ 1 micron	-15 to 220 F	10"-15" H_2O Over Initial Delta P
HEPA "HE" Series	99.97% @ 0.3 microns	-15 to 220 F	10"-15" H_2O Over Initial Delta P
"U" Series	99+% @ 25 micron	-15 to 220 F	10"-15" H_2O Over Initial Delta P
"W" Series	99+% @ 100 micron	-15 to 220 F	10"-15" H_2O Over Initial Delta P
"S1" Series	Stainless Steel Wire Mesh	-15 to 220 F	10"-15" H_2O Over Initial Delta P
"AC" & "ACP" Series	N/A	-15 to 220 F	Change When Carbon Saturates
"Y" Series Polypropylene	99+% @ 10 micron	-15 to 220 F	10"-15" H_2O Over Initial Delta P
"MX" & "MXD" Series -- Nomex Cloth	99+% @ 10 micron	-15 to 385 F	10"-15" H_2O Over Initial Delta P

4. Element Cleaning

Some types of Solberg inlet filter elements can be cleaned and reused. However, damage can occur to an element during cleaning so it is imperative that care is taken during disassembly, cleaning and re-assembly. Damaged elements can allow particulate bypass, which will damage rotating 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.
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. ***Stainless Steel Wire Mesh Element***: 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, wingnuts 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 degrees F. 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. *VS/VL*: Remove V-clamp by loosening Hex Nut or T-bolt and releasing.

   B. *CT/Small CSL/CBL*: Release wire-form clips.

   C. *Large CSL*: Loosen wingnut or hex head on T-bolts.

   D. *CSS*: Twist upper housing to release.

   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. Note: Model "CSS" elements should be free when housing tops are 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.

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Ph: 630/773-1363 Fax: 630/773-0727 Email: sales@solbergmfg.com Web: www.solbergmfg.com

5. Securing canister top to canister base.

   A. Make sure all surfaces are free from dust and other particulate.

   B. Hemisphere o-ring must rest evenly along canister/casting base o-ring groove.

   C. *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.

   D. *CT/Small CSL/CBL*: Hold canister housing against o-ring or sealing ring on main filter head. Re-fasten wire-form clips.

   E. *Large CSL*: Replace housing top plate. Feed T-bolts into corresponding slots and tighten evenly around perimeter. Note: Do NOT over tighten!

   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" 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 LIST: CSL, CT, VS, VL, CSS, AND CBL

Parent Model Model-Element-Connection	Prefilter Model	Housing						Element		
		Top Model No	O-Ring Model No	Gasket(s)/ Adapter Model No	Wingnut(s) Model No	Washer(s) Model No	Clips/ Bolts Model No	Top Plate Model No	Wingnuts/ Bolt Model No	Washer(s) Model No
CSS-05/04-xxx	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSS-07/06-xxx	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSS-11/10-xxx	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSL-825/824-xxx	N/A	T824	OR337	BG224	N/A	N/A	CPWF	N/A	N/A	N/A
CSL-843/842-xxx	PF842	T842	OR550	BG268	N/A	N/A	CPWF	N/A	N/A	N/A
CSL-849/848-xxx	PF848	T848	OR675	BG281	N/A	N/A	CPWF	N/A	N/A	N/A
CSL-851/850-xxx	PF850	T850	OR750	BG412	N/A	N/A	CPWF	N/A	N/A	N/A
CSL-239/238-xxx	PF238	TD238	OR1250	N/A	N/A	N/A	CPWF	N/A	WN38X16	WR38X16
CBL-879/878-xxx	PF848	TD848	OR675	N/A	N/A	N/A	CPWF	N/A	WN25X20	WR25X20
CT-235/234-xxx	PF234	N/A	GCT1100	ADCT234	N/A	N/A	CPWF	T8000437	BH38X16	WR38X88
CT-SM3-xxx	N/A	N/A	GCT1100	N/A	N/A	N/A	CPWF	N/A	N/A	N/A
CT-SM4-xxx	N/A	N/A	GCT1100	N/A	N/A	N/A	CPWF	N/A	N/A	N/A
VS-235/234-xxx	PF234	N/A	OR386	N/A	N/A	N/A	N/A	T8000437	WN38X16	WR38X16
VS-245/244-xxx	PF244	N/A	OR386	N/A	N/A	N/A	N/A	T1000437	WN38X16	WR38X16
VS-275/274-xxx	PF274	N/A	OR386	N/A	N/A	N/A	N/A	T12000437	WN38X16	WR38X16
VL-235/234-xxx	PF234	N/A	OR386	N/A	N/A	N/A	N/A	T8000437	WN38X16	WR38X16
VL-245/244-xxx	PF244	N/A	OR386	N/A	N/A	N/A	N/A	T1000437	WN38X16	WR38X16
VL-275/274-xxx	PF274	N/A	OR386	N/A	N/A	N/A	N/A	T12000437	WN38X16	WR38X16
CSL-235/234-xxx	PF234	TC1400	OR1200	N/A	WN38X16	WR38X16	BT38163	T8000437	WN38X16	WR38X16
CSL-335/334-xxx	PF334	TC1400	OR1200	ADEX300	WN38X16	WR38X16	BT38163	T8000437	WN38X16	WR38X16
CSL-245/244-xxx	PF244	TC1850	OR1600	N/A	WN38X16	WR38X16	BT38163	T1000437	WN38X16	WR38X16
CSL-345/344-xxx	PF344	TC1850	OR1600	ADEX300	WN38X16	WR38X16	BT38163	T1000437	WN38X16	WR38X16
CSL-275/274-xxx	PF274	TC1850	OR1600	N/A	WN38X16	WR38X16	BT38163	T12000437	WN38X16	WR38X16
CSL-375/374-xxx	PF374	TC1850	OR1600	ADEX300	WN38X16	WR38X16	BT38163	T12000437	WN38X16	WR38X16
CSL-377/376-xxx	PF376	TC2250	OR2000	N/A	WN38X16	WR38X16	BT38163	T14750625	HN50X13	WR50X13
CSL-384(2)-xxx	PF384(2)	N/A	OR2400	N/A	WN38X16	WR38X16	BT38163	T19750625	HN50X13	WR50X13
CSL-685-xxx	PF684	N/A	OR2400	N/A	WN38X16	WR38X16	BT38163	T19750625	HN50X13	WR50X13
CSL-485(2)/484(2)-xxx	PF484(2)	N/A	OR2400	N/A	WN38X16	WR38X16	BT38163	T19750625	HN50X13	WR50X13

*Note: Spare parts are for standard products. See page 4 for replacement element.

ATTACHMENT 7

VACUUM RELIEF VALVE CUT SHEETS AND RELATED INFORMATION

Model 215V is Non-code Vacuum and Model 337 is ASME Section VIII, Air/Gas Vacuum, 'UV' National Board Certified, Safety Valves

Features

- **Large nozzle design** provides high capacity.
- **Flat bronze valve seats are lapped** for optimum performance.
- **Warn ring offers easy adjustability** for precise opening with minimum pre-open or simmer and exact blowdown control.
- **Pivot between disc and spring** corrects misalignment and compensates for spring side thrust.

Model Descriptions

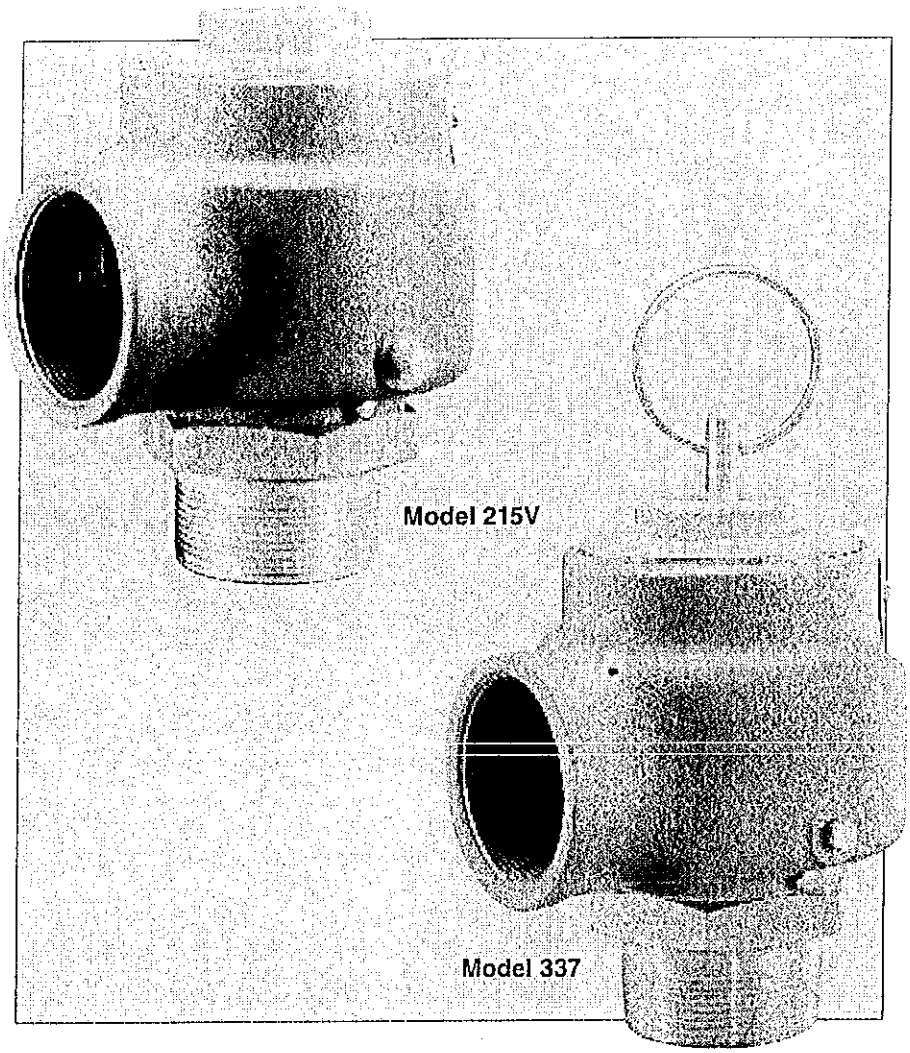
- **Model 337 has 'pull-ring' lift device** for easy manual testing.
- **Every valve is 100% tested/inspected** for pressure setting, blowdown and leakage.
- **All adjustments are factory sealed** to prevent tampering or disassembly.

Option

- SS trim. (nozzle and disc) (Variation 03)

Applications

- Protection of low to medium pressure high volume blowers, compressors and pneumatic conveying systems.
- Bulk hauling trailers/equipment.
- Light gauge tanks.
- Protection of high volume vacuum pumps and conveying systems.



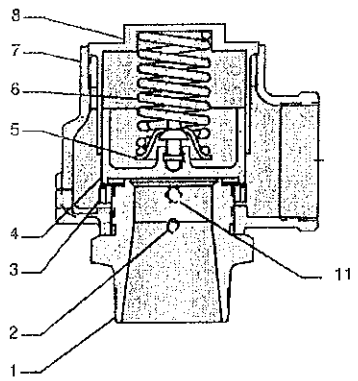
Vacuum Limits

Model 215V:
2-inch HG
to 29-inch HG
[67.7 to 982 mbarg]
-20° to 406°F [-29° to 208°C]

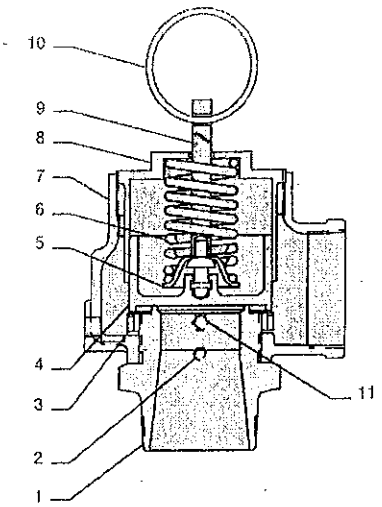
Pressure and Temperature Limits

Model 337:
1 to 60 psig [0.07 to 4.1 barg]
-20° to 406°F [-29° to 208°C]

Parts and Materials



Model 215V

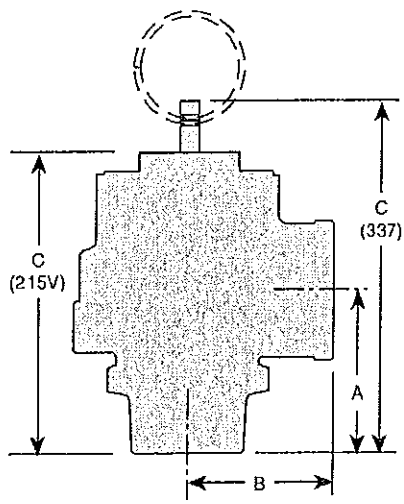


Model 337

No.	Part Name	215V	337
1	Nozzle[1]	Bronze, SB62	Bronze, SB62
2	Set Screw	Steel A108-1018 Brass Plated	Steel A108-1018 Brass Plated
3	Regulator Ring	Bronze B584 Alloy 84400	Bronze B584-C84400
4	Disc[1]	Bronze B584 Alloy 84400	Bronze B584-C84400
5	Spring Step	Steel A-109 Coated[3]	Steel A109 Coated[3]
6	Spring	SS. A313 TY 302	SS A313-302
7	Body	Cast Iron, Zinc Plated, B633	Iron A-126, CL A or B
8	Compression Screw	Bronze, B-584 Alloy 84400	Bronze, B584-C84400
9	Stem[2]	N/A	Brass B16
10	Lift Ring[2]	N/A	SS A313-302
11	Regulator Ring Set Screw	N/A	Brass B16

1. Disc and nozzle available in SSA-479 TY 316.
2. Stem and lift ring available on Model 337 only.
3. Corrosion preventative coating.

Size Inlet and Outlet	Dimensions, in [mm] A	B	C 215V	C 337	Weight lb [kg]
2" [50.8 mm]	3¼ [82.5]	3 [76.2]	6½ [165.1]	7 [177.8]	8 [3.6]
2½" [63.5 mm]	3¾ [95.2]	3½ [88.9]	7⅝ [194.6]	8 [203.2]	12 [5.4]
3" [76.2 mm]	4¼ [107.9]	4 [101.6]	8½ [215.9]	9 [228.6]	20 [4.1]



Model 337

Model 215V

Relief Set (in. HG)	Valve Inlet and Outlet Size		
	2" Orifice Area, in² 1.84	2½" Orifice Area, in² 2.79	3" Orifice Area, in² 4.04
2	229	347	503
5	338	512	742
10	415	630	912
15	426	646	936
20	426	646	936

Relief Set [mbarg]	Valve Inlet and Outlet Size		
	5.08 cm Orifice Area [11.86 cm²]	6.35 cm Orifice Area [17.97 cm²]	7.62 cm Orifice Area [26.05 cm²]
50	328	498	722
100	450	682	988
150	533	807	1170
200	593	899	1303
250	638	966	1400
300	669	1014	1470
350	690	1046	1516
400	701	1062	1540
450	704	1067	1546
500	704	1067	1546
550	704	1067	1546
600	704	1067	1546
650	704	1067	1546
700	704	1067	1546
750	704	1067	1546

Model 337

Set Pressure (psig)	Valve Inlet and Outlet Size		
	2"	2½"	3"
1	240	364	527
5	531	805	1166
10	741	1124	1628
15	948	1436	2081
20	1092	1656	2399
25	1237	1875	2718
30	1382	2095	3036
35	1542	2337	3386
40	1701	2578	3736
45	1860	2820	4086
50	2020	3061	4436
55	2179	3303	4786
60	2338	3544	5136

1. No code stamp or 'NB' on nameplate below 15 psig set.

Set Pressure [barg]	Valve Inlet and Outlet Size		
	50 mm	63 mm	80 mm
0.5	1049	1589	2303
1.0	1457	2208	3200
1.5	1888	2861	4147
2.0	2235	3387	4910
2.5	2613	3959	5739
3.0	2995	4538	6579
3.5	3377	5117	7418
4.0	3760	5696	8258

1. No code stamp or 'NB' on nameplate below 1.1 barg set.

Model Number/Order Guide

Model Number Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Example	2	1	5	V	—	H	0	1	A	Q	E	0	0	5	0

Model
215V
0337

Inlet Size
H - 2-inch [50.8 mm]
J - 2½-inch [63.5 mm]
K - 3-inch [76.2 mm]

Variation (01 through 99)
01 - Bronze Disc and Nozzle
03 - SS Disc and Nozzle
60 - BSP Connections

Design Revision
Indicates non-interchangeable revision. Current Design is at Revision 'A'

Valve Service
K - Air ASME Section VIII (Model 337 only)
Q - Vacuum (Model 215V only)
N - Non-code Air/Gas (Model 337 only)

Spring Material
E - SS Type 316
M - SS (26 psi thru 60 psi set) Type 17-7

Set Pressure
Model 337, 1 psig [0.7 barg] (0001) through 60 psig [4.1 barg] (0060)
Model 215V, 2-inch HG [68 mbarg] (0002) through 29-inch HG [982 mbarg] (0029) vacuum

Facility Phone: 828-669-3700

Tyco / Valves & Controls

www.kunklevalve.com

ATTACHMENT 8

MOISTURE SEPARATOR AND HIGH WATER LEVEL SWITCH CUT SHEETS AND RELATED INFORMATION

Air/Water Separator
Operation and Maintenance

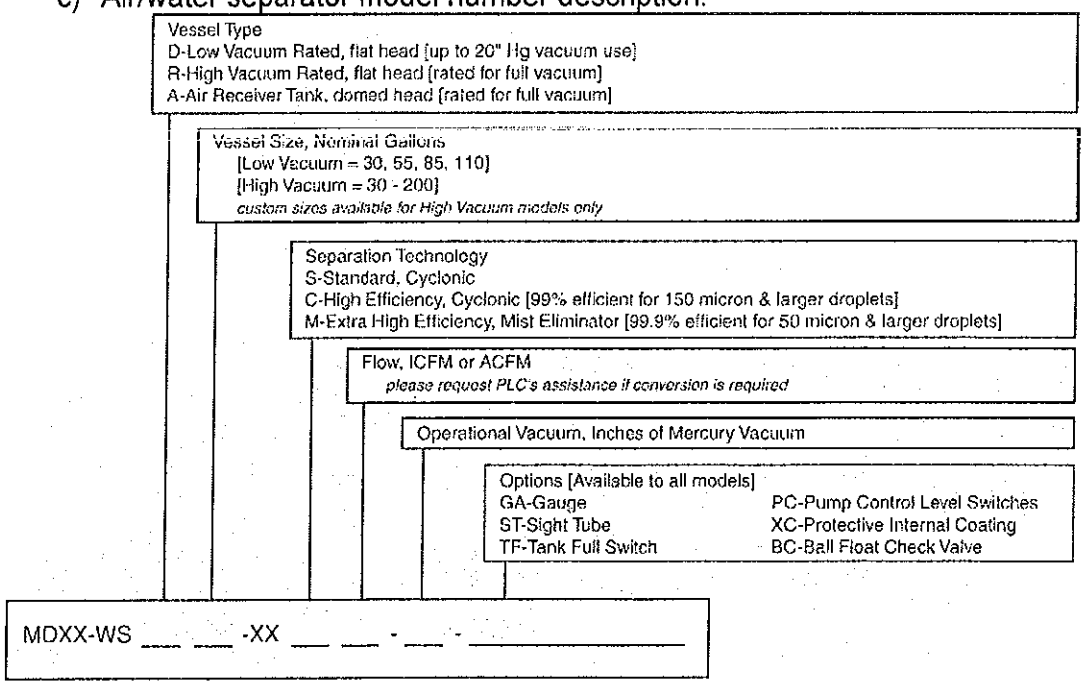
SECTION INCLUDES

1.1 APPLICATION

a) Product Level Control's air/water separators are designed to remove water from moisture-laden air streams. Proper selection and sizing of your air/water separator will ensure effective operation and longevity

b) Appurtenances required in addition to an air/water separator include:
   i) High water level switch. The high level switch will shut down the airflow when the separator becomes full of water.
   ii) Vacuum relief valve. The vacuum relief valve protects the separator from over pressurization.
   iii) Inline filter. The inline filter protects downstream equipment from foreign particles.

c) Air/water separator model number description:



1.2 RECEIVING AND UNPACKING

a) Upon receiving the unit, inspect carefully for any damage that may have occurred during shipment.
b) Shipping damage claims must be filed with the carrier at time of delivery.

1.3 TOOLS REQUIRED

i) No special tools are required to install the unit. Some separators can be heavy. Make sure you have appropriate equipment to place the separator in position.

1.4 INSTALLATION

a) Secure separator to floor. Separator must be mounted vertically and secured to prevent movement during operation.
b) Connect inlet and discharge piping to the separator. Inlet is horizontal while the outlet is on top. Use flexible couplings to avoid transferring vibration and stress to separator. Inlet and discharge piping must be secured such that the separator does not support the weight of the piping. Note: Keep in mind the weight of the pipe and its contents (air and water) when installing pipe supports.
c) Install water level switch (es). This switch is either installed in a sight tube or directly through the wall of the separator. Install and wire switch according to manufacturer's instructions and local codes. Typically this switch is wired to a control panel to control either a transfer pump or shut the system down when the separator becomes full of water.
d) Install and adjust vacuum relief valve according to manufacturer's instructions. Set the vacuum relief valve at the lowest of the following values: maximum vacuum rating of the vacuum blower, or maximum vacuum that can be applied to the separator. For separator models MDXX-WSR and MDXX-WSA, the vacuum relief valve can be set at full vacuum, or 28" mercury vacuum. For separator models MDXX-WSD (drum type), set the vacuum relief valve at 20" mercury vacuum. Note these are the maximum vacuum levels the separators can handle.
e) In cold climates, prevent the separator from freezing. Catastrophic failures can occur if water in the separator or water in transmission piping freezes.

1.5 OPERATION

a) Moisture-laden air enters the air/water separator through the horizontal inlet. After entering the separator, tangential forces created by cyclonic motion remove free moisture contained in the air stream. This separated moisture falls to the bottom of the separator as a liquid due to gravity. Air continues to swirl around the separator until it reaches the discharge at the top.
b) Manually drain the separator by opening the drain valve. It may be necessary to turn off the vacuum blower in order to allow the water to drain from the separator. This water may be considered hazardous waste. Be sure to wear appropriate safety clothing and follow proper procedures for disposal. Some locations require this water to be treated before discharge.

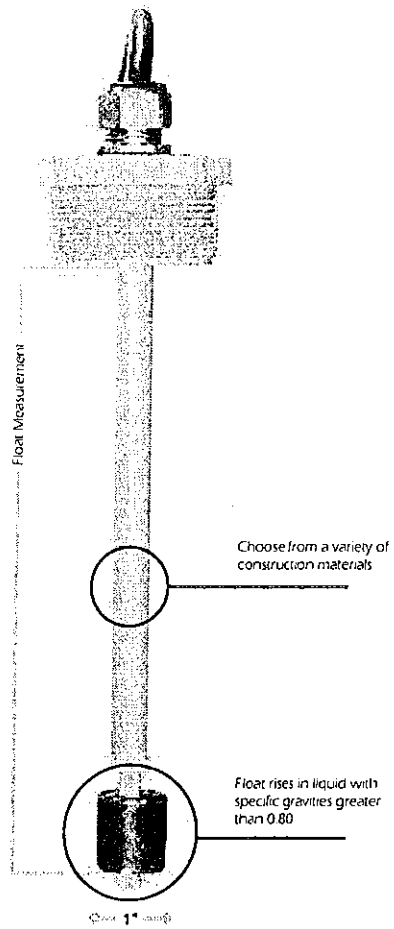
c) For systems with automatic water pump out: Water level switches will automatically operate the water transfer pump to empty the separator. Be sure the transfer pump is primed before operation. Also consult the transfer pump's literature for specific operating instructions. As stated above, this water may be hazardous. Follow above guidelines for disposal.

1.6 MAINTENANCE

a) Product Level Control's air/water separators require minimal maintenance.
b) Gain access to the interior of the separator through the removable lid or the clean out port. Lids are removed by removing the bolt and band at the top of the separator, remove discharge piping, and then remove the lid while being careful to prevent damage to the gasket. When reinstalling the lid, carefully place the gasket, ring, and tighten the bolt until the ends of the ring are ¼" apart. White tightening the bolt, tap the band horizontally with a hammer on the side opposite the bolt. If lid leaks, bolt may be tightened slightly more and silicone can be applied to gasket.
c) Periodically, a layer of sludge may form on the bottom of the separator. Remove the top lid of the separator and remove the sludge with water. Remember this sludge may be considered hazardous so be sure to wear appropriate safety clothing. If the separator does not contain a removable lid, gain access through the clean out port located on the side of the separator and remove the sludge as indicated above.
d) If your separator contains a high efficiency demister, periodically check the pressure drop across the separator. If the pressure drop increases to an unacceptable value, or when the separator's performance decreases, remove the demister and clean with an appropriate solution. Do not unwrap the demister. If the demister is unwrapped and then rewrapped, performance will be sacrificed.
e) Periodically, consult the maintenance instructions for the vacuum relief valve. Also, verify the vacuum setting in order to protect the separator.

Product Level Control

Product Level Control manufactures our own line of treatment sensors, custom-equipped for optimal on-site performance. By offering flexible product designs with a wide range of available options, we meet your individual project goals for the best possible value.



FEATURES

- **Constructed to meet client specifications**
- **Easily changed between Normally Open (NO) and Normally Closed (NC) — simply remove the E-clip and invert the float**
- **Various materials of construction allow for chemical resistance to contaminants**
- **Delivered fully assembled**
- **1-year warranty**

ELECTRICAL SPECIFICATIONS

- Maximum contact ratings:
  0.080 Amp, 120V, 60 Hz Resistive
  0.040 Amp, 240V, 60 Hz Resistive
  3.36 VA, 240V, 60 Hz Pilot Study
  1 Amp Max @ 24 VDC Resistive
- Single pole, single throw switch (SPST)
- 18/2 stranded copper conductors

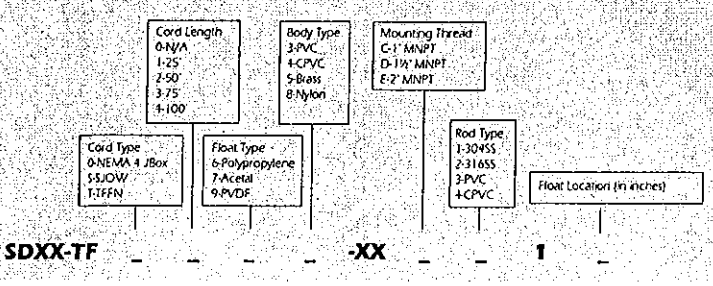
MECHANICAL SPECIFICATIONS

- Maximum pressure rating of 50 PSI @ 20°C
- Maximum temperature rating of 100°C
- Minimum specific gravity rating of 0.8☐
- Operable at angles up to 30° from vertical
- Length up to 48"
- Diameter equals 0.5"

PROCESS OF OPERATION

Operating as a single float assembly, the tank full sensor is used to detect high liquid levels and to prevent tank overflow.

PLC PERSONALIZED ORDERING NUMBER



ATTACHMENT 9

DRAIN PUMP CUT SHEETS AND RELATED INFORMATION

MOYNO

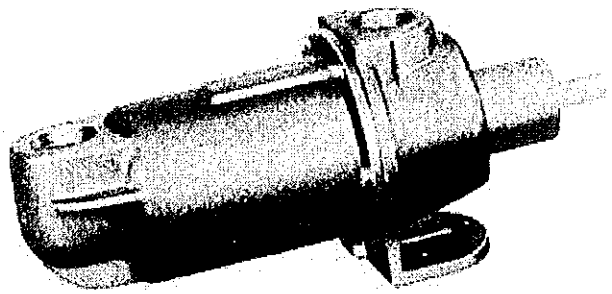
Always the Right Solution

SERVICE MANUAL

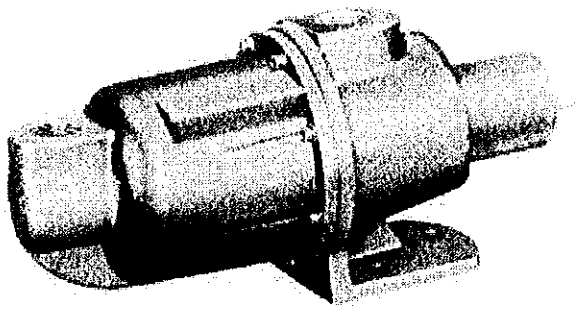
MOYNO® 500 PUMPS

300 SERIES

331, 332, 333, 344, 356 AND 367 MODELS



Mechanical Seal Models



Packing Gland Models

DESIGN FEATURES	MODELS				
	33101 34401 33201 35601 33301 36701	33104 34404 33204 35604 33304 36704	33108 33308 33208 34408	34411 35611	35613
Housing:	Cast Iron	AISI 316 SS	Nylon	Cast Iron	AISI 316 SS
Pump Rotor:	Chrome plated 416 SS	Chrome plated 316 SS	Chrome plated 416 SS	Chrome plated 416 SS	Chrome plated 316 SS
Pump Stator:	NBR (Nitrile)	NBR (Nitrile)	NBR (Nitrile)	NBR (Nitrile)	NBR (Nitrile)
Shaft:	416 SS	316 SS	416 SS	416 SS	316 SS
Flexible Joint:	Carbon steel/ NBR	316 SS/ NBR	Carbon steel/ NBR	Carbon steel/ NBR	316 SS/ NBR
Bearings:	Ball (sealed)	Ball (sealed)	Ball (sealed)	Ball (sealed)	Ball (sealed)
Mechanical Seal:	Carbon-ceramic	Carbon-ceramic	Carbon-ceramic	---	---
Packing:	---	---	---	Braided PTFE	Braided PTFE

Note: Alternate elastomers available. Refer to Repair/Conversion kit numbers, page 8.

INSTALLATION

Mounting Position. Pump may be mounted in any position. When mounting vertically, it is necessary to keep bearings above seals to prevent possible seal leakage into bearings.

Pre-Wetting. Prior to connecting pump, wet pump elements and mechanical seal or packing by adding fluid to be pumped into suction and discharge ports. Turn shaft over several times in a clockwise direction to work fluid into elements.

Piping. Piping to pump should be self-supporting to avoid excessive strain on pump housings. See Table 1 for suction and discharge port sizes of each pump model. Use pipe "dope" or tape to facilitate disassembly and to provide seal.

Drive. On belt driven units, adjust belt tension to point of non-slip. Do not overtighten.

On direct drive units, coupling components should be aligned and spaced at least 1/16" apart.

Pump rotation must be clockwise when facing shaft to prevent damage to pump. Check direction of rotation before startup.

Water Flush of Packing (356 Models Only). The packing may be either grease lubricated through a grease fitting in the stuffing box or have plumbing connected to the housing to allow a water flush.

Maximum speed is 1750 rpm.

When the material being pumped is abrasive in nature, it may be advantageous to flush the packing to prevent leakage under packing and excessive shaft wear.

Clean water can be injected through a 1/8" NPT tapped hole that normally houses the grease fitting for lubricating the packing. The water can be permitted to leak axially along the shaft in either direction or can be removed from the second tapped hole in the stuffing box. In both cases, the discharge from the stuffing box should be throttled slightly to maintain 10-15 PSI higher pressure in the stuffing box than is present in the discharge housing.

Table 1. Pump Data

Pump Models	331	332	333	344	356	367
Suction Port (NPT)	3/4*	3/4*	3/4*	3/4*	1-1/2	2
Discharge Port (NPT)	3/4	3/4	3/4	3/4	1-1/4	2
Discharge Pressure (psig)	150	100	50	40	50	50

*08 versions = 1" NPT

Table 2. Temperature Limits

Elastomer	Temperature Limits
*NBR	10°-160°F
*EPDM	10°-210°F
*FPM	10°-240°F

*NBR = Nitrile
*EPDM = Ethylene-Propylene-Diene Terpolymer
*FPM = Fluoroelastomer

OPERATION

Self-Priming. With wetted pumping elements, the pump is capable of 25 feet of suction lift when operating at 1750 rpm with pipe size equal to port size.

DO NOT RUN DRY. Unit depends on liquid pumped for lubrication. For proper lubrication, flow rate should be at least 10% of rated capacity.

Pressure and Temperature Limits. See Table 1 for maximum discharge pressure of each model. Unit is suitable for service at temperatures shown in Table 2.

Storage. Always drain pump for extended storage periods by removing suction housing bolts and loosening suction housing.

TROUBLE SHOOTING

WARNING: Before making adjustments, disconnect power source and thoroughly bleed pressure from system. Failure to do so could result in electric shock or serious bodily harm.

Failure To Pump.

1. Belt or coupling slip: Adjust belt tension or tighten set screw on coupling.
2. Stator torn; possibly excessive pressure: Replace stator, check pressure at discharge port.
3. Wrong rotation: Rotation must be clockwise when facing shaft.
4. Threads in rotor or on shaft stripped: Replace part. Check for proper rotation.
5. Excessive suction lift or vacuum.

Pump Overloads.

1. Excessive discharge pressure: Check discharge pressure for maximum rating given in Table 1. Check for obstruction in discharge pipe.
2. Fluid viscosity too high: Limit fluid viscosity to 20,000 CP or 100,000 SSU.

Viscosity CP	Limit RPM
1-300	1750
300-1,000	1200
1,000-2,000	700
2,000-5,000	350
5,000-10,000	180
10,000-20,000	100

3. Insufficient motor HP: Check HP requirement.

Noisy Operation.

1. Starved suction: Check fluid supply, length of suction line, and obstructions in pipe.
2. Bearings worn: Replace parts; check alignment, belt tension, pressure at discharge port.
3. Broken flexible joint: Replace part, check pressure at discharge port.
4. Insufficient mounting: Mount to be secure to firm base. Vibration induced noise can be reduced by using mount pads and short sections of hose on suction and discharge ports.

Mechanical Seal Leakage (Mechanical Seal Models Only).

1. Leakage at startup: If leakage is slight, allow pump to run several hours to let faces run in.
2. Persistent seal leakage: Faces may be cracked from freezing or thermal shock. Replace seal.

Packing Leakage (Packing Models Only).

1. Leakage at startup: Adjust packing as outlined in maintenance instructions.

Note: Slight leakage is necessary for lubrication of packing.

2. Persistent leakage: Packing rings and/or shaft may be worn. Replace parts as required.

Pump Will Not Prime.

1. Air leak on suction side: Check pipe connections.

MAINTENANCE

General. These pumps have been designed for a minimum of maintenance, the extent of which is routine lubrication and adjustment of packing. The pump is one of the easiest to work on in that the main elements are very accessible and require few tools to disassemble.

Packing Lubrication (356 Models Only). The zerk fitting on the side of the suction housing leads to the lantern ring halves in the mid-section of the packings. At least once a week, inject a small quantity of good quality grease, such as MPG-2 Multi Purpose Grease (Du Bois Chemical), or equivalent, into the zerk fitting to lubricate the packings.

Note: For Model 34411, lubricate packing by applying a liberal amount of grease during assembly.

Packing Adjustment (Packing Models Only). Packing gland attaching nuts should be evenly adjusted so they are little more than finger tight. Over-tightening of the packing gland may result in premature packing failure and possible damage to the shaft and gland.

When the packing is new, frequent minor adjustments are recommended for the first few hours of operation in order to compress and seat the packing. Be sure to allow slight leakage for lubrication of packing.

When excessive leakage can no longer be regulated by tightening the gland nuts, remove and replace the packings in accordance with the DISASSEMBLY and REASSEMBLY instructions. The entire pump need not be disassembled to replace the packings.

Bearing Lubrication. The prelubricated, fully sealed bearings do not require additional lubrication.

PUMP DISASSEMBLY

WARNING: Before disassembling pump, disconnect power source and thoroughly bleed pressure from system. Failure to do so could result in electric shock or serious bodily harm.

To Disassemble Mechanical Seal Models:

1. Disconnect suction and discharge piping.
2. Remove screws (112) holding suction housing (2) to pump body (1). Remove suction housing and stator (21).
3. Remove rotor (22) from flexible joint (24) by turning counter-clockwise (RH thread). Use 3/16 inch diameter punch to remove rotor pin (45) on Model 36701.
4. Flexible joint (24) can be removed from shaft (26) by using a 3/16 inch allen wrench in end of joint (1/4 inch wrench on 356 Models) and turn counter-clockwise. Use 3/16 inch diameter punch to remove shaft pin (46) on Model 36701.
5. Carefully slide mechanical seal (69) off shaft (26). Carefully pry seal seat out of pump body (1). If any parts of mechanical seal are worn or broken, the complete seal assembly should be replaced. Seal components are matched parts and are not interchangeable.
6. The bearings (29) and shaft (26) assembly can be removed from pump body (1) after snap ring (66) has been removed. To remove the assembly, lightly tap the shaft at threaded end using a block of wood to protect the threads. The bearings may be pressed off the shaft.

To Disassemble Packing Models:

1. Disconnect suction and discharge piping.
2. Remove screws (112) which hold suction housing (2) to pump body (1). Remove suction housing and stator (21).
3. Remove rotor (22) from flexible joint (24) by turning in a counter-clockwise direction (RH thread).
4. Flexible joint (24) can be removed by using a 3/16 inch allen wrench in end of joint (1/4 inch wrench on 356 Models) and turn in a counter-clockwise direction.
5. The packing (42) can be removed without removing the shaft (26) using the following procedure:
   a. Remove gland bolts (47).
   b. Slide gland (41) away from packing (42).
   c. Pull out packing (42) (and lantern ring halves (57) on 356 Models) using a packing removing tool.

   Note: Packing can be removed after shaft has been removed by pushing out from pump side of pump body after gland (41) has been detached.
6. The bearings (29) and shaft (26) assembly can be removed from pump body (1) after snap ring (66) has been removed. To remove the assembly, lightly tap the shaft at threaded end using a block of wood to protect the threads.
7. To disassemble shaft assembly, remove snap ring (66A) from shaft (26) and press bearings (29) and bearing spacer (33) off the shaft.

PUMP ASSEMBLY

To Assemble Mechanical Seal Models:

1. Press bearings (29) on shaft (26), and locate slinger ring (77) near bearing on threaded end of shaft.

Note: When replacing bearings, always press on the inner race when assembling to shaft, and on the outer race when pressing bearings into the housings.

2. Press shaft assembly into pump body (1) securing with snap ring (66).
3. Install mechanical seal (69) using the following procedure:
   a. Clean and oil sealing faces using a clean light oil (not grease).

Caution: Do not use oil on EPDM parts. Substitute glycerin or soap and water.

   b. Oil the outer surface of the seal seat, and push the assembly into the bore in the pump body (1), seating it firmly and squarely.
   c. After cleaning and oiling the shaft, slide the seal body along the shaft until it meets the seal seat.
   d. Install seal spring and spring retainer on shaft.
4. Thread flexible joint (24) into shaft (26) in a clockwise direction (RH thread). On 356 Models, install seal spacer (69A) and washer (116) before threading flexible joint onto shaft in a clockwise direction. On Model 36701, use shaft pin (46) to pin flexible joint (24) to shaft.
5. Thread rotor (22) onto flexible joint (24) in a clockwise direction (RH thread). On Model 36701, pin rotor (22) to joint using rotor pin (45).
6. Slide stator (21) on rotor (22). On 331 and 332 Models, insert rounded end of stator ring (135) into end of stator prior to installing stator on rotor.
7. Secure stator (21) and suction housing (2), with suction port vertically up, to pump body (1) using screws (112).
8. Proceed as in installation instructions.

To Assemble Packing Models:

1. Press bearings (29), with bearing spacer (33) in between, on shaft (26) and secure in place using snap ring (66A).

Note: When replacing bearings, always press on the inner race when assembling to shaft, and on the outer race when pressing bearings into the housings.

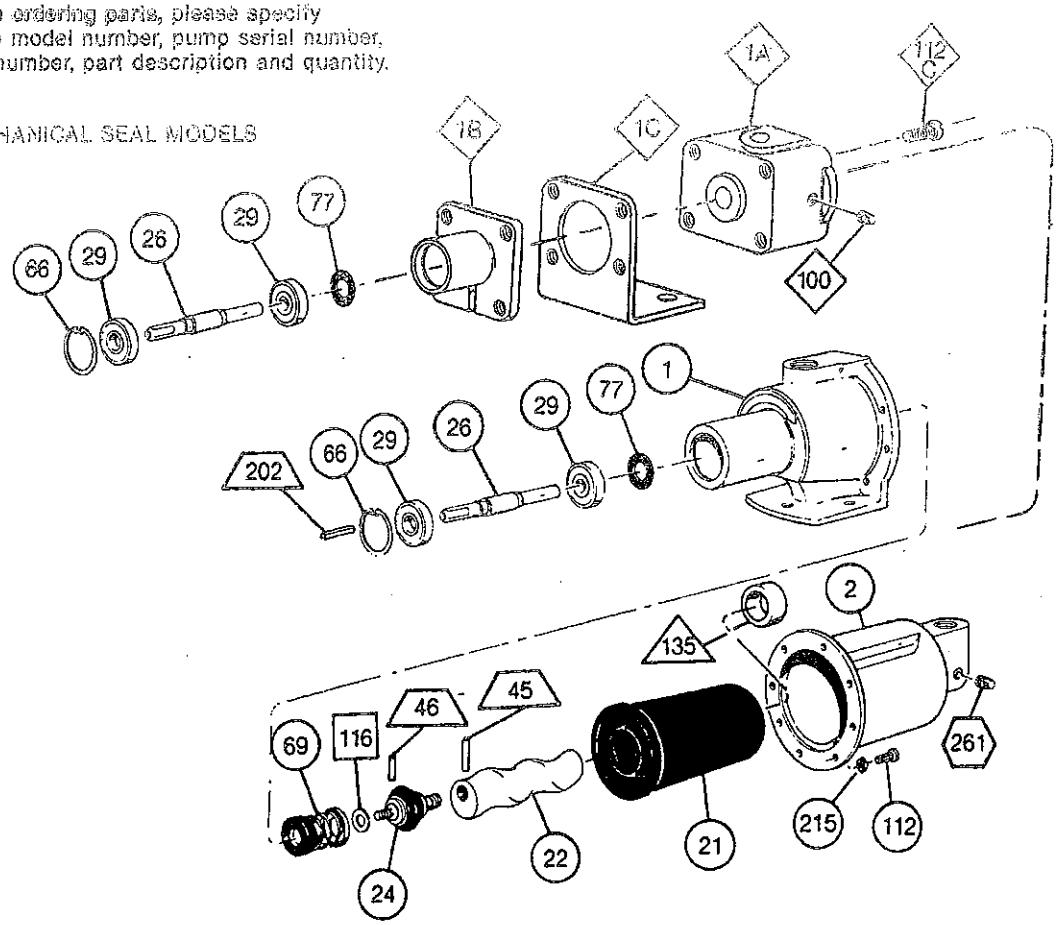
2. Install packing (42) before installing shaft assembly using the following procedure:
   a. Lubricate each individual ring of packing with a grease that is insoluble in the fluid being pumped.
   b. Individually assemble each ring of packing loosely in the packing chamber of the pump body (1). Stagger splits on rings. (Four rings, 3/16 inch square required on Model 34411; four rings, 1/4 inch square and two lantern ring halves (57) assembled between two rings on 356 Models).
   c. Loosely install packing gland (41) on pump body (1) using gland bolts (47).
3. Press shaft assembly into pump body (1) positioning slinger ring (77) between packing gland (41) and bearing end of pump body. Secure the shaft assembly with snap ring (66).
4. Thread flexible joint (24) into shaft (26) in a clockwise direction (RH thread).
5. Thread rotor (22) onto flexible joint (24) in a clockwise direction (RH thread).
6. Slide stator (21) on rotor (22). On 331 and 332 Models, insert rounded end of stator ring (135) into end of stator prior to installing stator on rotor.
7. Secure stator (21) and suction housing (2), with suction port vertically up, to pump body (1) using screws (112).
8. Proceed as in installation instructions.

Note: Adjust newly installed packing as described in maintenance procedure.

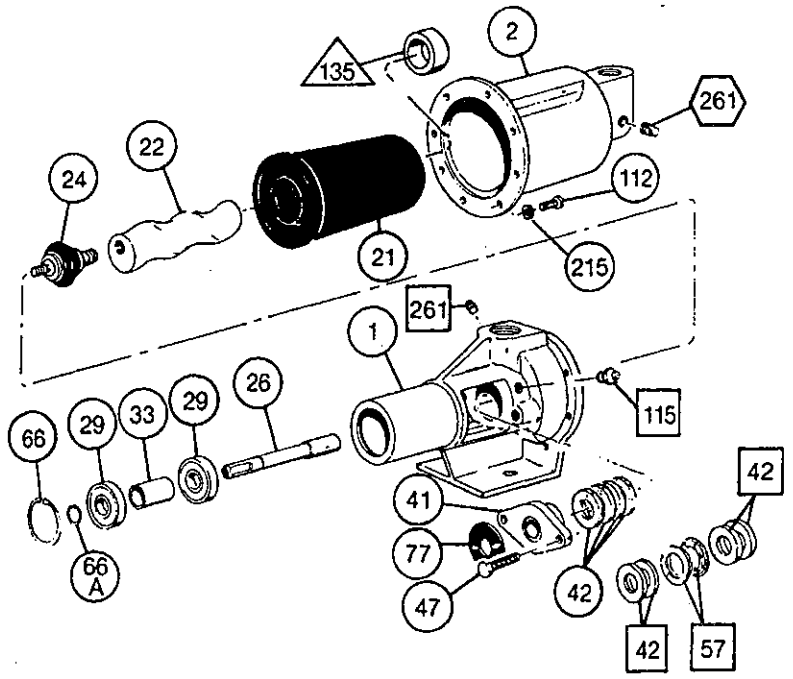
WARNING: Replace belt or coupling guards before reconnecting power.

When ordering parts, please specify pump model number, pump serial number, part number, part description and quantity.

MECHANICAL SEAL MODELS



PACKING MODELS



Used on 332 and 367 only.

Used on 356 only.

Used on 356 and 367 only.

Used on -08 only.

Used on 367 only.

PARTS LIST — 331, 332, 333, AND 344 MODELS

Item No.	Description	Mechanical Seal Models			Packing Gland Models
		33101 33201 33301 34401	33104 33204 33304 34404	33108 33208 33308 34408	34411
1	Pump Body	330-1065-002	330-1910-002		340-1000-001
1A	Discharge Housing			340-2362-000	
1B	Bearing Housing			330-4587-000	
1C	Pump Base			340-2369-000	
2	Suction Housing	330-1064-002	330-1911-002	330-4536-000	330-1064-002
*21	Stator	See Stator section below.			
*22	Rotor	See Rotor section below with circled numbers for each series.			
		①	②	①	①
24	Joint	Carbon Steel/NBR 320-1511-000	316 SS/NBR 320-3759-000	Carbon Steel/NBR 320-1511-000	
26	Drive Shaft	320-1499-000	320-2938-000	320-1499-000	320-2448-000
29	Bearing (2 req.)	630-0502-031			
33	Bearing Spacer				320-1900-000
41	Packing Gland				320-0101-004
42	Packing				340-3396-005
47	Gland Bolt				619-1520-161
66	Snap Ring	320-1506-000			
66A	Snap Ring				320-4182000
69	Mechanical Seal	320-2424-000			
77	Slinger Ring	320-6382-000			320-6384-000
100	Pipe Plug (3 req.)			610-0120-021	
112	Screws (8 req.)	619-1430-103	320-5968-000	619-0860-081	619-1430-103
112C	Screws (4 req.)			61 9-0890-281	
135	Stator Ring (331 -332 only)	320-7812-000			
215	Lock Washer (8 req.)	320-6464-000			

*Recommended spare parts.

STATORS		Models			
		331	332	333	344
21	Standard Stator, NBR All Models	340-3501-120	340-3502-120	340-3503-120	340-3504-120
21	EPDM Stator	340-3501-320	340-3502-320	340-3503-320	340-3504-320
21	FPM Stator	340-3501-520	340-3502-520	340-3503-520	340-3504-520
ROTORS					
22	① 416SS - All Models	320-2729-000	330-0906-000	320-1394-000	320-1841-000
22	② 316SS - All Models	320-2933-000	320-2942-000	320-2936-000	320-2934-000

See page 8 for Repair/Conversion Kits

PARTS LIST — 356 AND 367 MODELS

Item No.	Description	Mechanical Seal Models		Packing Gland Models		Mechanical Seal Model	
		35601	35604	35611	35613	36701	36704
1	Pump Body	Cast Iron 340-0636-000	316SS 340-1550-000	Cast Iron 350-0420-000	316SS 350-0491-000	Cast Iron 350-0423-000	316SS 350-0423-007
2	Suction Housing	350-0280-000	350-0489-000	350-0280-000	350-0489-000	350-0302-000	350-0302-007
*21	Stator	NBR 340-3505-120		NBR 340-3505-120		NBR 340-3506-120	
22	Rotor	416SS 320-2304-000	316SS 320-4431-000	416SS 320-2304-000	316SS 320-4431-000	416SS 330-2042-000	316SS 330-3077-000
24	Flex Joint	Carbon Steel 320-1583-000	316SS 320-4427-000	Carbon Steel 320-1583-000	316SS 320-4427-000	Carbon Steel 320-1749-000	316SS 320-4436-000
26	Drive Shaft	320-1759-000	320-4430-000	320-2765-000	320-4435-000	330-1805-000	330-1805-015
29	Bearing (2 req.)	630-0552-051				630-0552-061	
33	Bearing Spacer			320-2764-000			
41	Packing Gland			320-0003-004	320-0003-007		
*42	Packing			340-3396-008			
45	Rotor Pin					320-4439-002	
46	Shaft Pin					320-4439-001	
47	Gland Bolt			619-1530-241			
57	Lantern Ring Half**			320-6585-000			
66	Snap Ring	320-1758-000				320-2794-000	
66A	Snap Ring			320-3533-000			
*69	Mechanical Seal	320-3945-000				320-1750-000	
69A	Seal Spacer	320-4434-000					
77	Slinger Ring	320-6383-000		320-6385-000		320-6385-000	
112	Screws (6 req.)	619-1530-161				619-1530-161	
115	Zerk Fitting			320-2503-001			
135	Stator Spacer	330-7594-000					
202	Shaft Key					611-0040-240	
215	Lock Washer (6 req.)	623-0010-411					
261	Pipe Plug	610-0120-011	610-0420-010	610-0120-011	610-0420-010	610-0120-011	610-0420-010

*Recommended spare parts.
**2 Required

See page 8 for Repair/Conversion Kits

REPAIR/CONVERSION KIT NUMBERS

ELASTOMER REPAIR/CONVERSION KITS

Item No.	Description	331 Models			332 Models		
		NBR	EPDM	FPM	NBR	EPDM	FPM
—	Kit No.	311-9026-000	311-9025-000	311-9054-000	311-9027-000	311-9038-000	311-9055-000
21	• Stator	340-3501-120	340-3501-320	340-3501-520	340-3502-120	340-3502-320	340-3502-520
24	• Joint	320-1511-000‡	320-6367-000†	320-4670-000†	320-1511-000‡	320-6367-000†	320-4670-000†
69	• Seal	320-2424-000	320-6379-000	320-6501-000	320-2424-000	320-6379-000	320-6501-000
Item No.	**Description**	**333 Models**			**344 Models**		
		NBR	**EPDM**	**FPM**	**NBR**	**EPDM**	**FPM**
—	Kit No.	311-9029-000	311-9028-000	311-9056-000	311-9031-000	311-9030-000	311-9057-000
21	• Stator	340-3503-120	340-3503-320	340-3503-520	340-3504-120	340-3504320	340-3504520
24	• Joint	320-1511-000‡	320-6367-000†	320-4670-000†	320-1511-000‡	320-6367-000†	320-4670-000†
69	• Seal	320-2424-000	320-6379-000	320-6501-000	320-2424-000	320-6379-000	320-6501-000

†316SS/with appropriate elastomer.
‡Carbon steel. NBR kits are available only with carbon steel joints; a 316SS/NBR joint for 331-344 Models is available as 320-3759-000.

Item No.	Description	356 Models			367 Models		
		NBR	EPDM	FPM	NBR	EPDM	FPM
—	Kit No. (Mech. Seal Models)	311-9033-000	311-9032-000	311-9058-000	311-9060-000	311-9036-000	311-9124-000
21	• Stator	340-3505-120	340-3505-320	340-3505-520	340-3506-120	340-3506-320	340-3506-520
24	• Flex Joint	320-1583-000‡	320-6369-000†	320-4671-000†	320-1749-000‡	320-6378-000‡	3206515-000‡
69	• Seal	320-3945-000	320-6380-000	320-6510-000	320-1750-000	320-6390-000	320-6517-000
45	• Rotor Pins				320-4439-002	320-4439-002	320-4439-002
46	• Shaft Pin				320-4439-001	320-4439-001	320-4439-001
—	Kit No (Packing Gland Models)	311-9035-000	311-9034-000	311-9059-000			
21	• Stator	340-3505-120	340-3505-320	340-3505-520			
24	• Joint	320-1583-000‡	320-6369-000†	320-4671-000†			

†316SS/with appropriate elastomer.
‡Carbon steel. NBR kits are available only with carbon steel joints; a 316SS/NBR joint for Model 35604 and 35613 pumps is available as 320-4427-000; a 316SS/NBR joint for model 36704 is available as 320-4436-000.

ABRASION RESISTANT SEALS

Elastomer	Models		
	331-344	356	36701
NBR	3206460000	3206505000	3206511000
EPDM	3206502000	3206506000	3206512000
FPM	3206503000	3206507000	3206513000

NBR = Nitrile
EPDM = Ethylene-Propylene-Diene Terpolymer
FPM = Fluoroelastomer

Printed in U.S.A.

Double The Length Of Your Moyno Pump Warranty For FREE!

For your *free* pump warranty extension, choose from one of the three options below:

1. Go to www.moyno.com and fill out the registration form online
2. Mail this form by placing it in an envelope and sending it to: **Moyno, Inc.**
   Attn: Tish Wilson
   P. O. Box 960
   Springfield, OH 45501-0960
   U.S.A.
3. Fax this form to 937-327-3177

Thank you for choosing a Moyno Pump. Please take the time to complete this warranty registration form. Upon receipt of your form, your standard limited warranty on defective material and workmanship will be extended to twice the standard period of time at no additional cost to you. We appreciate your business and look forward to serving you in the future.

CERTIFICATE No. 101442

MOYNO

Always the Right Solution™

Always Insist on Genuine Moyno Replacement Parts!

Moyno® Pump Warranty Registration

Pump Model # _____ Pump Serial # _____

Purchased From _____ Date Purchased _____

Your Name _____ Your Title _____

Your Company Name _____

Address _____

City/State (Province)/Zip Code _____

Phone Number _____ Fax Number _____

E-mail _____

Application for Which This Pump Was Purchased

Material _____ Flow Rate _____ Process Temperature _____

Operating Speed _____ Viscosity _____ pH Value _____

Hours Operated per Day _____ Continuous _____ Intermittent _____

Discharge Pressure _____ Suction Pressure _____ NPSH Available _____

Percent of Solids _____ Particle Size _____ Abrasion Rating _____

How Did You First Hear of Moyno Pumps?

☐ Advertisement ☐ Postcard ☐ Trade Show ☐ Referral

☐ Distributor Salesperson ☐ Previous Experience With Moyno Pumps ☐ Other – Explain Below

Thank You!

RECOMMENDED STORAGE INSTRUCTIONS

The following general storage procedures are for pumps, Maz-O-Rators, and accessory equipment. Some accessories may require additional storage instructions. Warranties may not cover extended storage periods. Please contact the nearest representative for specific storage questions.

1. General Preparation for Storage
   A. Loosen gland relieving compression on packing.
   B. Remove stator and belts if units are to be stored for an extended period and cannot be rotated every 6 months. If it is not feasible to remove stator, seal the discharge port to preserve the rubber components. DO NOT ADD OIL TO NATURAL RUBBER (R) STATORS. TIGHTLY SEAL SUCTION AND DISCHARGE PORTS. (Pump only)
   C. On Maz-O-Rators, apply generous coat of heavy oil (equivalent to automotive SAE 20 or SAE 30) to the inside surface of the canopy, impeller, and all other unpainted surfaces enclosed by the canopy. Reinspect every 3 months.
   D. All non-painted or otherwise unprotected parts should be covered with a good rust preventative to prevent damage to surface during storage. The following rust preventative material is recommended:

      Available from Dow Corning Corporation
      Molykote Metal Protector
      Bulletin No. 71-309
      Midland, Michigan 48640

      Re-inspect at 3 month intervals or less.
   E. If possible, rotate shaft 180° manually every 3 months or less.
   F. Store inside if possible — if not feasible, units should be protected by plastic, weatherproof canvas, or suitable covering.

2. Temperature
   A. Store in a dry heated area.
   B. Maximum temperature 120°F (49°C). If exceeded, provide adequate air supply for the environment
   C. Minimum preferred temperature 50°F (10°C). If exceeded, provide space heaters. A constant minimum temperature as low as 30°F (-1.1°C) is acceptable. Temperatures fluctuating above and below 50°F (10°C) cause internal and external condensation and must be avoided.

3. Dew Point
   A. It is important that equipment be enclosed within an airtight dust cover.
   B. Relative humidity should not exceed 60%. Adequate desiccation for moisture control must be provided if relative humidity could exceed this limit.

4. Dust and Atmospheric Contaminants
   A. Dustfree environment is preferred. If not, securely enclose in an airtight polyvinyl or polyethylene cover to eliminate the interchange of air between the enclosure and the ambient due to slight pressure differentials.
   B. In high ozone environments, special precautions should be taken to prevent damage to the rubber stator, lip seals, belts, and some electrical insulation. If possible, wrap parts for storage to prevent access to air and sunshine. If it is not possible to wrap the parts, protect them by sealing all openings on each unit with tape and non-porous material.

5. Shock and Vibration
   A. Shock and vibration may loosen screws, damage meter movements, and cause false brinelling of the bearings.
   B. Vibration levels should not exceed 2 mils maximum at 60 hertz.
   C. Provide dampening materials when nearing the above level.

6. Start-up after Storage
   A. Fill unit with material to be pumped or a compatible liquid.
   B. Rotate pump manually to ensure elements are free and filled with liquid.
   C. Check packing area for leaks.
   D. Check threaded and gasketed connections for leaks —tighten as necessary. Replace pipe sealant or gaskets if necessary.
   E. Refer to normal start-up procedures.

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MOYNO

Always the Right Solution™

MOYNO, INC.
WARRANTY AND CLAIMS POLICY

The following statement of our Warranty and Claims Policy is intended to assist our customers in understanding the terms of our warranty, the circumstances under which we will honor claims, and the procedure for making claims.

Our Warranty and Claims Policy should be read in conjunction with and is subject in all respects to the terms and conditions of sale which appear on our quotation and acknowledgment forms and the specific terms of any distributorship or other such agreement between us and the individual customer.

1. **Warranty on Products Manufactured by Us.**

We warrant Products manufactured by us to be free from defects in material and workmanship for a period of one year from the shipment from our factory or warehouse.

Our liability under this warranty or in connection with any other claim relating to our products is limited to the repair, or at our option, the replacement or refund of the purchase price, of any Products or parts or components which are returned to us freight prepaid and which are defective in material or workmanship. Products or parts or components thereof which are repaired or replaced by us will be returned to our customer freight collect.

2. **Products of Other Manufacturers.**

We make no warranty with regard to any Products, including but not limited to electrical components or equipment and other prime movers, which are not manufactured by us. The only warranty which attaches to such Products is that warranty, if any, of the manufacturer of such Products. Our Customer Service Department should be consulted if our customers have questions as to whether particular Products are covered by our warranty or are separately warranted by their manufacturers.

3. **Limitation of Liability.**

The only warranty which we make to our customers is that warranty which is set forth on our quotation and acknowledgment forms and which is summarized above. WE DO NOT MAKE ANY OTHER EXPRESS WARRANTIES OR ANY IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR USE.

In addition, we do not assume and we expressly disclaim any liability for (i) any SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES which anyone may suffer as a result of the sale, delivery, servicing, use, or loss of use, of any Product, or (ii) any charges or expenses of any nature which are incurred without our express written consent.

Our total liability under our warranty or in connection with any claim involving any Product is expressly limited to the purchase price of the Product in respect of which damages are claimed.

4. **What Is Not Covered By Our Warranty: Types of Damages and Claims For Which We Are Not Responsible.**

The following are examples of the kinds of defects which are not covered by our warranty: defects which are caused by improper installation, improper or abnormal use or operation, or improper storage or handling; defects caused by our customer's failure to perform normal preventative maintenance; defects caused by the use of replacement parts not manufactured or supplied by us; defects caused by repairs by persons not authorized by us; defects caused by modifications or alterations made by our customer; and any damage to our Product occurring while it is in our customer's possession. Since these are examples and not a complete list, we suggest that our customers contact our Customer Service Department if they have any questions concerning the scope of our warranty.

Additional costs incurred by our customers because of delays in delivery are consequential damages for which we are not responsible.

Risk of loss or damage to our Products passes to our customer when we tender our Products to the carrier. Although we cannot process transit damage claims with any carrier on a customer's behalf, we will provide reasonable assistance to our customers when such claims arise.

5. Consultations With Customers.

When so requested, our engineers and other personnel may consult with our customers concerning our Products. While our employees will offer their best judgement on any question, the ultimate responsibility for selecting that Product which will perform the functions and applications desired by the customer rests with the customer. As noted above, we make no warranty, express or implied, as to the fitness of any Product for any particular purpose or use.

6. How To Make A Claim.

Within the limits of the terms and conditions set forth on our quotation and acknowledgement forms and in this Warranty and Claims Policy, we will honor reasonable and justified claims when adequate evidence is provided to show that our Product was defective.

Whenever a customer has a claim concerning a Product, the customer should contact the Sales or Customer Service Department. CUSTOMERS SHOULD NOT RETURN ANY PRODUCTS OR PARTS OR COMPONENTS TO US WITHOUT FIRST CONTACTING US.

When contacting us, customers should have the following information available:

1. Customer name, location, purchase order number and the date of purchase.
2. Product serial number (off nameplate).
3. Model number, including frame/type/trim (off nameplate).
4. Equipment installation date.
5. Equipment failure date.
6. Application or service of unit.
7. Details of claim.

We will notify the customer whether it will be necessary to return the Product or part or component to us. If so, we will send the customer an "AUTHORIZED RETURN GOODS TAG" that must be attached to the Product or part or component before returning it. All items returned to us must be returned freight prepaid.

If we determine that the Product or part or component is defective and that the defect is covered by our warranty, we will, as explained above, correct the defect or refund the purchase price.

Customers should promptly inspect all Products upon delivery. Claims for shortages must be made by our customers within 20 days after the date of shipment from our factory or warehouse. We suggest that shortages be noted on the bill of lading or packing list, which should then be sent to our Customer Service Department for verification.

All other claims must be submitted within 60 days after the date of shipment from our factory or warehouse, or in the case of an alleged breach of warranty, within 60 days after the date within the warranty period on which the defect is or should have been discovered.

Claims may not be deducted from payments made to us unless we have so agreed in writing in advance.

Moyno, Inc.
P.O. Box 960
Springfield, OH 45501-0960
U.S.A.
Telephone 1-877-4UMOYNO
(Municipal).....937-327-3510
Facsimile 937-327-3572
(Municipal).....937-327-3064
Web site: www.moyno.com

Moyno de México, S.A. de C.V.
Av. Encarnación Ortiz No. 1860
Col. Cosmopolita
C.P. 02670 Mexico, D.F.
Telephone 5556-7842
Facsimile 5556-2044

Robbins & Myers Limited
School Lane
Chandlers Ford, Hampshire SO53 3DG
ENGLAND
Telephone.....01703/252528
Facsimile 01703/252529

Robbins & Myers Singapore Pte, Ltd.
Singapore Branch
No. 130 Gul Circle
SINGAPORE 629596
Telephone 861-3877/8
.....& 861-6954
Facsimile 861-1642

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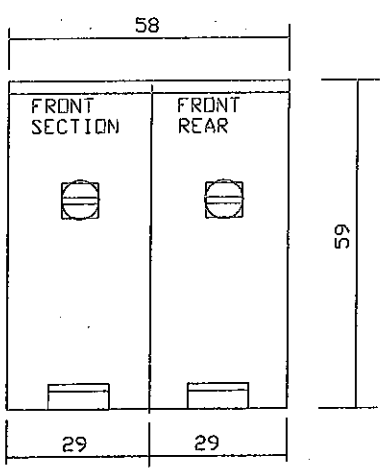
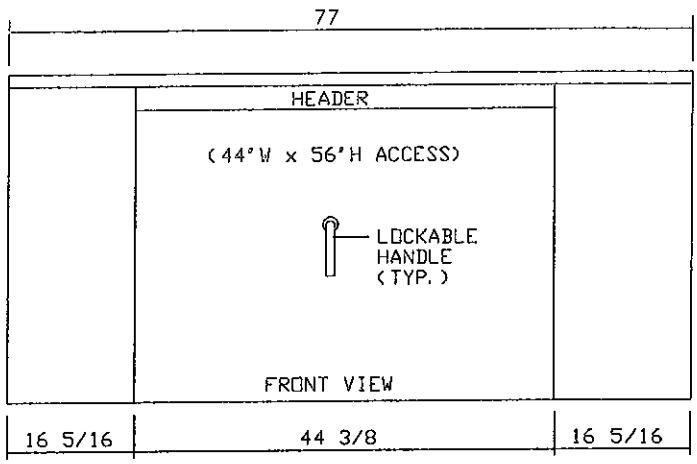
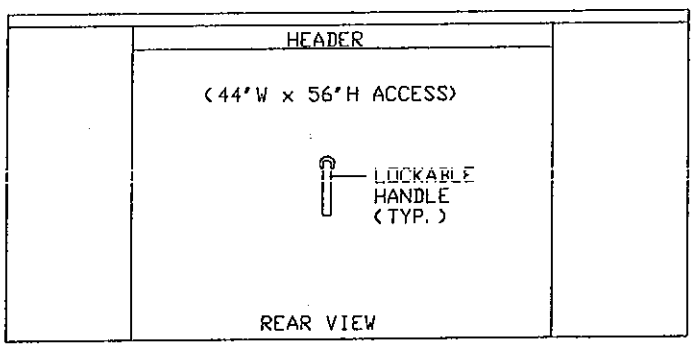
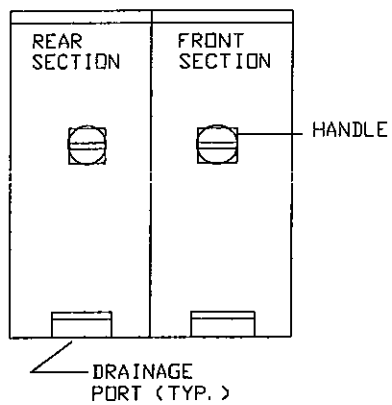
ATTACHMENT 10

HOT BOX CUT SHEETS AND RELATED INFORMATION









Hot Box®
924 LANE AVE N.
JACKSONVILLE, FLORIDA 32254
(904) 786-0204 (800) 736-0238
FAX (904) 783-6965
http://www.hot-box.com

TITLE: LB3E-D (STANDARD 2-PC AL ENCLOSURE - NO HEAT)

BY/DATE/DWG: SBT / 12-17-99 LB3E-D

ENGINEER / CONTRACTOR:

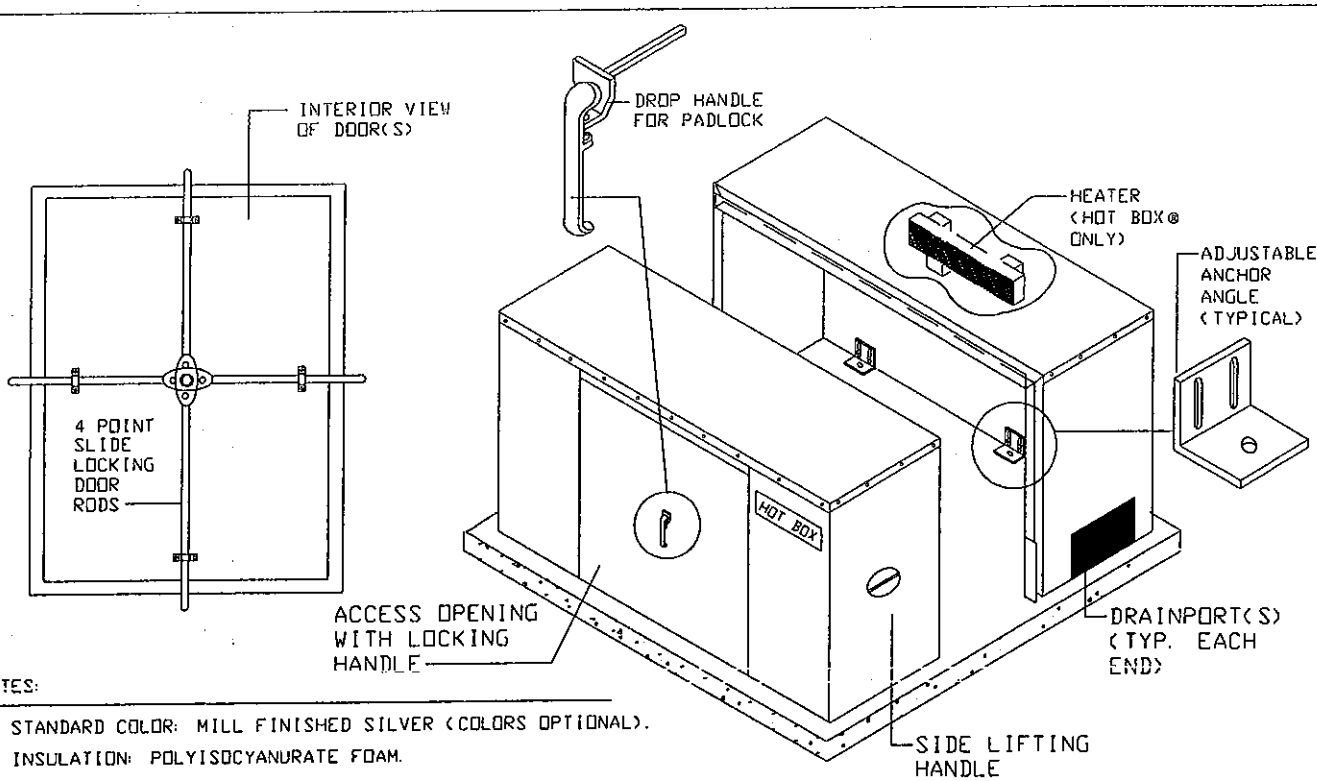
LOCATION:

APPROVED/DATE:

REV. 1: REV. 2: REV. 3: SCALE: N. T. S.

REP. / DISTRIBUTOR:

QUOTE NO:



NOTES:

1. STANDARD COLOR: MILL FINISHED SILVER (COLORS OPTIONAL).
2. INSULATION: POLYISOCYANURATE FOAM.
3. UNIT IS A LOK BOX™ WHEN INSTALLED WITHOUT THE HEAT.
4. ASSE CERTIFIED.

Hot Box®
250 LANE AVE. N.
JACKSONVILLE, FLORIDA 32254
(904) 786-0204 (800) 736-0238
FAX (904) 783-6965
http://www.hot-box.com

TITLE: STANDARD 2 SECTION ALUMINUM ENCLOSURE
HOT BOX® / LOK BOX™ 4" I. P. S. THROUGH 8" I. P. S.

BY/DATE/DWG: SBT / 10-12-98

ENGINEER / CONTRACTOR:

LOCATION: CATALOG DRAWING

APPROVED/DATE:

REV. 1:	REV. 2:	REV. 3:	SCALE:	REP. / DISTRIBUTOR:	QUOTE NO.:
1-26-99			N. T. S.		

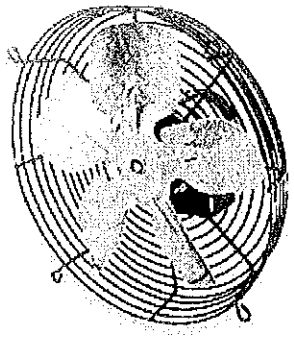
RESTR. DWG. PATENT # 4,726,394.

DWG. LOC.: D:\CADD\CATALOG\CAT-2-PC

ATTACHMENT 11

HEATING AND VENTILATION SYSTEM CUT SHEETS AND RELATED INFORMATION

GRAINGER



Exhaust Fan,10 in,115 V,595 CFM

Exhaust Fan, 10 in Fan Blade Diameter, 595 CFM at 0.000 in SP, 405 CFM at 0.125 in SP, 5.5 Sones at 0.000 in SP at 5 Ft., 115 VAC, 60 Hz, Single Phase, Shaded Pole, 1.4 Amps at Rated Load, 1550 Max Ambient Temp. 104 F, Max Depth 5 9/16 in, Mounting Position Vertical/Horizontal, Outside Dia 13 in

Grainger Item #	1HKL3
Brand	DAYTON
Mfr. Model #	1HKL3
Ship Qty.	1
Sell Qty. (Will-Call)	1
Ship Weight (lbs.)	7.62
Usually Ships	Today
Catalog Page No.	2989

Price shown may not reflect your price. Log in or register

Additional Info

7 to 24" Guard-Mounted Exhaust Fans
Designed for low pressure applications of up to 0.125" static pressure.
Steel wire intake guard has four mounting loops for easy installation and baked-on gray polyester finish to resist corrosion. Guard complies with OSHA regulations. Automatic shutter is recommended; see Index under Shutters, Fan. UL and C-UL Listed. CSA Certified.

- Shaded pole, totally enclosed air-over, 115V, 60 Hz motor
- Mount vertically or horizontally
- Not speed controllable
- Deep pitch stamped aluminum propeller
- Mounting screws included

Tech Specs

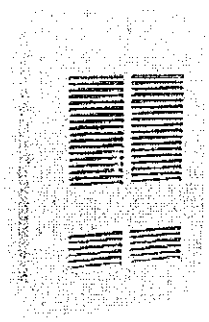
Item: Exhaust Fan
Type: Guard Mounted
Propeller Dia. (In.): 10
CFM @ 0.000-In. SP: 595
CFM @ 0.125-In. SP: 405
Sones @ 0.000-In. SP @ 5 Ft.: 5.5
Voltage: 115
Hz: 60
Phase: Single
Operating Amps: 1.4
Motor HP: 1/30
Max. Ambient Temp. (F): 104
Bearing Type: Sleeve
Motor RPM: 1550
Motor Type: Shaded Pole
Motor Enclosure: Totally Enclosed Air-Over
Motor Insulation: Class A
Max. Depth (In.): 5 9/16
Mounting Position: Vertical/Horizontal
Mounting Holes O.C. (In.): 8 3/4
Guard Material: Steel
Wire Guard Finish: Gray Polyester
Outside Dia. (In.): 13
Propeller Material: Stamped Aluminum
Number of Blades: 5

This form does not require a Material Safety Data Sheet (MSDS).

Approved Accessories

There are currently no approved accessories for this item.

GRAINGER



Heater,Wall Mount

Grainger Item #	5ZK70
Price (ea.)	**$149.40**
Brand	DAYTON
Mfr. Model #	5ZK70
Ship Qty.	1
Sell Qty. (Will-Call)	1
Ship Weight (lbs.)	10.1
Usually Ships	Today
Catalog Page No.	3193

Price shown may not reflect your web Log in or register

Additional Info

Shallow-Wall Electric Built-In Heaters
Designed for easy recess mounting in walls as shallow as 2 1/2".
Can also be vertically surface mounted with No. 5ZK72 mounting kit, sold separately. Heaters feature automatic thermal overload protection with indicator light and built-in thermostat. Grille is 20-gauge louvered steel. Designed for use in bathrooms, small offices, entryways, and workshops. ETL Certified.

- 9 1/4"W x 12 1/2"H x 2 1/2"D housing dimensions
- 10 1/2"W x 14 1/2"H x 1 1/4"D grille dimensions
- Ceiling mount models require remote wall thermostat
- Northern white finish

Tech Specs

Item: Electric Heater
Type: Fan Forced, Shallow Wall Mount
Voltage: 240/208
Amps AC: 8.4
Watts: 2000
Output (BtuH): 6824
Finish: Northern White
Color: Northern White
Mount Type: Recessed or Surface Mounted Vertically

Notes & Restrictions

There are currently no notes or restrictions for this item.

MSDS

This item does not require a Material Safety Data Sheet (MSDS).

Required Accessories

There are currently no required accessories for this item.

Optional Accessories

Frame,Surface Mount

Item #: 5ZK72
Brand: DAYTON
Usually Ships: Today
Price (ea): $32.70

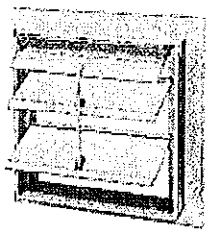
Alternate Products

There are currently no alternate products for this item.

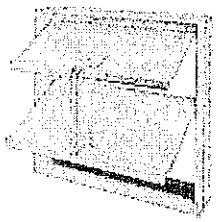
Repair Parts

Repair Parts Information is available for this item

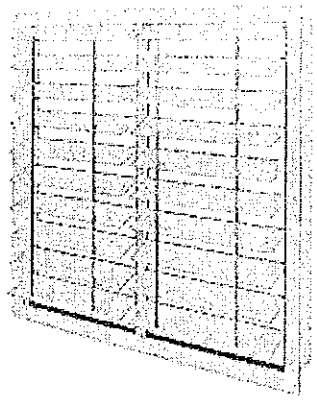
Heavy Duty Movable-Blade Wall Louvers



Single Panel Surface Mount with Flange



Single Panel Drop-In Mount



Double Panel Recessed Mount with Flange

Built to last, these louvers have 24-ga. aluminum blades, except louvers 30" and wider which have 22-ga. blades. Maximum air velocity is 2500 fpm. Temperature range is -20° to +200° F, except motorized units which have a maximum temperature of 130° F.

Aluminum Frame— Frame is 0.063" thick extruded aluminum, and frame depth is 1 7/8", except for drop-in mount louvers less than 50" wide, which are 0.05" thick and have a frame depth of 1 1/2".

Motorized— Motor opens and closes these louvers. Motor is 115/230 VAC, 60 Hz, single phase with four 36" leads for hardwiring.

Select from three mounting styles. With *surface-mount louvers* the frame and flange mount outside the wall. Overall size is 3" larger than opening size. With *recessed-mount louvers* the frame rests in the wall and the flange mounts to the outside wall. When the blades close they're flush with the wall. Overall size is 2 7/8" larger than opening size. Both surface- and recess-mount styles have 15/64" dia. mounting holes—eight holes for single panel louvers, 10 holes for double panel louvers, and 12 holes for triple panel louvers. *Drop-in mount louvers* go inside a wall or duct. Overall size is 1/8" smaller than opening size.

ATTACHMENT 12

FLOWMETERS AND PRESSURE/VACUUM GAUGES CUT SHEETS AND RELATED INFORMATION

Measurement Accessories

Blower Connection Key
NPT – American National Standard Taper Pipe Thread (Male)
NPSC – American National Standard Straight Pipe Thread for Coupling (Female)
SO – Slip On (Smooth – No Threads)

Air Flow Meter

FEATURES

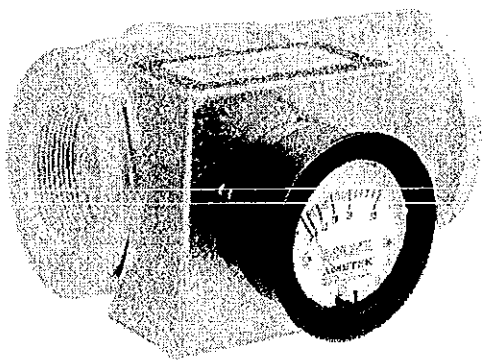
- Direct reading in SCFM
- Low pressure drop (2-4" typical) across the flow meter
- Non-clogging, low impedance air stream
- Light weight aluminum
- No moving parts
- Large easy-to-read dial
- Accurate within 2% at standard conditions
- Good repeatability
- Available in 2", 3" and 4" sizes
- Factory configured for quick installation
- .048" Allen key supplied for gauge adjustment

OPTIONS

- For 4-20 mA outputs and digital readouts see page G-9
- High temperature version (above 140°F)
- Corrosion-resistant version with Chem-Tough™ or in stainless steel
- FDA-approved Food Tough™ surface conversion
- High pressure version (100 PSI)

BENEFITS

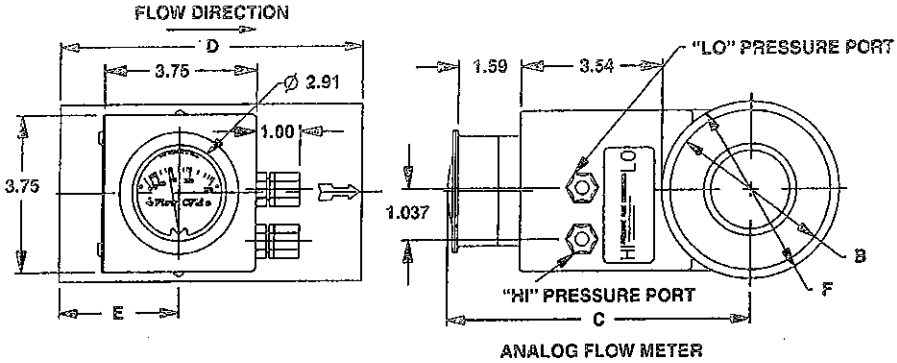
- OPTIMIZE SYSTEM EFFICIENCY
  Measuring the correct air flow can assist you in fine-tuning to your system's optimal efficiency.
- BALANCE MULTI-PIPING SYSTEMS
  When evacuating CFM from more than one pipe, different run lengths or end system impedance can cause one pipe to handle more CFM than the other. With an accurate CFM reading, piping can be balanced by bleeding air in/out or by creating an extra impedance.
- DETECT CHANNELING OR PLUGGING
  For systems in which channeling or plugging can occur, a change in the CFM measured can help indicate the unseen changes in your system.



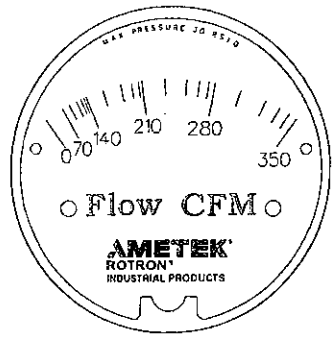
Current Models		Flow Range	B	C	D	E	F
Model	Part #	(SCFM)	Threads	Length	Width		
FM20C030Q	550599	6-30	2" - 11.5 NPSC	7.18"	7.0"	2.0"	3.75"
FM20C045Q	550600	9-45					
FM20C065Q	550601	13-65					
FM20C125Q	550602	25-125			5.6"		
FM20C175Q	550603	35-175					
FM20C225Q	550604	45-225					
FM30C250Q	550605	50-250	3" - 8 NPSC	7.52"	7.4"	2.5"	4.43"
FM30C350Q	550606	70-350					
FM30C475Q	550607	95-475					
FM40C450Q	550608	90-450	4" - 8 NPSC	8.00"	7.7"	2.7"	5.43"
FM40C600Q	550609	120-600					
FM40C850Q	550610	170-850					

Blower Model Reference Key	
A = SPIRAL	E = DR/EN/CP 656, 6, 623, S7
B = DR/EN/CP 068, 083, 101, 202	F = DR/EN/CP 707, 808, 858, S9, P9 (Inlet Only)
C = DR/EN/CP 303, 312, 313, 353	G = DR/EN/CP 823, S13, P13 (Inlet Only)
D = DR/EN/CP 404, 454, 513, 505, 555, 523	H = DR/EN/CP 909, 979, 1223, 14, S15, P15 (Inlet Only)

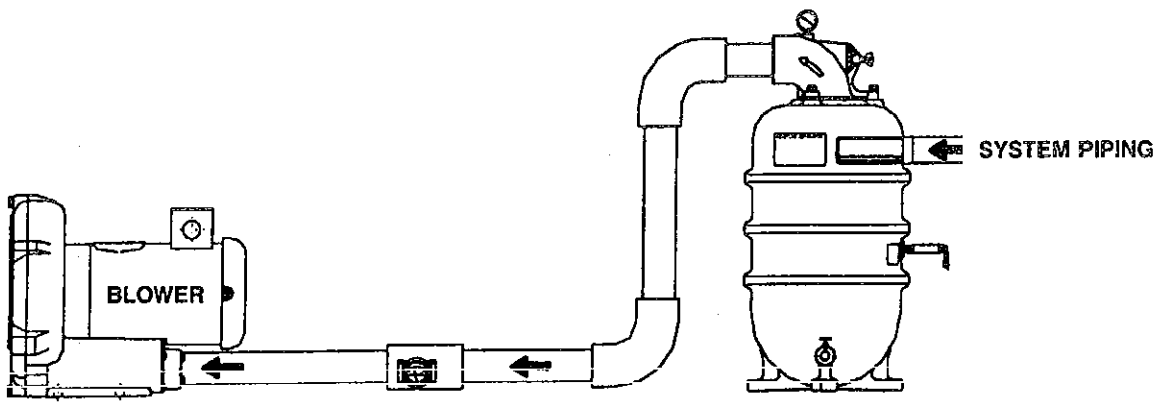
TYPICAL FLOW METER ARRANGEMENT



ANALOG FLOW METER



TYPICAL GAUGE FACE



HIGH TEMPERATURE/PRESSURE CORRECTION

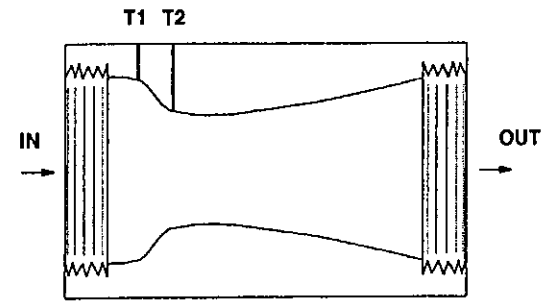
$$SCFM_2 = \frac{SCFM_1}{-\left(\frac{14.7}{Pf_2}\right) \times \left(\frac{530}{Tf_2 + 460}\right)}$$

Pf_2 = Absolute Pressure in PSIA

Tf_2 = Temperature in °F

- Use on inlet to limit need to correct for high pressure or elevated outlet temperature
- Standard model limits = 140°F and 30 PSIG

HOW IT WORKS



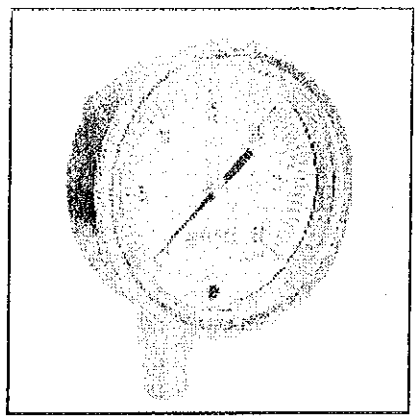
Rotron's flow meter is a venturi style design. After air enters the inlet, the pressure is measured in the T1 tap. The second tap, T2, measures the pressure at the throat. The differential between T1 and T2 registers across a special calibrated CFM gauge to provide accurate readings. The throat is then expanded back to the original size to keep pressure loss to under 2-4 IWG.

ASHCROFT®

Low Pressure Diaphragm Gauge
Series 1490, Grade A (2-1-2%)

- *2½" and 3½" dial size*
- *Glass-filled polysulfone case material, won't rust or dent*
- ***Beryllium copper diaphragm***
- ***Brass socket***
- ***Wetted materials of beryllium copper, brass, polysulfone and RTV silicone***
- ***Exclusive autoclavable feature***

The Ashcroft® Type 1490 low pressure diaphragm gauge is designed to measure pressure from 10 in.H_2O to 15 psi, both positive and negative pressures. This gauge uses a very sensitive diaphragm capsule to measure low pressure and vacuum. The gauge is specifically designed for use whenever the pressure medium is a gas that is not corrosive to beryllium copper, brass, polysulfone and RTV silicone. The polysufone case is suitable for intermittent or continuous service on natural gas provided a .013" throttle plug is installed in the socket. Typical applications are, but not limited to, vacuum pumps, gas leak detectors, air compressors, air filters, gas burners, gas measurement, vacuum ovens, suction regulators and respirators.



SELECTION CHART

DIAL SIZE		TYPE		WETTED MATERIAL		CONN. SIZE & TYPE		CONNECTION LOCATION		RANGES		OPTIONAL FEATURES	
Code	Desc.	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
25	2½"	1490	Low Pressure Diaphragm Gauge	A	Beryllium Copper Brass Socket Polysulfone RTV Silicone	01	⅛ NPT	L	Lower	10 IW	0 to 10"H_2O	XAK	Autoclavable
35	3½"					02	¼ NPT	B	Center Back			XAN	1% Opt. Accuracy
						HD	⅛" I.D. Tubing Hose Barb[2,3]	T	Top		See Chart for	XDA	Dial Marking
						HE	3/16" I.D. Tubing Hose Barb[2,3]	D	3 O'Clock		Entire List of	XNH	Stain. Steel Tag
						HF	¼" I.D. Tubing Hose Barb[2,3]	E	9 O'Clock		Ranges	XNN	Paper Tag
						HG	¼" O.D. Polytube Hose Barb[2,3]					XTU[1,3]	Throttle Plug
						HH	10-32-2B Female Thread[2,3]					XUC[2]	U-clamp
												XZY	FlutterGuard™

(1) A throttle plug must be installed in the socket whenever the gauge is used for intermittent or continuous service on natural gas.
(2) U-clamp furnished when hose barb or female thread is specified. **EXAMPLES: 25 1490A 02L 10 IW XNH**
(3) Throttle plug not available with hose barb or female thread connections.

STANDARD RANGES

Pressure	Figure Intervals	Minor Graduation
0/10 in. H_2O	1	0.1
0/15 in. H_2O	5	0.2
0/30 in. H_2O	5	0.5
0/60 in. H_2O	10	1
0/100 in. H_2O	10	1
0/160 in. H_2O	20	2
0/200 in. H_2O	20	2
0/300 in. H_2O	50	5
0/10 oz./in.²	1	0.1
0/15 oz./in.²	5	0.2
0/30 oz./in.²	5	0.5
0/60 oz./in.²	10	1
0/100 oz./in.²	10	1
0/160 oz./in.²	20	2
0/250 oz./in.²	50	5
0/3 psi	0.5	0.05
0/5 psi	1	0.1
0/10 psi	1	0.1
0/15 psi	5	0.2

STANDARD RANGES

Vacuum	Figure Intervals	Minor Graduation
15/0 in.H_2O	5	0.2
30/0 in.H_2O	5	0.5
60/0 in.H_2O	10	1
100/0 in.H_2O	10	1
200/0 in.H_2O	20	2
15/0 oz./in.²	5	0.2
30/0 oz./in.²	5	0.5
60/0 oz./in.²	10	1
100/0 oz./in.²	10	1
Compound		
-30/30 in.H_2O	10	1
-30/30 in.oz./in.²	10	1
-10/10 in.H_2O	2	0.2

Dual Scale

Range		Graduations			
		Inner Scale		Outer Scale	
Inner Scale	Outer Scale	Figure Intervals	Minor Grad.	Figure Intervals	Minor Grad.
0/9 oz./in.²	0/15 in.H_2O	1	0.2	5	0.2
0/20 oz./in.²	0/35 in.H_2O	5	0.5	5	0.5
0/35 oz./in.²	0/60 in.H_2O	5	0.5	10	1
0/60 oz./in.²	0/100 in.H_2O	10	1	10	1

Other ranges available on request. Consult factory.

STANDARD METRIC RANGES

Pressure	Figure Intervals	Minor Graduation
0/60 cm. H_2O	10	1
0/2.5 kPa	0.5	0.05
0/4 kPa	1	0.1
0/10 kPa	1	0.1
0/16 kPa	2	0.2
0/25 kPa	5	0.5
0/40 kPa	10	1
0/100 kPa	10	1
Vacuum		
2.5/0 kPa	0.5	0.05
4/0 kPa	1	0.1
10/0 kPa	1	0.1
16/0 kPa	2	0.2
25/0 kPa	5	0.5
40/0 kPa	10	1
100/0 kPa	10	1
Compound		
-10/60 cm H_2O	10	1
-10/80 cm H_2O	10	1
-20/40 cm H_2O	10	1
-10/100 cm H_2O	10	1
-10/120 cm H_2O	20	2

HOW TO ORDER THIS LOW PRESSURE DIAPHRAGM GAUGE

Select: 25 — 1490 — A — 02L — XXX — 10"H_2O

1. Dial size – 2½ (25), 3½ (35)
2. Case type
3. Wetted material
4. Connection size – ¼ (02), ⅛ (01)
5. Connection location – Lower (L), Back (B)
6. Optional features – see page 108
7. Standard pressure range – 10"H_2O

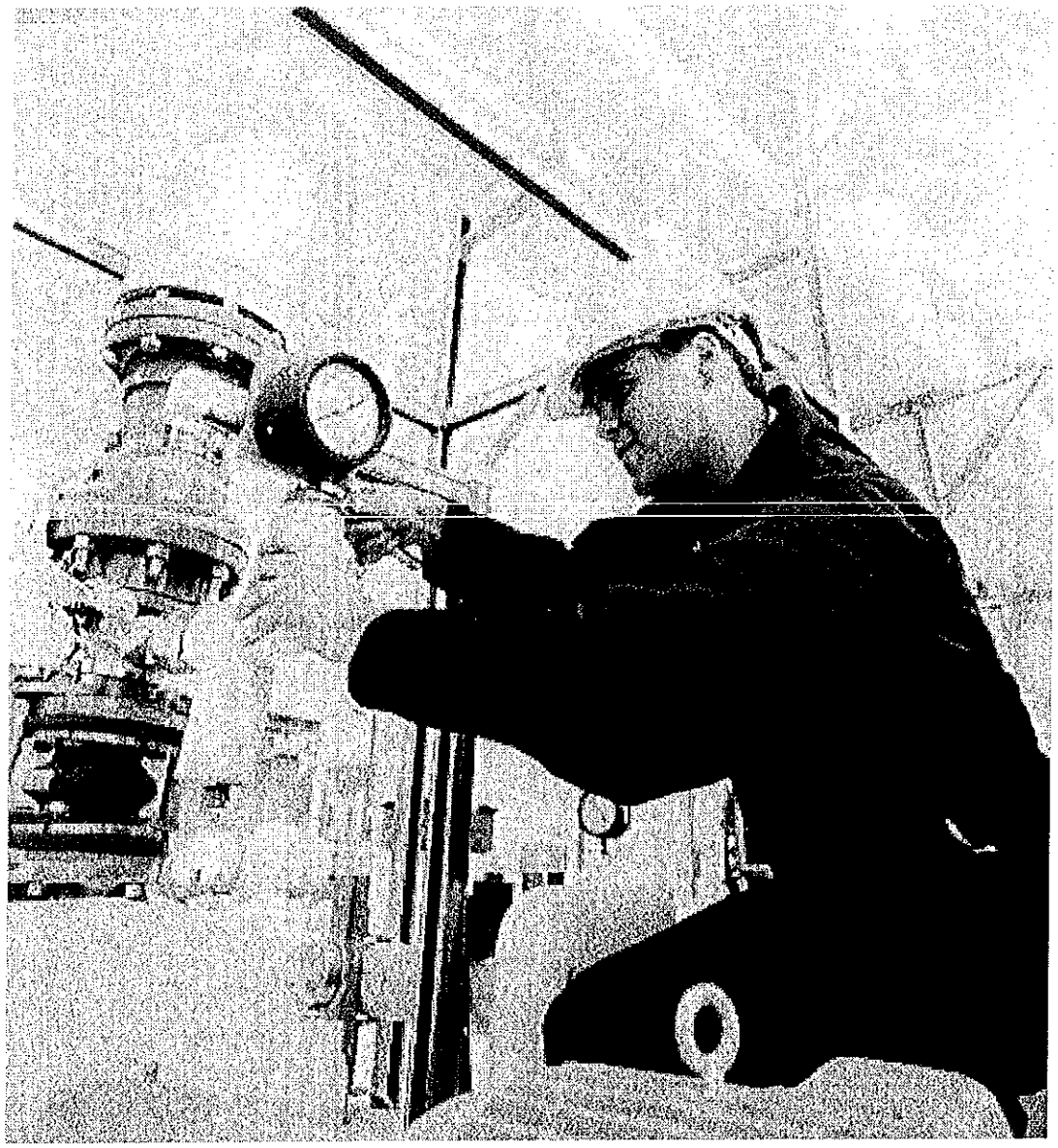
Reference Bulletin DG-2

Consult factory for guidance in product selection
Phone (203) 378-8281, FAX (203) 385-0499 or
visit our web site at www.ashcroft.com

INSTRUMENT
a Halliburton company

ASHCROFT®

PRESSURE GAUGE INSTALLATION, OPERATION AND MAINTENANCE



DRESSER

Measurement

I&M012-10099-5/02 (250-1353J)

CONTENTS

Cover photo courtesy of Johnson/Yokogawa Co.

Campbell Micro-Bean® is a registered trademark of J.A. Campbell Co.

Chemiquip® is a registered trademark of Chemiquip Products Co. Inc.

1.0 Instrument Selection

Users should become familiar with ASME B40.1 (Gauges – Pressure Indicating Dial Type – Elastic Element) before specifying pressure measuring instruments. That document – containing valuable information regarding gauge construction, accuracy, safety, selection and testing – may be ordered from *The American Society of Mechanical Engineers,* 345 East 47th Street, New York, N.Y. 10017.

WARNING: To prevent misapplication, pressure gauges should be selected considering media and ambient operating conditions. Improper application can be detrimental to the gauge, causing failure and possible personal injury, property damage or death. The information contained in this manual is offered as a guide in making the proper selection of a pressure gauge. Additional information is available from Dresser Instrument Division.

The following is a highlight of some of the more important considerations:

1.1 Range – The range of the instrument should be approximately twice the maximum operating pressure. Too low a range may result in (a) low fatigue life of the elastic element due to high operating stress and (b) susceptibility to overpressure set due to pressure transients that exceed the normal operating pressure. Too high a range may yield insufficient resolution for the application.

1.2 Temperature – Refer to page 2 of this manual for important information concerning temperature related limitations of pressure gauges, both dry and liquid filled.

1.3 Media – The material of the process sensing element must be compatible with the process media from a corrosion point of view. Consult the Corrosion Guide available on the website: **www.dresserinstruments.com** or Dresser Instrument Division. Use of a diaphragm seal with the gauge is recommended for process media that (a) are corrosive to the process sensing element; (b) contain heavy particulates (slurries) or (c) are very viscous including those that harden at room temperature. Additionally, diaphragm seals with flexible line assemblies should be considered for applications involving hot lines (see page 2) or significant levels of vibration and/or pulsation.

1.4 Oxidizing media – It is extremely important that when specifying gauges for use on oxidizing media the appropriate gauge cleanliness level per ASME B40.1 be included in the gauge specification. Gauges containing significant amounts of hydrocarbon contamination inside the pressure system will often rupture explosively in such service.

1.5 Pulsation/Vibration – Severe service applications are characterized by the presence of significant levels of pressure pulsation and/or vibration. Gauges should be protected from severe pressure pulsation by the inclusion of a dampener such as a throttle plug/screw or porous metal snubber. If the pulsation is extreme, a liquid filled gauge, with dampener should be used. A liquid filled gauge will also last significantly longer than a comparable dry gauge when vibration is present. If the vibration levels are extreme the only solution may be to remotely mount the gauge away from the source of vibration. In that case flexible tubing may be used to connect the gauge to the pressure source.

1.6 Gauge fills. – Once it has been determined that a liquid filled gauge is in order, the next step is selecting the type of fill. **Glycerin** satisfies most applications. While being the least expensive fill, its usable temperature range is 0/250°F. **Silicone** filled gauges have a broader service range: –40/250°F. Oxidizing media require the use of a compatible gauge fill such as **Halocarbon,** with a service range of –50/250°F .

1.7 Mounting – Users should predetermine how the gauge will be mounted in service: stem (pipe), wall (surface) or panel (flush). Ashcroft wall or panel mounting kits should be ordered with the gauge.

2.0 PRODUCT SELECTION

2.1 Ratings – To ensure long life and accurate readings, pressure gauges should not be exposed to process or ambient temperatures over 150°F. This is especially true of gauges with liquid filled cases due to thermal expansion of the case fill fluid. Long term exposure to temperatures in excess of 150°F may cause discoloration of dials and fill fluids, as well as hardening of elastomeric case seals and possible fill leakage. Soft soldered, silver brazed and welded pressure joints are rated at 250°F maximum, 450°F maximum and 750°F maximum respectively. Plastic gauge cases, including phenolic, should not be exposed to temperatures in excess of 250°F. Maximum recommended service temperatures for gauge windows are as follows: 350°F for plain glass; 300°F for polysulfone; 270°F for polycarbonate; 200°F for laminated safety glass; and 180°F for acrylic.

2.2 Accuracy – Heat and cold affect accuracy of indication. A general rule of thumb for **dry gauges** is 0.5% of full scale change for every 40°F change from 75°F. Double that allowance for gauges with hermetically sealed or liquid filled cases, except for Duragauge® gauges where no extra allowance is required due to the elastomeric, compensating back. Above 250°F there may exist very significant errors in indication.

2.3 Steam service – In order to prevent live steam from entering the bourdon tube, a siphon filled with water should be installed between the gauge and the process line. Siphons can be supplied with ratings up to 4,000 psi at 1,000°F. If freezing of the condensate in the loop of the siphon is a possibility, a diaphragm seal should be used to isolate the gauge from the process steam. Siphons should also be used whenever condensing, hot vapors (not just steam) are present.

2.4 Hot lines – When a gauge is installed on a process line containing hot liquid or gas, one solution is to simply include an extra foot (200°F process) to 4 feet (600°F process) of 1/2" piping (or smaller diameter flexible tubing) between the hot line and the gauge. The slow rate of heat transfer through the added pipe wall and dead-ended process fluid will generally protect the gauge from damage.

2.5 Cold Service – The minimum recommended operating temperature for all gauges is -50°F. A hermetically sealed gauge case is recommended to minimize condensate freezing on the movement, thus hindering its action. Gauges filled with silicone oil will provide maximum resistance to the effects of operating in freezing conditions. While glycerin filled gauges can be safely stored at temperatures down to -50°F , their operation is impeded at temperatures below +20°F due to the marked increase in the viscosity of the glycerin.

2.6 Diaphragm seals – Diaphragm seals (isolators) with filled, flexible line assemblies are another good solution to the problem of hot liquid and gas lines. Due to the small diameter of the flexible line (capillary) a five foot line length will usually assure that the temperature of the gauge connection does not exceed 150°F. Even one foot of capillary often will prevent the high temperature of the seal from reaching the gauge. This solution is also superior to a siphon on steam service where the water filled siphon might freeze. Refer to sales bulletin DS-1 for a listing of service temperature ranges by type of fill.

2.7 Autoclaving – Sanitary gauges with clamp type connections are frequently steam sterilized in an autoclave. Gauges equipped with polysulfone windows will withstand more autoclave cycles than those equipped with polycarbonate windows. Gauges equipped with plain glass or laminated safety glass **should not be autoclaved.** Gauge cases should be vented to atmosphere (removing the rubber fill/safety plug if necessary) **before** autoclaving to prevent the plastic window from cracking or excessively distorting. If the gauge is liquid filled, the fill should also be drained from the case before autoclaving.

3.0 INSTALLATION

3.1 Location – Whenever possible, gauges should be located to minimize the effects of vibration, extreme ambient temperatures and moisture. Dry locations away from very high thermal sources (ovens, boilers etc.) are preferred. If the mechanical vibration level is extreme, the gauge should be remotely located (usually on a wall) and connected to the pressure source via flexible tubing.

3.2 Gauge reuse – ASME B40.1 recommends that gauges not be moved indiscriminately from one application to another. Whereas the cumulative number of pressure cycles on an in-service or previously used gauge is generally unknown, it is generally safer to install a new gauge whenever and wherever possible. This will also minimize the possibility of a reaction with previous media.

3.3 Tightening of gauge – Torque should never be applied to the gauge case. Instead, an open end or adjustable wrench should always be used on the wrench flats of the gauge socket to tighten the gauge into the fitting or pipe. NPT threads require the use of a suitable thread sealant, such as pipe dope or teflon tape, and must be tightened very securely to ensure a leak tight seal.

CAUTION: Torque applied to a diaphragm seal or its attached gauge, that tends to loosen one relative to the other, can cause loss of fill and subsequent inaccurate readings. Always apply torque **only** to the wrench flats on the lower seal housing when installing filled, diaphragm seal assemblies or removing same from process lines.

3.4 Process Isolation – A shut-off valve should be installed between the gauge and the process in order to be able to isolate the gauge for inspection or replacement without shutting down the process.

3.5 Surface mounting – Also known as wall mounting. Gauges should be kept free of piping strains. The gauge case mounting feet, if applicable, will ensure clearance between the pressure relieving back and the mounting surface.

3.6 Panel mounting – Also known as panel mounting. The applicable panel mounting cutout dimensions can be found in Ashcroft sales bulletins – see item 9.4 RESOURCES on page 14 of this manual. These dimensions are also on Ashcroft® gauge general dimension drawings which can be obtained from the Customer Service department in Stratford, Connecticut.

4.0 OPERATION

4.1 Frequency of inspection – This is quite subjective and depends upon the severity of the service and how critical the accuracy of the indicated pressure is. For example, a monthly inspection frequency may be in order for critical, severe service applications. Annual in-spections, or even less frequent schedules, are often employed in non-critical applications.

4.2 In-service inspection – If the accuracy of the gauge cannot be checked in place, the user can at least look for (a) erratic or random pointer motion; (b) readings that are suspect – especially indications of pressure when the user believes the true pressure is 0 psig.

4.3 When to check accuracy – Obviously any suspicious behavior of the gauge pointer warrants a full accuracy check be performed. Even if the gauge is not showing any symptoms of abnormal performance, the user may want to establish a frequency of bench type inspection.

4.4 When to recalibrate – This depends on the criticality of the application. If the accuracy of a 3-2-3% commercial type gauge is only 0.5% beyond specification, the user must decide whether it's worth the time and expense to bring the gauge back into specification. Conversely if the accuracy of a 0.25% test gauge is found to be 0.1% out of specification then obviously the gauge should be recalibrated.

4.1 [illegible] – These include (a) bent or unattached pointers due to extreme pressure pulsation; (b) broken windows which should be replaced to keep dirt out of the internals; (c) leakage of gauge fill; (d) case damage – dents and/or cracks; (e) any signs of service media leakage through the gauge including its connection; (f) discoloration of gauge fill that impedes readability.

4.2 Spare parts – As a general rule it is recommended that the user maintain in his parts inventory one complete Ashcroft instrument for every ten (or fraction thereof) of that instrument type in service.

5.0 GAUGE REPLACEMENT

It is recommended that the user stock one complete Ashcroft instrument for every ten (or fraction thereof) of that instrument type in service. With regard to gauges having a service history, consideration should be given to discarding rather than repairing them. Gauges in this category include the following:

a. Gauges that exhibit a span shift greater than 10%. It is possible the bourdon tube has suffered thinning of its walls by corrosion.

b. Gauges that exhibit a zero shift greater than 25%. It is likely the bourdon tube has seen significant overpressure leaving residual stresses that may be detrimental to the application.

c. Gauges which have accumulated over 1,000,000 pressure cycles with significant pointer excursion.

d. Gauges showing any signs of corrosion and/or leakage of the pressure system.

e. Gauges which have been exposed to high temperature or simply exhibit signs of having been exposed to high temperature – specifically 250°F or greater for soft soldered systems; 450°F or greater for brazed systems; and 750°F or greater for welded systems.

f. Gauges showing significant friction error and/or wear of the movement and linkage (assuming the movement cannot be replaced).

g. Gauges having damaged sockets, especially damaged threads.

h. Liquid filled gauges showing loss of case fill.

NOTE: ASME B40.1 does not recommend moving gauges from one application to another. This policy is prudent in that it encourages the user to procure a new gauge, properly tailored by specification, to each application that arises.

6.0 ACCURACY: PROCEDURES/DEFINITIONS

Accuracy inspection – Readings at approximately five points equally spaced over the dial should be taken, both upscale and downscale, before and after lightly rapping the gauge to remove friction. A pressure standard with accuracy at least 4 times greater than the accuracy of the gauge being tested is recommended.

Equipment – A finely regulated pressure supply will be required. It is critical that the piping system associated with the test setup be leaktight. The gauge under test should be positioned as it will be in service to eliminate positional errors due to gravity.

Method – Two checking techniques exist – direct and reverse reading. ASME B40.1 recommends the direct approach wherein **known** pressures are applied and readings are taken from the gauge under test. When the gauge under test has a relatively coarsely graduated dial, it is tempting to use the reverse method wherein the applied pressure is adjusted to precisely align its pointer with a dial graduation and then readings are taken from the pressure standard. The reverse reading technique is often misleading and should not be used.

Calculations – After recording all of the readings it is necessary to calculate the errors associated with each test point using the following formula: ERROR in percent = 100 times (TRUE VALUE minus READING) ÷ RANGE. Plotting the individual errors (Figure 1 on page 6) makes it possible to visualize the total gauge characteristic. The plot should contain all four curves: upscale – before rap; upscale – after rap; downscale – before rap; downscale – after rap. *Rap* means lightly tapping the gauge **before** reading to remove friction as described in ASME B40.1.

Referring to Figure 1 on page 6, several classes of error may be seen:

Zero – An error which is approximately equal over the entire scale. This error can be manifested when either the gauge is dropped or overpressured and the bourdon tube takes a permanent set. This error may often be corrected by simply repositioning the pointer. Except for test gauges, it is recommended that the pointer be set at midscale pressure to "split" the errors.

Span – A span error exists when the error at full scale pressure is different from the error at zero pressure. This error is often proportional to the applied pressure. Most Ashcroft gauges are equipped with an internal, adjusting mechanism with which the user can correct any span errors which have developed in service.

Linearity – A gauge that has been properly spanned can still be out of specification at intermediate points if the response of the gauge as seen in Figure 1 on page 6 is not linear. The Ashcroft Duragauge® is equipped with a rotary movement feature which permits the user to minimize this class of error. Other Ashcroft gauge designs (e.g., 1009 Duralife®) require that the dial be moved left or right prior to tightening the dial screws.

Hysteresis – Some bourdon tubes have a material property known as hysteresis. This material characteristic results in differences between the upscale and downscale curves. This class of error can **not** be eliminated by adjusting the gauge movement or dial position.

Friction – This error is defined as the difference in readings before and after lightly rapping the gauge case. If excessive, the movement should be replaced (if replaceable by design). One possible cause of excessive friction is improper adjustment of the hairspring. The hairspring should be level and the coils should not touch or distort at any point between zero and full scale. The hairspring torque should also be at a near optimum level – adequate without being excessive.

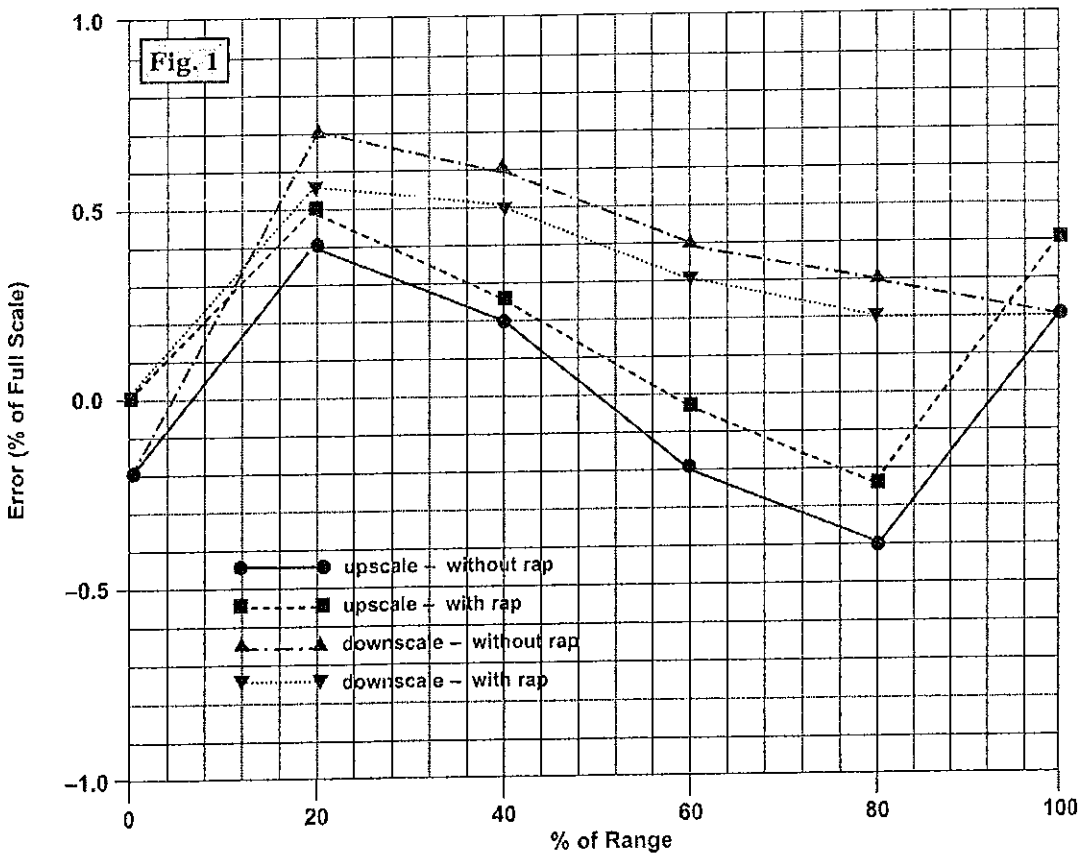
(Continued on page 7)

INDICATED VALUE (PSI)

True Value – PSI	Increasing – Without RAP	Increasing – With RAP	Decreasing – Without RAP	Decreasing – With RAP
0	–.4	0	–.4	0
40	+.8	+1.0	+1.4	+1.1
80	+.4	+.5	+1.2	+1.0
120	–.4	–1.0	+.8	+.6
160	–.8	–.5	+.6	+.4
200	+.4	+.8	+.4	+.4

ERROR (% OF FULL SCALE)

True Value – % of Range	Increasing – Without RAP	Increasing – With RAP	Decreasing – Without RAP	Decreasing – With RAP
0	–.20	0	–.20	0
20	+.40	+.50	+.70	+.55
40	+.20	+.25	+.60	+.50
60	–.20	–.05	+.40	+.30
80	–.40	–.25	+.30	+.20
100	+.20	+.40	+.20	+.20



6.1 Calibration – Solid Front Pressure Gauges – Inspect gauge for accuracy. Many times gauges are simply "off zero" and a simple pointer adjustment using the micrometer pointer is adequate. If inspection shows the gauge warrants recalibration to correct span and/or linearity errors, proceed as follows:

a. Remove ring, window and, if solid front case, the rear closure assembly.

b. Pressurize the gauge once to full scale and back to zero.

c. Refer to Figure 2 on page 8 for a view of a typical Ashcroft system assembly with component parts identified.

d. For solid front gauges, adjust the micrometer pointer so that it rests at the true zero position. For open front gauges the pointer and dial must also be disassembled and the pointer should then be lightly pressed onto the pinion at the 9:00 o'clock position.

e. Apply full scale pressure and note the magnitude of the span error. With open front gauges, ideal span (270 degrees) will exist when at full scale pressure the pointer rests exactly at the 6:00 o'clock position.

f. If the span has shifted significantly (span error greater than 10%), the gauge should be replaced because there may be some partial corrosion inside the bourdon tube which could lead to ultimate failure. If the span error exceeds 0.25%, loosen the lower link screw and move the lower end of the link toward the movement to increase span or away to decrease span. An adjustment of 0.004 inch will change the span by approximately 1%. This is a repetitive procedure which often requires more than one adjustment of the link position and the subsequent rechecking of the errors at zero and full scale pressure.

g. Apply midscale pressure and note error in reading. Even though the gauge is accurate at zero and full scale, it may be inaccurate at the midpoint. This is called linearity error and is minimized by rotating the movement. If the error is positive, the movement should be rotated counter clockwise. Rotating the movement one degree will change this error by approximately 0.25%. Rotating the movement often affects span and it should be subsequently rechecked and readjusted if necessary according to step 6.1e and 6.1f.

h. While recalibrating the gauge, the friction error – difference in readings taken with and without rap – should be noted. This error should not exceed the basic accuracy of the gauge. If the friction error is excessive, the movement should be replaced. One possible cause of excessive friction is improper adjustment of the hairspring. The hairspring torque,or tension, must be adequate without being excessive. The hairspring should also be level, unwind evenly (no turns rubbing) and it should never tangle.

NOTES:

1 For operation of test gauge external zero reset, refer to Figure 3 on page 8.

2 For test gauge calibration procedure, refer to Figure 4 on page 9.

6.2 Calibration – 1009 Duralife® Gauge – Inspect gauge for accuracy. Many times gauges are simply "off zero" and a simple pointer adjustment using the adjustable pointer is adequate. If the inspection shows that the gauge warrants recalibration to correct span and/or linearity errors, proceed as follows:

Remove ring, window, gasket and pointer using Ashcroft tool kits 1205T and 1206T.

Positive Pressure Ranges –

a. Remove dial and lightly press pointer onto pinion at 9:00 o'clock position.

b. Apply full scale pressure and rotate span block as shown in Figure 5a on page 11 until pointer rests at 6:00 o'clock position.

c. Fully exhaust pressure and check that pointer still is at 9:00 o'clock position. If not repeat steps 1 and 2 until span is correct.

(Continued on page 10)

Fig. 2

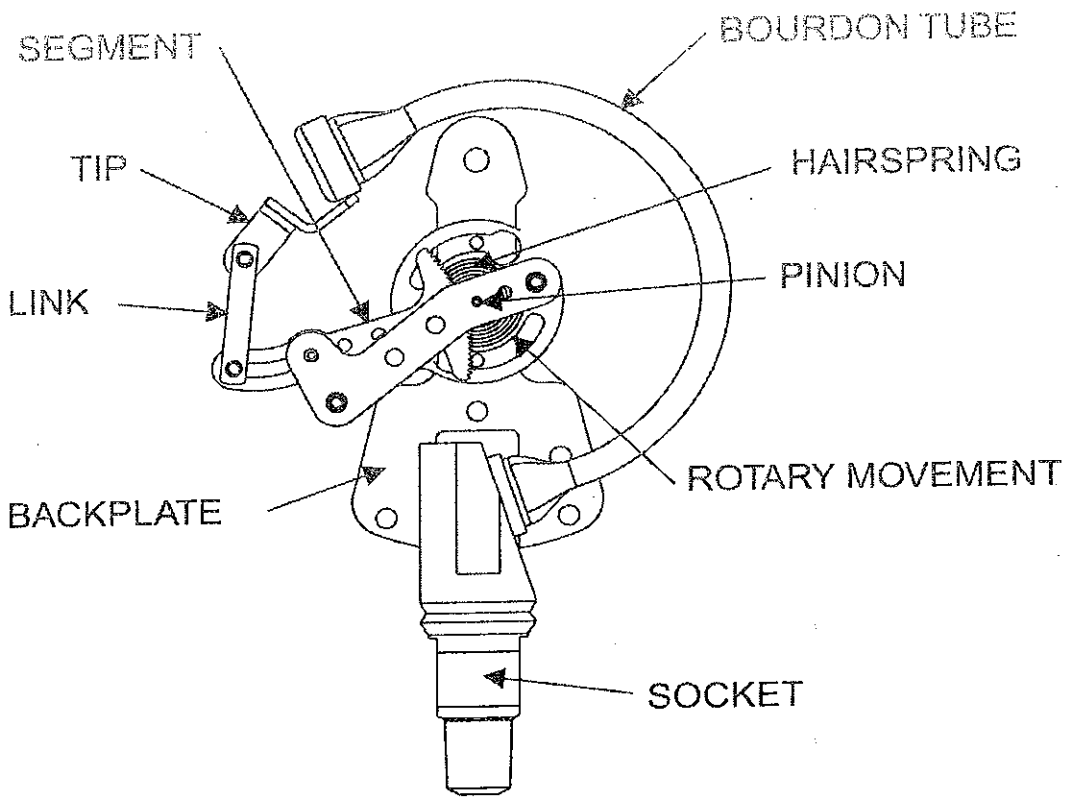
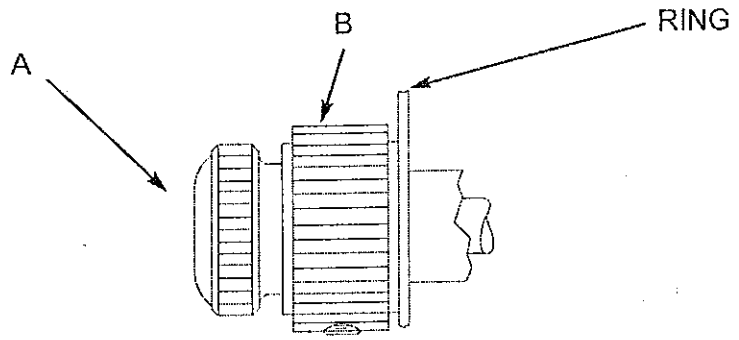


Fig. 3



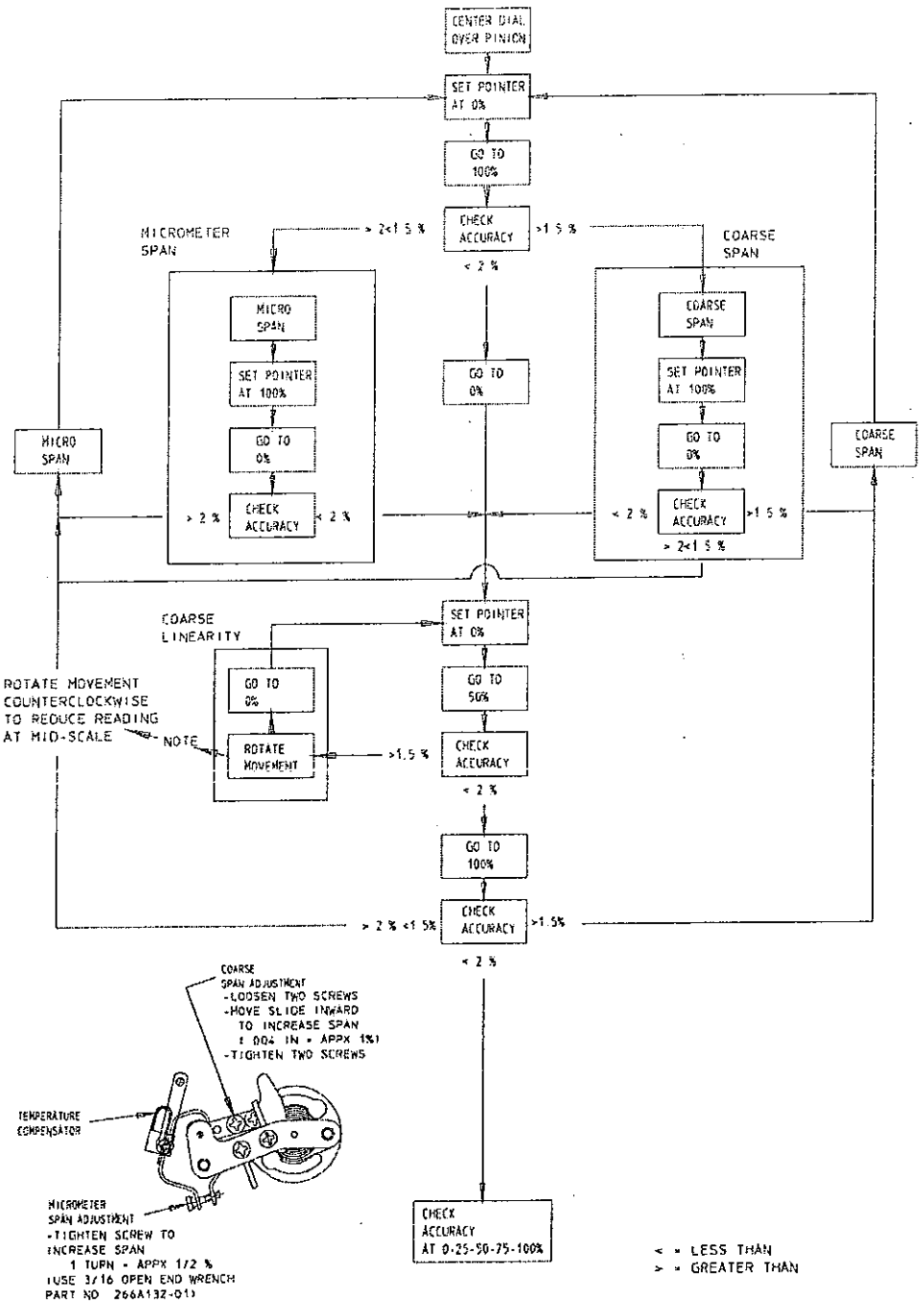
INSTRUCTIONS FOR USE:

LOOSEN RING LOCKING **SCREW "A"**
OBTAIN REQUIRED ADJUSTMENT BY ROTATING **KNOB "B"** CLOCKWISE OR COUNTER-CLOCKWISE.
TIGHTEN **SCREW "A"** DOWN ON **KNOB "B"**.

*Applicable only for test gauge with hinged ring design.

Fig. 4

THIS TEST GAUGE IS PROVIDED WITH A MICROMETER SPAN ADJUSTMENT. TO SIMPLIFY CALIBRATION THE FLOW CHART BELOW OUTLINES THE RECOMMENDED CALIBRATION PROCEDURE



d. Remove pointer and reassemble dial and dial screws (finger tight).

e. Lightly press pointer onto pinion.

f. Check accuracy at full scale. If error exceeds 1% return to step 1, otherwise proceed.

g. Check accuracy at midscale. If error exceeds 1% slide dial left or right to compensate.

h. Continue at * below.

Vacuum range --

a. Using a pencil, refer to dial and mark the 0 and 25 inch of Hg positions on the case flange.

b. Remove the dial.

c. Apply 25 inches of Hg vacuum.

d. Lightly press pointer onto pinion carefully aligning it with the 25 inch of Hg vacuum mark on case flange.

e. Release vacuum fully.

f. Note agreement of pointer to zero mark on case flange.

g. If span is high or low, turn span block as shown in Figure 5b on page 11.

h. Repeat steps 4 through 8 until span is correct.

i. Remove the pointer.

j. With 25 inches of Hg vacuum applied, reassemble dial, dial screws (finger tight) and pointer.

k. Apply 15 inches of Hg vacuum and note accuracy of indication. If required, slide dial left or right to reduce error to 1% maximum.

l. Continue at * below.

* Now complete calibration of the gauge as follows:

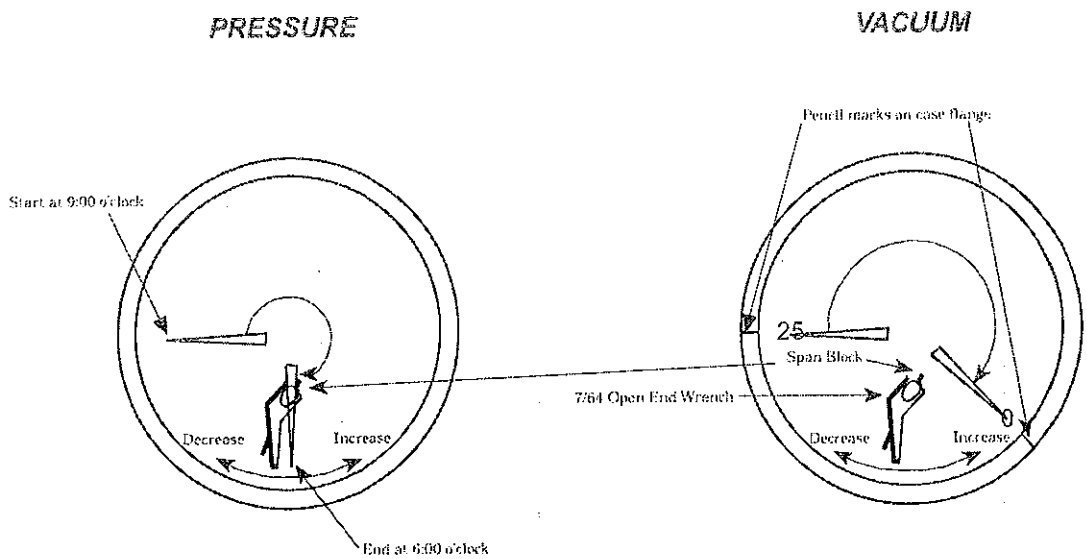
a. Firmly tighten dial screws.

b. Firmly tap pointer onto pinion, using brass back-up tool from Ashcroft kit 1205T if gauge has rear blow-out plug. If gauge has top fill hole no back-up is required.

c. Recheck accuracy at zero, midscale and full scale points (Figures 5a & 5b on page 11).

d. Reassemble window, gasket and ring.

1009 DURALIFE CALIBRATION



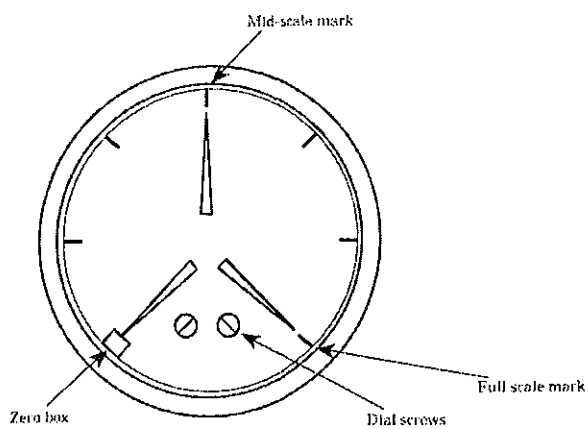


Fig. 5a

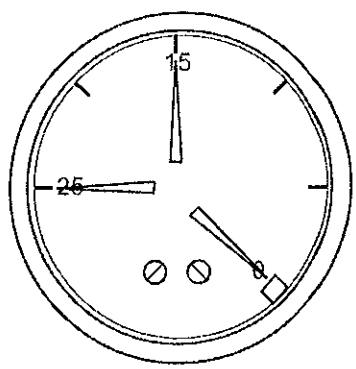


Fig. 5b

7.0 DIAPHRAGM SEALS

7.1 General – A diaphragm seal (isolator) is a device which is attached to the inlet connection of a pressure instrument to isolate its measuring element from the process media. The space between the diaphragm and the instrument's pressure sensing element is solidly filled with a suitable liquid. Displacement of the liquid fill in the pressure element, through movement of the diaphragm, transmits process pressure changes directly to a gauge, switch or any other pressure instrument. When diaphragm seals are used with pressure gauges, an additional 0.5% tolerance must be added to the gauge accuracy because of the diaphragm spring rate.

Used in a variety of process applications where corrosives, slurries or viscous fluids may be encountered, the diaphragm seal affords protection to the instrument where:

- The process fluid being measured would normally clog the pressure element,
- Pressure element materials capable of withstanding corrosive effects of certain fluids are not available.
- The process fluid might freeze due to changes in ambient temperature and damage the element.

7.2 Installation – Refer to sales bulletin DS-1 for information regarding (a) seal configurations; (b) filling fluids; (c) temperature range of filling fluids; (d) diaphragm material pressure and temperature limits; (e) bottom housing material pressure and temperature limits; (f) pressure rating of seal assembly; (g) accuracy/temperature errors of seal assembly; (h) diaphragm seal displacement. The volumetric displacement of the diaphragm must at least equal the volumetric displacement of the measuring element in the pressure instrument to which the seal is to be attached.

It is imperative that the pressure instrument/diaphragm seal assembly be **properly** filled prior to being placed in service. Ashcroft diaphragm seal assemblies should only be filled by a seal assembler certified by Dresser Industries. Refer to section 3.3 for a cautionary note about not applying torque on either the instrument or seal relative to the other.

7.3 Operation – All Ashcroft diaphragm seals, with the exception of Type 310 mini-seals, are continuous duty. Should the pressure instrument fail, or be removed accidentally or deliberately, the diaphragm will seat against a matching surface preventing damage to the diaphragm or leakage of the process fluid.

7.4 Maintenance – Clamp type diaphragm seals – Types 100, 200 and 300 – allow for replacement of the diaphragm or diaphragm capsule, if that ever becomes necessary. The Type 200 top housing must also be replaced with the diaphragm. With all three types the clamping arrangement allows field disassembly to permit cleaning of the seal interior.

7.5 Failures – Diaphragm failures are generally caused by either corrosion, high temperatures or fill leakage. Process media build-up on the process side of the diaphragm can also require seal cleaning or replacement. Consult Customer Service, Stratford CT for advice on seal failures and/or replacement. Refer also to Product Information page ASH/PI-14C containing drawing 96A121 *Corrosion Data Guide.*

WARNING: All seal components should be selected considering process and ambient operating conditions to prevent misapplication. Improper application could result in failure, possible personal injury, property damage or death.

8.0 DAMPENING DEVICES

8.1 General – Some type of dampening device should be used whenever the pressure gauge may be exposed to repetitive pressure fluctuations that are fairly rapid, high in magnitude and especially when transitory pressure spikes exceeding the gauge range are present (as with starting and stopping action of

valves and pumps). A restricted orifice of some kind is employed through which pressure fluctuations must pass before they reach the bourdon tube. The dampener reduces the magnitude of the pressure pulse thus extending the life of the bourdon tube and movement. This reduction of the pressure pulsation as "seen" by the pressure gauge is generally evidenced by a reduction in the pointer travel. If the orifice is very small the pointer may indicate the average service pressure, with little or no indication of the time varying component of the process pressure.

Commonly encountered media (e.g. – water and hydraulic oil) often carry impurities which can plug the orifice over time thus rendering the gauge inoperative until the dampener is cleaned or replaced.

Highly viscous media and media that tend to periodically harden (e.g., asphalt) require a diaphragm seal be fitted to the gauge. The seal contains an internal orifice which dampens the pressure fluctuation within the fill fluid.

8.2 Throttle Screws & Plugs – These accessories provide dampening for the least cost. They have the advantage of fitting completely within the gauge socket and come in three types: (a) a screwed-in type which permits easy removal for cleaning or replacement; (b) a pressed in, non-threaded design and (c) a pressed in, threaded design which provides a highly restrictive, helical flow path. Not all styles are available on all gauge types.

8.3 Ashcroft Gauge Saver – Type 1073 Ashcroft Gauge Saver features an elastomeric bulb that fully isolates the process media from the bourdon tube. In addition to providing dampening of pressure pulses, the bourdon tube is protected from plugging and corrosion. The space between the bulb and bourdon tube is completely filled with glycerin. Felt plugs located between the bulb and bourdon tube are first compressed some amount to restrict the flow of glycerin through an orifice and thus provide a degree of dampening. The greater the compression of the felts the greater the degree of dampening.

8.4 Ashcroft Pulsation Dampener – Type 1106 Ashcroft Pulsation Dampener is a moving pin type in which the restricted orifice is the clearance between the pin and any one of five preselected hole diameters. Unlike a simple throttle screw/plug, this device has a self-cleaning action in that the pin moves up and down under the influence of pressure fluctuations.

8.5 Ashcroft Pressure Snubber – The heart of the Type 1112 pressure snubber is a thick porous metal filter disc. The disc is available in four standard porosity grades.

8.6 Campbell Micro-Bean® – Type 1110 Micro-Bean is a precision, stainless steel, needle valve instantly adjustable to changing conditions of flow and viscosity. A very slight taper on the valve stem fits into tapered hole in the body. The degree of dampening is easily adjusted by turning the valve handle. A filter is built into the Micro-Bean to help prevent plugging.

8.7 Ashcroft Needle Valves – Type 7001 thru 7004 steel needle valves provide varying degrees of dampening similar to the Campbell Micro-Bean but with a less precise and less costly adjustability. Like the Micro-Bean these devices, in the event of plugging, can easily be opened to allow the pressure fluid to clear away the obstruction.

8.8 Chemiquip® Pressure Limiting Valves – Model PLV-255, PLV-2550, PLV-5460, PLV-5500 and PLV-6430, available with and without built-in snubbers, automatically "shut off" at adjustable preset values of pressure to protect the gauge from damage to overpressure. They are especially useful on hydraulic systems wherein hydraulic transients (spikes) are common.

9.0 RESOURCES

9.1 Test Equipment

9.1.1 Test gauge calibration
9.1.2 1009 Duralife® calibration
9.1.3 Duragauge® calibration
9.1.4 Diaphragm seal filling

9.2 Pressure Instrument Testing Equipment

9.2.1 Type 1305D Deadweight Tester
9.2.2 Type 1327D Pressure Gauge Comparator
9.2.3 Type 1327CM "Precision" Gauge Comparator

9.3 Tools & Tool Kits

9.3.1 Type 2505 universal carrying case for 1082 test gauge
9.3.2 Type 266A132-01 span wrench for 1082 test gauge
9.3.3 Type 1280 conversion kit for 4½" lower connect 1279/1379
9.3.4 Type 1283 conversion kit for 4½" back connect 1279/1379
9.3.5 Type 1284 conversion kit for 6" lower & back connect
9.3.6 Type 1281 socket O-Ring kit for 1279/1379 lower connect
9.3.7 Type 1285 4½" ring wrench for 1279/1379 lower & back connect
9.3.8 Type 1286 6" ring wrench for 1379 lower & back connect
9.3.9 Type 1287 cone tool for installing diaphragm & spring on 1279/1379 back connect
9.3.10 Type 1105T calibration tool kit (all gauges except 1009 Duralife®)
9.3.11 Type 3220 pointer puller (all gauges except 1009 Duralife®)
9.3.12 Type. 3530 pinion back-up tool for 1009 Duralife®
9.3.13 Type 1230 throttle plug insertion (¼ NPT) for 1009 Duralife®
9.3.14 Type 1231 throttle plug insertion (½ NPT) for 1009 Duralife® (body only)
9.3.15 Type 1205T calibration hand tools for 1009 Duralife®
9.3.16 Type 1206T ring removal & assembly tools for 1009 Duralife®

9.4 Sales Bulletins

9.4.1 Pressure Instrument Testing Equipment – Bulletin TE-1
9.4.2 Type 1327CM Portable Precision Gauge Comparator – Bulletin TE-2
9.4.3 Test Gauges – Bulletin TG-2
9.4.4 Duragauge® Pressure Gauges – Bulletin DU-1
9.4.5 General Service Gauges – Bulletin IG-1
9.4.6 Type 1009 Duralife® Industrial Gauges – Bulletin SS-1
9.4.7 Type 1008 Metric Case Gauges – Bulletin SS-1
9.4.8 Duralife® Metric Process Gauges – Bulletin SS-1
9.4.9 Type 1032 Sanitary Pressure Gauges – Bulletin SG-2
9.4.10 Special Service Gauges – Bulletin IG-1
9.4.11 Diaphragm Seals – Bulletin DS-1

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Fax: 82-2-2274-0794
E-Mail: dkisjlee@chollian.net

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Mexico Operations
Henry Ford No. 114
Esq. Foulton Fracc.
Industrial San Nicolas
54030 Tlalnepantla,
Edo De Mexico
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(52)55-53-10-89-83
(52)55-53-10-28-29
(52)55-53-10-28-75
Fax: (52)55-53-10-26-08
E-Mail: mendiet@avantel.net

Saudi Arabia
Dresser Al Rushaid Valve &
Instrument Co. (DARVICO)
P.O. Box 10145
Jubail Industrial City
Saudi Arabia 31961
Tel: 966-3-341-0278
Fax: 966-3-341-7624
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E-Mail: sam_dastur@darvico.com

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Dresser Singapore
Instrument Operations
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#07-15/17 Singapore 318995
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Fax: 65-6252-6603
E-Mail: john.wong@dresser.com.sg

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Dresser Europe GmbH
East Gillibrands, Skelmersdale
Lancashire, WN8 9TU
United Kingdom
Tel: 14-16-95-52600
Fax: 14-16-95-52693
E-Mail: Johanna.Gribben@
dresser-instrument.co.uk
E-Mail: sales@dresser-instrument.co.uk

Venezuela
Manufactures Petroleras
Venezolanas (M.P.V.)
KM 7 Carretera A El Mojan Calle 18,
#15B355 ZONA Ind. Norte Sector
Canchancha Maracaibo Edo
Zulia Venezuela
Tel: 58-61-579-762/070
Fax: 58-61-579-461
E-Mail: contactenos@mapvensa.com
E-Mail: ventasmpv@telcel.net.ve

DRESSER
Measurement

Visit our web site www.ashcroft.com

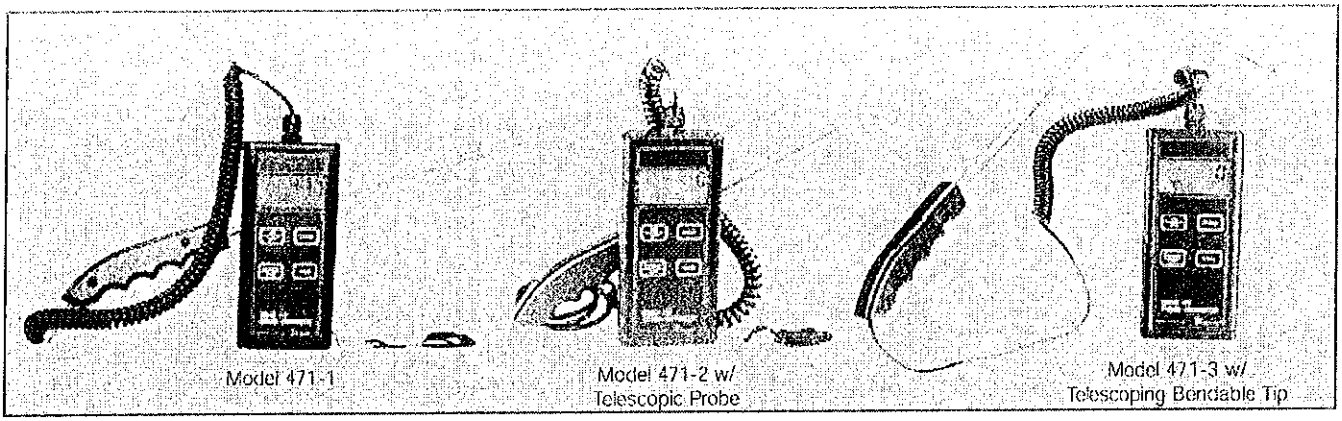
ATTACHMENT 13

THERMOMETER CUT SHEETS AND RELATED INFORMATION

Series 471

Digital Thermo-Anemometer

Four Field Selectable Ranges from 500 to 15,000 FPM



The Series 471 Digital Thermo Anemometers are versatile dual function instruments that quickly and easily measure air velocity in four field selectable ranges, in either feet per minute or meters per second, plus air temperature in °F or °C. High contrast LCD display shows both range selected and present velocity. Convenient backlight provides perfect visibility in low light conditions. Light automatically shuts off after 2-1/2 minutes to prolong battery life. Low battery warning is included.

Stainless steel probe with comfortable hand grip is etched with insertion depth marks from 0-8 inches and 0-20 cm on the Model 471-1. When fully extended, the probe length on models 471-2 and 471-3 reach 33 inches (83 cm). Model 471-3 features a telescoping bendable probe for easy access in hard-to-reach locations.

Extruded aluminum housing fully protects electronics, yet is lightweight and comfortable to hold even when taking multiple readings as part of duct traverses. An integral sliding cover protects sensors when not in use.

Standard accessories are 9 volt alkaline battery, wrist strap, custom fitted carrying case and step drill for making duct holes from 3/16" to 1/2".

Note: Ranges are field selectable.

Range Number	Velocity, FPM	Velocity, MPS	Accuracy
1	0-500	0-3.0	±3% F.S.
2	0-1500	0-7.0	±3% F.S.
3	0-5000	0-30	±4% F.S.
4	0-15000	0-75	±5% F.S.

SPECIFICATIONS

AIR VELOCITY SPECIFICATIONS:

Service: Air.
Range: Field Selectable 0-500, 0-1500, 0-5000, 0-15000 FPM (see chart for Metric Conversions).
Accuracy: Depending on range (See chart) @ 59 to 86°F (15 to 30°C). Outside this range add 0.11% per °F (0.2% per °C).
Temperature Limits: Probe: 0 to 200°F (-18 to 100°C).
Ambient: 32 to 104°F (0 to 40°C).
Display: 4-1/2 Digit 0.4" High.
Resolution: 1 FPM / 0.1 MPS.
Response Time: 15 Seconds.
Power Requirements: 9 volt alkaline battery, included.
Probe: 5/16" (8.13 mm) diameter probe with integral hand grip and 6 ft. (15.2 cm) coiled cord. Length of probe: Model 471-1 = 10" (25.4 cm); Models 471-2 and 471-3 = 33" (83 cm) extended.
Weight: 12 oz (340 g).

TEMPERATURE SPECIFICATIONS:

Range: 0 to 200°F (-18 to 100°C).
Accuracy: ±2°F (1°C).
Temperature Limits: Probe: 0 to 200°F (-18 to 100°C). Ambient: 32 to 104°F (0 to 40°C).
Display: 4-1/2 Digit 0.4" high.
Resolution: 0.1°.
Response Time: 30 Seconds.

Model 471-1 Digital Thermo Anemometer includes battery, wrist strap, 6-step drill, carrying case and instructions.

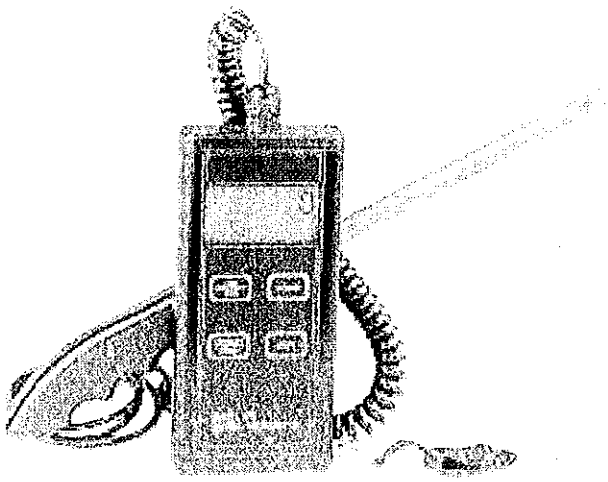
Model 471-2 Digital Thermo Anemometer with telescoping probe includes battery, wrist strap, 6-step drill, carrying case and instructions.

Model 471-3 Digital Thermo Anemometer with telescoping bendable tip includes battery, wrist strap, 6-step drill, carrying case and instructions.

Dwyer®

Series 471 Digital Thermo Anemometer

Specifications - Installation and Operating Instructions



Introduction

The Series 471 Digital Thermo Anemometers are versatile dual function hand-held battery operated instruments that quickly and easily measure air velocity in four field selectable ranges – feet per minute (FPM) or meters per second (MPS) – plus air temperature in °F or °C. High contrast LCD display shows both range selected and present velocity.

The stainless steel probe (5/16" dia.) with comfortable hand grip is etched with insertion depth marks from 0-8 inches and 0-20 cm on the Model 471-1.

The Model 471-2 and 471-3 probes extend to 33 inches (83cm). The probe tip on the Model 471-3 is bendable up to 90 degrees in any direction for easy access in hard-to-reach locations. A 7/16" (111 mm) hole is required for full probe insertion. When extending or collapsing the tip, be sure the connecting cable moves freely through the opening at the base of the handle. For optimum accuracy, be sure to extend the tip a minimum of 2 1/2" (6.36 cm) for all measurements.

Also note that with all models the two openings in the tip must be parallel to air flow for best accuracy. A convenient way to assure proper alignment when tip is out of view (such as inside a duct) is to note the orientation relative to the handle before insertion.

Battery Installation

To install the 9 volt alkaline battery, first remove the two screws and end cap at the bottom of unit. Attach the battery clip to the battery and place it inside the case. Be careful not to pinch wires when putting battery in place. Replace cover and sealing gasket. If wrist strap will be used, install "Z" shaped clip under one of the screw heads before securing. Do not overtighten screws. Snap wrist strap to the clip.

PHYSICAL DATA

Specified Accuracy Temperature Limits:
59 to 86°F (15-30°C). Outside this range add 0.11% per °F (0.2% per °C).
Flow Temperature Range: 32-200°F, 0-100°C.

TEMPERATURE MEASUREMENT: 0 to 200°F, -17 to 100°C
Temperature Accuracy: ±2°F, 1°C.
Resolution: 0.1°
Ambient Temperature Limits: 32 to 104°F, 0-40°C.
Storage Temperature Limits: -40 to 176°F, -40 to 80°C.
Probe: 5/16" [8.13 mm] diameter probe with integral hand grip and 6 ft. [15.2 cm] coiled cord.
Length of probe: Model 471-1=10" [25.4 cm]; Models 471-2 and 471-3= 33" [83 cm].
Power Source: 9 volt alkaline battery, included.
Housing Size: 6 9/16"H x 2 13/16"W x 29/32"D (166 x 71 x 23 mm).
Weight, Battery Included: 12 ounces (340 grams).
Carrying Case: 2 3/8"H x 13 1/2"W x 10 1/2"D
(60 x 343 x 267 mm).

Air Velocity Ranges

Range Number	Velocity, FPM	Velocity, MPS	Accuracy*
1	0-500	0-3.0	±3% F.S.
2	0-1500	0-7.0	±3% F.S.
3	0-5000	0-30	±4% F.S.
4	0-15000	0-70	±5% F.S.

*Temperature Range for velocity accuracy specified is 59 to 86°F (15 to 30°C). Outside this range add 0.11% per °F (0.2% per °C).

On-Off Operation

The on-off control is a toggle function. Press the ON/OFF key once to turn unit on and again to turn it off. If the Series 471 is left on for approximately 2 1/2 minutes with no activity, the device will turn off automatically to conserve battery life.

Display Backlight

The Series 471 includes a standard backlight display to improve visibility under poor lighting conditions. The instrument must first be switched off before this feature can be activated. Next, press and hold the ON/OFF key down. After about 1 second, the backlight will switch on and remain lighted for approximately 2 minutes. It will then automatically shut off to conserve battery life.

Selecting Velocity or Temperature Measurement

To switch between velocity and temperature measurement, press the VELOCITY/TEMP key.

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46361, U.S.A.
Phone: 219/879-8000 www.dwyer-inst.com
Fax: 219/872-9057 e-mail: info@dwyer-inst.com
Lit-By Fax: 888/891-4963

Series 471 Digital Thermo Anemometer

Specifications - Installation and Operating Instructions

Selecting Units of Measurement

The Series 471 will display velocity or temperature in either English or metric units. Velocity can be expressed in your choice of feet per minute (FPM) or meters per second (MPS). Temperature can be indicated in either °F or °C. Currently selected units will be indicated on the display. To change units press the UNITS key. Units selected will remain in memory even when power is shut off.

Selecting Velocity Range

Four velocity ranges can be selected in either English or metric units. Choose a range where typical readings fall within the center to upper portion of the span. The range selected will be shown in smaller characters in the lower left corner of the display. To change ranges, press the RANGE key until the required one is shown. Each time the range is changed, the display velocity will momentarily read zero until the sensor stabilizes with the new range.

Low Battery Indicator

A weak battery can cause improper operation and/or inaccurate measurements. A low battery indicator is included on the display to warn when the battery needs to be replaced. Although the unit might appear to operate and indicate properly, accuracy of readings cannot be assured when the LO BAT indicator is displayed. Replace the exhausted battery with a fresh alkaline type such as Duracell® MN1604, Eveready® 522 or equivalent. Zinc carbon types are not recommended because of their significantly shorter life and increased potential for leakage. Do not leave exhausted batteries in the unit due to possible leakage and resulting damage.

Probe Care and Cleaning

Always cover the tip when not in use by fully collapsing the telescoping sections or sliding up the cover attached to the 471-1. Use only clean, dry particulate free air. Although probe requires little maintenance, occasional cleaning may be necessary for best accuracy.

Caution: Tip is fragile and must not be touched. Do not use brushes, cotton swabs, etc. to clean. Remove battery before cleaning. Provide adequate ventilation and gently bathe the probe tip in a small container of denatured alcohol. Wash briefly, avoiding extended soaking. Remove from bath and gently shake off excess. Allow to completely air dry before replacing battery and returning to service. Do not use pressurized cleaners or compressed air, both of which could cause permanent damage.

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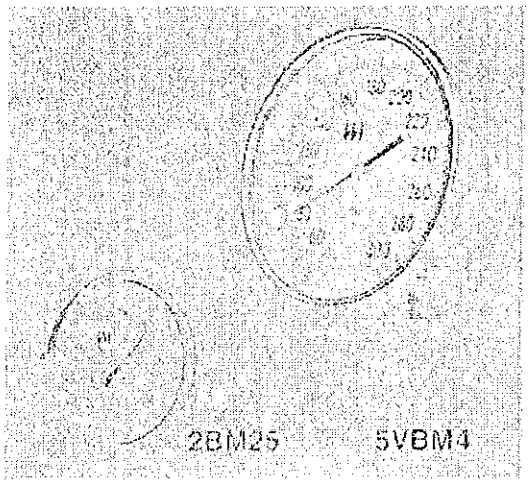
WEISS INSTRUMENTS, INC.
903 Waverly Ave. Holtsville, New York 11742
(631) 207-1200 ⊙ Fax: (631) 207-0900

BIMETAL DIAL THERMOMETERS



Weiss offers a complete line of Commercial Bimetal Thermometers in 2", 3" and 5" dial sizes. All versions are hermetically sealed and silicone dampened for optimum performance in most industrial applications. A recalibration feature is standard on the Vari-angle types. Other 3" and 5" dial forms are available with or without a reset feature for a wider customer choice and savings.

CASE: The entire case assembly is of Type 304 Stainless Steel. To insure a moisture proof unit, the heavy glass face is securely gasketed with the case and bezel assembly, hermetically sealed.

STEM ASSEMBLY:The stem and fixed thread connection is fabricated of stain-less steel. All welded construction insures complete corrosion resistance. Model BM, RBM and VBM stem diameter is 1/4" and for 2" dials the fixed thread is 1/4" NPT, 3" and 5" dials are 1/2" NPT.

MODEL 2BM - 2" Angle

CAT NO.	Stem Lenght [1]	NPT
2BM25	21/2"	1/4"
2BM4	4"	1/4"
2BM6	6"	1/4"
2BM9	9"	1/4"
2BM12	12"	1/4"

MODEL 3BM, 3" Angle - 3BMS, 3" Straight

CAT NO.		Stem Lenght [1]	NPT
3BM25	3BMS25	21/2"	1/2"
3BM4	3BMS4	4"	1/2"
3BM6	3BMS6	6"	1/2"
3BM9	3BMS9	9"	1/2"
3BM12	3BMS12	12"	1/2"

MODEL 5BM, 5" Angle - 5BMS, 5" Straight

CAT NO.		Stem Lenght [1]	NPT
5BM25	5BMS25	21/2"	1/2"
5BM4	5BMS4	4"	1/2"
5BM6	5BMS6	6"	1/2"
5BM9	5BMS9	9"	1/2"
5BM12	5BMS12	12"	1/2"

MODEL 3RBM, 3" Angle - 3RBMS, 3" Straight

CAT NO.		Stem Lenght [1]	NPT
3RBM25	3RBMS25	21/2"	1/2"
3RBM4	3RBMS4	4"	1/2"
3RBM6	3RBMS6	6"	1/2"
3RBM9	3RBMS9	9"	1/2"
3RBM12	3RBMS12	12"	1/2"

Series RBM with Recalibrator

MODEL 5RBM, 5" Angle - 5RBMS, 5" Straight

CAT NO.		Stem Lenght [1]	NPT
5RBM25	5RBMS25	21/2"	1/2"
5RBM4	5RBMS4	4"	1/2"
5RBM6	5RBMS6	6"	1/2"
5RBM9	5RBMS9	9"	1/2"
5RBM12	5RBMS12	12"	1/2"

CAT NO.	Stem Lenght [1]	NPT
3VM25	21/2"	1/2"
3VBM4	4"	1/2"
3VBM6	6"	1/2"
3VBM9	9"	1/2"
3VBM12	12"	1/2"

CAT NO.	Stem Lenght [1]	NPT
5VM25	21/2"	1/2"
5VBM4	4"	1/2"
5VBM6	6"	1/2"
5VBM9	9"	1/2"
5VBM12	12"	1/2"

[1]Includes thread. Longer stem lenghts available.
NOTE: When ordering Silicone Filled Bimetals add Prefix SF to appropriate Catalog No. Ex: SF5RBM25

FAHRENHEIT	FIG. INTER.	SCALE DIV.	CELSIUS	FIG. INTER.	SCALE DIV.	DUAL SCALE - F&C	
-80/0/120	20°	2°	-50/0/50	10°	1°	-80/0/120F	-60/0/50C
-20/0/120	20°	2°	[2]0/50	5°	1/2°	-20/0/120F	-30/0/50C
[2]30/130	10°	1°	0/100	10°	1°	[2]30/130F	0-55C
0/200	20°	2°	0/150	10°	1°	0/200F	-15/0/90C
0/250	20°	2°	0/200	20°	2°	0/250F	-20/0/120C
50/300	20°	2°	0/300	50°	2°	50/300F	10/150C
50/400	50°	5°	[1]0/450	50°	5°	50/400F	10/200C
50/550	50°	5°	[1 3]100/550	50°	5°	50/550F	10/260C
[1]100/800	100°	10°				[1]100/800F	40/425C
[1 3]200/1000	100°	10°				[1 3]200/1000F	100/540C

[1] Minimum stem length for these ranges is 4". [2] Minimum stem length is 4" Straight and Vari-angle Form.
[3] Satisfactory for continous service up to 800°F of 425°C. Can be used for intermittent service from 800-1000°F or 425-500°C.

SEPARABLE SOCKETS FOR 3" AND 5" ONLY

EXT TH'D	CAT. NO.	STEM LGTH.	INSERT LGTH.	LAG EXT.
3/4" NPT	B25	21/2	1	
	B35	4	21/2	
	BR6	6	41/2	
	BR9	9	71/2	
	BR12	12	101/2	
EXT TH'D	CAT. NO.	STEM LGTH.	INSERT LGTH.	LAG EXT.
3/4 NPT	BN6	6	21/2	2
	BN9	9	41/2	3
	BN12	12	71/2	3

DUCT MOUNTING FLANGES

CAT. NO.	INSERTION
BF3	STANDARD
BF3-2	EXTENSION NECK

PRODUCT LEVEL CONTROL, INC.

VALVES

File Name: 07-060 BOM
Customer: KLEIGMAN BROS
Site Reference: GLENDALE/QUEENSNY
Date: 11/20/2007
Generated by: Bruce

Reference	Qty	Units	Description	Material	Part Number
BV 100, 101, 102, 103	4	each	VALVE, BUTTERFLY, WAFER TYPE, LOCKABLE LEVER HANDLE, 3"	SCH 80 PVC/EDPM	CEPEX-16708, 89991030
BV 104, 105	2	each	VALVE, BUTTERFLY, WAFER TYPE, LOCKABLE LEVER HANDLE, 4"	SCH 80 PVC/EDPM	CEPEX-16709, 89991040
BV 204	3	each	VALVE, BUTTERFLY, WAFER TYPE, LOCKABLE LEVER HANDLE, 4", 200 NSWOG	CAST/ALBRONZE/EPDM	MILWAUKEE-4CW223E
CV 201, 202	2	each	CHECK VALVE, 3" WAFER DESIGN NARROW PROFILE SWING CHECK, LOW PRESSURE DROP, PNEUMATIC AND BULK MATERIAL HANDLING, 150PSI, 450F, INCLUDES PIVOT STOPPER FOR USE IN VERTICAL UPFLOW	AL/TEFLON	TECHNOCHECK-110-3" WITH STOPPER
CV 204	1	each	CHECK VALVE, 4" WAFER DESIGN NARROW PROFILE SWING CHECK, LOW PRESSURE DROP, PNEUMATIC AND BULK MATERIAL HANDLING, 150PSI, 450F, INCLUDES PIVOT STOPPER FOR USE IN VERTICAL UPFLOW	AL/TEFLON	TECHNOCHECK-110-4" WITH STOPPER
GV 106	1	each	VALVE, GATE, FNPT, 3", 200 WOG 125 SWP	BRONZE	WATTS-3WGV
GV 201, 202	4	each	VALVE, GATE, FNPT, 2 1/2", 200 WOG 125 SWP	BRONZE	WATTS-212WGV
SAMPLE PORTS	3	each	1/4" MNPT BARBED SAMPLE PORT	BRASS	4793K2

ATTACHMENT 14

VAPOR PHASE CARBON ADSORBER CUT SHEETS AND RELATED INFORMATION

APPENDIX A – SITE MAPS AND HOSPITAL DIRECTIONS

Google

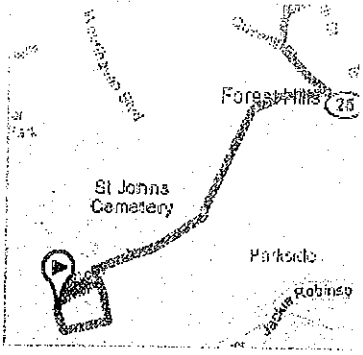
Start: 76-01 77th Ave
Ridgewood, NY 11385
End: 102-01 66th Rd
Forest Hills, NY 11375
Travel: 2.9 mi -- about 11 mins

76-01 77th Ave
Ridgewood, NY 11385
Drive: 2.9 mi -- about 11 mins

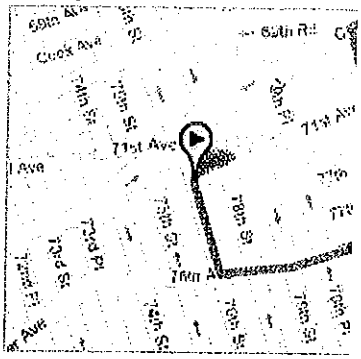
1.	Head south on 76th St toward 78th Ave	0.1 mi
2.	Turn left at 78th Ave	0.3 mi 1 min
3.	Turn left at 80th St	0.1 mi
4.	Slight left to stay on 80th St	0.2 mi
5.	Turn right at Cooper Ave	0.6 mi 2 mins
6.	Turn left at Woodhaven Blvd	233 ft 1 min
7.	Turn right at Yellowstone Blvd	1.0 mi 3 mins
8.	Turn left at Queens Blvd/RT-25 W	0.1 mi 1 min
9.	Slight right at Queens Blvd	0.2 mi
10.	Turn right at 67th Rd	141 ft
11.	Turn left at 102nd St	0.1 mi

102-01 66th Rd
Forest Hills, NY 11375

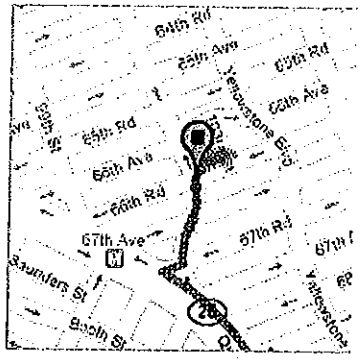
Overview



Start



End



These directions are for planning purposes only. You may find that construction projects, traffic, or other events may cause road conditions to differ from the map results.

Map data ©2007 NAVTEQ™

Medical Specialties

Nephrology	Surgery	Joint Center	Radiology	Emergency Services
Physical Therapy	Podiatry	Cancer Care	Orthopedics	Women's Health
Medicine	Respiratory Care	All Specialties ...		

Forest Hills Hospital is a proud member of the North Shore-LIJ Health System. As a 222-bed community hospital located in an ethnically diverse residential neighborhood in northern Queens, it is the Hospital's mission to provide the highest quality and most compassionate healthcare in the county, with sensitivity and respect for the cultural needs of our patients and their families.

Our Emergency Department, a Certified Heart Station, Designated Stroke Center, and 911 receiving site, treats over 25,000 patients a year, and our House Calls Program delivers non-emergent medical care to our community's frail, homebound elderly. Our Women's New Life Center features Labor-Delivery-Recovery suites for new moms and their families, and our Adult Primary Care Center offers high-quality, affordable, outpatient healthcare. We offer general surgery, bloodless medicine and surgery, bariatric surgery, orthopedics, gynecology, and gastroenterology services conveniently on-site and through a vast array of affiliated medical staff.

Read our community service plan .

The Advanced Wound Healing Institute

The Advanced Wound Healing Institute specializes in treating patients who have been suffering with disability and seemingly endless attempts to heal persistent sores or bone infection, with outstanding results.

Excellence in Podiatry

Forest Hills Hospital has an active Podiatry staff, providing patients with excellence in both the ambulatory and hospital environment. All aspects of Podiatric Medicine and Surgery are represented, from reconstructive foot surgery to Diabetic limb preservation.

Bariatric Surgery Program

Our Bariatric Surgery Program offers comprehensive care,

Emergency Services

Forest Hills Hospital has a 911-receiving, state-of-the-art emergency department that is a certified heart station. We have the ability to treat all types of acute coronary syndromes, with clot-buster drugs available. We consistently meet the American Heart Association recommendation to deliver the drug to the patient with an acute myocardial infarction within 30 minutes. The Emergency Department has 21 rooms, including an area for pediatrics, cardiac and trauma care. All beds are monitored and equipped for minor procedures. A CT scanner is located in the department to allow for rapid access. Digitalized radiology is utilized in the department. Technological innovations include computerized physician order entry and bedside registration. The Emergency Department has equipment for and trained staff in disaster preparedness.

The department is staffed with attending physicians boarded in emergency medicine and registered nurses certified in emergency care/trauma care. For patients requiring more advanced cardiac or pediatric care, we have the ability to stabilize and transfer them to our tertiary facility at North Shore University Hospital in Manhasset.

Patients do not need a referral to come to the Emergency Department.

Director

Jeffrey Horwitz, D.O., FACP, FACEP

Assistant Director

James Halfpenny, D.O. FACEP, FAAFP

Assistant Director of Nursing

Joseph Mazzo, RN

Location

Emergency Services
Forest Hills Hospital
102-01 66th Road
Forest Hills, NY 11375

Contact

(718) 830-4200

APPENDIX B – SITE SPECIFIC COMPOUNDS

Siemens/USFilter Vapor Phase Carbon Material Safety Data Sheet
Mallinckrodt Chemicals Material Safety Data Sheet

APPENDIX B – SITE SPECIFIC COMPOUNDS

USFilter Material Safety Data Sheet
Mallinckrodt Chemicals Material Safety Data Sheet

USFilter

Material Safety Data Sheet

SECTION 1 – CHEMICAL PRODUCT AND COMPANY INFORMATION

****

Product Name: USF Activated Carbon
Part Number: multiple Chemical Family: carbon

Manufacturer's Name: U.S. Filter Corporation
Address: 4669 Shepherd Trail, Rockford, IL 61103
Product/Technical Information Phone Number: (815) 877-3041
Medical/Handling Emergency Phone Number: Call CHEMTREC at (800) 424-9300
24 hours a day
Transportation Emergency Phone Number: Call CHEMTREC at (800) 424-9300
24 hours a day

Issue Date: April 1, 2000
Revision Date/Revision Number: August 28, 2000/Rev 2

SECTION 2 – COMPOSITION INFORMATION

****

Chemical Name	Percent by Weight	CAS#
Carbon	100%	7440-44-0

SECTION 3 – HAZARDS IDENTIFICATION

****

Appearance & Odor: Black particulate pellet or powder
Emergency Overview: Dust that contacts eyes may be irritating or cause mechanical injury. Dust may cause slight skin irritation. Dust may be irritating to the respiratory tract and cause coughing or sneezing. Ingestion of powder may be irritating to the gastrointestinal tract. Warning: Wet activated carbon depletes oxygen from the air and therefore dangerously low levels of oxygen may be encountered. Whenever workers enter a vessel containing activated carbon, the vessel's oxygen content should be determined and work procedures for potentially low oxygen areas should be followed.
Fire &Explosion Hazards: Finely dispersed particles form explosive mixtures in air. When burned, hazardous products of combustion including carbon oxides can occur. Irritating and/or toxic gases due to decomposition of the product may be generated during a fire. Fight fire from a safe distance from a protected location. Contact with strong oxidizers such as ozone or liquid oxygen may cause rapid combustion.
Primary Route(s) of Exposure: Eye contact, skin contact, ingestion, or inhalation are all possible routes of entry.
Inhalation- Acute Effects: Dust may be irritating to the respiratory tract and cause coughing or sneezing.
Skin Contact-Acute Effects: Dust may cause slight skin irritation.

SECTION 3 – HAZARDS IDENTIFICATION (cont.)

****

Eye Contact- Acute Effects: Dust that contacts eyes may be irritating or cause mechanical injury.
Ingestion- Acute Effects: Ingestion of powder may be irritating to the gastrointestinal tract.

SECTION 4 – FIRST AID MEASURES

****

Inhalation First Aid: Remove affected person from area to fresh air and provide oxygen if breathing is difficult. Give artificial respiration ONLY if breathing has stopped and give CPR ONLY if there is no breathing and no pulse. Obtain medical attention.
Skin Contact First Aid: Wash skin for 5 minutes with flowing water and soap. Clothing should be discarded or washed before reuse. Obtain medical assistance if irritation develops. DO NOT instruct person to neutralize affected skin area.
Eye Contact First Aid: Immediately irrigate eyes with flowing water continuously for 15 minutes while holding eyes open. Contacts should be removed before or during flushing. Seek medical assistance if irritation develops. DO NOT instruct person to neutralize.
Ingestion First Aid: Vomiting may need to be induced if directed by a physician or poison control center. DO NOT have unqualified personnel induce vomiting. Obtain medical attention immediately.
Medical Conditions Aggravated: Respiratory ailments may be aggravated by exposure to this product.
Note to Physician: No specific antidote, treat patient symptomatically.

SECTION 5 – FIRE FIGHTING MEASURES

****

Flash Point/Method: Nonflammable
Auto Ignition Temperature: 840°C (1,710°F)
Upper/Lower Explosion Limits: not applicable

Extinguishing Media: Water spray, carbon dioxide, foam or dry chemical
Fire Fighting Procedures: In the event of a fire, wear full protective clothing and NIOSH approved self-contained breathing apparatus with full face piece, operated in the positive pressure mode.
Fire & Explosion Hazards: When burned, hazardous products of combustion including carbon oxides can occur. Irritating and/or toxic gases due to decomposition of the product may be generated during a fire. Fight fire from a safe distance from a protected location. Contact with strong oxidizers such as ozone or liquid oxygen may cause rapid combustion. Dust explosion is possible if in a powder or granular form, mixed with air.
Hazardous Products of Decomposition and /or Combustion: Carbon oxides.

NFPA Ratings:
HEALTH-1 FLAMMABILITY- 0 REACTIVITY-0 OTHER- none

SECTION 6 – ACCIDENTAL RELEASE MEASURES

****

Clean up spills in a manner that does not disperse dust into the air. Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding unnecessary exposure, and removal of material from eyes, skin, and clothing. Dispose of virgin (unused) carbon (waste or spillage) in a facility permitted for non-hazardous wastes. Spent (used) carbon should be disposed of in accordance with applicable laws. Do not reuse empty bags. Dispose of in facility permitted for non-hazardous wastes. DO NOT DUMP INTO ANY SEWERS, ON THE GROUND OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State, Local and Provincial laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

SECTION 7 – HANDLING AND STORAGE

****

Handling: Avoid dispersion into air. Keep containers dry and closed. Follow good handling and housekeeping practices to minimize spills, generation of airborne dusts, and accumulation of dusts on exposed surfaces. Use with adequate exhaust ventilation to draw dust away from workers' breathing zones. Prevent or minimize exposures to dusts by using appropriate respirators, gloves, and eye protection. Wash exposed skin areas thoroughly with soap and water. Use caution when pouring, using pneumatic transport, swirling, etc. as this material can become electrostatically charged.

Storage: Avoid breaking bags or spilling media so as to avoid possibly creating residual dust. Store in ambient atmospheric conditions. Product should be stored in a closed dry container. Maintain good housekeeping procedures. Store away from strong oxidizers such as ozone, liquid oxygen, chlorine, permanganate, etc.

General Comments: Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

SECTION 8 –PERSONAL PROTECTION/ EXPOSURE CONTROL

****

Respiratory Protection: Use NIOSH/MSHA approved respiratory protection equipment appropriate to the material and/or its concentration where airborne exposure is likely. If exposures cannot be kept to a minimum with engineering controls, consult manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer.

Skin Protection: Wear appropriate dust resistant clothing and gloves.

Eye Protection: Safety glasses with side shields are recommended for any type of handling. Where eye contact or dusty conditions may be likely, dust tight goggles are recommended.

SECTION 8 –PERSONAL PROTECTION/ EXPOSURE CONTROL (cont.)

****

Ventilation Protection: Provide ventilation if necessary to minimize exposure. Dilute ventilation acceptable, but local mechanical exhaust ventilation preferred, if practical, at sources of air contamination such as open process equipment. The following publication offers ventilation guidelines and techniques: "INDUSTRIAL VENTILATION, A MANUAL OF RECOMMENDED PRACTICE" available from the ACGIH.

Other Protection: Safety showers, with quick opening valves which stay open, and eye wash fountains, or other means of washing the eyes with a gentle flow of cool to tepid tap water, should be readily available in all areas where this material is handled or stored. Water should be supplied through insulated and heat-traced lines to prevent freeze-ups in cold weather.

Exposure Limits:
OSHA PEL-TWA: 15 mg/m^3 (total), 5 mg/m^3 (resp)
OSHA PEL-STEL: 10 mg/m^3

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

****

Appearance & Odor: Black particulate pellet or powder

Vapor Pressure: N/A*
Boiling Point: N/A
Specific Gravity: 2.3g/cc real density
Volatile Percentage: 0%
Flash Point/method: Nonflammable
Upper/Lower Explosion Limits: N/A

Vapor Density (Air=1): N/A
Melting Point: N/A
Solubility in Water: Insoluble
pH: N/D**
Auto Ignition Temperature: 840°C
Other: none

*N/A-Not applicable
**N/D=Not determined

SECTION 10 – STABILITY AND REACTIVITY

****

Stability: This product is considered stable under the specified conditions of storage, shipment and use.
Incompatibilities: Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, permanganate, etc. may result in rapid combustion. Avoid contact with strong acids.
Polymerization: Hazardous polymerization will not occur.
Decomposition: Hazardous decomposition will produce carbon oxides.
Conditions to avoid: Store away from strong oxidizers such as ozone, liquid oxygen, chlorine, permanganate, etc. Moist air will reduce the operating life.

SECTION 11 – TOXICOLOGICAL INFORMATION

****

INHALATION – Acute: Inhalation of carbon dust is mildly irritating to the lungs and can immediately give rise to an increased mucociliary transport and airway resistance mediated by the vagus. The inhalation LC50 (Rat) is > 64.4 mg/l.
INHALATION – Chronic: There are no known chronic inhalation effects.

SECTION 11 – TOXICOLOGICAL INFORMATION (cont.)

****

SKIN CONTACT – Acute: Skin contact is expected to be slightly irritating. The primary skin irritation index (rabbit) is 0.
SKIN CONTACT – Chronic: There are no known chronic dermal effects.
EYE CONTACT – Acute: Eye contact can cause conjunctivitis, epithelial hyperplasia of the cornea, as well as eczematous inflammation of the eyelids.
INGESTION – Acute: Carbon is practically nontoxic. The probable oral lethal dose (human) is greater than 15 g/kg; more than one quart (2.2 lbs) for a 70 kg (150 lb) person.
INGESTION – Chronic: There are no known chronic ingestion effects.
CARCINOGENICITY/MUTAGENICITY: There are no known carcinogenic/mutagenic effects.
REPRODUCTIVE EFFECTS: There are no known reproductive effects.
NEUROTOXICITY: There are no known neurotoxic effects.
OTHER EFFECTS: No other toxic effects of carbon are known.
TARGET ORGANS: Target organs include the respiratory system and the cardiovascular system.

SECTION 12 – ECOLOGICAL INFORMATION

****

This material, in its original state, is not harmful to the environment.

SECTION 13 – DISPOSAL CONSIDERATIONS

****

Clean spills in a manner that does not disperse dust into the air, preferably a wet-down procedure or vacuum. If material is not contaminated, spilled media can be rebagged. Material that cannot be used or chemically reprocessed and empty containers should be disposed of in accordance with all applicable regulations. Product containers should be thoroughly emptied before disposal. Generators of waste material are required to evaluate all waste for compliance with RCRA and any local disposal procedures and regulations. NOTE: State and local regulations may be more stringent than federal regulations.

Warning: Wet activated carbon depletes oxygen from the air and therefore dangerously low levels of oxygen may be encountered. Whenever workers enter a vessel containing activated carbon, the vessel's oxygen content should be determined and work procedures for potentially low oxygen areas should be followed.

SECTION 14 – TRANSPORTATION INFORMATION

****

DOT Shipping Description: Not DOT Regulated

SECTION 15 - REGULATORY INFORMATION

****

CERCLA SECTION 103 (40CFR302.4): no RQ: none
SARA SECTION 302 (40CFR355.30): no
SARA SECTION 304 (40CFR355.40): no
SARA SECTION 313 (40CFR372.65): no
SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21):
ACUTE: yes CHRONIC: no FIRE: no REACTIVE: no SUDDEN RELEASE: no
OSHA PROCESS SAFETY (29CFR1910.119): no
CALIFORNIA PROPOSITION 65: no

SECTION 16 - OTHER INFORMATION

****

Disclaimer: The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the user thereof. It is the buyer's responsibility to ensure that its activities comply with federal, state, provincial and local laws.

Created by: MSDS Coordinator

NFPA 704 (Section 16)

MATERIAL SAFETY DATA SHEET

MSDS No. 9908

Dyed Diesel Fuel

1. CHEMICAL PRODUCT and COMPANY INFORMATION (rev. Mar-00)

Amerada Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): CHEMTREC (800) 424-9300
COMPANY CONTACT (business hours): Corporate Safety (732) 750-6000

SYNONYMS: Tax-exempt Diesel Fuel; Dyed Premium Diesel Fuel
See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS (rev. Mar-00)

INGREDIENT NAME	EXPOSURE LIMITS	CONCENTRATION PERCENT BY WEIGHT
Diesel Fuel CAS NUMBER: 68476-34-6	OSHA PEL-TWA: 5 mg/m, as mineral oil mist ACGIH TLV-TWA: 1997 NOIC- 100 mg/m^3, skin, A3	100
Naphthalene CAS NUMBER: 91-20-3	OSHA PEL: 10 ppm ACGIH TLV-TWA/STEL: 10 / 15 ppm, A4	Typically < 0.01

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher, and red dye.
Premium Diesel Fuel contains a multifunctional additive.

3. HAZARDS IDENTIFICATION (rev. Feb-98; Tox-98)

EMERGENCY OVERVIEW

CAUTION!

OSHA/NFPA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED

Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation (rash). Long-term, repeated exposure may cause skin cancer.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).

EYES
Contact with liquid or vapor may cause mild irritation.

SKIN
May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

Revision Date: 02/28/01

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11 Toxicological Information.

IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A). NIOSH regards whole diesel fuel exhaust particulates as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

4. FIRST AID MEASURES (rev. Feb-98; Tox-98)

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES (rev. Oct-96)

FLAMMABLE PROPERTIES:

FLASH POINT:	> 125 °F (> 52 °C) minimum PMCC
AUTOIGNITION POINT:	494 °F (257 °C)
OSHA/NFPA FLAMMABILITY CLASS:	2 (COMBUSTIBLE) (see Section 14 for transportation classification).
LOWER EXPLOSIVE LIMIT (%):	0.6
UPPER EXPLOSIVE LIMIT (%):	7.5

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

FIRE FIGHTING INSTRUCTIONS

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES (rev. Feb-98)

ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE (rev. Feb-98)

HANDLING PRECAUTIONS

Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES
Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION (rev. Feb-98)

ENGINEERING CONTROLS
Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION
Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION
Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION
A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES (rev. Jan-94)

APPEARANCE
Red or reddish-colored (dyed) liquid

ODOR
Mild, petroleum distillate odor

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	320 to 690 °F (160 to 366 °C)
VAPOR PRESSURE:	0.009 psia @ 70 °F (21 °C)
VAPOR DENSITY (air = 1):	> 1.0
SPECIFIC GRAVITY (H_2O = 1):	0.83 to 0.86 @ 60 °F (16 °C)
PERCENT VOLATILES:	100 %
EVAPORATION RATE:	Slow; varies with conditions
SOLUBILITY (H_2O):	Negligible

10. STABILITY and REACTIVITY (rev. Jan-94)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers; Viton ® ; Fluorel ®

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL PROPERTIES (rev. Mar-00; Tox-98)

ACUTE TOXICITY

Acute dermal LD50 (rabbits): > 5 ml/kg
Acute oral LD50 (rats): 9 ml/kg
Primary dermal irritation: extremely irritating (rabbits)
Draize eye irritation: non-irritating (rabbits)
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY

Carcinogenic: OSHA: NO IARC: NO NTP: NO ACGIH: 1997 NOIC: A3

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

MUTAGENICITY (genetic effects)

This material has been positive in a mutagenicity study.

12. ECOLOGICAL INFORMATION (rev. Feb-98)

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

13. DISPOSAL CONSIDERATIONS (rev. Feb-98)

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION (rev. Feb-98)

PROPER SHIPPING NAME:	Diesel Fuel
HAZARD CLASS and PACKING GROUP:	3, PG III
DOT IDENTIFICATION NUMBER:	NA 1993
DOT SHIPPING LABEL:	None

15. REGULATORY INFORMATION (rev. Feb-01)

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) or, if not practical, the U.S. Coast Guard with follow-up to the National Response Center, as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the *de minimis* levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Amerada Hess Corporate Safety if you require additional information regarding this product.

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 3 (Combustible Liquid) and Class D, Division 2, Subdivision B (Toxic by other means)

16. OTHER INFORMATION (rev. Feb-01)

NFPA® HAZARD RATING	HEALTH:	0	Negligible
	FIRE:	2	Moderate
	REACTIVITY:	0	Negligible
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	2	Moderate
	REACTIVITY:	0	Negligible
			* CHRONIC

SUPERSEDES MSDS DATED: 03/04/00

ABBREVIATIONS:

AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute (212) 642-4900
API	American Petroleum Institute (202) 682-8000
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
DOT	U.S. Department of Transportation [General info: (800) 467-4922]
EPA	U.S. Environmental Protection Agency
HMIS	Hazardous Materials Information System
IARC	International Agency For Research On Cancer
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Canadian Workplace Hazardous Materials Information System

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

Bradley Fixtures Corporation
W142 N9101 Fountain Boulevard
Menomonee Falls, Wisconsin 53052 USA

Telephone Number: 262-251-6000
Emergency Phone Number: 262-251-6000

SECTION #1 – PRODUCT IDENTIFICATION

Product: Bradley OptiAid™/ OptiAid Plus™ / OneStep™ (Blue Label)

Chemical Family: Eyewash solution

This MSDS is being provided to your company for the purpose of providing current health and safety information to your management and for your employees who work with this product. Please read the information on these sheets before attempting to use the product. You must also provide this information to those people in your company whose responsibility it is to comply with Federal, State, and/or Provincial "Right to Know" regulations. Also make sure that this information is available and disseminated to your employees before their use of the product. This information should be kept on file and made available to any employee who requests it. It is your obligation to comply with safety and health regulations pertinent to your jurisdiction.

SECTION #2 – COMPOSITION/INFORMATION ON INGREDIENTS

Component: Boric acid
CASRN 10043-35-3
No OSHA PEL(s) or ACGIH TLV(s)

Component: Sodium chloride
CASRN 7647-14-5
No OSHA PEL(s) or ACGIH TLV(s)

Component: Sodium borate
CASRN 7632-04-4
No OSHA PEL(s) or ACGIH TLV(s)

SECTION #3 – HAZARDS IDENTIFICATION

Primary Route(s) of Entry

Ingestion.

Eye Hazards

Eye contact with this product is not known to be hazardous.

Skin Hazards

Skin contact with the product is not known to be hazardous.

Ingestion Hazards

Ingestion of the product may cause mild gastric irritation.

Inhalation Hazards

If this product is used in a manner that produces a mist, inhalation of the mist may irritate the nose, throat, and upper respiratory tract.

SECTION #4 - FIRST AID MEASURES

Ingestion

Do not induce vomiting. If subject is conscious, give large quantities of milk or water. Do not attempt to give liquids to an unconscious person. If the subject is unconscious or convulsive, seek immediate medical assistance.

Eyes

None applicable.

Skin

None applicable. If clothing becomes wetted with product, replace with dry clothing.

Inhalation

If symptoms of irritation occur, remove subject from the area. Seek medical attention if necessary.

Note to Physician

The product may cause mild gastric irritation if swallowed. Individual components are present at concentrations ≤10 grams/liter each.

SECTION #5 – FIRE FIGHTING MEASURES

Fire and Explosion Hazards

This product is non-flammable and non-explosive.

Extinguishing Media

Not applicable (non-flammable mixture)

SECTION #6 – ACCIDENTAL RELEASE MEASURES

Spill Procedures

Flush away spilled product to drain with water, unless prohibited by local regulations. Consult the appropriate authorities to determine specific requirements for your jurisdiction.

SECTION #7 – HANDLING AND STORAGE

Handling Precautions

No special handling precautions are required.

Storage Precautions

Store in a cool place away from incompatible materials (see Section #10).

Work/Hygienic Practices

Wash hands and face immediately after each use.

SECTION #8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Mechanical ventilation is not required under prescribed conditions of use. If the product is used in a manner that generates airborne mist, provide appropriate ventilation (dilution, local exhaust) adequate to control mist concentrations in air.

Eye/Face Protection

Eye protection is not required.

Skin Protection

Skin protection is not required.

Respiratory Protection

Respiratory protection is not required under prescribed conditions of use. If the product is used in a manner that generates airborne mist not controlled by ventilation, wear a NIOSH-approved dust/mist respirator (rated *N95* or better) to minimize nose, throat, and respiratory tract irritation.

SECTION #9 - PHYSICAL AND CHEMICAL PROPERTIES

Percent Volatile: >98%
pH range: 6.4 - 8.4
Boiling point: >212° F./100° C.
Solubility (water): complete

Vapor pressure: not applicable
Evaporation rate: <1 (n-BuAc = 1)
Specific Gravity: *ca.* 1.00
Appearance: Clear colorless liquid

SECTION #10 - STABILITY AND REACTIVITY

Stability: stable

Hazardous Polymerization: will not occur

Incompatible Materials: Strong oxidizing agents

Hazardous Decomposition Byproducts: Not applicable

SECTION #11 - TOXICOLOGICAL INFORMATION

Toxicological Information

This product has not been subject to toxicological testing by the supplier.

Carcinogenicity

None of the components of this product are classified as potential or demonstrated human carcinogens by IARC, NTP, or OSHA.

SECTION #12 - ECOLOGICAL INFORMATION

No data available.

SECTION #13 – DISPOSAL CONSIDERATIONS

Waste Disposal Methods

Dispose of product in accordance with applicable Federal, State/Provincial, and local regulations.

SECTION #14 – TRANSPORT INFORMATION

This product is not a *Hazardous Substance* or *Dangerous Goods* according to USDOT, TDG (Canada), ICAO, or IMO regulations.

SECTION #15 – REGULATORY INFORMATION

SARA Title III Notifications and Information

SARA Title III - Hazard Class(es): None

SARA Title III - Section 313 Supplier Notification: This product contains no chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372.

***Controlled Products Regulations* (Canada) Information**

Components Toxicology Data

Component (CASRN)	LD_{50} (Route/Species)	LC_{50} (Species)
Boric acid (10043-35-3)	2660 mg/kg (oral/rat)	No data available
Sodium chloride (7647-14-5)	3 gm/kg (oral/rat)	> 42 gm/m³/1h (rat)
Sodium borate (7632-04-4)	3250 mg/kg (oral/mouse)	No data available

WHMIS Hazard Classification(s) of product: none applicable
Components on *Ingredients Disclosure List*: none

SECTION #16 – REVISION INFORMATION

Date of previous version: 30 January 2004

Reason(s) for revision: Addition of new product

DISCLAIMER OF EXPRESS AND IMPLIED WARRANTIES

We believe that the information contained herein is current as of the date of the Material Safety Data Sheet. Since the use of this product is not within the use of Bradley Fixtures Corporation, it is the user's obligation to determine the conditions of safe use of the product. Additionally, as data, standards, and regulations change, and conditions of use and handling are beyond our control, NO WARRANTIES, EXPRESSED OR IMPLIED, ARE MADE AS TO THE COMPLETENESS OR CONTINUING ACCURACY OF THIS INFORMATION. The user should review any recommendations in the specific context of the intended use to determine whether or not they are appropriate.

SECTION 3 - PHYSICAL DATA			
BOILING POINT:	100°-430°F (38° -221°C)	% VOLATILITY BY VOLUME:	100%
VAPOR PRESSURE:	325 - 525 (mmHg @ 20°C)	VAPOR DENSITY (AIR = 1):	<4
SPECIFIC GRAVITY	0.74 @15°C where (H20 = 1):	SOLUBILITY IN WATER:	Slight
EVAPORATION RATE (n-butyl acetate = 1): Rapid and varies			
APPEARANCE & ODOR: Colorless liquid. Gasoline odor.			

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA		
FLASH POINT: -40°F (- 40°C) (Tag. Closed Cup)		AUTOIGNITION TEMP: 536 °F (280°C)
FLAMMABILITY LIMITS IN AIR (% BY VOL.)	LEL: 1.5	UEL: 7.6
EXTINGUISHING MEDIUM: Foam, carbon dioxide, dry chemical, and water fog.		
SPECIAL FIRE FIGHTING PROCEDURES: Evacuate area. For large spills, fire-fighting foam is the preferred agent and should be applied in sufficient quantities to blanket the gasoline surface. Water spray may be used to flush spill away from exposures, but good judgment should be practiced to prevent spreading of the gasoline into sewers, streams or drinking water supplies. If a leak or spill has not ignited, apply a foam blanket to suppress the release of vapors. If foam is not available, a water spray curtain can be used to disperse vapors and to protect personnel attempting to stop the leak.		
UNUSUAL FIRE AND EXPLOSION HAZARDS: EXTREMELY FLAMMABLE. Do not store or pour near sources of ignition. Do not pressurize, cut, heat, weld, or expose to sources of ignition. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Do not mix or store with strong oxidants. Bond and ground all containers/transfers.		

SECTION 5 - HEALTH DATA		
	ACUTE HEALTH EFFECTS	CHRONIC HEALTH EFFECTS
INHALATION	Central nervous system depressant. May cause headaches and irritation to the nose, throat, and lungs.	Chronic exposure to the component benzene may result in adverse effects of the blood including anemia, decreased white blood cell count, decreased platelets, aplastic anemia and leukemia. In addition, chronic inhalation of vapors of the component benzene may cause fatigue, nervousness, irritability, blurred vision and labored breathing. Chronic inhalation of the n-hexane vapors, a component of this material, may result in severe degeneration of the peripheral nervous system. Epidemiological studies have reported anxiety and asthmatic bronchitis among workers chronically exposed to isomers of trimethylbenzene.
INGESTION	May cause irritation and burning of the gastrointestinal tract (mouth, throat, and stomach). May cause nausea, vomiting, diarrhea, and restlessness.	Chronic effects of ingestion and subsequent aspiration of this product into the lungs may include pneumatocele (lung cavity) formation and chronic lung dysfunction.

SKIN CONTACT	May cause irritation, drying, and cracking of the skin. May cause dermatitis.	Prolonged and repeated contact with the skin may cause redness, blistering, dryness, lesions and/or scaly dermatitis.
EYE CONTACT	Irritation of the eye	Symptoms of chronic exposure resemble those of acute exposure

FIRST AID PROCEDURES

INHALATION: Remove from vapor to fresh air. If breathing has stopped give artificial respiration. Maintain airway and blood pressure and administer oxygen if available. Keep affected person warm and at rest. Qualified personnel should perform administration of oxygen. Get medical attention immediately.

INGESTION: Do not induce vomiting or give anything by mouth to an unconscious person. When vomiting occurs, keep persons head lower than heart to prevent pulmonary aspiration. Get medical attention immediately. If less than ½ pint (liter) ingested, immediately give 1-2 glasses of water and call a physician. Ingestion in small quantities is not expected to be a problem.

SKIN CONTACT: Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains (approximately 15-20 minutes). If irritation develops, seek medical aid. Remove fuel soaked clothing and launder before reuse.

EYE CONTACT: Flush eyes immediately with large amounts of water, occasionally lifting upper and lower lids until no evidence of chemical remains (approximately 15-20 minutes). If irritation develops, seek medical aid.

TOXICOLOGICAL DATA	Gasoline and Refinery Streams: Studies conducted by the American Petroleum Institute examined a reference unleaded gasoline for mutagenic, teratogenic and sensitization potential; no evidence of these hazards was found. However, isolated constituents of gasoline may display these or other potential hazards in laboratory tests. There were no significant adverse effects in three-month subchronic inhalation studies in rats or monkeys, or in a two-year skin cancer study in mice. Studies with laboratory concentrations over a prolonged period of time caused kidney damage and kidney cancer in male rats and liver cancer in female mice. There was no evidence of significant adverse systemic or reproductive effects for light catalytic cracked napthas and reformed napthas. Components: Gasoline consists of a complex blend of petroleum/processing derived paraffinic, olefinic, napthenic and aromatic hydrocarbons which include up to 5% benzene (with 1-2% typical in the U.S.), n-hexane, mixed zylenes, toluene, ethylbenzene and trimethyl benzene. Repeated exposures to low levels of benzene have been reported to result in blood abnormalities including anemia and, in rare cases, leukemia in both animals and humans. Prolonged exposure to n-hexane may result in nervous system damage, including numbness of the extremities and, in extreme cases, paralysis. The adverse effects associated with these components have not been observed in studies with gasoline or the refinery streams from which it is formulated. Generally, human exposures to gasoline vapors are considerably less than those used in the animal toxicity studies. As far as scientists know, low level or infrequent exposures to gasoline vapors are unlikely to be associated with cancer of other serious diseases in humans.

SECTION 6 - REACTIVITY DATA

STABILITY:	Stable under normal temperatures and pressures.
HAZARDOUS POLYMERIZATION:	Hazardous polymerization will not occur.
CONDITIONS TO AVOID:	Avoid build-up of static electricity. May be ignited by heat, sparks, or flame. Vapors may travel to a source of ignition and flash back. Vapor explosion hazard indoors, outdoors, or in sewers.
INCOMPATIBLES:	May explode or react violently when exposed to oxidizing materials. Avoid halogens, strong acids and alkalies.
DECOMPOSITION PRODUCTS:	Carbon monoxide, oxides of nitrogen, and hydrocarbons.

SECTION 7 - SPECIAL PROTECTION	
RESPIRATORY PROTECTION:	Use with adequate ventilation. Use approved respiratory protection, for large spills or when conducting work in confined spaces.
VENTILATION:	Use in well ventilated area with local exhaust ventilation. Ventilation required and equipment must be explosion proof. Use away from all ignition sources.
EYE PROTECTION:	If splash with liquid is possible, wear chemical type goggles.
PROTECTIVE GLOVES:	Neoprene, PVC
OTHER PROTECTIVE CLOTHING OR EQUIPMENT:	Employee must wear appropriate impervious clothing and equipment to prevent repeated or prolonged skin contact with this substance.

Sprague

ETHANOL GASOLINE

(Reformulated ~ Conventional)
Content Last Revised 01/19/2004

5 pages

SECTION 8 - SPECIAL PRECAUTIONS

SAFE HANDLING:	◦ NEVER SIPHON GASOLINE BY MOUTH. ◦ GASOLINE SHOULD NOT BE USED AS A SOLVENT OR CLEANING AGENT. ◦ USE NON-SPARKING TOOLS AND EXPLOSION-PROOF EQUIPMENT. ◦ AVOID CONTACT WITH SKIN. AVOID INHALATION OF VAPORS OR MISTS. ◦ USE IN WELL VENTILATED AREA AWAY FROM ALL IGNITION SOURCES. ◦ PORTABLE CONTAINERS APPROVED FOR STORING FUEL MUST BE PLACED ON THE GROUND AND THE NOZZLE MUST STAY IN CONTACT WITH THE CONTAINER WHEN FILLING TO PREVENT BUILD-UP AND DISCHARGE OF STATIC ELECTRICITY.
STORAGE:	◦ DRUMS AND STORAGE CONTAINERS MUST BE GROUNDED AND BONDED AND EQUIPPED WITH SELF-CLOSING VALVES, PRESSURE VACUUM BUNGS AND FLAME ARRESTERS. STORE AWAY FROM ALL IGNITION SOURCES IN A COOL AREA EQUIPPED WITH AN AUTOMATIC SPRINKLING SYSTEM. OUTSIDE OR DETACHED STORAGE PREFERRED.
SPILL AND LEAK PROCEDURES:	DANGER, EXTREMELY FLAMMABLE LIQUID AND VAPOR! Shut off ignition sources (no smoking, shut off flames or flares in hazard area). Isolate hazard area and restrict entry. Run-off may create a fire and explosion hazard in storm drains and sewer systems. If properly trained, proceed with the following measures: 1. For small spills, take up with sand or other absorbent material and place into containers for later disposal; and, 2. For large spills, dike far ahead of spill to prevent entrance into watercourses and/or ground water. Observe local, state, and federal governmental regulations.
WASTE DISPOSAL METHOD	1. Under EPA RCRA (40 CFR 261.21) if this product becomes a waste material intended for disposal, it would be ignitable hazardous waste (waste code number D001). 2. It may also have TCLP benzene concentration greater than 0.5 PPM, and it would be considered a toxic waste (waste code number D018). Refer to latest EPA and State regulations regarding proper disposal.

SECTION 9 - DOT HAZARDOUS MATERIAL INFORMATION

PROPER DOT SHIPPING NAME: GASOLINE; 3; UN 1203, PGII		**LABEL:** FLAMMABLE LIQUID	**REQUIRED PLACARDING:** FLAMMABLE / UN 1203
HAZARD CLASS: CLASS 3 (Flammable liquid)	**PACKING GROUP (P.G.): II**	**N.A/U.N. NUMBER:** UN 1203 (Note, Emergency Response Guide #128)	**RQ: N/A**

SECTION 10 - EPA SARA TITLE III INFORMATION

SECTION 311/312 HAZARD CLASSIFICATION:	**ACUTE:** YES		**CHRONIC:** YES
	FIRE: YES	**PRESSURE:** NO	**REACTIVE:** NO

SECTION 11 - REMARKS

This product contains no "extremely hazardous substances". The product does contain components that may require reporting under SARA (313) Toxic Release. Please refer to section 2 Ingredients and associated component

concentrations.

SECTION 12 - ADDITIONAL REGULATORY DATA

PRECAUTIONARY LABEL TEXT:

CONTAINS GASOLINE DANGER! FOR INDUSTRIAL USE ONLY!

EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. MAY CAUSE EYE, SKIN, NOSE, THROAT AND LUNG IRRITATION, DIZZINESS, NAUSEA, LOSS OF CONSCIOUSNESS. LOW VISCOSITY MATERIAL-IF SWALLOWED MAY BE ASPIRATED AND CAN CAUSE SERIOUS OR FATAL LUNG DAMAGE.

LONG-TERM EXPOSURE TO GASOLINE VAPOR HAS CAUSED KIDNEY AND LIVER CANCER IN LABORATORY ANIMALS.

Keep away from heat, sparks, and flame. Avoid all personal contact. Avoid prolonged breathing of vapor. Keep container closed. Use with adequate ventilation. Misuse of gasoline may cause serious injury or illness. For use as a motor fuel only. Not to be used as a solvent or skin cleaning agent. Never siphon by mouth.

FIRST AID: If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician immediately. In case of contact, immediately wash skin with soap and plenty of water. Remove contaminated clothing. Call a physician if symptoms occur. Wash clothing before reuse. If swallowed, seek immediate medical attention. Do not induce vomiting. Only induce vomiting at the instruction of a physician. Do not induce vomiting or give any thing by mouth to an unconscious person.

ExxonMobil

Material Safety Data Sheets

602649-00 MOBIL DTE 26
MATERIAL SAFETY DATA BULLETIN

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: MOBIL DTE 26
SUPPLIER: EXXONMOBIL OIL CORPORATION
3225 GALLOWS RD.
FAIRFAX, VA 22037

24 - Hour Health and Safety Emergency (call collect): 609-737-4411

24 - Hour Transportation Emergency:
CHEMTREC: 800-424-9300 202-483-7616
LUBES AND FUELS: 281-834-3296

Product and Technical Information:
Lubricants and Specialties: 800-662-4525 800-443-9966
Fuels Products: 800-947-9147
MSDS Fax on Demand: 713-613-3661
MSDS Internet Website: http://www.exxon.com, http://www.mobil.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAMES AND SYNONYMS: PET. HYDROCARBONS AND ADDITIVES

GLOBALLY REPORTABLE MSDS INGREDIENTS:

None.

See Section 8 for exposure limits (if applicable).

3. HAZARDS IDENTIFICATION

Under normal conditions of use, this product is not considered hazardous according to regulatory guidelines (See section 15).

EMERGENCY OVERVIEW: Dark Amber Liquid. Note: Pressurized mists may form a flammable mixture. DOT ERG No. : NA

POTENTIAL HEALTH EFFECTS: Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation.

Potential health effects/toxicological data: See Section II

4. FIRST AID MEASURES

EYE CONTACT: Flush thoroughly with water. If irritation occurs, call a physician.
SKIN CONTACT: Wash contact areas with soap and water. Remove and clean oil soaked clothing daily and wash affected area.
INJECTION INJURY WARNING: If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.
INHALATION: Not expected to be a problem. However, if respiratory irritation, dizziness, nausea, or unconsciousness occurs due to excessive vapor or mist exposure, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or mouth-to-mouth resuscitation.
INGESTION: Not expected to be a problem. Seek medical attention if discomfort occurs. Do not induce vomiting.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Carbon dioxide, foam, dry chemical and water fog.
SPECIAL FIRE FIGHTING PROCEDURES: Water or foam may cause frothing. Use water to keep fire exposed containers cool. Water spray may be used to flush spills away from exposure. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.
SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, fire fighters must use self-contained breathing apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS: Note: Pressurized mists may form a flammable mixture.
COMBUSTION PRODUCTS: Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.
Flash Point C(F): > 204(399) (ASTM D-92).
Flammable Limits (approx.% vol.in air) - LEL: 0.9%, UEL: 7.0%
NFPA HAZARD ID: Health: 0, Flammability: 1, Reactivity: 0

6. ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES: Report spills/releases as required to appropriate authorities. U.S. Coast Guard and EPA regulations require immediate reporting of spills/releases that could reach any waterway including intermittent dry creeks. Report spill/release to Coast Guard National Response Center toll free number (800)424-8802. In case of accident or road spill notify CHEMTREC (800) 424-9300.
PROCEDURES IF MATERIAL IS RELEASED OR SPILLED:
LAND SPILL: Shut off source taking normal safety precautions. Take measures to minimize the effects on ground water. Recover by pumping or contain spilled material with sand or other suitable absorbent and remove mechanically into containers. If necessary,

dispose of absorbed material as described in section 13.
WATER SPILL: Confine the spill immediately with booms. Warn other ships in the vicinity. Notify port and other relevant authorities. Remove from the surface by skimming or with suitable absorbents if permitted by regulatory authorities. Use of suitable dispersants should be considered where recommended in local oil spill procedures.
ENVIRONMENTAL PRECAUTIONS: Prevent material from entering sewers, water sources or low lying areas; advise the relevant authorities if it has, or if it contaminates soil/vegetation.
PERSONAL PRECAUTIONS: See Section 8

7. HANDLING AND STORAGE

HANDLING: High pressure injection under the skin may occur due to the rupture of pressurized lines. Always seek medical attention. No special precautions are necessary beyond normal good hygiene practices. See Section 8 for additional personal protection advice when handling this product.
STORAGE: Keep containers closed when not in use. Do not store in open or unlabelled containers. Store away from strong oxidizing agents and combustible materials. Do not store near heat, sparks, flame or strong oxidants.
SPECIAL PRECAUTIONS: Prevent small spills and leakages to avoid slip hazard.
EMPTY CONTAINER WARNING: Empty containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS:

When mists/aerosols can occur, the following are recommended: 5 mg/m3 (as oil mist)- ACGIH Threshold Limit Value (TLV), 10 mg/m3 (as oil mist) - ACGIH Short Term Exposure Limit (STEL), 5 mg/m3 (as oil mist) - OSHA Permissible Exposure Limit (PEL)

VENTILATION: If mists are generated, use adequate ventilation, local exhaust or enclosures to control below exposure limits.
RESPIRATORY PROTECTION: If mists are generated, and/or when ventilation is not adequate, wear approved respirator.
EYE PROTECTION: If eye contact is likely, safety glasses with side shields or chemical type goggles should be worn.
SKIN PROTECTION: Not normally required. When splashing or liquid contact can occur frequently, wear oil resistant gloves and/or other protective clothing. Good personal hygiene practices should always be followed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Typical physical properties are given below. Consult Product Data Sheet for specific details.

APPEARANCE: Liquid
COLOR: Dark Amber
ODOR: Mild
ODOR THRESHOLD-ppm: NE
pH: NA
BOILING POINT C(F): > 316(600)
MELTING POINT C(F): NA
FLASH POINT C(F): > 204(399) (ASTM D-92)
FLAMMABILITY (solids): NE
AUTO FLAMMABILITY C(F): NA
EXPLOSIVE PROPERTIES: NA
OXIDISING PROPERTIES: NA
VAPOR PRESSURE-mmHg 20 C: < 0.1
VAPOR DENSITY: > 2.0
EVAPORATION RATE: NE
RELATIVE DENSITY, 15/4 C: 0.881
SOLUBILITY IN WATER: Negligible
PARTITION COEFFICIENT: > 3.5
VISCOSITY AT 40 C, cSt: 68.0
VISCOSITY AT 100 C, cSt: 8.5
POUR POINT C(F): < -18(0)
FREEZING POINT C(F): NE
VOLATILE ORGANIC COMPOUND: NE
DMSO EXTRACT, IP-346 (WT.%): <3, for mineral oil only
NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES

FOR FURTHER TECHNICAL INFORMATION, CONTACT YOUR MARKETING REPRESENTATIVE

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10. STABILITY AND REACTIVITY

STABILITY (THERMAL, LIGHT, ETC.): Stable.
CONDITIONS TO AVOID: Extreme heat and high energy sources of ignition.
INCOMPATIBILITY (MATERIALS TO AVOID): Strong oxidizers.
HAZARDOUS DECOMPOSITION PRODUCTS: Product does not decompose at ambient temperatures.
HAZARDOUS POLYMERIZATION: Will not occur.

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11. TOXICOLOGICAL DATA

---ACUTE TOXICOLOGY---
ORAL TOXICITY (RATS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
DERMAL TOXICITY (RABBITS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
INHALATION TOXICITY (RATS): Practically non-toxic (LC50: greater than 5 mg/l). ---Based on testing of similar products and/or the components.
EYE IRRITATION (RABBITS): Practically non-irritating. (Draize score: greater than 6 but 15 or less). ---Based on testing of similar

products and/or the components.
SKIN IRRITATION (RABBITS): Practically non-irritating (Primary Irritation Index: greater than 0.5 but less than 3) -- Based on testing of similar products and/or the components.
OTHER ACUTE TOXICITY DATA: Although an acute inhalation study was not performed with this product, a variety of mineral and synthetic oils, such as those in this product, have been tested. These samples had virtually no effect other than a nonspecific inflammatory response in the lung to the aerosolized mineral oil. The presence of additives in other tested formulations (in approximately the same amounts as in the present formulation) did not alter the observed effects.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---
No significant adverse effects were found in studies using repeated dermal applications of similar formulations to the skin of laboratory animals for 13 weeks at doses significantly higher than those expected during normal industrial exposure. The animals were evaluated extensively for effects of exposure (hematology, serum chemistry, urinalysis, organ weights, microscopic examination of tissues etc.).

---REPRODUCTIVE TOXICOLOGY (SUMMARY)---
No teratogenic effects would be expected from dermal exposure, based on laboratory developmental toxicity studies of major components in this formulation and/or materials of similar composition.

---CHRONIC TOXICOLOGY (SUMMARY)---
Repeated and/or prolonged exposure may cause irritation to the skin, eyes or respiratory tract. Overexposure to oil mist may result in oil droplet deposition and/or granuloma formation. For mineral base oils: Base oils in this product are severely solvent refined and/or severely hydrotreated. Chronic mouse skin painting studies of severely treated oils showed no evidence of carcinogenic effects. These results are confirmed on a continuing basis using various screening methods such as Modified Ames Test, IP-346, and/or other analytical methods. For synthetic base oils: The base oils in this product have been tested in the Ames assay and other tests of mutagenicity with negative results. These base oils are not expected to be carcinogenic with chronic dermal exposures.

---SENSITIZATION (SUMMARY)---
Not expected to be sensitizing based on tests of this product, components, or similar products.

---

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE AND EFFECTS:

In the absence of specific environmental data for this product, this assessment is based on information for representative products.

ECOTOXICITY: Available ectoxicity data (LL50 >1000 mg/L) indicates that adverse effects to aquatic organisms are not expected from this product.

MOBILITY: When released into the environment, adsorption to sediment and soil will be the predominant behavior.

PERSISTENCE AND DEGRADABILITY: This product is expected to be inherently biodegradable

BIOACCUMULATIVE POTENTIAL: Bioaccumulation is unlikely due to the very low water solubility of this product, therefore bioavailability to aquatic organisms is minimal.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Product is suitable for burning in an enclosed, controlled burner for fuel value. Such burning may be limited pursuant to the Resource Conservation and Recovery Act. In addition, the product is suitable for processing by an approved recycling facility or can be disposed of at an appropriate government waste disposal facility. Use of these methods is subject to user compliance with applicable laws and regulations and consideration of product characteristics at time of disposal.

RCRA INFORMATION: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity, or reactivity. The unused product is not formulated with substances covered by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

14. TRANSPORT INFORMATION

USA DOT: NOT REGULATED BY USA DOT.

RID/ADR: NOT REGULATED BY RID/ADR.

IMO: NOT REGULATED BY IMO.

IATA: NOT REGULATED BY IATA.

STATIC ACCUMULATOR (50 picosiemens or less): YES

15. REGULATORY INFORMATION

US OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purposes, this product is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

EU Labeling: Product is not dangerous as defined by the European Union Dangerous Substances/Preparations Directives. EU labeling not required.

Governmental Inventory Status: All components comply with TSCA, DINECS, EINECS, AICS, NZIOC, and DSL

U.S. Superfund Amendments and Reauthorization Act (SARA) Title III:
This product contains no "EXTREMELY HAZARDOUS SUBSTANCES".

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

This product contains no chemicals subject to the supplier notification requirements of SARA (313) toxic release program.

The following product ingredients are cited on the lists below:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS *
ZINC (ELEMENTAL ANALYSIS) (0.08%)	7440-66-6	22
ZINC ALKYL DITHIOPHOSPHATE (0.67%)	68649-42-3	22

--- REGULATORY LISTS SEARCHED ---
1=ACGIH ALL 6=IARC 1 11=TSCA 4 16=CA P65 CARC 21=LA RTK
2=ACGIH A1 7=IARC 2A 12=TSCA 5a2 17=CA P65 REPRO 22=MI 293
3=ACGIH A2 8=IARC 2B 13=TSCA 5e 18=CA RTK 23=MN RTK
4=NTP CARC 9=OSHA CARC 14=TSCA 6 19=FL RTK 24=NJ RTK
5=NTP SUS 10=OSHA Z 15=TSCA 12b 20=IL RTK 25=PA RTK
26=RI RTK

* EPA recently added new chemical substances to its TSCA Section 4 test rules. Pleas contact the supplier to confirm whether the ingredients in this product currently ap a TSCA 4 or TSCA 12b list.
Code key:CARC=Carcinogen; SUS=Suspected Carcinogen; REPRO=Reproductive

16. OTHER INFORMATION

USE: HYDRAULIC OIL

NOTE: PRODUCTS OF EXXON MOBIL CORPORATION AND ITS AFFILIATED COMPANIES ARE NOT FORMULATED TO CONTAIN PCBS.

Health studies have shown that many hydrocarbons pose potential human health risks which may vary from person to person. Information provided on this MSDS reflects intended use. This product should not be used for other applications. In any case, the following advice should be considered:

INDUSTRIAL LABEL

Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation. Always observe good hygiene measures. First Aid: Wash skin with soap and water. Flush eyes with water. If overcome by fumes or vapor, remove to fresh air. If ingested do not induce vomiting. If symptoms persist seek medical assistance. Read and understand the MSDS before using this product.

****
For Internal Use Only: MHC: 1* 1* 1* 1* 1*, MPPEC: A, TRN: 602649-00,
ELIS: 400251, CMCS97: 970101, REQ: US - MARKETING, SAFE USE: L
EHS Approval Date: 03JAN2003
****

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Prepared by: ExxonMobil Oil Corporation
Environmental Health and Safety Department, Clinton, USA

Emergency Numbers

Material Safety Data Sheet

SECTION I - Material Identity
SECTION II - Manufacturer's Information
SECTION III - Physical/Chemical Characteristics
SECTION IV - Fire and Explosion Hazard Data
SECTION V - Reactivity Data
SECTION VI - Health Hazard Data
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SECTION VIII - Control Measures
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SECTION XII - Ingredients/Identity Information

SECTION I - Material Identity

Item Name	
Part Number/Trade Name	30876 HEAVY DUTY CLEAR SOLVENT CEMENT
National Stock Number	8040P30876
CAGE Code	53472
Part Number Indicator	A
MSDS Number	192880
HAZ Code	B

SECTION II - Manufacturer's Information

Manufacturer Name	OATEY
P.O. Box	35906
Street	4700 WEST 160TH STREET
City	CLEVELAND
State	OH
Country	US
Zip Code	44135
Emergency Phone	800 424-9300 CHEMTREC
Information Phone	216 267-7100

MSDS Preparer's Information

Date MSDS Prepared/Revised	30DEC02
Active Indicator	Y

Alternate Vendors

SECTION III - Physical/Chemical Characteristics

Appearance/Odor	CLEAR LIQUID, ETHER LIKE ODOR
Boiling Point	151F/66C
Melting Point	NA
Vapor Pressure	145
Vapor Density	2.5
Specific Gravity	0.96
Evaporation Rate	5.5-8.0 (BUAC)
Solubility in Water	NEGLIGIBLE
Percent Volatiles by Volume	80-85%
Chemical pH	NA
Container Type	R
Container Pressure Code	1
Temperature Code	4
Product State Code	L

SECTION IV - Fire and Explosion Hazard Data

Flash Point	5
Flash Point Method	PMCC
Lower Explosion Limit	1.8
Upper Explosion Limit	11.8
Extinguishing Media	[SMALL] USE DRY CHEMICAL, CO2, WATER OR FOAM EXTINGUISHER. [LARGE] EVACUATE AREA AND CLAL FIRE DEPARTMENT IMMEDIATELY
Special Fire Fighting Procedures	EVACUATE AREA AND CALL FIRE DEPARTMENT IMMEDIATELY
Unusual Fire/Explosion Hazards	NR

SECTION V - Reactivity Data

Stability	YES
Stability Conditions to Avoid	HEAT, SPARKS, OPEN FLAME
Materials to Avoid	ACIDS, OXIDIZING MATERIALS, ALKALIS, CHLORINATED INORGANICS, COPPER, COPPER ALLOYS
Hazardous Decomposition Products	CARBON MONOXIDE, CARBON DIOXIDE, HYDROGEN CHLORIDE, SMOKE
Hazardous Polymerization	NO
Polymerization Conditions to Avoid	WILL NOT OCCUR
LD50 - LD50 Mixture	NR

SECTION VI - Health Hazard Data

Route of Entry: Skin	YES
Route of Entry: Ingestion	YES
Route of Entry: Inhalation	YES

Health Hazards - Acute and Chronic	[EYES] IRRITATION [SKIN] IRRITATION, DERMATITIS [INHAL] IRRITATION, HEADACHE, DIZZINESS, NAUSEA, NUMBNESS OF THE EXTREMITIES [INGEST] MAY BE ASPIRATED INTO THE LUNGS OR CAUSE SYSTEMIC EFFECTS
Carcinogenity: NTP	NR
Carcinogenity: IARC	NR
Carcinogenity: OSHA	NR
Explanation of Carcinogenity	NR
Symptoms of Overexposure	[EYES] IRRITATION [SKIN] IRRITATION, DERMATITIS [INHAL] IRRITATION, HEADACHE, DIZZINESS, NAUSEA, NUMBNESS OF THE EXTREMITIES [INGEST] MAY BE ASPIRATED INTO THE LUNGS OR CAUSE SYSTEMIC EFFECTS
Medical Cond. Aggrevated by Exposure	NR
Emergency/First Aid Procedures	[EYES] FLUSH W/ WATER FOR 15 MINUTES [SKIN] WASH W/ SOAP AND WATER, REMOVE CONTAMINATED CLOTHING, LAUNDER BEFORE REUSE [INHAL] REMOVE TO FRESH AIR [INGEST] IF CONSCIOUS, WASH OUT MOUTH WITH COPIOUS AMOUNTS OF WATER. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY

SECTION VII - Precautions for Safe Handling and Use

Steps if Material Released/Spilled	ABSORB WITH ABSORBENT MATERIALS
Neutralizing Agent	NR
Waste Disposal Method	DISPOSE IAW FEDERAL, STATE, LOCAL REGS
Handling and Storage Precautions	STORE IN A COOL DRY PLACE
Other Precautions	NR

SECTION VIII - Control Measures

Respiratory Protection	USE NIOSH APPROVED CANNISTER RESPIRATOR IN ABSENCE OF ADEQUATE VENTILATION
Ventilation	OPEN DOORS & WINDOWS. EXHAUST VENTILATION CAPABLE OF MAINTAINING EMISSIONS AT THE POINT OF USE BELOW PEL
Protective Gloves	RUBBER GLOVES
Eye Protection	SAFETY GLASSES WITH SIDE SHIELDS
Other Protective Equipment	EYE WASH STATION AND SAFETY SHOWER
Work Hygenic Practices	WASH HANDS AFTER USE
Supplemental Health/Safety Data	NR

SECTION IX - Label Data

Protect Eye	NO
Protect Skin	NO
Protect Respiratory	NO

Chronic Indicator	UNKNOWN
Contact Code	UNKNOWN
Fire Code	UNKNOWN
Health Code	UNKNOWN
React Code	UNKNOWN

SECTION X - Transportation Data

SECTION XI - Site Specific/Reporting Information

Volatile Organic Compounds (P/G)	5.424
Volatile Organic Compounds (G/L)	650.0059

SECTION XII - Ingredients/Identity Information

Ingredient #	01
Ingredient Name	2-PROPANONE
CAS Number	67641
Percent	5
Ingredient #	02
Ingredient Name	CYCLOHEXANONE
CAS Number	108941
Percent	18
Ingredient #	03
Ingredient Name	FURAN, TETRAHYDRO-
CAS Number	109999
Percent	50
Ingredient #	04
Ingredient Name	2-BUTANONE
CAS Number	78933
Percent	25
Ingredient #	05
Ingredient Name	PVC RESIN (NON HAZARDOUS)
CAS Number	9002862
Percent	20
Ingredient #	06
Ingredient Name	AMORPHOUS FUMED SILICA (NON HAZARDOUS)
CAS Number	112945525
Percent	4

Material Safety Data Sheet

SECTION I - Material Identity

Item Name	
Part Number/Trade Name	LA-CO LOC PURPLE PRIMER FOR PVC/CPVC ABS
National Stock Number	8040010042705
CAGE Code	08854
Part Number Indicator	A
MSDS Number	187898
HAZ Code	B

SECTION II - Manufacturer's Information

Manufacturer Name	LA-CO INDUSTRIES, INC./MARKAL COMPANY
Street	1201 PRATT BLVD
City	ELK GROVE
State	IL
Country	US
Zip Code	60007
Emergency Phone	800-424-9300 (CHEMTREC)
Information Phone	847-956-7600

MSDS Preparer's Information

Date MSDS Prepared/Revised	25SEP98
Active Indicator	N

Alternate Vendors

SECTION III - Physical/Chemical Characteristics

Hazard Storage Compatibility Code	NR
Net Propellant Weight (Ammo)	NR
Appearance/Odor	PURPLE LIQUID, STRONG SOLVENT ODOR
Boiling Point	180F
Melting Point	NA
Vapor Pressure	143
Vapor Density	2.5
Specific Gravity	.85
Decomposition Temperature	NR
Evaporation Rate	3.5
Solubility in Water	65%
Percent Volatiles by Volume	100
Chemical pH	NR
Corrosion Rate	NR
Container Type	R
Container Pressure Code	1
Temperature Code	4
Product State Code	L

SECTION IV - Fire and Explosion Hazard Data

Flash Point	6
Flash Point Method	TCC
Lower Explosion Limit	2
Upper Explosion Limit	12
Extinguishing Media	ALCHOL RESISTANT FOAM, CO2, DRY CHEMICAL
Special Fire Fighting Procedures	WEAR SCBA W/FULL FACEPIECE OPERARTED IN A PRESSURE-DEMAND OR OTHER POSSITIVE PRESSURE MODE
Unusual Fire/Explosion Hazards	VAPORS IS HEAVIER THAN AIR, MAY TRAVEL LONG DISTANCES ALONG GROUND OR BE MOVED BY VENTILATION AND IGNITED

SECTION V - Reactivity Data

Stability	YES
Stability Conditions to Avoid	HEAT, SPARKS, AND OPEN FLAMES
Materials to Avoid	STRONG OXIDIZERS
Hazardous Decomposition Products	CARBON MONOXIDE, HYDROGEN CHLORIDE
Hazardous Polymerization	MAY
Polymerization Conditions to Avoid	CAN OCCUR IN PRESENCE OF CATIONIC INTIATORS SUCH AS SELECTED LEWIS ACIDS OR STRONG ACIDS
LD50 - LD50 Mixture	N/R

SECTION VI - Health Hazard Data

Route of Entry: Skin	YES
Route of Entry: Ingestion	YES
Route of Entry: Inhalation	YES
Health Hazards - Acute and Chronic	POTENTIAL LOCAL & SYTEMIC EFFECTS DUE TO SINGLE OR SHORT TERM OVEREXPOSURE TO THE EYES AND SKIN OR THROUGH INGESTION OR INHALATION
Carcinogenity: NTP	NO
Carcinogenity: IARC	NO
Carcinogenity: OSHA	NO
Explanation of Carcinogenity	NONE
Symptoms of Overexposure	EYE:CAUSES IRRITATION, REDNESS, TEARING & BLURRED VISION SKIN: SLIGHT TO MODERATE IRRITATION AND DEFATTING INGESTION: GASTRO-INTESTIONAL IRRITATION, NAUSEA, DIZZINESS, VOMITING & DIARRHEA INHALATION: NASAL & RESPIRATORY IRRITATION AND HEADACHE
Medical Cond. Aggrevated by Exposure	NR
Emergency/First Aid Procedures	EYE: IMMED. FLUSH W/WATER FOR AT LEAST 15 MIN. CALL A PHYSICIAN SKIN: WASH SKIN W/WATER & SOAP. REMOVE AND LAUNDER CONTAMINATED CLOTHING INGESTION: GIVE 2 GLASSES OF WATER. CALL A PHYSICIAN. KEEP PERSON WARM, QUIET INHALATION: REMOVE TO FRESH AIR. GET MEDICAL ATTENTION

SECTION VII - Precautions for Safe Handling and Use

Steps if Material Released/Spilled	REMOVE ALL IGNITION SOURCES. ABVSORBE W/INERT MATERIAL AND DISPOS OF W/ SOLID WASTE. FOR LARGE SPILLS: DIKE AREA COLLECT AND DESTROY BY INCINERATION . OTHERWISE DILUTE W/WATER AND ABSORBE W/ INERT MATERIAL
Neutralizing Agent	NR
Waste Disposal Method	DISPOSE OF IN ACCORDANCE TO ALL STATE AND FEDERAL LAWS. MAY BE INCINERATED
Handling and Storage Precautions	KEEP AWAY FROM HEAT, SPARKS & FLAME. AVOID BREATHING VAPOR. AVOID CONTACT W/EYES, SKIN & CLOTHING. KEEP CONTAINER CLOSED. USE ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING
Other Precautions	CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED SINCE THEY MAY CONTAIN PRODUCT RESIDUES

SECTION VIII - Control Measures

Respiratory Protection	USE NIOSH APPROVED RESPIRATOR IF TLV LEVELS ARE EXCEEDED
Ventilation	LOCAL OR GENERAL
Protective Gloves	RUBBER OR NEOPRENE
Eye Protection	SAFETY GOGGLES
Other Protective Equipment	EYE BATH, SAFETY SHOWER, FACE SHIELD, RUBBER SAFETY BOOTS
Work Hygenic Practices	WASH WITH SOAP AND WATER AFTER HANDELING
Supplemental Health/Safety Data	NR

SECTION IX - Label Data

Protect Eye	YES
Protect Skin	YES
Protect Respiratory	YES
Chronic Indicator	NO
Contact Code	SLIGHT
Fire Code	UNKNOWN
Health Code	UNKNOWN
React Code	UNKNOWN
Specific Hazard and Precaution	NO TARGET ORGANS LISTED FOR CHRONIC EXPOSURES

SECTION X - Transportation Data

Container Quantity	1
Unit of Measure	PT

SECTION XI - Site Specific/Reporting Information

Volatile Organic Compounds (P/G)	5.424
Volatile Organic Compounds (G/L)	650

SECTION XII - Ingredients/Identity Information

Ingredient #	01
Ingredient Name	TETRAHYDROFURAN
CAS Number	109999
Proprietary	NO
Percent	25
OSHA PEL	200 PPM
ACGIH TLV	200 PPM
Ingredient #	02
Ingredient Name	METHYL ETHYL KETONE
CAS Number	78933
Proprietary	NO
Percent	60
OSHA PEL	200 PPM
ACGIH TLV	200 PPM
Ingredient #	03
Ingredient Name	CYCLOHEXANONE
CAS Number	108941
Proprietary	NO
Percent	15
OSHA PEL	250 PPM
ACGIH TLV	250 PPM

WD-40

MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Manufacturer:	WD-40 Company	Telephone:	
		Emergency only:	1-(800) 424-9300 (CHEMTREC)
Address:	1061 Cudahy Place (92110)	Information:	(619) 275-1400
	P.O. Box 80607	Chemical Name:	Organic Mixture
	San Diego, California	Trade Name:	WD-40 Aerosol
	92138-0607		

II. HAZARDOUS INGREDIENTS

Chemical Name	CAS Number	%	Exposure Limit ACGIH/OSHA
Aliphatic Petroleum Distillates	8052-41-3	45-50	100 ppm PEL
Petroleum Base Oil	64742-65-0	15-25	5 mg/M^3 TWA (mist)
LVP Hydrocarbon Fluid	64742-47-8	12-18	1200 mg/M^3 TWA
Carbon Dioxide	124-38-9	2-3	5000 ppm PEL
Non-hazardous Ingredients		< 10	

III. PHYSICAL DATA

Boiling Point:	323°F (minimum)	Evaporation Rate:	Not determined
Vapor Density (air=1):	Greater than 1	Vapor Pressure:	110 ±5 PSI @ 70°F
Solubility in Water:	insoluble	Appearance:	Light amber
Specific Gravity (H_2O=1):	0.817 @ 72°F	Odor:	Characteristic odor
Percent Volatile (volume):	74%	VOC:	412 grams/liter (49.5%)

IV. FIRE AND EXPLOSION

Flash Point:	131°F Tag Closed Cup
Flammable Limits:	(Solvent Portion) [Lel] 1.0% [Uel] 6.0%
Extinguishing Media:	CO_2, Dry Chemical, Foam.
Special Fire Fighting Procedures:	Contents Under Pressure
Unusual Fire and Explosion Hazards:	FLAMMABLE - U.F.C. level 3 AEROSOL

V. HEALTH HAZARD / ROUTE(S) OF ENTRY

Threshold Limit Value — Aliphatic Petroleum Distillates (Stoddard Solvent) lowest TLV (ACGIH 100 ppm.)

Symptoms of Overexposure

Inhalation (Breathing): May cause anesthesia, headache, dizziness, nausea and upper respiratory irritation.

Skin contact: May cause drying of skin and/or irritation.

Eye contact: May cause irritation, tearing and redness.

Ingestion (Swallowed): May caused irritation, nausea, vomiting and diarrhea.

First Aid Emergency Procedures

Ingestion (Swallowed): Do not induce vomiting, seek medical attention.

Eye Contact: Immediately flush eyes with large amounts of water for 15 minutes.

Skin Contact: Wash with soap and water.

Inhalation (Breathing): Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give oxygen.

Pre-existing medical conditions such as eye, skin and respiratory disorders may be aggravated by exposure.

DANGER!

Aspiration Hazard: If swallowed, can enter lungs and may cause chemical pneumonitis. Do not induce vomiting. Call Physician immediately.

Suspected Cancer Agent
Yes___ No_X_

The components in this mixture have been found to be noncarcinogenic by NTP, IARC and OSHA

VI. REACTIVITY DATA

Stability:	Stable X	Unstable ____
Conditions to avoid:	NA	
Incompatibility:	Strong oxidizing agents	
Hazardous decomposition products:	Thermal decomposition may yield carbon monoxide and/or carbon dioxide.	
Hazardous polymerization:	May occur ____	Will not occur X

VII. SPILL OR LEAK PROCEDURES

Spill Response Procedures

Spill unlikely from aerosol cans. Leaking cans should be placed in plastic bag or open pail until pressure has dissipated.

Waste Disposal Method

Empty aerosol cans should not be punctured or incinerated; bury in land fill. Liquid should be incinerated or buried in land fill. Dispose of in accordance with local, state and federal regulations.

VIII. SPECIAL HANDLING INFORMATION

Ventilation:	Sufficient to keep solvent vapor less than TLV.
Respiratory Protection:	Advised when concentrations exceed TLV.
Protective Gloves:	Advised to prevent possible skin irritation.
Eye Protection:	Approved eye protections to safeguard against potential eye contact, irritation or injury.
Other Protective Equipment:	None required.

IX. SPECIAL PRECAUTIONS

Keep from sources of ignition. Avoid excessive inhalation of spray particles, do not take internally. Do not puncture, incinerate or store container above 120°F. Exposure to heat may cause bursting. Keep can away from electrical current or battery terminals. Electrical arcing can cause burn-through (puncture) which may result in flash fire, causing serious injury. Keep from children.

X. TRANSPORTATION DATA (49 CFR 172.101)

Domestic Surface

Description:	Consumer Commodity
Hazard Class:	ORM-D
ID No:	None
Label Required:	Consumer commodity (ORM-D)

XI. REGULATORY INFORMATION

All ingredients for this product are listed on the TSCA inventory.

SARA Title III chemicals:	None
California Prop 65 chemicals:	None
CERCLA reportable quantity:	None
RCRA hazardous waste no:	D001 (Ignitable)

SIGNATURE: Peter Fougner TITLE: Director of Global Quality Assurance

REVISION DATE: December, 2004 SUPERSEDES: November, 2003

NA: Not applicable NDA: No data available < = Less than > = More than

U. S. SILICA COMPANY

MSDS - MATERIAL SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Names/Trade Names:

Silica Sand sold under various names: ASTM TESTING SANDS ◦ GLASS SAND ◦ FLINT SILICA ◦ DM-SERIES ◦ F-SERIES ◦ FOUNDRY SANDS ◦ FJ-SERIES ◦ FP-SERIES ◦ H-SERIES ◦ L-SERIES ◦ N-SERIES ◦ NJ-SERIES ◦ OK-SERIES ◦ P-SERIES ◦ T-SERIES ◦ HYDRAULIC FRACING SANDS ◦ MIN-U-SIL® Ground Silica◦ MYSTIC WHITE® ◦ #1 DRY ◦ #1 SPECIAL ◦ PENN SAND® ◦ Q-ROK® ◦ SIL-CO-SIL® Ground Silica ◦ SUPERSIL® ◦ MASON SAND ◦ GS-SERIES ◦ PER-SPEC

Synonyms/Common Names: Sand, Silica Sand, Quartz, Crystalline Silica, Flint, Ground Silica.

Manufacturer's Name:
U. S. Silica Company
P. O. Box 187
Berkeley Springs, WV 25411

Emergency Telephone Number: 304-258-2500 (8:30 am to 5:00 pm eastern)
304-258-8295 (fax)

Date Prepared: June 30, 2006 (revising February 10, 2005)

SECTION 2 - HAZARD IDENTIFICATION

EMERGENCY OVERVIEW:

The U. S. Silica Company material is a white or tan sand, or ground sand. It is not flammable, combustible or explosive. It does not cause burns or severe skin or eye irritation. A single exposure will not result in serious adverse health effects. Crystalline silica (quartz) is not known to be an environmental hazard.

Crystalline silica (quartz) is incompatible with hydrofluoric acid, fluorine, chlorine trifluoride or oxygen difluoride.

OSHA REGULATORY STATUS

This material is considered hazardous under the OSHA Hazard Communications Standard (29 CFR 1910.1200).

POTENTIAL HEALTH EFFECTS:

Inhalation:

a. Silicosis — Respirable crystalline silica (quartz) can cause silicosis, a fibrosis (scarring) of the lungs. Silicosis may be progressive; it may lead to disability and death.

b. Lung Cancer — Crystalline silica (quartz) inhaled from occupational sources is classified as carcinogenic to humans.

c. Tuberculosis — Silicosis increases the risk of tuberculosis.

d. Autoimmune and Chronic Kidney Diseases — Some studies show excess numbers of cases of scleroderma, connective tissue disorders, lupus, rheumatoid arthritis, chronic kidney diseases and end-stage kidney disease in workers exposed to respirable crystalline silica.

e. Non-Malignant Respiratory Diseases (other than silicosis) — Some studies show an increased incidence in chronic bronchitis and emphysema in workers exposed to respirable crystalline silica.

Eye Contact: Crystalline silica (quartz) may cause abrasion of the cornea.

Skin Contact: Not applicable. **Ingestion:** Not applicable.

Chronic Effects: The adverse health effects -- silicosis, lung cancer, autoimmune and chronic kidney diseases, tuberculosis, and non-malignant respiratory diseases-- are chronic effects.

Signs and Symptoms of Exposure: Generally, there are no signs or symptoms of exposure to crystalline silica (quartz).

Medical Conditions Generally Aggravated by Exposure: The condition of individuals with lung disease (e.g., bronchitis, emphysema, chronic obstructive pulmonary disease) can be aggravated by exposure.

See Section 11, Toxicological Information, for additional detail on potential adverse health effects.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

	Chemical Formula	Typical %, By Weight	CAS #
Crystalline Silica (quartz)	SiO_2	99.0 - 99.9	14808-60-7
Aluminum Oxide	Al_2O_3	< .8	1344-28-1
Iron Oxide	Fe_2O_3	< .1	1309-37-1
Titanium Oxide	TiO_2	< .1	13463-67-7

SECTION 4 - FIRST AID MEASURES

Inhalation: No specific first-aid is necessary since the adverse health effects associated with exposure to crystalline silica (quartz) result from chronic exposures. If there is a gross inhalation of crystalline silica (quartz), remove the person immediately to fresh air, give artificial respiration as needed, seek medical attention as needed.

Eye Contact: Wash immediately with water. If irritation persists, seek medical attention.

Skin Contact: Not applicable.

Ingestion: Not applicable.

SECTION 5 - FIRE FIGHTING MEASURES

Crystalline silica (quartz) is not flammable, combustible or explosive.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spills: Use dustless methods (vacuum) and place into closable container for disposal, or flush with water. Do not dry sweep. Wear protective equipment specified below.

Waste Disposal Method: See Section 13.

SECTION 7 - HANDLING AND STORAGE

Precautions During Handling and Use: Do not breathe dust. Use adequate ventilation and dust collection. Keep airborne dust concentrations below permissible exposure limit ("PEL"). Do not rely on your sight to determine if dust is in the air. Respirable crystalline silica dust may be in the air without a visible dust cloud.

If crystalline silica dust cannot be kept below permissible limits, wear a respirator approved for silica dust when using, handling, storing or disposing of this product or bag. See Section 8 for further information on respirators. Practice good housekeeping. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain, clean, and fit test respirators in accordance with OSHA regulations. Maintain and test ventilation and dust collection equipment. Wash or vacuum clothing that has become dusty.

The OSHA Hazard Communication Standard, 29 CFR Sections 1910.1200, 1915.1200, 1917.28, 1918.90, 1926.59 and 1928.21, and state and local worker or community "right-to-know" laws and regulations should be strictly followed.

Do not use U. S. Silica Company materials for sandblasting.

Precautions During Storage: Avoid breakage of bagged material or spills of bulk material. Use dustless methods (vacuum) and place into closable container for disposal, or flush with water. Do not dry sweep. See control measures in Section 8.

The OSHA Hazard Communication Standard, 29 CFR Sections 1910.1200, 1915.1200, 1917.28, 1918.90, 1926.59 and 1928.21, and state and local worker or community "right-to-know" laws and regulations should be strictly followed. WARN YOUR EMPLOYEES (AND YOUR CUSTOMERS IN CASE OF RESALE) BY POSTING AND OTHER MEANS OF THE HAZARDS AND THE REQUIRED OSHA PRECAUTIONS. PROVIDE TRAINING FOR YOUR EMPLOYEES ABOUT THE OSHA PRECAUTIONS.

For additional precautions, see American Society for Testing and Materials (ASTM) standard practice E 1132-99a, "Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica."

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Local Exhaust Ventilation: Use sufficient local exhaust ventilation to reduce the level of respirable crystalline silica to below the OSHA PEL. See ACGIH "Industrial Ventilation, A Manual of Recommended Practice" (latest edition).

Respiratory Protection:

If it is not possible to reduce airborne exposure levels to below the OSHA PEL with ventilation, use the table below to assist you in selecting respirators that will reduce personal exposures to below the OSHA PEL. This table is part of the NIOSH Respirator Selection Logic, 2004, Chapter III, Table 1, "Particulate Respirators". The full document can be found at www.cdc.gov/niosh/npptl/topics/respirators; the user of this MSDS is directed to that site for information concerning respirator selection and use.

The assigned protection factor (APF) is the minimum anticipated level of protection provided by each type of respirator worn in accordance with an adequate respiratory protection program. For example, an APF of 10 means that the respirator should reduce the airborne concentration of a particulate by a factor of 10, so that if the workplace concentration of a particulate was 150 ug/m^3, then a respirator with an APF of 10 should reduce the concentration of particulate to 15 ug/m^3.

Assigned protection factor [1]	Type of Respirator (Use only NIOSH-certified respirators)
10	Any air-purifying elastomeric half-mask respirator equipped with appropriate type of particulate filter. [2] Appropriate filtering facepiece respirator. [2,3] Any air-purifying full facepiece respirator equipped with appropriate type of particulate filter. [2] Any negative pressure (demand) supplied-air respirator equipped with a half-mask.
25	Any powered air-purifying respirator equipped with a hood or helmet and a high efficiency (HEPA) filter. Any continuous flow supplied-air respirator equipped with a hood or helmet.
50	Any air-purifying full facepiece respirator equipped with N-100, R-100, or P-100 filter(s). Any powered air-purifying respirator equipped with a tight-fitting facepiece (half or full facepiece) and a high-efficiency filter. Any negative pressure (demand) supplied-air respirator equipped with a full facepiece. Any continuous flow supplied-air respirator equipped with a tight-fitting facepiece (half or full facepiece). Any negative pressure (demand) self-contained respirator equipped with a full facepiece.
1,000	Any pressure-demand supplied-air respirator equipped with a half-mask.

1. The protection offered by a given respirator is contingent upon (1) the respirator user adhering to complete program requirements (such as the ones required by OSHA in 29CFR1910.134), (2) the use of NIOSH-certified respirators in their approved configuration, and (3) individual fit testing to rule out those respirators that cannot achieve a good fit on individual workers.
2. Appropriate means that the filter medium will provide protection against the particulate in question.
3. An APF of 10 can only be achieved if the respirator is qualitatively or quantitatively fit tested on individual workers.

Exposure Guidelines:

Component	CAS No.	Percentage (by wt.)	OSHA PEL		ACGIH TLV		NIOSH REL		Unit
			TWA	STEL	TWA	STEL	TWA	STEL	
Crystalline Silica (quartz)	14808-60-7	99.0-99.9	$\frac{10}{\%\ SiO_2 + 2}$	None	.025	None	.05	None	mg/m^3

If crystalline silica (quartz) is heated to more than 870°C, it can change to a form of crystalline silica known as trydimite; if crystalline silica (quartz) is heated to more than 1470°C, it can change to a form of crystalline silica known as cristobalite. The OSHA PEL for crystalline silica as trydimite or cristobalite is one-half of the OSHA PEL for crystalline silica (quartz).

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	White or tan sand; granular, crushed, or ground.		
Boiling Point:	4046°F/2230°C	**Odor:**	None
Vapor Pressure (mm Hg.):	None	**Specific Gravity (Water = 1):**	2.65
Vapor Density (Air = 1):	None	**Melting Point:**	3110°F/1710°C
Solubility in Water:	Insoluble in water	**Evaporation Rate (Butyl Acetate = 1):**	None

SECTION 10 - STABILITY AND REACTIVITY

Stability: Crystalline silica (quartz) is stable.

Incompatibility (Materials to Avoid): Contact with powerful oxidizing agents, such as fluorine, chlorine trifluoride and oxygen difluoride, may cause fires.

Hazardous Decomposition or Byproducts: Silica will dissolve in hydrofluoric acid and produce a corrosive gas - silicon tetrafluoride.

Hazardous Polymerization: Will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

The method of exposure to crystalline silica that can lead to the adverse health effects described below is inhalation.

A. SILICOSIS

The major concern is silicosis, caused by the inhalation and retention of respirable crystalline silica dust. Silicosis can exist in several forms, chronic (or ordinary), accelerated, or acute.

Chronic or Ordinary Silicosis (often referred to as Simple Silicosis) is the most common form of silicosis, and can occur after many years of exposure to relatively low levels of airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis.

Simple silicosis is characterized by lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter, primarily in the upper lung zones. Often, simple silicosis is not associated with symptoms, detectable changes in lung function or disability.

Simple silicosis may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF). Complicated silicosis or PMF is characterized by lung lesions (shown as radiographic opacities) greater than 1 centimeter in diameter. Although there may be no symptoms associated with complicated silicosis or PMF, the symptoms, if present, are shortness of breath, wheezing, cough and sputum production. Complicated silicosis or PMF may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease (cor pumonale).

Accelerated Silicosis can occur with exposure to high concentrations of respirable crystalline silica over a relatively short period; the lung lesions can appear within five (5) years of initial exposure. Progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that lung lesions appear earlier and progression is more rapid.

Acute Silicosis can occur with exposures to very high concentrations of respirable crystalline silica over a very short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis is fatal.

B. CANCER

IARC - The International Agency for Research on Cancer ("IARC") concluded that there was "*sufficient evidence* in humans for the carcinogenicity of crystalline silica in the forms of quartz or cristobalite from occupational sources", and that there is "*sufficient evidence* in experimental animals for the carcinogenicity of quartz and cristobalite." The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is *carcinogenic to humans (Group 1)*." The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances studies. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." For further information on the IARC evaluation, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 68, "Silica, Some Silicates..." (1997).

NTP - The National Toxicology Program's Eleventh Annual Report on Carcinogens classifies "silica, crystalline (respirable size)" as a known human carcinogen.

OSHA - Crystalline silica (quartz) is not regulated by the U. S. Occupational Safety and Health Administration as a carcinogen.

C. AUTOIMMUNE DISEASES

Several studies have reported excess cases of several autoimmune disorders, -- scleroderma, systemic lupus erythematosus, rheumatoid arthritis -- among silica-exposed workers. For a review of the subject, the following may be consulted: "Occupational Exposure to Crystalline Silica and Autoimmune Disease", Environmental Health Perspectives, Volume 107, Supplement 5, pp. 793-802 (1999); "Occupational Scleroderma", Current Opinion in Rheumatology, Volume 11, pp. 490-494 (1999).

D. TUBERCULOSIS

Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to persons with tuberculosis. The following may be consulted for further information: Occupational Lung Disorders, Third Edition, Chapter 12, entitled "Silicosis and Related Diseases", Parkes, W. Raymond (1994); "Risk of pulmonary tuberculosis relative to silicosis and exposure to silica dust in South African gold miners," Occup Environ Med., Volume 55, pp.496-502 (1998).

E. KIDNEY DISEASE

Several studies have reported excess cases of kidney diseases, including end stage renal disease, among silica-exposed workers. For additional information on the subject, the following may be consulted: "Kidney Disease and Silicosis", Nephron, Volume 85, pp. 14-19 (2000).

F. NON-MALIGNANT RESPIRATORY DISEASES

The reader is referred to Section 3.5 of the NIOSH Special Hazard Review cited below, for information concerning the association between exposure to crystalline silica and chronic bronchitis, emphysema and small airways disease. There are studies that disclose an association between dusts found in various mining occupations and non-malignant respiratory diseases, particularly among smokers. It is unclear whether the observed associations exist only with underlying silicosis, only among smokers, or result from exposure to mineral dusts generally (independent of the presence or absence of crystalline silica, or the level of crystalline silica in the dust).

Sources of information:

The ***NIOSH Hazard Review - Occupational Effects of Occupational Exposure to Respirable Crystalline Silica*** published in April 2002 summarizes and discusses the medical and epidemiological literature on the health risks and diseases associated with occupation exposures to respirable crystalline silica. The *NIOSH Hazard Review* should be consulted for additional information, and citations to published studies on health risks and diseases associated with occupational exposure to respirable crystalline silica. The *NIOSH Hazard Review* is available from NIOSH - Publications Dissemination, 4676 Columbia Parkway, Cincinnati, OH 45226, or by calling 1-800-35-NIOSH (1-800-356-4676), or through the NIOSH web site, www.cdc.gov/niosh/topics/silica, then click on the link "NIOSH Hazard Review: Health Effects of Occupational Exposure to Respirable Crystalline Silica".

SECTION 12 - ECOLOGICAL INFORMATION

Crystalline silica (quartz) is not known to be ecotoxic; i.e., there are no data that suggests that crystalline silica (quartz) is toxic to birds, fish, invertebrates, microorganisms or plant

SECTION 13 - DISPOSAL CONSIDERATIONS

General: The packaging and material may be landfilled; however, material should be covered to minimize generation of airborne dust.

RCRA: Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.

The above applies to materials as sold by U. S. Silica Company. The material may be contaminated during use, and it is the responsibility of the user to assess the appropriate disposal of the used material.

SECTION 14 - TRANSPORT INFORMATION

Crystalline silica (quartz) is not a hazardous material for purposes of transportation under the U. S. Department of Transportation Table of Hazardous Materials, 49 CFR §172.101.

SECTION 15 - REGULATORY INFORMATION

UNITED STATES (FEDERAL AND STATE)

TSCA No.: Crystalline silica (quartz) appears on the EPA TSCA inventory under the CAS No. 14808-60-7.

RCRA: Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.

CERCLA: Crystalline silica (quartz) is not classified as a hazardous substance under regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 40 CFR §302.

Emergency Planning and Community Right to Know Act (SARA Title III): Crystalline silica (quartz) is not an extremely hazardous substance under Section 302 and is not a toxic chemical subject to the requirements of Section 313.

Clean Air Act: Crystalline silica (quartz) mined and processed by U.S. Silica Company is not processed with or does not contain any Class I or Class II ozone depleting substances.

FDA: Silica is included in the list of substances that may be included in coatings used in food contact surfaces, 21 CFR §175.300(b)(3)(xxvi).

NTP: Respirable crystalline silica, primarily quartz dusts occurring in industrial and occupational settings, is classified as Known to be a Human Carcinogen.

OSHA Carcinogen: Crystalline silica (quartz) is not listed.

California Proposition 65: Crystalline silica (airborne particles of respirable size) is classified as a substance known to the State of California to be a carcinogen.

California Inhalation Reference Exposure Level (REL): California established a chronic REL of 3 ug for silica (crystalline, respirable). A chronic REL is an airborne level of a substance at or below which no adverse health effects are anticipated in individuals indefinitely exposed to the substance at that level.

Massachusetts Toxic Use Reduction Act: Silica, crystalline (respirable size, <10 microns) is "toxic" for purposes of the Massachusetts Toxic Use Reduction Act.

Pennsylvania Worker and Community Right to Know Act: Quartz is a hazardous substance under the Act, but it is not a special hazardous substance or an environmental hazardous substance.

CANADA

Domestic Substances List: U. S. Silica Company products, as naturally occurring substances, are on the Canadian DSL.

WHMIS Classification: D2A

OTHER

EINECS No.: 238-878-4

EEC Label (Risk/Safety Phrases): R 48/20, R 40/20, S22, S38

IARC: Crystalline silica (quartz) is classified in IARC Group 1.

Japan MITI: All of the components of this product are existing chemical substances as defined in the Chemical Substance Control Law.

Australian Inventory of Chemical Substances: All of the components of this product are listed on the AICS inventory or exempt from notification requirements.

National, state, provincial or local emergency planning, community right-to-know or other laws, regulations or ordinances may be applicable--consult applicable national, state, provincial or local laws.

SECTION 16 - OTHER INFORMATION

Hazardous Material Information System (HMIS):

Health	*
Flammability	0
Reactivity	0
Protective Equipment	E

* For further information on health effects, see Sections 2 and 11 of this MSDS.

National Fire Protection Association (NFPA):

Health	0
Flammability	0
Reactivity	0

Web Sites with Information about Effects of Crystalline Silica Exposure:

The U. S. Silica web site will provide updated links to OSHA and NIOSH web sites addressing crystalline silica issues. www.u-s-silica.com, click in "Information", then click on "Health & Safety".

U. S. SILICA COMPANY DISCLAIMER

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects that may be caused by purchase, resale, use or exposure to our silica. Customers-users of silica must comply with all applicable health and safety laws, regulations, and orders, including the OSHA Hazard Communication Standard.

MSDS Number: T0767 * * * * * Effective Date: 08/16/05 * * * * * Supersedes: 03/08/05

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone (CHEMTREC)
800-424-9300 1-703-527-3887

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center may request the caller's name and number in case it is necessary to obtain additional information concerning this call.

All non-emergency questions should be routed to Customer Service [1-800-582-2537] for assistance.

TETRACHLOROETHYLENE

1. Product Identification

Synonyms: ethylene tetrachloride; tetrachloroethene; perchloroethylene; carbon bichloride; carbon dichloride
CAS No.: 127-18-4
Molecular Weight: 165.83
Chemical Formula: Cl2C:CCl2
Product Codes:
J.T. Baker: 9218, 9360, 9453, 9465, 9469
Mallinckrodt: 1933, 8058

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Tetrachloroethylene	127-18-4	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL

NERVOUS SYSTEM, LIVER AND KIDNEYS. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate (Life)
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:
Irritating to the upper respiratory tract. Giddiness, headache, intoxication, nausea and vomiting may follow the inhalation of large amounts while massive amounts can cause breathing arrest, liver and kidney damage, and death. Concentrations of 600 ppm and more can affect the central nervous system after a few minutes.
Ingestion:
Not highly toxic by this route because of low water solubility. Used as an oral dosage for hookworm (1 to 4 ml). Causes abdominal pain, nausea, diarrhea, headache, and dizziness.
Skin Contact:
Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.
Eye Contact:
Causes irritation, redness, and pain.
Chronic Exposure:
May cause liver, kidney or central nervous system damage after repeated or prolonged exposures. Suspected cancer risk from animal studies.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance. The use of alcoholic beverages enhances the toxic effects.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard but becomes hazardous in a fire situation because of vapor generation and possible degradation to phosgene (highly toxic) and hydrogen chloride (corrosive). Vapors are heavier than air and collect in low-lying areas.
Explosion:
Not considered to be an explosion hazard. Containers may explode when involved in a fire.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Water spray may be used to keep fire exposed containers cool.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Store in a cool, dry, ventilated area away from sources of heat or ignition. Isolate from flammable materials. Protect from direct sunlight. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8 Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA), 200 ppm (ceiling),
300 ppm/5min/3-hour (max)

-ACGIH Threshold Limit Value (TLV):
25 ppm (TWA), 100 ppm (STEL); listed as A3, animal carcinogen
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Ethereal odor.
Solubility:
0.015 g in 100 g of water.
Specific Gravity:
1.62 @ 20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
121C (250F)
Melting Point:
-19C (-2F)
Vapor Density (Air=1):
5.7
Vapor Pressure (mm Hg):
18 @ 25C (77F)
Evaporation Rate (BuAc=1):
0.33 (trichloroethylene = 1)

1 Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Slowly decomposed by light. Deteriorates rapidly in warm, moist climates.

Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition. Hydrogen chloride gas and phosgene gas may be formed upon heating. Decomposes with moisture to yield trichloroacetic acid and hydrochloric acid.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong acids, strong oxidizers, strong alkalis, especially NaOH, KOH; finely divided metals, especially zinc, barium, lithium. Slowly corrodes aluminum, iron and zinc.
Conditions to Avoid:
Moisture, light, heat and incompatibles.

11. Toxicological Information

Oral rat LD50: 2629 mg/kg; inhalation rat LC50: 4100 ppm/6H; investigated as a tumorigen, mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Tetrachloroethylene (127-18-4)	No	Yes	2A

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to quickly evaporate. When released into the soil, this material may leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released to water, this material is expected to quickly evaporate. When released into water, this material is not expected to biodegrade. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals.
Environmental Toxicity:
The LC50/96-hour values for fish are between 1 and 10 mg/l. The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TETRACHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1897
Packing Group: III
Information reported for product/size: 20L

International (Water, I.M.O.)

Proper Shipping Name: TETRACHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1897
Packing Group: III
Information reported for product/size: 20L

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Tetrachloroethylene (127-18-4)	Yes	Yes	Yes	Yes

------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Tetrachloroethylene (127-18-4)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Tetrachloroethylene (127-18-4)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Tetrachloroethylene (127-18-4)	100	U210	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Liquid)

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 2[Z]
Poison Schedule: None allocated.
WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 0 Reactivity: 0
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor or mist.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3, 11.
Disclaimer:
****

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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Disclaimer: These guidelines were developed under contract using generally accepted secondary sources. The protocol used by the contractor for surveying these data sources was developed by the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), and the Department of Energy (DOE). The information contained in these guidelines is intended for reference purposes only. None of the agencies have conducted a comprehensive check of the information and data contained in these sources. It provides a summary of information about chemicals that workers may be exposed to in their workplaces. The secondary sources used for supplements III and IV were published before 1992 and 1993, respectively, and for the remainder of the guidelines the secondary sources used were published before September 1996. This information may be superseded by new developments in the field of industrial hygiene. Therefore readers are advised to determine whether new information is available.

OCCUPATIONAL SAFETY AND HEALTH GUIDELINE FOR 1,2-DICHLOROETHYLENE

INTRODUCTION

This guideline summarizes pertinent information about 1,2-dichloroethylene for workers and employers as well as for physicians, industrial hygienists, and other occupational safety and health professionals who may need such information to conduct effective occupational safety and health programs. Recommendations may be superseded by new developments in these fields; readers are therefore advised to regard these recommendations as general guidelines and to determine whether new information is available.

SUBSTANCE IDENTIFICATION

* Formula

C(2)H(2)Cl(2)

* Structure

(For Structure, see paper copy)

* Synonyms

Acetylene dichloride; dioform; 1,2-dichloroethylene;

sym-dichloroethylene; 1,2-dichloroethene; 1,2-dichloroethene;

1,2-DCE

* Identifiers

CAS No.: 540-59-0 (sym); 156-59-2 (cis); 156-60-5 (trans)

RTECS No.: KV9360000 (sym); KV9420000 (cis); KV9400000 (trans)

3. DOT UN: 1150 29

4. DOT label: Flammable liquid

* Appearance and odor

1,2-Dichloroethylene is a colorless, volatile liquid with an ether-like, slightly acrid odor. The commercial product is available as either the cis- or trans-isomer or a mixture of the two isomers. The trans isomer has an odor threshold concentration of 17 parts per million (ppm) parts of air.

CHEMICAL AND PHYSICAL PROPERTIES

* Physical data

1. Molecular weight: 96.95

2. Boiling point (at 760 mm Hg): 60.3 degrees C (140.54 degrees F) (cis); 47.5 degrees C (117.5) (trans)

3. Specific gravity (water = 1): 1.28 (cis); 1.26 (trans)

4. Vapor density: 3.34

5. Melting point: -50 degrees C (-58 degrees F) (trans); -80.5 degrees C (-112.9 degrees F) (cis)

6. Vapor pressure: Data not available.

7. Solubility: Insoluble in water; soluble in alcohol, ether, acetone, benzene, and chloroform.

8. Evaporation rate: Data not available.

* Reactivity

1. Conditions contributing to instability: Heat, flame, or other ignition sources; light, air, or moisture will gradually decompose 1,2-dichloroethylene. The commercial product usually contains an inhibitor to prevent polymerization.

2. Incompatibilities: Contact between 1,2-dichloroethylene and strong oxidizers, strong alkalies, potassium hydroxide, or copper may cause violent reactions.

3. Hazardous decomposition products: Toxic gases such as hydrogen chloride may be released in a fire involving 1,2-dichloroethylene.

4. Special precautions: Use only non-sparking tools during the transfer or handling of 1,2-dichloroethylene.

* Flammability

The National Fire Protection Association has assigned a flammability rating of 3 (serious fire hazard) to 1,2-dichloroethylene.

1. Flash point: 2 to 3.9 degrees C (36 to 39 degrees F) (closed cup).

2. Autoignition temperature: 460 degrees C (860 degrees F).

3. Flammable limits in air (percent by volume): Lower, 5.6; upper, 12.8.

4. Extinguishant: For small fires use dry chemical, carbon dioxide, water spray, or standard foam. Use water spray, fog, or standard foam to fight large fires involving 1,2-dichloroethylene.

Fires involving 1,2-dichloroethylene should be fought upwind from the maximum distance possible. Keep unnecessary people away; isolate the hazard area and deny entry. Isolate the area for 1/2 mile in all directions if a tank, rail car, or tank truck is involved in the fire. Emergency personnel should stay out of low areas and ventilate closed spaces before entering. Vapors may travel to a source of ignition and flash back. Vapors are an explosion and poison hazard indoors, outdoors, or in sewers. Containers of 1,2-dichloroethylene may explode in the heat of the fire and should be moved from the fire area if it is possible to do so safely. If this is not possible, cool fire exposed containers from the sides with water until well after the fire is out. Do not get water inside the containers. Stay away from the ends of containers. Personnel should withdraw immediately if a rising sound from a venting safety device is heard or if there is discoloration of a container due to fire. Firefighters should wear a full set of protective clothing and self-contained breathing apparatus when fighting fires involving 1,2-dichloroethylene.

EXPOSURE LIMITS

* OSHA PEL

The current Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for 1,2-dichloroethylene is 200 ppm (790 milligrams per cubic meter (mg/m(3)) as an 8-hour time-weighted average (TWA) concentration [29 CFR 1910.1000, Table Z-1].

* NIOSH REL

The National Institute for Occupational Safety and Health (NIOSH) has established a recommended exposure limit (REL) for 1,2-dichloroethylene of 200 ppm (790 mg/m(3)) as a TWA for up to a 10-hour workday and a 40-hour workweek [NIOSH 1992].

* ACGIH TLV

The American Conference of Governmental Industrial Hygienists (ACGIH) has assigned 1,2-dichloroethylene a threshold limit value (TLV) of 200 ppm (793 mg/m(3)) as a TWA for a normal 8-hour workday and a 40-hour workweek [ACGIH 1994, p. 18].

* Rationale for Limits

The NIOSH limit is based on the risk of narcotic effects and mucous membrane irritation [NIOSH 1992].

The ACGIH limit is based on the no-effect level of 1,000 ppm in animals [ACGIH 1991, p. 430].

HEALTH HAZARD INFORMATION

* Routes of Exposure

Exposure to 1,2-dichloroethylene can occur through inhalation, ingestion, and eye or skin contact [Sittig 1991].

* Summary of toxicology

Effects on Animals: 1,2-Dichloroethylene vapor is a central nervous system depressant and a mild irritant of the mucous membranes [ACGIH 1991; Hathaway et al. 91]. The acute oral LD(50) for a 60:40 cis-trans mixture in rats is reported as greater than 2,000 mg/kg [Clayton and Clayton 1982]. Inhalation exposure to 16,000 ppm for 4 hours was lethal to rats, but 8-minute exposures to the same concentration produced anesthesia [Clayton and Clayton 1982]. Chronic exposure studies have shown that repeated inhalation of up to 1,000 ppm dichloroethylene resulted in no identified ill effects in rats, rabbits, guinea pigs, and dogs [ACGIH 1991; Hathaway et al. 1991]. Dogs narcotized by inhaling 1,2-dichloroethylene vapor developed superficial corneal turbidity that cleared within 48 hours and did not disturb vision [Grant 1986].

2. Effects on Humans: The major effect of 1,2-dichloroethylene is narcosis; it has been used in a combination with ether (Dichloren) as an anesthetic in at least 2000 cases. No evidence of eye toxicity was seen in these cases [Grant 1986]. In high concentrations, exposure to 1,2-dichloroethylene causes central nervous system depression; in milder exposures, it can produce nausea, vomiting, weakness, tremor, epigastric cramps, burning of the eyes and vertigo [Gosselin 1984; Hathaway et al. 1991]. One fatality has been reported that was due to inhalation of a very high vapor concentration in a small enclosure [Hathaway et al. 1991].

* Signs and symptoms of exposure

1. Acute exposure: Exposure to the vapor of dichloroethylene may cause burning of the eyes. Other symptoms of acute exposure are nausea, vomiting, and epigastric distress. Symptoms of exposure-related narcosis including drowsiness, tremor, incoordination, dizziness, and weakness; these symptoms clear quickly after exposure is terminated.

2. Chronic exposure: 1,2-Dichloroethylene is a defatting agent, and repeated skin exposure may cause irritation and dermatitis.

EMERGENCY MEDICAL PROCEDURES

* Emergency medical procedures: [NIOSH to supply]

5. Rescue: Remove an incapacitated worker from further exposure and implement appropriate emergency procedures (e.g., those listed on the Material Safety Data Sheet required by OSHA's Hazard Communication Standard [29 CFR 1910.1200]). All workers should be familiar with emergency procedures, the location and proper use of emergency equipment, and methods of protecting themselves during rescue operations.

EXPOSURE SOURCES AND CONTROL METHODS

The following operations may involve 1,2-dichloroethylene and lead to worker exposures to this substance:

* The manufacture and transportation of 1,2-dichloroethylene

* Use as a low-temperature extraction solvent for heat-sensitive substances (caffeine, perfume oils, and fats from fish and meat) and in dye extraction.

* Use as a general solvent of gums, rubber, waxes, oils, camphor, phenol, esters, ether derivatives, acetyl cellulose, lacquers, resins, thermoplastics, artificial fibers, and organic materials.

* Use as a chemical intermediate in the synthesis of polymers, telomers, and

chlorinated solvents and compounds.

* Use in miscellaneous applications as dry cleaning agent, cleaning solution for printed circuit boards, food packaging adhesives, germicidal fumigants, and in retarding fermentation.

* Use as a refrigerant and coolant and in the manufacture of artificial pearls and pharmaceuticals.

Methods that are effective in controlling worker exposures to 1,2-dichloroethylene, depending on the feasibility of implementation, are as follows:

* Process enclosure
* Local exhaust ventilation
* General dilution ventilation
* Personal protective equipment

Workers responding to a release or potential release of a hazardous substance must be protected as required by paragraph (q) of OSHA's Hazardous Waste Operations and Emergency Response Standard [29 CFR 1910.120].

Good sources of information about control methods are as follows:

1. ACGIH [1992]. Industrial ventilation -- a manual of recommended practice. 21st ed. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

2. Burton DJ [1986]. Industrial ventilation -- a self study companion. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

3. Alden JL, Kane JM [1982]. Design of industrial ventilation systems. New York, NY: Industrial Press, Inc.

4. Wadden RA, Scheff PA [1987]. Engineering design for control of workplace hazards. New York, NY: McGraw-Hill.

5. Plog BA [1988]. Fundamentals of industrial hygiene. Chicago, IL: National Safety Council.

MEDICAL SURVEILLANCE

OSHA is currently developing requirements for medical surveillance. When these requirements are promulgated, readers should refer to them for additional information and to determine whether employers whose employees are exposed to 1,2-dichloroethylene are required to implement medical surveillance procedures.

* Medical Screening

Workers who may be exposed to chemical hazards should be monitored in a systematic program of medical surveillance that is intended to prevent occupational injury and disease. The program should include education of employers and workers about work-related hazards, early detection of adverse health effects, and referral of workers for diagnosis and treatment. The occurrence of disease or other work- related adverse health effects should prompt immediate evaluation of primary preventive measures (e.g., industrial hygiene monitoring, engineering controls, and personal protective equipment). A medical surveillance program is intended to supplement, not replace, such measures. To detect and control work-related health effects, medical evaluations should be

performed (1) before job placement, (2) periodically during the term of employment, and (3) at the time of job transfer or termination.

Preplacement medical evaluation

Before a worker is placed in a job with a potential for exposure to 1,2-dichloroethylene, a licensed health care professional should evaluate and document the worker's baseline health status with thorough medical, environmental, and occupational histories, a physical examination, and physiologic and laboratory tests appropriate for the anticipated occupational risks. These should concentrate on the function and integrity of the skin, respiratory system, liver, and kidneys. Medical surveillance for respiratory disease should be conducted using the principles and methods recommended by the American Thoracic Society.

A preplacement medical evaluation is recommended to assess medical conditions that may be aggravated or may result in increased risk when a worker is exposed to 1,2-dichloroethylene at or below the prescribed exposure limit. The health care professional should consider the probable frequency, intensity, and duration of exposure as well as the nature and degree of any applicable medical condition. Such conditions (which should not be regarded as absolute contraindications to job placement) include a history and other findings consistent with diseases of the skin, respiratory system, liver, or kidneys.

* Periodic medical evaluations

Occupational health interviews and physical examinations should be performed at regular intervals during the employment period, as mandated by any applicable Federal, State, or local standard. Where no standard exists and the hazard is minimal, evaluations should be conducted every 3 to 5 years or as frequently as recommended by an experienced occupational health physician. Additional examinations may be necessary if a worker develops symptoms attributable to 1,2-dichloroethylene exposure. The interviews, examinations, and medical screening tests should focus on identifying the adverse effects of 1,2-dichloroethylene on the skin, respiratory system, liver, or kidneys. Current health status should be compared with the baseline health status of the individual worker or with expected values for a suitable reference population.

* Termination medical evaluations

The medical, environmental, and occupational history interviews, the physical examination, and selected physiologic or laboratory tests that were conducted at the time of placement should be repeated at the time of job transfer or termination to determine the worker's medical status at the end of his or her employment. Any changes in the worker's health status should be compared with those expected for a suitable reference population.

* Biological monitoring

Biological monitoring involves sampling and analyzing body tissues or fluids to provide an index of exposure to a toxic substance or metabolite. No biological monitoring test acceptable for routine use has yet been developed for 1,2-dichloroethylene.

WORKPLACE MONITORING AND MEASUREMENT

Determination of a worker's exposure to airborne 1,2-dichloroethylene is made using a charcoal tube (100/50 mg sections, 20/40 mesh). Samples are collected at a maximum

flow rate of 0.2 liter/minute until a maximum collection volume of 5 liters is reached. The sample is then treated with carbon disulfide. Analysis is conducted by gas chromatography using a flame ionization detector (GC/FID). This method is described in the OSHA Computerized Information System [OSHA 1994] and is fully validated. NIOSH has published this method (Method No. 1003) in the NIOSH Manual of Analytical Methods [NIOSH 1994b].

PERSONAL HYGIENE PROCEDURES

If 1,2-dichloroethylene contacts the skin, workers should immediately wash the affected areas with large amounts of soap and water.

Clothing contaminated with 1,2-dichloroethylene should be removed immediately, and provisions should be made for the safe removal of the chemical from the clothing. Persons laundering the clothes should be informed of the hazardous properties of 1,2-dichloroethylene, particularly its potential for causing irritation and at high concentrations, narcotic effects.

A worker who handles 1,2-dichloroethylene should thoroughly wash hands, forearms, and face with soap and water before eating, using tobacco products, using toilet facilities, applying cosmetics, or taking medication.

Workers should not eat, drink, use tobacco products, apply cosmetics, or take medication in areas where 1,2-dichloroethylene or a solution containing 1,2-dichloroethylene is handled, processed, or stored.

STORAGE

1,2-Dichloroethylene should be stored in a cool, dry, well-ventilated area in tightly sealed containers that are labeled in accordance with OSHA's Hazard Communication Standard [29 CFR 1910.1200]. Containers of 1,2-dichloroethylene should be protected from physical damage and should be stored separately from strong oxidizers, strong alkalies, potassium hydroxide, or copper.

SPILLS AND LEAKS

In the event of a spill or leak involving 1,2-dichloroethylene, persons not wearing protective equipment and clothing should be restricted from contaminated areas until cleanup has been completed. The following steps should be undertaken following a spill or leak:

1. Do not touch the spilled material; stop the leak if it is possible to do so without risk.

2. Notify safety personnel.

3. Remove all sources of heat and ignition.

4. Ventilate the area of the spill or leak.

5. Use non-sparking tools.

6. Use water spray to reduce vapors; do not get water inside the container.

7. Keep spilled material out of confined spaces because of the possibility of explosions.

8. For small liquid spills, take up with sand or other noncombustible absorbent material and place into closed containers for later disposal.

9. For large liquid spills, build dikes far ahead of the spill to contain the 1,2-dichloroethylene for later reclamation or disposal.

SPECIAL REQUIREMENTS

U.S. Environmental Protection Agency (EPA) requirements for emergency planning, reportable quantities of hazardous releases, community right-to-know, and hazardous waste management may change over time. Users are therefore advised to determine periodically whether new information is available.

* Emergency planning requirements

1,2-dichloroethylene is not subject to EPA emergency planning requirements under the Superfund Amendments and Reauthorization Act (SARA) (Title III) in 42 USC 11022.

* Reportable quantity requirements for hazardous releases

A hazardous substance release is defined by EPA as any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of contaminated containers) of hazardous substances. In the event of a release that is above the reportable quantity for that chemical, employers are required to notify the proper Federal, State, and local authorities [40 CFR 355.40].

Employers are not required by the emergency release notification provisions in 40 CFR Part 355.40 to notify the National Response Center of an accidental release of 1,2-dichloroethylene; there is no reportable quantity for this substance.

* Community right-to-know requirements

Employers who own or operate facilities in SIC codes 20 to 39 that employ 10 or more workers and that manufacture 25,000 pounds or more of 1,2-dichloroethylene per calendar year or otherwise use 10,000 pounds or more of 1,2-dichloroethylene per calendar year are required by EPA [40 CFR Part 372.30] to submit a Toxic Chemical Release Inventory form (Form R) to EPA reporting the amount of 1,2-dichloroethylene emitted or released from their facility annually.

* Hazardous waste management requirements

EPA considers a waste to be hazardous if it exhibits any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR 261.21-261.24. Under the Resource Conservation and Recovery Act (RCRA) [40 USC 6901 et seq.], EPA has specifically listed many chemical wastes as hazardous. Although 1,2-dichloroethylene is not specifically listed as a hazardous waste under RCRA, EPA requires employers to treat waste as hazardous if it exhibits any of the characteristics discussed above.

Providing detailed information about the removal and disposal of specific chemicals is beyond the scope of this guideline. The U.S. Department of Transportation, EPA, and State and local regulations should be followed to ensure that removal, transport, and disposal of this substance are conducted in accordance with existing regulations. To be certain that chemical waste disposal meets EPA regulatory requirements, employers should address any questions to the RCRA hotline at (703) 412-9810 (in the Washington, D.C. area) or toll-free at (800) 424-9346 (outside Washington, D.C.). In addition, relevant State and local

authorities should be contacted for information on any requirements they may have for the waste removal and disposal of this substance.

RESPIRATORY PROTECTION

Conditions for respirator use

Good industrial hygiene practice requires that engineering controls be used where feasible to reduce workplace concentrations of hazardous materials to the prescribed exposure limit. However, some situations may require the use of respirators to control exposure. Respirators must be worn if the ambient concentration of 1,2-dichloroethylene exceeds prescribed exposure limits. Respirators may be used (1) before engineering controls have been installed, (2) during work operations such as maintenance or repair activities that involve unknown exposures, (3) during operations that require entry into tanks or closed vessels, and (4) during emergencies. Workers should only use respirators that have been approved by NIOSH and the Mine Safety and Health Administration (MSHA).

* Respiratory protection program

Employers should institute a complete respiratory protection program that, at a minimum, complies with the requirements of OSHA's Respiratory Protection Standard [29 CFR 1910.134]. Such a program must include respirator selection, an evaluation of the worker's ability to perform the work while wearing a respirator, the regular training of personnel, respirator fit testing, periodic workplace monitoring, and regular respirator maintenance, inspection, and cleaning. The implementation of an adequate respiratory protection program (including selection of the correct respirator) requires that a knowledgeable person be in charge of the program and that the program be evaluated regularly. For additional information on the selection and use of respirators and on the medical screening of respirator users, consult the latest edition of the NIOSH Respirator Decision Logic [NIOSH 1987b] and the NIOSH Guide to Industrial Respiratory Protection [NIOSH 1987a].

PERSONAL PROTECTIVE EQUIPMENT

Workers should use appropriate personal protective clothing and equipment that must be carefully selected, used, and maintained to be effective in preventing skin contact with 1,2-dichloroethylene. The selection of the appropriate personal protective equipment (PPE) (e.g., gloves, sleeves, encapsulating suits) should be based on the extent of the worker's potential exposure to 1,2-dichloroethylene. The resistance of various materials to permeation by 1,2-dichloroethylene is shown below:

Material	Breakthrough time (hr)
butyl rubber	<1(*)
natural rubber	<1(*)
neoprene	<1(*)
nitrile rubber	<1(*)
polyvinyl alcohol	<1(*)
polyvinyl chloride	<1(*)
viton	Caution 1 to 4

(*) Not recommended, degradation may occur

To evaluate the use of these materials with 1,2-dichloroethylene, users should consult the best available performance data and manufacturers' recommendations. Significant differences have been demonstrated in the chemical resistance of generically similar PE materials (e.g., butyl) produced by different manufacturers. In addition, the chemical resistance of a mixture may be significantly different from that of any of its pure components.

Any chemical-resistant clothing that is used should be periodically evaluated to determine its effectiveness in preventing dermal contact. Safety showers and eye wash stations should be located close to operations that involve 1,2-dichloroethylene.

Splash-proof chemical safety goggles or face shields (20 to 30 cm long, minimum) should be worn during any operation in which a solvent, caustic, or other toxic substance may be splashed into the eyes.

In addition to the possible need for wearing protective outer apparel (e.g., aprons, encapsulating suits), workers should wear work uniforms, coveralls, or similar full-body coverings that are laundered each day. Employers should provide lockers or other closed areas to store work and street clothing separately. Employers should collect work clothing at the end of each work shift and provide for its laundering. Laundry personnel should be informed about the potential hazards of handling contaminated clothing and instructed about measures to minimize their health risk.

Protective clothing should be kept free of oil and grease and should be inspected and maintained regularly to preserve its effectiveness.

Protective clothing may interfere with the body's heat dissipation, especially during hot weather or during work in hot or poorly ventilated work environments.

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Occupational Safety & Health Administration
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Washington, DC 20210

Benzene

From Wikipedia, the free encyclopedia

Benzene is an organic chemical compound with the formula C_6H_6. It is sometimes abbreviated Ph-H. Benzene is a colorless and flammable liquid with a sweet smell and a relatively high melting point. It is carcinogenic and its use as an additive in gasoline is now limited, but it is an important industrial solvent and precursor in the production of drugs, plastics, synthetic rubber, and dyes. Benzene is a natural constituent of crude oil, but it is usually synthesized from other compounds present in petroleum. Benzene is an aromatic hydrocarbon and the second [*n*]-annulene ([6]-annulene), a cyclic hydrocarbon with a continuous alternation of single and double bonds.

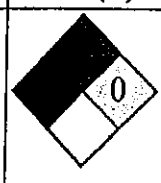
Contents

History

The word benzene derives historically from "gum benzoin", sometimes called "benjamin" (i.e., benzoin resin), an aromatic resin known to European pharmacists and perfumers since the fifteenth century as a product of southeast Asia. "Benzoin" is itself a corruption of the Arabic expression "luban jawi," or "frankincense of Java." An acidic material was derived from benzoin by sublimation, and named "flowers of benzoin," or benzoic acid. The hydrocarbon thus acquired the name benzin, benzol, or benzene.[1]

Benzene has been the subject of many studies by many famous scientists ranging from Michael Faraday to Linus Pauling. In 1825, Faraday first isolated benzene from the oily residue derived from the production of illuminating gas, giving it the name

Benzene

General	
Systematic name	Benzene
Other names	Benzol 1,3,5-cyclohexatriene
Molecular formula	C_6H_6
SMILES	c1ccccc1 C1=CC=CC=C1
InChI	InChI=1/C6H6 /c1-2-4-6-5-3-1/h1-6H
Molar mass	78.1121 g/mol
Appearance	Colorless liquid
CAS number	[71-43-2]
Properties	
Density and phase	0.8786 g/cm³, liquid
Solubility in water	1.79 g/L (25 °C)
Melting point	5.5 °C (278.6 K)
Boiling point	80.1 °C (353.2 K)
Viscosity	0.652 cP at 20 °C
Structure	
Molecular shape	Planar
Symmetry group	D_{6h}
Dipole moment	0 D
Hazards	
MSDS	External MSDS
EU classification	Flammable (**F**) Carc. Cat. 1 Muta. Cat. 2 Toxic (**T**)
NFPA 704	
	R45, R46, R11, R36/38,

R-phrases	R45, R46, R361, R62, R65
S-phrases	S53, S45
Flash point	−11 °C
Autoignition temperature	561 °C
RTECS number	CY1400000
Supplementary data page	
Structure and properties	n, ε_r, etc.
Thermodynamic data	Phase behaviour Solid, liquid, gas
Spectral data	UV, IR, NMR, MS
Related compounds	
Related hydrocarbons	cyclohexane naphthalene
Related compounds	toluene borazine

Except where noted otherwise, data are given for materials in their standard state (at 25°C, 100 kPa)
Infobox disclaimer and references

...bicarburet of hydrogen.[2][3] In 1833, Eilhard Mitscherlich produced it via the distillation of benzoic acid (from gum benzoin) and lime. Mitscherlich gave the compound the name ...*in*.[4] In 1845, Charles Mansfield, working under August ...elm von Hofmann, isolated benzene from coal tar. Four years later, Mansfield began the first industrial-scale production of benzene, based on the coal-tar method.

Gradually the sense developed among chemists that substances related to benzene formed a natural chemical family. In 1855 August Wilhelm Hofmann used the word "aromatic" to designate this family relationship, after a characteristic property of many of its members.

The empirical formula for benzene was long known, but its highly polyunsaturated structure was challenging to determine. Archibald Scott Couper in 1858 and Joseph Loschmidt in 1861 suggested possible structures that contained multiple double bonds or multiple rings, but the study of aromatic compounds was in its very early years, and too little evidence was then available to help chemists decide on any particular structure.

In 1865 the German chemist Friedrich August Kekulé published a paper in French (for he was then teaching in Francophone Belgium) suggesting that the structure contained a six-membered ring of carbon atoms with alternating single and double bonds. The next year he published a much longer p... in German on the same subject.[5][6] Kekulé used evidence that had accumulated in the intervening years to -- na.../, that there always appeared to be only one isomer of any monoderivative of benzene, and that there always appeared to be exactly three isomers of every diderivative -- to argue in support of his proposed structure. Kekulé's symmetrical ring could explain these curious facts.

The new understanding of benzene, and hence of all aromatic compounds, proved to be so important for both pure and applied chemistry that in 1890 the German Chemical Society organized an elaborate appreciation in Kekulé's honor, celebrating the twenty-fifth anniversary of his first benzene paper. Here Kekulé spoke of the creation of the theory. He said that he had discovered the ring shape of the benzene molecule after having a reverie or day-dream of a snake seizing its own tail (this is a common symbol in many ancient cultures known as the Ouroboros). This vision, he said, came to him after years of studying the nature of carbon-carbon bonds. This was 20 years after he had solved the problem of how carbon atoms could bond to up to four other atoms at the same time. It is curious that a similar humorous depiction of benzene had appeared in 1886 in the *Berichte der Durstigen Chemischen Gesellschaft* (Journal of the Thirsty Chemical Society), a parody of the *Berichte der Deutschen Chemischen Gesellschaft*, only the parody had monkeys seizing each other in a circle, rather than snakes as in Kekulé's anecdote.[7] Some historians have suggested that the parody was a lampoon of the snake anecdote, possibly already well-known through oral transmission even if it had not yet appeared in print.[1] Others have speculated that Kekulé's story in 1890 was a re-parody of the monkey spoof, and was a mere invention rather than a recollection of an event in his life.

Kekulé's 1890 speech[8] in which these anecdotes appeared has been translated into English.[9] If one takes the anecdote as the memory of a real event, circumstances mentioned in the story suggest that it must have happened early in ...2.[10]

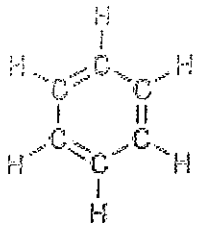
The cyclic nature of benzene was finally confirmed by the eminent crystallographer Kathleen Lonsdale.[11][12]

In 1836 the French chemist Auguste Laurent named the substance "phène"; this is the root of the word phenol, which is hydroxylated benzene, and phenyl, which is the radical formed by abstraction of a hydrogen atom from benzene.

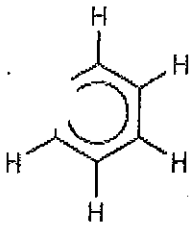
Structure

Main article: aromaticity

Benzene presents a special problem in that, to account for all the bonds, there must be alternating double carbon bonds:



Using X-ray diffraction, researchers discovered that all of the carbon-carbon bonds in benzene are of the same length of 140 picometres (pm). The C-C bond lengths are greater than a double bond (135pm) but shorter than a single bond (147pm). This intermediate distance is explained by electron delocalization: the electrons for C-C bonding are distributed equally between each of the six carbon atoms. One representation is that the structure exists as a superposition of so-called resonance structures, rather than either form individually. This delocalisation of electrons is known as aromaticity, and gives benzene great stability. This enhanced stability is the fundamental property of aromatic molecules that differentiates them from molecules that are non-aromatic. To reflect the delocalised nature of the bonding, benzene is often depicted with a circle inside a hexagonal arrangement of carbon atoms:



As is common in organic chemistry, the carbon atoms in the diagram above have been left unlabeled. Benzene occurs sufficiently often as a component of organic molecules that there is a Unicode symbol with the code 232C to represent it:

⌬

Many fonts do not have this Unicode character, so many programs may not be able to display it correctly. A graphical representation of this symbol can be found at the following URL:
http://www.fileformat.info/info/unicode/char/232c/index.htm

Substituted benzene derivatives

Main article: Aromatic hydrocarbons

Many important chemicals are derived from benzene, wherein with one or more of the hydrogen atoms is replaced with er functional group. Examples of simple benzene derivatives are phenol, toluene, and aniline, abbreviated PhOH, and $PhNH_2$, respectively. Linking benzene rings gives biphenyl, C_6H_5-C_6H_5. Further loss of hydrogen gives "fused" aromatic hydrocarbons, such as naphthalene and anthracene. The limit of the fusion process is the hydrogen-free material graphite.

In heterocycles, carbon atoms in the benzene ring are replaced with other elements. The most important derivatives are

the rings containing nitrogen. Replacing one CH with N gives the compound pyridine, C_5H_5N. Although benzene and pyridine are *structurally* related, benzene cannot be converted into pyridine. Replacement of a second CH bond with N gives, depending on the location of the second N, pyridazine, pyrimidine, and pyrazine.

Production

Trace amounts of benzene may result whenever carbon-rich materials undergo incomplete combustion. It is produced in volcanoes and forest fires, and is also a component of cigarette smoke.

Up until World War II, most benzene was produced as a byproduct of coke production in the steel industry. However, in the 1950s, increased demand for benzene, especially from the growing plastics industry, necessitated the production of benzene from petroleum. Today, most benzene comes from the petrochemical industry, with only a small fraction being produced from coal.

Three chemical processes contribute equally to industrial benzene production: catalytic reforming, toluene hydrodealkylation, and steam cracking.

Catalytic reforming

In catalytic reforming, a mixture of hydrocarbons with boiling points between 60-200 °C is blended with hydrogen gas and then exposed to a bifunctional platinum chloride or rhenium chloride catalyst at 500-525 °C and pressures ranging from 8-50 atm. Under these conditions, aliphatic hydrocarbons form rings and lose hydrogen to become aromatic hydrocarbons. The aromatic products of the reaction are then separated from the reaction mixture by extraction with any one of a number of solvents, including diethylene glycol or sulfolane, and benzene is then separated from the other aromatics by distillation.

Toluene hydrodealkylation

Toluene hydrodealkylation converts toluene to benzene. In this process, toluene is mixed with hydrogen, then passed over a chromium, molybdenum, or platinum oxide catalyst at 500-600 °C and 40-60 atm pressure. Sometimes, higher temperatures are used instead of a catalyst. Under these conditions, toluene undergoes dealkylation according to the chemical equation:

$$C_6H_5CH_3 + H_2 \rightarrow C_6H_6 + CH_4$$

This irreversible reaction is accompanied by an equilibrium side reaction that produces biphenyl (aka diphenyl):
$2C6H6 \leftrightarrow H2 + C12H10$

Typical reaction yields exceed 95%. Sometimes, xylene and heavier aromatics are used in place of toluene, with similar efficiency.

Toluene disproportionation

Where a chemical complex has similar demands for both benzene and xylene, then toluene disproportionation (**TDP**) may be an attractive alternative. Broadly speaking 2 toluene molecules are reacted and the methyl groups rearranged from one toluene molecule to the other, yielding one benzene molecule and one xylene molecule.

Given that demand for *para*-xylene (p-xylene) substantially exceeds demand for other xylene isomers, a refinement of the TDP process called **Selective TDP** (STDP) may be used. In this process, the xylene stream exiting the TDP unit is approximately 90% paraxylene.

Steam cracking

n cracking is the process for producing ethylene and other olefins from aliphatic hydrocarbons. Depending on the tock used to produce the olefins, steam cracking can produce a benzene-rich liquid byproduct called *pyrolysis gasoline*. Pyrolysis gasoline can be blended with other hydrocarbons as a gasoline additive, or distilled to separate it into its components, including benzene.

Uses

Early uses

In the 19th and early-20th centuries, benzene was used as an after-shave lotion because of its pleasant smell. Prior to the 1920s, benzene was frequently used as an industrial solvent, especially for degreasing metal. As its toxicity became obvious, benzene was supplanted by other solvents, especially toluene (methyl benzene), which has similar physical properties but is not carcinogenic.

In 1903, Ludwig Roselius popularized the use of benzene to decaffeinate coffee. This discovery led to the production of Sanka (the letters "ka" in the brand name stand for *kaffein*). This process was later discontinued.

As a petrol additive, benzene increases the octane rating and reduces knocking. Consequently, petrol often contained several percent benzene before the 1950s, when tetraethyl lead replaced it as the most widely-used antiknock additive. With the global phaseout of leaded petrol, benzene has made a comeback as a gasoline additive in some nations. In the United States, concern over its negative health effects and the possibility of benzene entering the groundwater have led t ngent regulation of petrol's benzene content, with limits typically around 1%. European petrol specifications now cc a the same 1% limit on benzene content.

Current uses of benzene

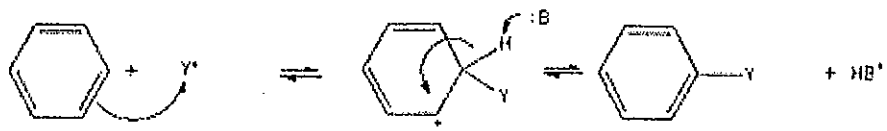
Today benzene is mainly used as an intermediate to make other chemicals. Its most widely-produced derivatives include styrene, which is used to make polymers and plastics, phenol for resins and adhesives (via cumene), and cyclohexane, which is used in the manufacture of Nylon. Smaller amounts of benzene are used to make some types of rubbers, lubricants, dyes, detergents, drugs, explosives, napalm and pesticides.

In laboratory research, toluene is now often used as a substitute for benzene. The solvent-properties of the two are similar but toluene is less toxic and has a wider liquid range.

Benzene has been used as a basic research tool in a variety of experiments including analysis of a two-dimensional gas.

Reactions of benzene

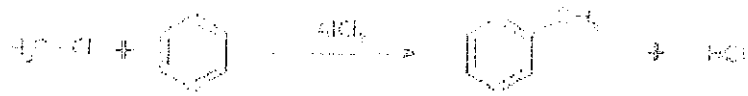
- Electrophilic aromatic substitution is a general method of derivatizing benzene. Benzene is sufficiently nucleophilic that it undergoes substitution by acylium ions or alkyl carbocations to give substituted derivatives.



- The Friedel-Crafts acylation is a specific example of electrophilic aromatic substitution. The reaction

involves the acylation of benzene (or many other aromatic rings) with an acyl chloride using a strong Lewis acid catalyst such as aluminium chloride or iron chloride which act as a halogen carrier.

- Like the Friedel-Crafts acylation, the Friedel-Crafts alkylation involves the alkylation of benzene (and many other aromatic rings) using an alkyl halide in the presence of a strong Lewis acid catalyst.



- sulfonation.
- Nitration: Benzene undergoes nitration with nitronioum ions (NO_2^+) as the electrophile. Thus, warming benzene at 50-55 degrees Celsius, with a combination of concentrated sulphuric and nitric acid to produce the electrophile, gives nitrobenzene.

- Hydrogenation: Benzene and derivatives convert to cyclohexane and derivatives when treated with hydrogen at 450K and 10atm of pressure with a finely divided nickel catalyst.
- Benzene is an excellent ligand in the organometallic chemistry of low-valent metals. Important examples include the sandwich and half-sandwich complexes respectively $Cr(C_6H_6)_2$ and $[RuCl_2(C_6H_6)]_2$.

Health effects

B ne exposure has serious health effects. Breathing high levels of benzene can result in death, while low levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

The major effects of benzene are chronic (long-term) exposure through the blood. Benzene damages the bone marrow and can cause a decrease in red blood cells, leading to anemia. It can also cause excessive bleeding and depress the immune system, increasing the chance of infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

The US Department of Health and Human Services (DHHS) classifies benzene as a human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, a potentially fatal cancer of the blood-forming organs. In particular, Acute myeloid leukemia and acute lymphoblastic leukaemia (AML & ALL) may be caused by benzene.

Several tests can determine exposure to benzene. There is a test for measuring benzene in the breath; this test must be hortly after exposure. Benzene can also be measured in the blood; however, because benzene disappears rapidly in e blood, measurements are accurate only for recent exposures.

In the body, benzene is metabolized. Certain metabolites can be measured in the urine. However, this test must be done shortly after exposure and is not a reliable indicator of benzene exposure, since the same metabolites may be present in urine from other sources.

The US Environmental Protection Agency has set the maximum permissible level of benzene in drinking water at 0.005 milligrams per liter (0.005 mg/L). The EPA requires that spills or accidental releases into the environment of 10 pounds (4.5 kg) or more of benzene be reported to the EPA.

The US Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 1 part of benzene per million parts of air (1 ppm) in the workplace during an 8-hour workday, 40-hour workweek. The short term exposure limit for airborne benzene is 5 ppm for 15 minutes.

In recent history there have been many examples of the harmful health effects of benzene and its derivatives. Toxic Oil Syndrome caused localised immune-suppression in Madrid in 1981 from people ingesting benzene-contaminated rapeseed oil. Chronic Fatigue Syndrome has also been highly correlated with people who eat "denatured" food that use solvents to remove fat or contain benzoic acid.

Workers in various industries that make or use benzene may be at risk for being exposed to high levels of this carcinogenic chemical. Industries that involve the use of benzene include the rubber industry, oil refineries, chemical plants, shoe manufacturers, and gasoline related industries. In 1987, OSHA estimated that about 237,000 workers in the United States were potentially exposed to benzene, and it is not known if this number has substantially changed since then.

Water and soil contamination are important pathways of concern for transmission of benzene contact. In the U.S. alone there are approximately 100,000 different sites which have benzene soil or groundwater contamination. In 2005, the water supply to the city of Harbin in China with a population of almost nine million people, was cut off because of a major benzene exposure. Benzene leaked into the Songhua River, which supplies drinking water to the city, after an explosion at a China National Petroleum Corporation (CNPC) factory in the city of Jilin on 13 November.

In March 2006, the official Food Standards Agency in Britain conducted a survey of 150 brands of soft drinks. It found that four contained benzene levels above World Health Organization limits. The affected batches were removed from sale. See benzene in soft drinks[13]

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9. ^ O. T. Benfey, "August Kekulé and the Birth of the Structural Theory of Organic Chemistry in 1858," *Journal of Chemical Education*, 35 (1958), 21-23

   ^ Jean Gillis, "Auguste Kekulé et son oeuvre, realisee a Gand de 1858 a 1867," *Memoires de l'Academie Royale de Belgique*, 7:1 (1866), 1-40.
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10. ^ "FDA: Too Much Benzene In Some Drinks" (http://www.cbsnews.com/stories/2006/05/19/health/main1638170.shtml), *CBS News*, May 19, 2006, retrieved July 11, 2006

ternal links

- ATSDR - Case Studies in Environmental Medicine: Benzene Toxicity (http://www.atsdr.cdc.gov/HEC/CSEM/benzene/)
- Benzene (http://www.phc.vcu.edu/Feature/oldfeature/benzene/index.html)
- Benzene Material Safety Data Sheet (http://www.hazard.com/msds/f2/bqv/bqvjq.html)
- International Chemical Safety Card 0015 (http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/_icsc00/icsc0015.htm)
- MSAT Regulations and Remedies (http://www.processengr.com/ppt_presentations/msat_regulation_options.pdf)
- Australian National Pollutant Inventory - Benzene (http://www.npi.gov.au/database/substance-info/profiles/12.html)
- NIOSH Pocket Guide to Chemical Hazards (http://www.cdc.gov/niosh/npg/npgd0049.html)
- IARC Monograph: "Benzene" (http://www-cie.iarc.fr/htdocs/monographs/suppl7/benzene.html)
- CID 241 (http://pubchem.ncbi.nlm.nih.gov/summary/summary.cgi?cid=241) from PubChem
- Computational Chemistry Wiki (http://www.compchemwiki.org/index.php?title=Benzene)
- Couper and Carbon bonds (http://classes.yale.edu/chem125a/125/history99/5Valence/Couper/Couper.html)
- Dept. of Health and Human Services: TR-289: Toxicology and Carcinogenesis Studies of Benzene (http://ntp.niehs.nih.gov/index.cfm?objectid=0707525C-0F07-05BF-A16CAC7B0ECC97B5)
- Kekule, Couper and dreams of Benzene (http://classes.yale.edu/chem125a/125/history99/5Valence/Kekule/Kekule.html)
- Loschmidt's Benzene structure (http://www.physicstoday.org/pt/vol-54/iss-3/captions/p45cap4.html)
- Video Podcast (http://www.ch.ic.ac.uk/video/index.rss) (Sir John Cadogan giving a lecture on Benzene since Faraday, in 1991)
  Benzene 3D view and pdb-file (http://www.welsch.com/e/index.php5?chap=6&moduletype=moleculeviewer&post_site=1)

Retrieved from "http://en.wikipedia.org/wiki/Benzene"

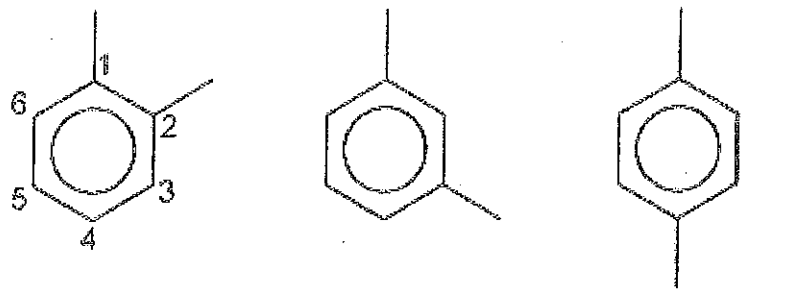
Categories: Annulenes | Simple aromatic rings | IARC Group 1 carcinogens | Soil contamination | Solvents | Aromatic hydrocarbons | Hazardous air pollutants | Water pollution | Immunotoxins

Xylene

From Wikipedia, the free encyclopedia

See also: o-Xylene, m-Xylene, and p-Xylene

The term xylenes refers to a group of 3 benzene derivatives which encompasses *ortho-*, *meta-*, and *para-* isomers of dimethyl benzene. The *o-*, *m-* and *p-* isomers specify to which carbon atoms (of the main benzene ring) the two methyl groups are attached. Counting the carbon atoms from one of the ring carbons bonded to a methyl group, and counting towards the second ring carbon bonded to a methyl group, the *o-* isomer has the IUPAC name of 1,2-dimethylbenzene. The *m-* isomer has the IUPAC name of 1,3-dimethylbenzene. And *p-* isomer has the IUPAC name of 1,4-dimethylbenzene.



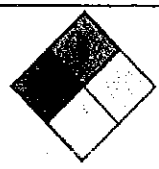
1,2-dimethylbenzene (*ortho*-xylene) 1,3-dimethylbenzene (*meta*-xylene) 1,4-dimethylbenzene (*para*-xylene)

It is a colorless, sweet-smelling liquid that is very flammable. It occurs naturally in petroleum and coal tar and is formed during forest fires. The chemical properties differ slightly from isomer to isomer. The melting point is between −47.87 °C (*m*-xylene) and 13.26 °C (*p*-xylene). The boiling point is for each isomer at around 140 °C. The density is at around 0.87 kg/L and thus is less dense than water. Xylene in air can be smelled at 0.08 to 3.7 parts of xylene per million parts of air (ppm) and can begin to be tasted in water at 0.53 to 1.8 ppm.

Chemical industries produce xylene from petroleum. It is one of the top 30 chemicals produced in the United States in terms of volume. Xylene is used as a solvent and in the printing, rubber, and leather industries. *p*-Xylene is used as a feedstock in the production of terephthalic acid, which is a monomer used in the production of polymers. It is also used as a cleaning agent for steel and for silicon wafers and chips, a pesticide [1] (http://www.cdpr.ca.gov/cgi-bin/epa/chemdet.pl?pccode=086803), a thinner for paint, and in paints and varnishes. It may be substituted for toluene to thin laquers where slower drying is desired. It is found in small amounts in airplane fuel and gasoline. In animal studies it is often swabbed on the ears of rabbits to facilitate blood flow and collection, although the area must subsequently be cleansed with alcohol to prevent inflammation.

With oxidizing agents, such as potassium permanganate ($KMnO_4$), the methyl group can be oxidized to a carboxylic acid. By oxidizing both methyl groups towards the acid, *o*-xylene forms phthalic acid, whereas *p*-xylene forms terephthalic acid.

Xylenes and Its Isomers			
General			
Common name	**Xylenes**	***o*-Xylene**	***m*-Xylene**
Systematic name	Dimethylbenzenes	1,2-Dimethylbenzene	1,3-Dimethylbenzene
Other names	Xylols	*o*-Xylol; Orthoxylene	*m*-Xylol; Metaxylene

Molecular formula	C_8H_{10}		
SMILES	Cc1c(C)cccc1	Cc1cc(C)ccc1	
Molar mass	106.16 g/mol		
Appearance	clear, colorless liquid		
CAS number	[1330-20-7]	[95-47-6]	[108-38-3]
Properties			
Density and phase	0.864 g/mL, liquid	0.88 g/mL, liquid	0.86 g/mL, liquid
Solubility in water	practically insoluble		
	Soluble in non-polar solvents such as aromatic hydrocarbons		
Melting point	-47.4°C (226 K)	−25°C (248 K)	−48°C (225 K)
Boiling point	138.5°C (412 K)	144°C (417 K)	139°C (412 K)
Viscosity		.812 cP at 20°C	.62 cP at 20°C
Hazards			
MSDS	Xylenes (http://sciencelab.com/msds.php?msdsId=9927646)	*o*-Xylene (http://sciencelab.com/msds.php?msdsId=9927647)	*m*-Xylene (http://sciencelab.com/msds.php?msdsId=9927323)
EU classification	Harmful (**Xn**)		
NFPA 704			
Flash point	24°C	17°C	25°C
R/S statement	R10, R20/21, R38: (S2), S25		
RTECS number		ZE2450000	ZE2275000
Supplementary data page			
Structure & properties	n, ε_r, etc.		
Thermodynamic data	Phase behaviour Solid, liquid, gas		
Spectral data	UV, IR, NMR, MS		
Related compounds			
Related aromatic hydrocarbons	toluene, mesitylene, benzene, ethylbenzene		
Related compounds	xylenols - types of phenols		

Except where noted otherwise, data are given for materials in their standard state (at 25°C, 100 kPa)
Infobox disclaimer and references

Health effects

Xylene affects the brain. High levels from exposure for short periods (14 days or less) or long periods (more than 1 year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels (see inhalants).

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. It is not yet known whether xylene harms the unborn fetus if the mother is exposed to low levels of xylene during pregnancy.

Besides occupational exposure, the principal pathway of human contact is via soil contamination from leaking underground storage tanks containing petroleum products. Humans who come into contact with the soil or groundwater may become affected. Use of contaminated groundwater as a water supply could lead to adverse health effects.

Another common form of human exposure to xylene is in the use of certain types of pens, writing and drawing instruments, and art supplies.

See also

Water pollution
- Toxicity
- Gasoline

External links

- International Chemical Safety Card 0084 (http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/_icsc00/icsc0084.htm) (*o*-Xylene)
- International Chemical Safety Card 0085 (http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/_icsc00/icsc0085.htm) (*m*-Xylene)
- International Chemical Safety Card 0086 (http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/_icsc00/icsc0086.htm) (*p*-Xylene)
- NIOSH Pocket Guide to Chemical Hazards (http://www.cdc.gov/niosh/npg/npgd0668.html) (*o*-Xylene)
- NIOSH Pocket Guide to Chemical Hazards (http://www.cdc.gov/niosh/npg/npgd0669.html) (*m*-Xylene)
- NIOSH Pocket Guide to Chemical Hazards (http://www.cdc.gov/niosh/npg/npgd0670.html) (*p*-Xylene)
- European Chemicals Bureau (http://ecb.jrc.it/)

Categories: Aromatic hydrocarbons | Hazardous air pollutants | Soil contamination | Solvents

Toluene

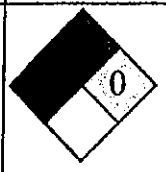
From Wikipedia, the free encyclopedia

Toluene, also known as methylbenzene or phenylmethane, is a clear, water-insoluble liquid with the typical smell of paint thinners, redolent of the sweet smell of the related compound benzene. It is an aromatic hydrocarbon that is widely used as an industrial feedstock and as a solvent.

Contents

History

The name *toluene* was derived from the older name *tolu* that refers to tolu balsam, an aromatic extract from the tropical American tree

Toluene	
	
General	
Systematic name	methylbenzene
Other names	toluene phenylmethane toluol
Molecular formula	C_7H_8
SMILES	Cc1ccccc1
Molar mass	92.14 g/mol
Appearance	Clear colorless, liquid
CAS number	[108-88-3]
Properties	
Density and phase	0.8669 g/cm³, liquid
Solubility in water	0.053 g/100 mL (20-25°C)
In ethanol, acetone, hexane, dichloromethane	Fully miscible
Melting point	−93 °C (180 K)/(-135.4°F)
Boiling point	110.6°C (383.8 K)/ 231.08°F
Critical temperature	320 °C (593 K)/ 608°F
Viscosity	0.590 cP at 20°C/ 68°F
Dipole moment	0.36 D
Hazards	
MSDS	ScienceLab.com (http://www.sciencelab.com/xMSDS-Toluene-9927301)
Main hazards	highly flammable
NFPA 704	
Flash point	4 °C/ 39.2 °F
R-phrases	R11, R38, R48/20, R63, R65, R67
S-phrases	(S2), S36/37, S29, S46, S62
RTECS number	XS5250000
Supplementary data page	

Myroxylon balsamum, from which it was first i ted. It was o ally named by Jöns Jakob Berzelius.

Structure & properties	π, ε_r, etc.
Thermodynamic data	Phase behaviour Solid, liquid, gas
Spectral data	UV, IR, NMR, MS
Related compounds	
Related aromatic hydrocarbons	benzene xylene naphthalene
Related compounds	methylcyclohexane
Except where noted otherwise, data are given for materials in their standard state (at 25°C, 100 kPa) Infobox disclaimer and references	

Chemical properties

Toluene reacts as a normal aromatic hydrocarbon towards electrophilic aromatic substitution.[1][2][3] The methyl group makes it around 25 times more reactive than benzene in such reactions. It undergoes smooth sulfonation to give *p*-toluenesulfonic acid, and chlorination by Cl_2 in the presence of $FeCl_3$ to give ortho and para isomers of chlorotoluene. It undergoes nitration to give ortho and para nitrotoluene isomers, but if heated it can give dinitrotoluene and ultimately the explosive trinitrotoluene (TNT).

With other reagents the methyl side chain in toluene may react, undergoing oxidation. Reaction with potassium permanganate leads to benzoic acid, whereas reaction with chromyl chloride leads to benzaldehyde (Étard reaction). Halogenation can be performed under free radical conditions. For example, *N*-bromosuccinimide (NBS) heated with toluene in the presence of AIBN leads to benzyl bromide.

C tic hydrogenation of toluene to methylcyclohexane requires a high pressure of hydrogen to go to completion, bec e of the stability of the aromatic system.

Preparation

Toluene occurs naturally at low levels in crude oil and is usually produced in the processes of making gasoline via a catalytic reformer, in an ethylene cracker or making coke from coal. Final separation (either via distillation or solvent extraction) takes place in a BTX plant.

Uses

Toluene is a common solvent, able to dissolve: paints, paint thinners, many chemical reactants, rubber, printing ink, adhesives (glues), lacquers, leather tanners, and disinfectants. It can also be used as a fullerene indicator, and is a raw material for toluene diisocyanate (used in the manufacture of polyurethane foam) and TNT. Industrial uses of toluene include dealkylation to benzene and disproportionation to a mixture of benzene and xylene. When oxidized it yields benzaldehyde and benzoic acid, two important intermediates in chemistry. It is also used as a carbon source for making Multi-Wall Carbon Nanotubes. Toluene can be used to break open red blood cells in order to extract hemoglobin in biochemistry experiments.

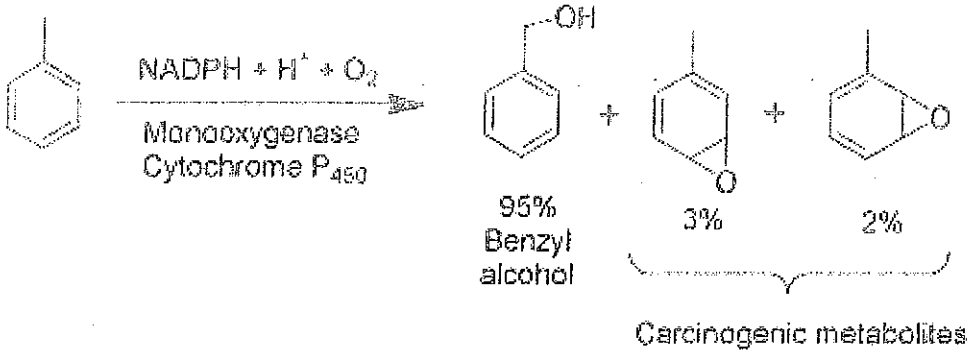
Toluene can be used as an octane booster in gasoline fuels used in internal combustion engines. Toluene at 84% by v e, fueled all the turbo Formula 1 teams in the 1980s.

Toxicology and metabolism

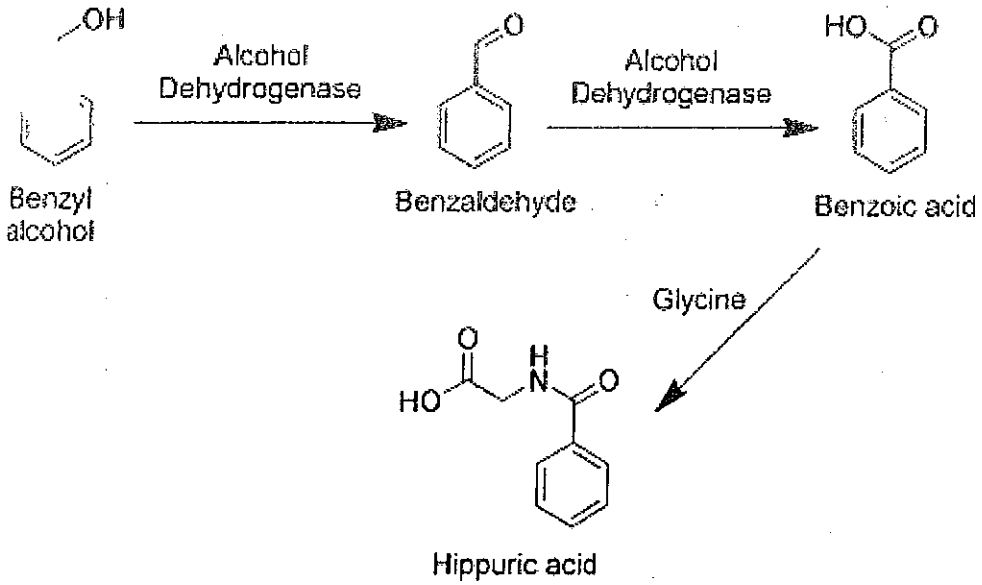
Inhalation of toluene fumes can be intoxicating, but in larger doses nausea-inducing. Toluene may enter the human

system not only through vapour inhalation from the liquid evaporation, but also following soil contamination events, where human contact with soil, ingestion of contaminated groundwater or soil vapour off-gassing can occur.

oxicity of toluene can be explained mostly by its metabolism. As toluene has very low water solubility, it cannot e body via the normal routes (urine, feces, or sweat). It must be metabolized in order to be excreted. The methyl group of toluene is more easily oxidized by cytochrome P450 than the benzene ring. Therefore, in the metabolism of toluene, 95% is oxidized to become benzyl alcohol.[4] The toxic metabolites are created by the remaining 5% that are oxidized to benzaldehyde and cresols.[5][6] Most of the reactive products are detoxified by conjugation to glutathione but the remainder may severely damage cells.[7]



Toluene is mainly excreted as benzoic acid and hippuric acid, both formed by further metabolic oxidation of benzyl alcohol.



See also

- Organic chemistry
- Water pollution
- Isotoluenes are toluene isomers

I rences

1. ^ B. S. Furnell et al., *Vogel's Textbook of Practical Organic Chemistry*, 5th edition, Longman/Wiley, New York, 1989
2. ^ L. G. Wade, *Organic Chemistry*, 5th ed., p. 871, Prentice Hall, Upper Saddle RIver, New Jersey, 2003
3. ^ J. March, *Advanced Organic Chemistry*, 4th ed., p. 723, Wiley, New York, 1992

4. ^ Nakajima T, Wang R, Elovaara E, Gonzalez F, Gelboin H, Raunio H, Pelkonen O, Vainio H, Aoyama T (1997). "Toluene metabolism by cDNA-expressed human hepatic cytochrome P450". *Biochem Pharmacol* 53 (3): 271-7. PMID 9065730 (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9065730).
5. ^ Chapman D, Moore T, Michener S, Powis G. "Metabolism and covalent binding of [14C]toluene by human and rat liver microsomal fractions and liver slices". *Drug Metab Dispos* 18 (6): 929-36. PMID 1981539 (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1981539).
6. ^ Hanioka H, Hamamura M, Kakino K, Ogata H, Jinno H, Takahashi A, Nishimura T, Ando M (1995). "Dog liver microsomal P450 enzyme-mediated toluene biotransformation". *Xenobiotica* 25 (11): 1207-17. PMID 8592870 (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8592870).
7. ^ van Doorn R, Leijdekkers C, Bos R, Brouns R, Henderson P (1981). "Alcohol and sulphate intermediates in the metabolism of toluene and xylenes to mercapturic acids". *J Appl Toxicol* 1 (4): 236-42. PMID 6764216 (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6764216).

External links

- External solubility data (http://144.16.93.203/energy/HC270799/HDL/ENV/enven/vol364.htm)
- Computational Chemistry Wiki (http://www.compchemwiki.org/index.php?title=Toluene)

Retrieved from "http://en.wikipedia.org/wiki/Toluene"

Categories: Articles with unsourced statements since March 2007 | All articles with unsourced statements | Aromatic hydrocarbons | Hazardous air pollutants | Soil contamination | Solvents | Antiknock agents | DEA List II chemicals

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Department of Health and Human Services
Agency for Toxic Substances & Disease Registry

ToxFAQs™

ToxFAQs™
for
Ethylbenzene
(*Etilbenceno*)
June 1999

PDF Version, 125 KB

CAS#: 100-41-4

This fact sheet answers the most frequently asked health questions about ethylbenzene. For more information, you may call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

Highlights

Ethylbenzene is a colorless liquid found in a number of products including gasoline and paints. Breathing very high levels can cause dizziness and throat and eye irritation. Ethylbenzene has been found in at least 731 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is ethylbenzene?

Ethylbenzene is a colorless, flammable liquid that smells like gasoline. It is found in natural products such as coal tar and petroleum and is also found in manufactured products such as inks, insecticides, and paints.

Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

What happens to ethylbenzene when it enters the environment?

- Ethylbenzene moves easily into the air from water and soil.
- It takes about 3 days for ethylbenzene to be broken down in air into other chemicals.
- Ethylbenzene may be released to water from industrial discharges or leaking underground storage tanks.
- In surface water, ethylbenzene breaks down by reacting with other chemicals found naturally in water.
- In soil, it is broken down by soil bacteria.

How might I be exposed to ethylbenzene?

- Breathing air containing ethylbenzene, particularly in areas near fast cities or highways.
- Drinking contaminated tap water.
- Working in an industry where ethylbenzene is used or made.
- Using products containing it, such as gasoline, carpet glues, varnishes, and paints.

How can ethylbenzene affect my health?

Limited information is available on the effects of ethylbenzene on people's health. The available information shows dizziness, throat and eye irritation, tightening of the chest, and a burning sensation in the eyes of people exposed to high levels of ethylbenzene in air.

Animals studies have shown effects on the nervous system, liver, kidneys, and eyes from breathing ethylbenzene in air.

How likely is ethylbenzene to cause cancer?

The EPA has determined that ethylbenzene is not classifiable as to human carcinogenicity.

No studies in people have shown that ethylbenzene exposure can result in cancer. Two available animal studies suggest that ethylbenzene may cause tumors.

How does ethylbenzene affect children?

Children may be exposed to ethylbenzene through inhalation of consumer products, including gasoline, paints, inks, pesticides, and carpet glue. We do not know whether children are more sensitive to the effects of ethylbenzene than adults.

It is not known whether ethylbenzene can affect the development of the human fetus. Animal studies have shown that when pregnant animals were exposed to ethylbenzene in air, their babies had an increased number of birth defects.

How can families reduce the risk of exposure to ethylbenzene?

Exposure to ethylbenzene vapors from household products and newly installed carpeting can be minimized by using adequate ventilation.

Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.

Sometimes older children sniff household chemicals, including ethyl-benzene, in an attempt to get high. Talk with your children about the dangers of sniffing chemicals.

Is there a medical test to show whether I've been exposed to ethylbenzene?

Ethylbenzene is found in the blood, urine, breath, and some body tissues of exposed people. The most common way to test for ethylbenzene is in the urine. This test measures substances formed by the breakdown of ethylbenzene. This test needs to be done within a few hours after exposure occurs, because the substances leave the body very quickly.

These tests can show you were exposed to ethylbenzene, but cannot predict the kind of health effects that might occur.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level of 0.7 milligrams of ethylbenzene per liter of drinking water (0.7 mg/L).

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of ethylbenzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 100 parts of ethylbenzene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological Profile for Ethylbenzene. *Update*. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Environmental Medicine
1600 Clifton Road NE, Mailstop F-32
Atlanta, GA 30333
Phone: 1-888-42-ATSDR (1-888-422-8737)
FAX: (770)-488-4178
Email: ATSDRIC@cdc.gov

This page was updated on 02/07/2007

APPENDIX C – PARTS LIST AND SPARE PARTS RECORDS

APPENDIX C – PARTS LIST AND SPARE PARTS RECORDS

PRODUCT LEVEL CONTROL, INC.

SVE / DUAL PHASE PARTS LIST

File Name: 07-050 BOM
Customer: KLEIGMAN BROS
Site Reference: GLENDALE/QUEENSNY
Date: 11/20/2007
Generated by: Bruce

Reference	Qty	Units	Description	Material	Part Number
B 201, 202	2	each	BLOWER, REGENERATIVE, ENVIRONMENTAL, 2 1/2" FNPT I/O, R7, 10 HP 3 PHASE, TEFC, 208-230/460 V, 35-29.5/15 AMPS, 3 PHASE		GAST-R7100A-3
FILTER/SILENCER	2	each	FILTER, AIR, INLINE, 2 1/2" FNPT WITH QUICK RELEASE LID-290SCFM	STEEL/POLY ESTER	SOLBERG-CSL-851-250HC
VRV 105	1	each	VACUUM RELIEF VALVE, 2" FNPT, 2/229, 5/338, 10/415, 15/426, 20/426 ("HG/SCFM RATING) RATED FOR SERVICE UP TO 29"HG	BRONZE, SS, CAST	KUNKLE-215V-H01AQE0007 (SET VACUUM, 7 INCH Hg)

PRODUCT LEVEL CONTROL, INC.

AIR WATER SEPARATOR PARTS LIST

File Name: 07-050 BOM
Customer: KLEIGMAN BROS
Site Reference: GLENDALE/QUEENSNY
Date: 11/20/2007
Generated by: Bruce

Reference	Qty	Units	Description	Material	Part Number
T 101	1	each	40 GALLON SEPARATOR WITH MANUAL DRAIN VALVE, 20" Hg MAX, LINED	16 GA STEEL	PLC-MDXX-WSD55-XXS
LSH 101	1	each	LEVEL SWITCH, VERTICAL, SINGLE LEVEL SWITCHING, 2" FNPT TOP MOUNT, 25' SJOW CORD, POLYPROPYLENE FLOAT, PVC BODY	PP/PVC	PLC-SDA0-TFS163-XXE31
DRAIN PUMP PLUS SPARE	2	each	PUMP END, POSITIVE DISPLACEMENT PROGRESSING CAVITY, 15GPM @ 0PSI, 10.4GPM @ 40PSI, 3/4"I X 3/4"O, 5/8" SHAFT	CI/SS/NBR	MOYNO 500-34401
DRAIN PUMP PLUS SPARE	2	each	MOTOR, 1 HP, 1800 RPM, 56 FRAME, 3 PHASE 60 Hz 208-230/460 VAC, 1.47 FL AMPS AT 460 VAC, TEFC, 1.25 SERVICE FACTOR, 104°F AMBIENT TEMPERATURE, 3300 FEET ABOVE SEA LEVEL, CLASS F INSULATION	CAST IRON FRAME	WEG-00118ES3ED56

PRODUCT LEVEL CONTROL, INC.

ENCLOSURE

File Name: 07-050 BOM
Customer: KLEIGMAN BROS
Site Reference: GLENDALE/QUEENSNY
Date: 11/20/2007
Generated by: Bruce

Reference	Qty	Units	Description	Material	Part Number
building	1	each	HOT-BOX MODEL LB3E-D, INSIDE DIMENSIONS 74"L x 55"W x 57.5"H, 18 GAUGE ALUMINIMUM EXTERIOR, EXPOSED POLYISOCYANURATE INSULATION INTERIOR, LESS DRAINAGE PORTS		LB3E-D LESS DRAINAGE PORTS
heater	1	each	Wall Mount Heater, Voltage Rating 240/208 Volts, Current Rating 8.4 Amps, Power Rating 2000 Watts, BtuH 6824, Finish White, Automatic Re-set thermal Overload Protection with Indicator Light		GRAINGER-5ZK70 SURFACE MOUNT
exhaust fan	1	each	Exhaust Fan, Guard Mounted, Propeller Dia 10 In, CFM @ 0.000-In SP 595, @ 0.125-In SP 405, Sones @ 0.000-In SP @ 5 Ft 5.5, Voltage 115, 60 Hz, Single Phase, Operating Amps 1.4, Motor HP 1/30, Max Ambient Temp 104 F, Max Depth 5 9/16 In, Mounting Position Vertical/Horizontal, Outside Dia 13 In	AL/STEEL	GRAINGER-1HKL3
louver	1	each	Hvy Dty Alum Frame Movable-Blade Wall Louver 12" X 12" Opening, Motorized Operation 115/230 VAC, 60 Hz, single phase with four 36" leads for hardwiring, Recessed Mnt	AL	McMASTER-2047K138

PRODUCT LEVEL CONTROL, INC.

GAUGES

File Name: 07-050 BOM
Customer: KLEIGMAN BROS
Site Reference: GLENDALE/QUEENSNY
Date: 11/20/2007
Generated by: Bruce

Reference	Qty	Units	Description	Material	Part Number
FI 101, 102, 103, 201, 202, SPARES (2)	7	each	VENTURI FLOWMETER, 3" FPT, 95-475 SCFM	ALUMINUM	ROTRON-FM30C475Q-550607
FI 203	1	each	VENTURI FLOWMETER, 4" FPT, 120-600 SCFM	ALUMINUM	ROTRON-FM40C600Q-550609
PI 201, 202, 204, 205	4	each	GAUGE, VACUUM, 0-60" WC 2 1/2" DIAL 1/4" MNPT LBM -20-180°F	PS/CU,BR,PS, RTV	Ashcroft-251490A02LXXX60"H2OVAC
PI 203, 206, 210	3	each	GAUGE, PRESSURE, 0-60" WC 2 1/2" DIAL 1/4" MNPT CBM -20-180°F	PS/CU,BR,PS, RTV	Ashcroft-251490A02BXXX60"H2O
PORTABLE FLOW INDICATOR	2	each	DWYER 471-2 DIGITAL THERMO ANEMOMETER WITH TELESCOPING PROBE, INCLUDES BATTERY, WRIST STRAP, 6-STEP DRILL, CARRYING CASE AND INSTRUCTIONS		DWYER 471-2
TI 201, 202, 203	3	each	THERMOMETER, 0-250°F 3" DIAL 2 1/2" STEM 1/2" MNPT CBM	300 SS	GOODIN-3BM25250, WEISS 3BM25

PRODUCT LEVEL CONTROL, INC.

VALVES

File Name: 07-050 BOM
Customer: KLEIGMAN BROS
Site Reference: GLENDALE/QUEENSNY
Date: 11/20/2007
Generated by: Bruce

Reference	Qty	Units	Description	Material	Part Number
BV 100, 101, 102, 103	4	each	VALVE, BUTTERFLY, WAFER TYPE, LOCKABLE LEVER HANDLE, 3"	SCH 80 PVC/EDPM	CEPEX-16708, 89991030
BV 104, 105	2	each	VALVE, BUTTERFLY, WAFER TYPE, LOCKABLE LEVER HANDLE, 4"	SCH 80 PVC/EDPM	CEPEX-16709, 89991040
BV 204	3	each	VALVE, BUTTERFLY, WAFER TYPE, LOCKABLE LEVER HANDLE, 4", 200 NSWOG	CAST/ALBRONZE/EPDM	MILWAUKEE-4CW223E
CV 201, 202	2	each	CHECK VALVE, 3" WAFER DESIGN NARROW PROFILE SWING CHECK, LOW PRESSURE DROP, PNEUMATIC AND BULK MATERIAL HANDLING, 150PSI, 450F, INCLUDES PIVOT STOPPER FOR USE IN VERTICAL UPFLOW	AL/TEFLON	TECHNOCHECK-110-3" WITH STOPPER
CV 204	1	each	CHECK VALVE, 4" WAFER DESIGN NARROW PROFILE SWING CHECK, LOW PRESSURE DROP, PNEUMATIC AND BULK MATERIAL HANDLING, 150PSI, 450F, INCLUDES PIVOT STOPPER FOR USE IN VERTICAL UPFLOW	AL/TEFLON	TECHNOCHECK-110-4" WITH STOPPER
GV 106	1	each	VALVE, GATE, FNPT, 3", 200 WOG 125 SWP	BRONZE	WATTS-3WGV
GV 201, 202	4	each	VALVE, GATE, FNPT, 2 1/2", 200 WOG 125 SWP	BRONZE	WATTS-212WGV
SAMPLE PORTS	3	each	1/4" MNPT BARBED SAMPLE PORT	BRASS	4793K2

SPARE PARTS RECORDS

PART REFERENCE	QTY/DATE	OPERATOR	DESCRIPTION	MATERIAL	PART NO.

APPENDIX D – URS EXISTING SVE SYSTEM O&M MANUAL

Operation and Maintenance Manual
And
As-Built Drawings For
Soil Vapor Extraction System

Kliegman Bros. Site
Queens County
Site # 2-41-031

May 12th, 2003

Prepared By:
EnviroTrac Ltd
80 B Air Park Drive
Ronkonkoma, NY 11779
(631) 471-1500

A Full Service Environmental Consulting and Contracting Firm

EnviroTrac

Table of Contents

Figures

Appendices

EnviroTrac Ltd
80 B Air Park Drive
Ronkonkoma, New York

URS Corp.
282 Delaware Avenue
Buffalo, New York

Project: **Kliegman Bros. Site**
76-01 77th Ave
Glendale, New York

SECTION 1: SYSTEM DESCRIPTION

1.1 Theory of Operation

The Soil Vapor Extraction (SVE) system installed by EnviroTrac Ltd. at the former Kliegman Bros. site is designed for soil degassing and subsurface ventilation applications that require low vacuum/high flow capabilities.

The SVE system works by applying a vacuum through wells near the source of contamination in the soil. Volatile constituents of the contaminant mass "evaporate" and the vapors are drawn toward the extraction wells. The extracted vapor is then pulled through the associated piping and treated by two 1000-lb carbon units before being discharged to the atmosphere. The increased airflow through the subsurface can also stimulate biodegradation of some of the less volatile contaminants.

1.2 System Components

The SVE system consists of: a regenerative blower, inlet and outlet piping, a manifold, a moisture separator, a fresh air valve, an air filter, inlet and outlet silencers, a temperature gauge, a pressure gauge, vacuum gauges, a flow-meter, a portable velocity meter, and two 1000-lb vapor phase carbon units. Blower specifications and performance curves are provided as Appendix A. On each of the manifold legs there is a vacuum gauge, a ball valve, and a sample/anemometer port. A flow-meter is located on the influent side of the air filter to measure the total system flow rate. A vacuum gauge is located on both the influent and effluent sides of the air filter. The fresh air valve is located on the manifold. A pressure gauge, temperature gauge, and an anemometer/sample port are located on the effluent side of the blower before the first carbon unit. A sample port is located after both the first and second carbon units. A ¼" sample port is located at the wellheads of each of the three SVE wells. The control panel for the system is mounted on the outside of the system enclosure. An automatic programmable speech dialer has been install inside the control panel. The autodialer has the ability to call up to four numbers in the event of a system shutdown. Refer to Appendix G for instructions on programming the autodialer. An electrical schematic for the control panel can be found in figure E1. Refer to Figures 1–3 for a complete description of the system, including a site map, trench cross-sections and wellhead details, and a process and instrumentation diagram. The blower and gauge manufacturers are listed below:

Regenerative Blowers – Siemens - Model 2BH18001AK12
Vacuum Gauges (On Manifold) - Noshok - 200 Series diagram gauges

Vacuum Gauges (On Blower) - Weiss – Model 10806

Flowmeter - Rotron - Model FM30C350Q

SECTION 2: SYSTEM START-UP

Equipment start-up will demonstrate that the equipment has been properly installed and is performing satisfactorily. Equipment start-up shall include system operation and diagnosis only. This phase will continue until, in the opinion of the Engineer and/or the URS Representative, the system operates satisfactorily and satisfies design specifications.

Prior to the initiation of start-up activities, the following services will be performed:

- Inspect and clean equipment and piping so they are free of foreign matter.
- Check motor driven equipment for correct rotation. Motor rotation should be checked after any modifications have been made to the motor contact located within the panel.
- Open and close valves by hand and operate other devices to check for binding interference or improper functioning.
- Check power supply for correct voltage and polarity for electric powered equipment.

SECTION 3: SYSTEM OPERATION

Periodic adjustments to the system manifold will be required to ensure maintenance of adequate air/soil gas flow through the formation. The system is designed for a minimum total flow rate of 220 cfm and a vacuum of 20 in. w.c. at each wellhead. When insufficient or excessive vacuum has been detected, adjustments to the valves of the SVE wells will be required. The ball valves located on each of the manifold legs can be opened or closed to increase or decrease airflow and vacuum.

Actual site conditions are likely to vary as soil moisture content fluctuates. As soil moisture content increases, you are likely to see higher running vacuums and quicker elapsed time to fill the moisture separator. The system has been designed to withstand such fluctuations. If there is too much water entering the system, simply reduce the vacuum by closing the ball valves on the manifold.

The blower vacuum should be recorded during each visit. The gauge located nearest the blower should never exceed the blower's maximum vacuum of 92.5 "H_2O. A vacuum relief valve has been installed as a preventative measure to ensure that the blower's maximum vacuum is never exceeded.

The recommended tasks to be performed during monthly visits are as follows.

- Inspect soil vapor extraction system.
- Perform vacuum balance adjustment, as required to maintain a wellhead vacuum of 20 in. w.c. The wellhead vacuums can be monitored from the sample ports installed at the top of each well. (See

figure 2.) Note that during times of high soil moisture content, the vacuum should be lowered to reduce the amount of moisture generated.

- Work valves, to ensure they are operable.
- Measure and record soil vapor flow rate from each extraction well.
- Measure and record vacuum at each extraction well.
- Measure and record total soil vapor flow rate.
- Measure and record vacuum on both the influent and effluent of the air filter.
- Measure and record temperature on the effluent of the blower.
- Measure and record pressure of the blower's discharge.
- Measure and record volatile organic compound concentrations (VOCs) at each extraction well (hand pump required).
- Measure and record volatile organic compound concentrations (VOCs) at the combined discharge before, in-between, and after the two carbon units.

SECTION 4: SYSTEM MAINTENANCE

The following can be used as a guideline for equipment maintenance. All procedures should be followed on a monthly basis.

Rotron – Regenerative Blower Model DR707D89MX

- Keep air filter clean as described below. If foreign material enters the blower, the cover and impeller should be removed and cleaned to avoid impeller imbalance. Bearings should be changed after 15,000 to 20,000 hours on average. Refer to Appendix A for blower specs and maintenance instructions.

Solberg – Air Filter CSL-239-300C

- Replace filter element when the differential pressure across the filter is 10" water column above the initial pressure differential. A cut sheet for this series of Air Filters is provided as Appendix B.

Rotron – Direct Read Flow Meter

- The air flow meter is designed to require minimal maintenance. If the tubes of the meter become plugged remove and clean them. Refer to Appendix C for operation and maintenance procedures.

Rotron – MS300D Moisture Separator

- Remove the cover and inspect the inside of the moisture separator. If necessary wash out the inside of the moisture separator with water. The relief valve should be inspected upon emptying the separator and readjusted upon restart. Refer to manual (Appendix D) for procedure.

General Carbon – TV-1000 Vapor Phase Carbon Vessels

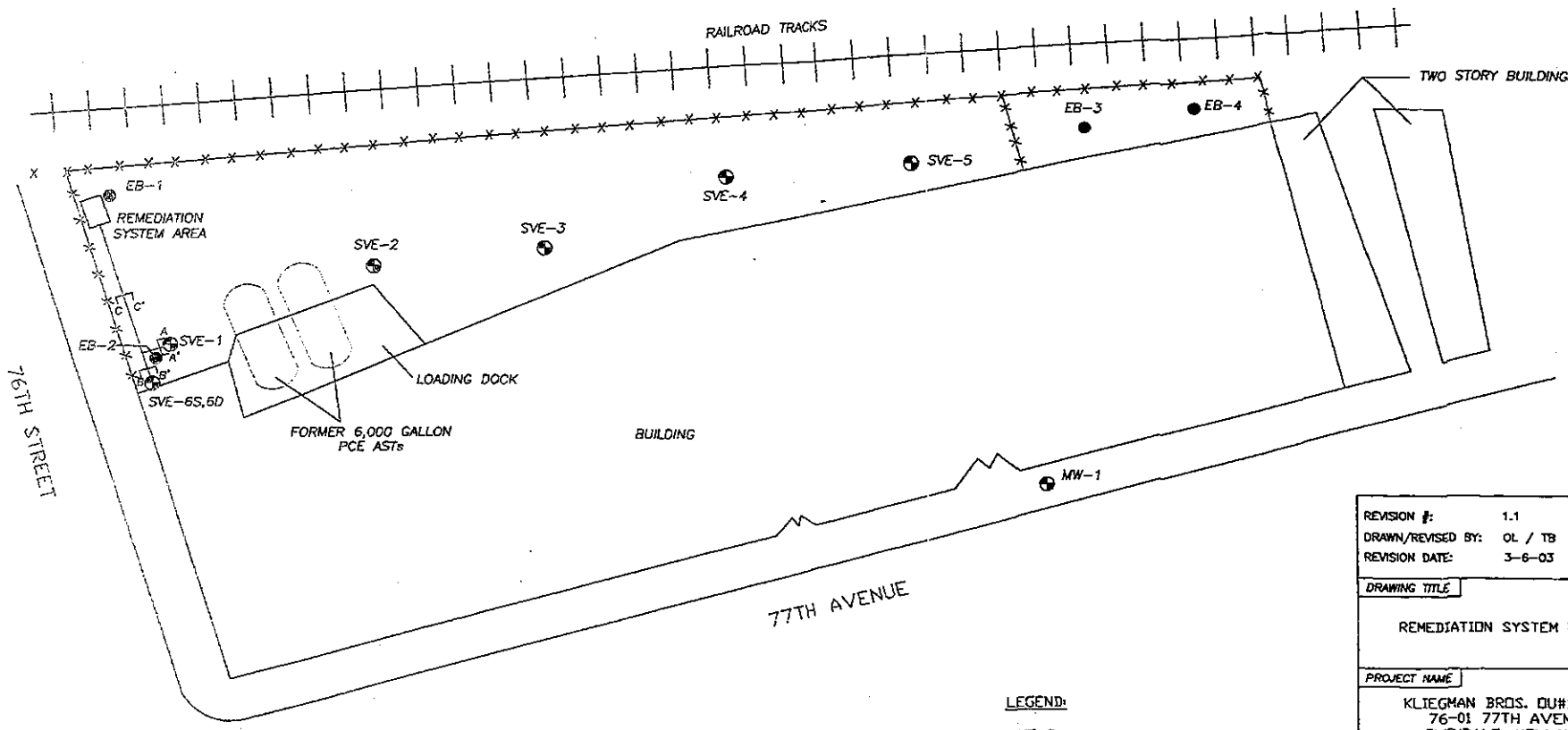
- The only maintenance required is testing for contaminants in the influent and effluent streams, and checking the operating pressure of the system. To change the carbon unbolt the flange on top of the vessel and use a large vacuum to remove the carbon. A cut sheet and maintenance guide is provided as Appendix E.

Marley – Series B2452 Wall Heater

- Every six months the heater should be opened and cleaned. After each year of use 2 or 3 drops of S.A.E. 10W or 20W oil should be added to the fan motor bearings. Refer to Appendix F for maintenance and trouble-shooting procedures.

System Telephone Number

- (718) 890 – 6464



LEGEND:

SVE-5 — SAMPLING LOCATION & SOIL VAPOR EXTRACTION WELL LOCATION

EB-3 — SOIL SAMPLING LOCATION

A / A' — TRENCH CROSS SECTION

SYSTEM LINES

FENCE

REVISION #:	1.1	FIGURE:
DRAWN/REVISED BY:	OL / TB	1
REVISION DATE:	3-6-03	

DRAWING TITLE

REMEDIATION SYSTEM LAYOUT

PROJECT NAME

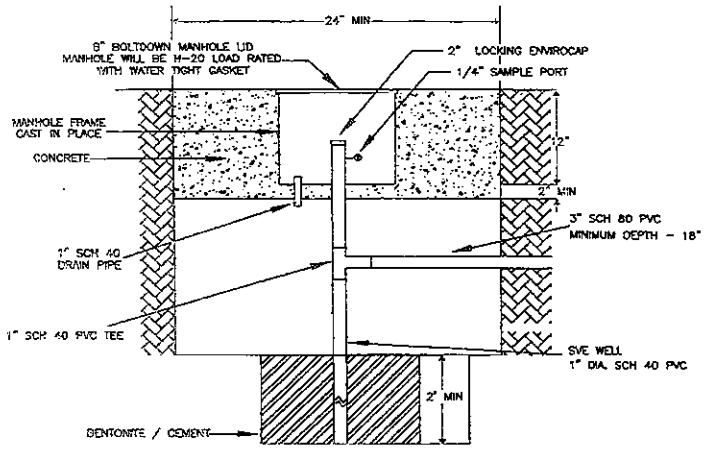
KLIEGMAN BROS. OU#1 SITE
76-01 77TH AVENUE
GLENDALE, NEW YORK

PREPARED FOR

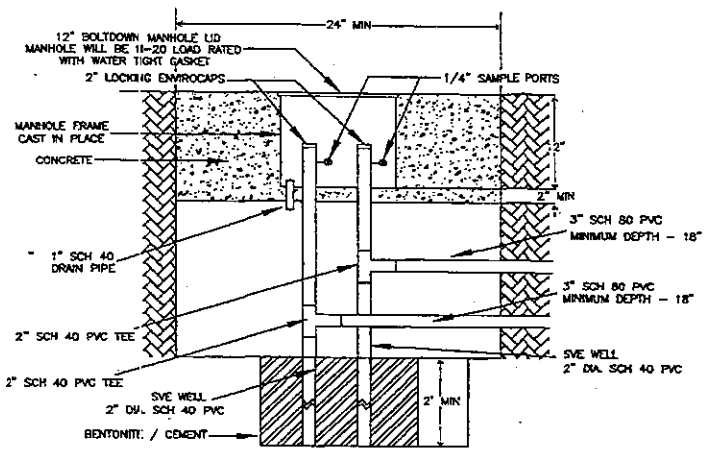
URS CORPORATION
282 DELAWARE AVENUE
BUFFALO, NEW YORK 14202

EnviroTrac
80-B Air Park Drive
Ronkonkoma, New York 11779
Phone: (631) 471-1500 Fax: (631) 471-6363

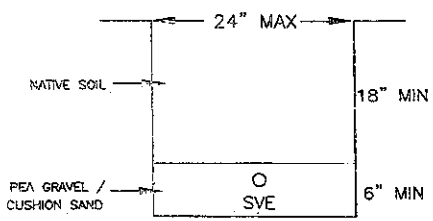
SVE-1



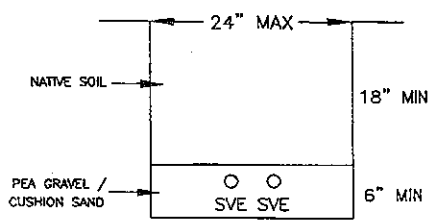
SVE-6S, 6D



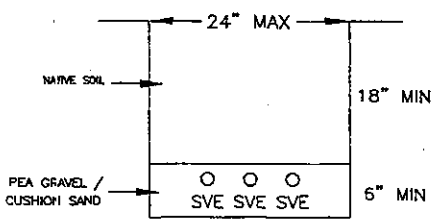
TYPICAL TRENCH CROSS SECTIONS



SECTION A – A'



SECTION B – B'



SECTION C – C'

NOTE:

1) ALL SOIL VAPOR EXTRACTION PIPING IS 3" DIAMETER PVC SCHEDULE 80
2) IF THE EXCAVATED SOIL IS NOT SUITABLE FOR BACKFILL, OFFSITE SOURCES OF BACKFILL MUST BE PROVIDED. THE REUSE OF THE SOIL WILL BE DIRECTED BY THE ENGINEER.
3) EDGES OF THE TRENCHES WILL BE SAWCUT THROUGH THE EXISTING ASPHALT.
4) TRENCHES WILL BE BACKFILLED AND RESTORED TO MATCH EXISTING CONDITION AND ELEVATION

REVISION #:	1.2	FIGURE:
DRAWN/REVISED BY:	OL / TB	2
REVISION DATE:	5-28-03	

DRAWING TITLE

TRENCH CROSS SECTION
AND WELLHEAD DETAILS

PROJECT NAME

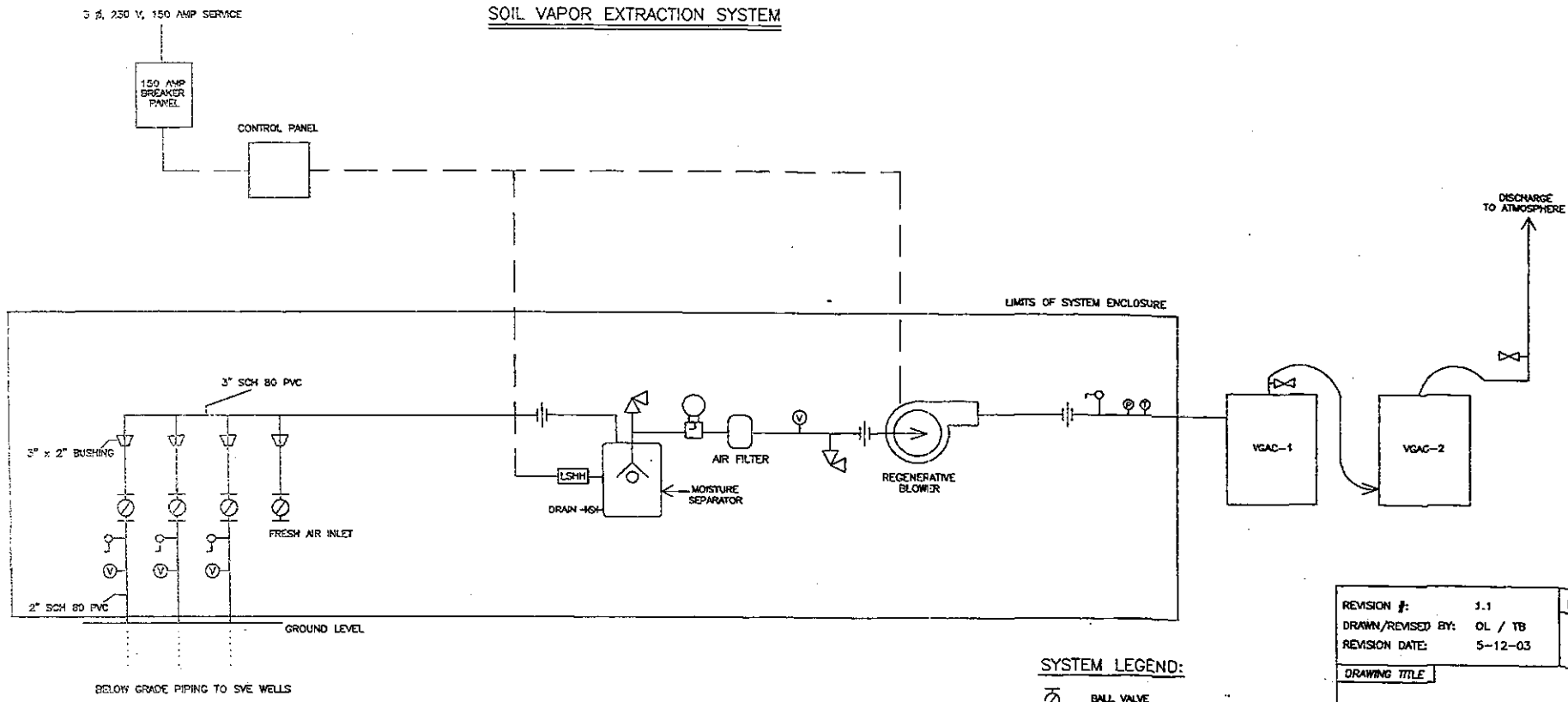
KLIEGMAN BROS. DU#1 SITE
76-01 77TH AVENUE
GLENDALE, NEW YORK

PREPARED FOR

URS CORPORATION
282 DELAWARE AVENUE
BUFFALO, NEW YORK 14202

EnviroTrac
80-B Air Park Drive
Ronkonkoma, New York 11779
Phone: (631) 471-1500 Fax: (631) 471-6363

SOIL VAPOR EXTRACTION SYSTEM



NOTE:

BLOWER: ROTRON MODEL NO: DR707DB9MX
AIR FILTER: SOLBERG MODEL NO: CSL-239-300C
MOISTURE SEPARATOR: ROTRON MODEL NO: MS300D
VAPOR PHASE CARBON ADSORPTION UNITS: GENERAL CARBON MODEL:TV-1000

SYSTEM LEGEND:

- BALL VALVE
- FLOWMETER
- VACUUM RELIEF VALVE
- UNION
- LSHH — HIGH WATER LEVEL SENSOR
- V — VACUUM GAUGE
- P — PRESSURE GAUGE
- T — TEMPERATURE GAUGE
- SAMPLE PORT, ANEMOMETER PORT
- SAMPLE PORT

REVISION #:	1.1	FIGURE:
DRAWN/REVISED BY:	OL / YB	3
REVISION DATE:	5-12-03	

DRAWING TITLE

PROCESS AND INSTRUMENTATION DIAGRAM
SOIL-VAPOR EXTRACTION

PROJECT NAME

KLIEGMAN BROS. OU#1 SITE
76-01 77TH AVENUE
GLENDALE, NEW YORK

PREPARED FOR

URS CORPORATION
282 DELAWARE AVENUE
BUFFALO, NEW YORK 14202

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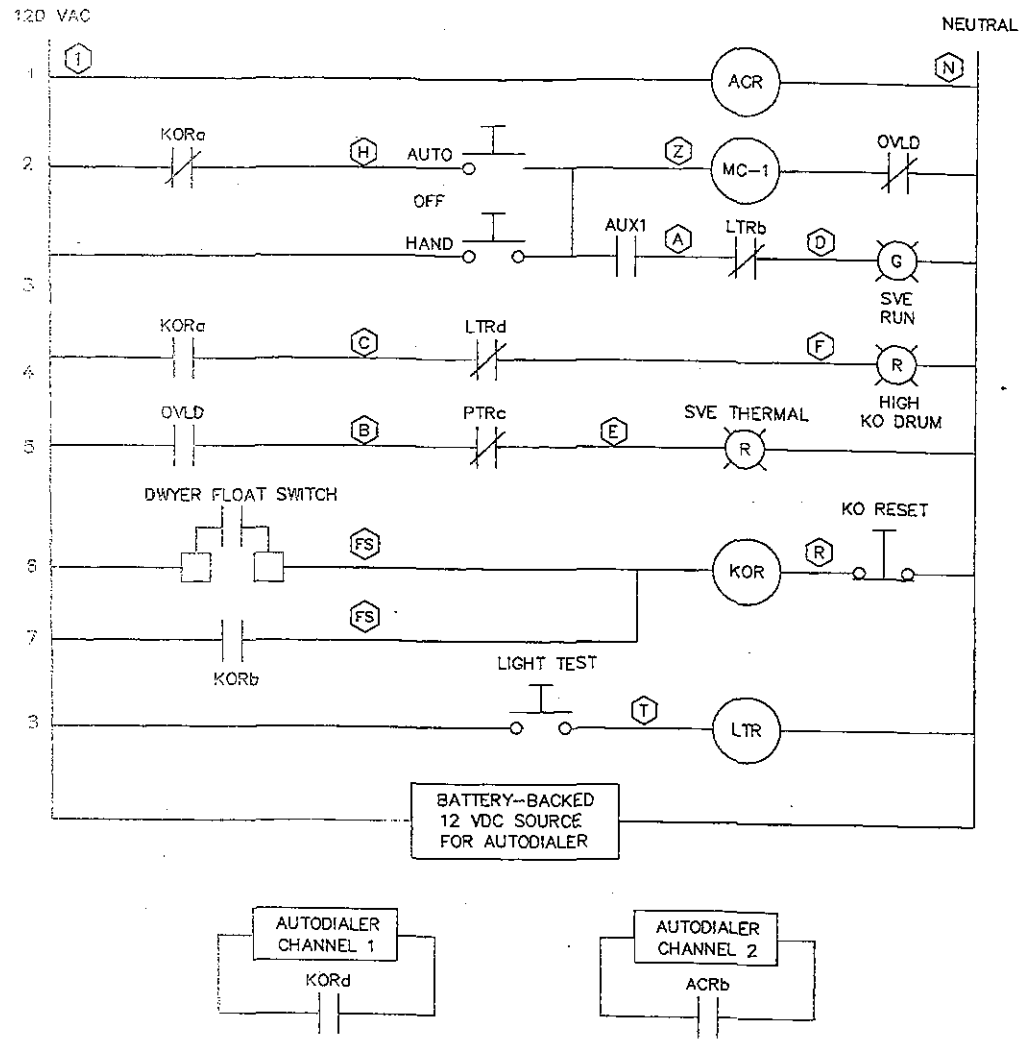
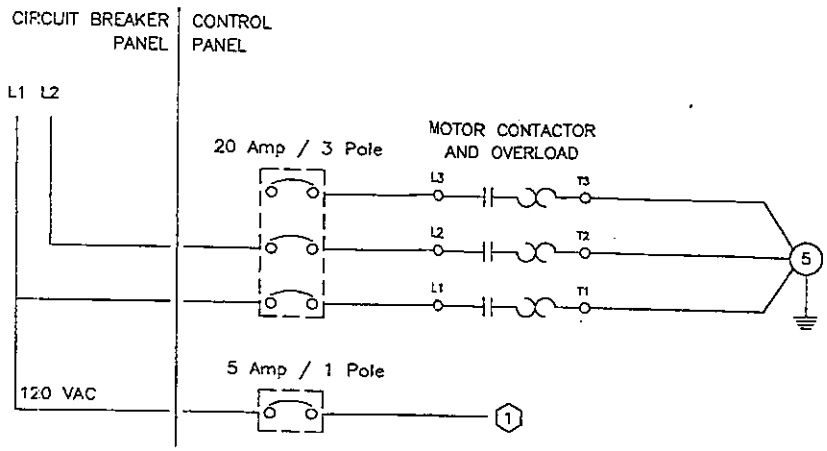
Ronkonkoma, New York 11779
Phone: (631) 471-1500 Fax: (631) 471-6363



CONTROL PANEL SCHEMATIC



CIRCUIT BREAKER PANEL SHALL FEED CONTROL PANEL BREAKERS AS FOLLOWS:
(3) #10 WIRES FROM A 3-POLE, 30 AMP TO THE 3-POLE, 20 AMP
(1) #12 WIRE TO PROVIDE THE CONTROL NEUTRAL
(1) #12 WIRE TO PROVIDE EARTH GROUND
THE CONTROL POWER SHALL PIGGY-BACK OFF THE 20-AMP DIN BREAKER

X COIL OF RELAY OR STARTER

G GREEN LIGHT

R RED LIGHT

NORMALLY CLOSED CIRCUIT

NORMALLY OPEN CIRCUIT

LTR LIGHT TEST RELAY

KOR MOISTURE SEPARATOR RELAY

TERMINAL CONNECTION

REVISION #: 1.1 REVSED BY: OL REVISION DATE: 04-17-03	FIGURE: E-1
DRAWING TITLE:	
PROJECT NAME: FINAL DESIGN SCHEMATIC OF SVE CONTROL PANEL	
PROJECT NAME: Kliegman Brothers GLENDALE, NEW YORK NYSDEC No. D003825-39	
PREPARED FOR: URS Corporation Buffalo, New York	

EnviroTrac
80-B Air Park Drive
Ronkonkoma, New York 11779
Phone: (631) 471-1500 Fax: (631) 471-6363

Appendix A

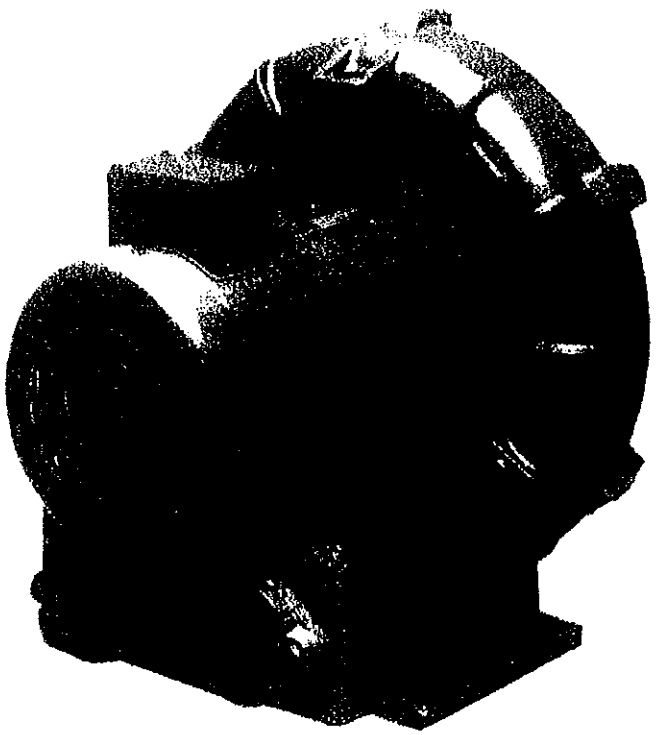
DR 707 & CP 707
Regenerative Blower

FEATURES
- Manufactured in the USA – ISO 9001 compliant
- CE compliant – Declaration of Conformity on file
- Maximum flow: 295 SCFM
- Maximum pressure: 100 IWG
- Maximum vacuum: 6.8" Hg (92.5 IWG)
- Standard motor: 5.0 HP, TEFC
- Cast aluminum blower housing, impeller & cover; cast iron flanges (threaded)
- UL & CSA approved motor with permanently sealed ball bearings
- Inlet & outlet internal muffling
- Quiet operation within OSHA standards

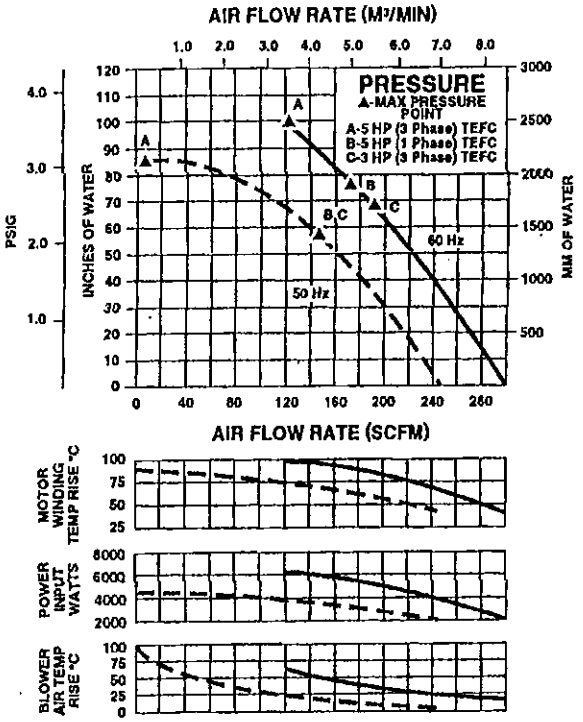
MOTOR OPTIONS
- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Various horsepowers for application-specific needs

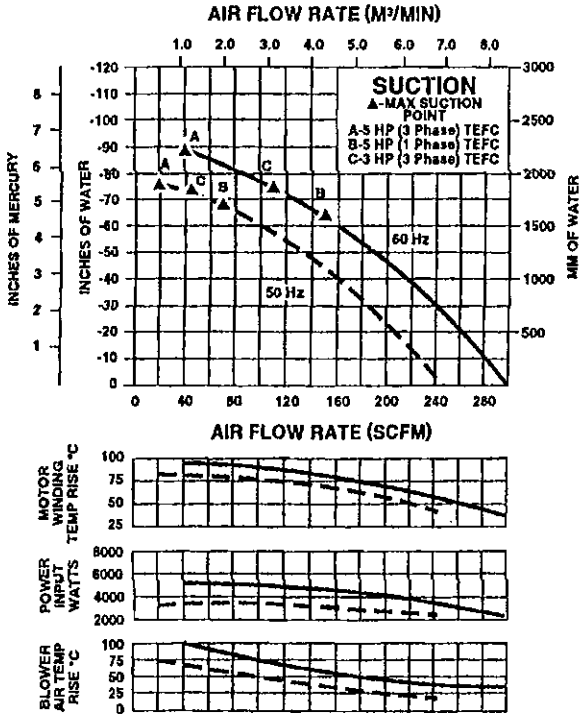
BLOWER OPTIONS
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

ACCESSORIES (See Catalog Accessory Section)
- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges & relief valves
- Switches – air flow, pressure, vacuum or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)
- Variable frequency drive package



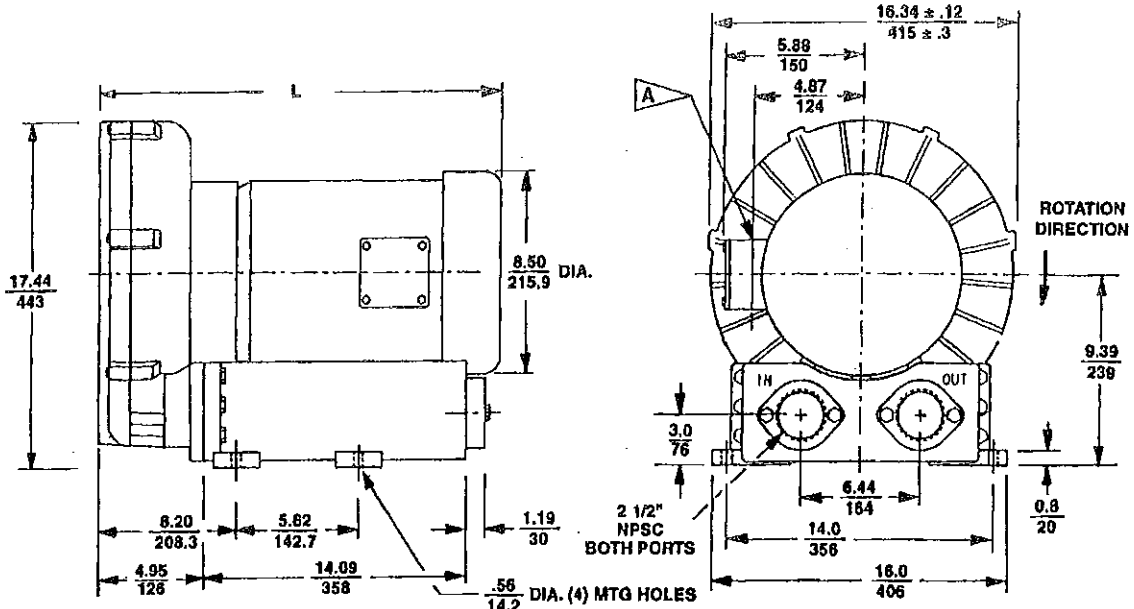
BLOWER PERFORMANCE AT STANDARD CONDITIONS





Rev. 2/01

DR 707 & CP 707
Regenerative Blower



MODEL	L (IN)	L (MM)
DR707D89MX	18.17	461.5
DR707D5MX	19.67	499.6
DR707D86MX	18.17	461.5
DR707K72MX	18.17	461.5
CP707FF72MXLR	18.17	461.5

DIMENSIONS: IN / MM
TOLERANCES: .XX ± .08/2
(UNLESS OTHERWISE NOTED)

Scale CAD drawing available upon request.

A TERMINAL BOX CONNECTION 1.06 INCH DIAMETER ON TEFC MOTORS, .75 NPT ON XP MOTORS

SPECIFICATIONS

MODEL	DR707D89MX	DR707D5MX	DR707D86MX	DR707K72MX	CP707FF72MXLR	HiE707D89MX
Part No.	038704	038706	038707	038708	038720	038709
Motor Enclosure – Shaft Material	TEFC – CS	TEFC – CS	TEFC – CS	TEFC – CS	ChemTEFC – SS	TEFC – CS
Horsepower	5	5	5	3	Same as DR707D89MX – 038704 except add Chemical Processing (CP) features from catalog inside front cover	Same as DR707D89MX – 038704 except add High Efficiency motor
Voltage [1]	208-230/460	230	575	230/460		
Phase – Frequency [1]	Three - 60 Hz	Single - 60 Hz	Three - 60 Hz	Three - 60 Hz		
Insulation Class [2]	F	F	F	F		
NEMA Rated Motor Amps	17.3-15.6/7.8	21	4.8	13.3-12/6		
Service Factor	1.15	1.0	1.15	1.15		
Locked Rotor Amps	165-155/76	124	60	106/53		
Max. Blower Amps [3]	19.5-17.6/8.8	25	6.9	13.6/7.3		
Recommended NEMA Starter Size	1-1/0	1.5	0	0/0		
Shipping Weight	169 lb (76.8 kg)	178 lb (81 kg)	162 lb (74 kg)	146 lb (66 kg)		

[1] Rotron motors are designed to handle a broad range of world voltages and power supply variations. Our dual voltage 3 phase motors are factory tested and certified to operate on both: **208-230/415-460 VAC-3 ph-60 Hz** and **190-208/380-415 VAC-3 ph-50 Hz**. Our dual voltage 1 phase motors are factory tested and certified to operate on both: **104-115/208-230 VAC-1 ph-60 Hz** and **100-110/200-220 VAC-1 ph-50 Hz**. All voltages above can handle a ±10% voltage fluctuation. Special wound motors can be ordered for voltages outside our certified range.

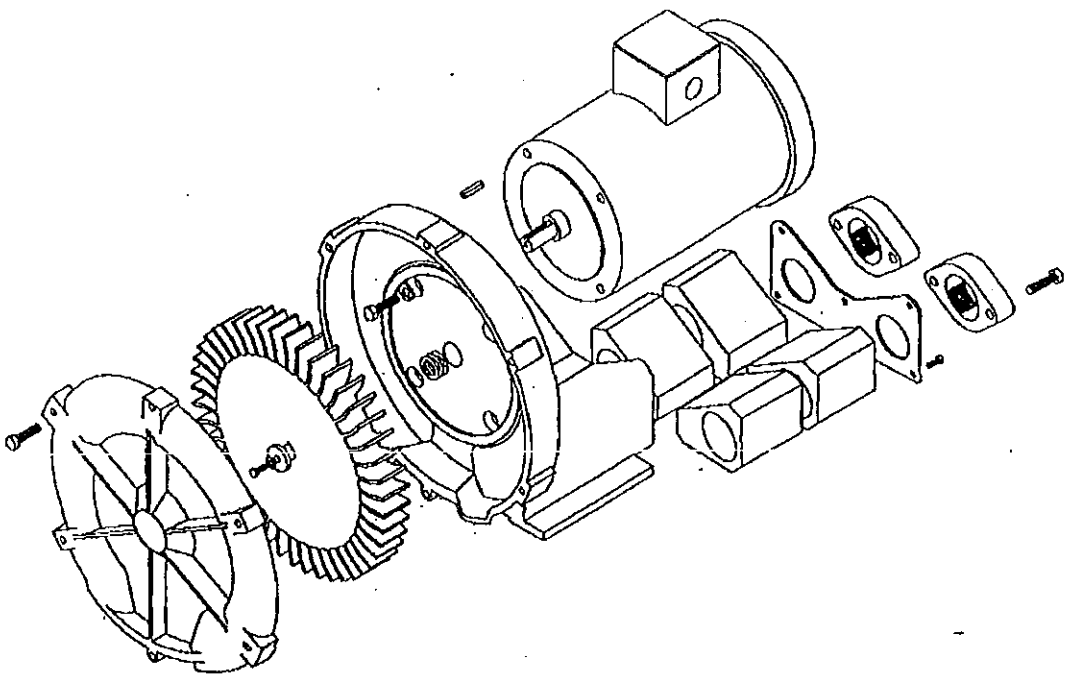
[2] Maximum operating temperature: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F rated motors or 120°C for Class B rated motors. Blower outlet air temperature should not exceed 140°C (air temperature rise plus inlet temperature). Performance curve maximum pressure and suction points are based on a 40°C inlet and ambient temperature. Consult factory for inlet or ambient temperatures above 40°C.

[3] Maximum blower amps corresponds to the performance point at which the motor or blower temperature rise with a 40°C inlet and/or ambient temperature reaches the maximum operating temperature.

Specifications subject to change without notice. Please consult your Local Field Sales Engineer for specification updates. Rev. 2/01

SERVICE AND PARTS MANUAL FOR BLOWER MODEL

DR707 – DR808



ROTRON® Industrial Products
75 North Street, Saugerties, NY 12477 U.S.A.
Telephone: 845-246-3401 Fax: 845-246-3802
e-mail: rotronindustrial@ametek.com
internet: www.rotronindustrial.com

AMETEK

Your Choice. Our Commitment.™

WARRANTY, INSTALLATION, MAINTENANCE AND TROUBLESHOOTING INSTRUCTIONS

ROTRON INDUSTRIAL PRODUCTS
75 North Street, Saugerties, NY 12477 U.S.A.
Telephone: 845 -246-3401 Fax: 845-246-3802
e-mail: rotronindustrial@ametek.com web site: www.rotronindustrial.com

1. **No Fault Policy** - AMETEK Rotron DR, EN and HiE regenerative direct drive blowers are guaranteed for one full year from the date of installation (limited to 18 months from the date of shipment.) to the original purchaser only. Should the blower fail, **regardless of the cause of failure**, we will at our option repair or replace the blower.

2. **Standard Policy** - AMETEK Rotron Minispiral, Revaflow, Multiflow, Nautilair, remote drive blowers, moisture separators, packaged units, CP blowers, Nasty Gas™ models and special built (EO) products are guaranteed for one full year from date of shipment for workmanship and material defect to the original purchaser only. Should the blower fail, we will evaluate the failure. If failure is determined to be workmanship or material defect related, we will at our option repair or replace the blower.

3. **Parts Policy** - AMETEK Rotron spare parts and accessories are guaranteed for three months from date of shipment for workmanship and material defect to the original purchaser only. If failure is determined to be workmanship or material defect related we will at our option repair or replace the part.

Corrective Action - A written report will be provided indicating reason(s) for failure, with suggestions for corrective action. Subsequent customer failures due to abuse, misuse, misapplication or repeat offense will not be covered. AMETEK Rotron will then notify you of your options. Any failed unit that is tampered with by attempting repair or diagnosis will void the warranty, unless authorized by the factory.

Terms and Conditions - Our warranty covers repairs or replacement of regenerative blowers only, and will not cover labor for installation, outbound and inbound shipping costs, accessories or other items not considered integral blower parts. Charges may be incurred on products returned for reasons other than failures covered by their appropriate warranty. Out-of -warranty product and in warranty product returned for failures determined to be caused by abuse, misuse, or repeat offense will be subject to an evaluation charge. Maximum liability will in no case exceed the value of the product purchased. Damage resulting from mishandling during shipment is not covered by this warranty. It is the responsibility of the purchaser to file claims with the carrier. Other terms and conditions of sale are stated on the back of the order acknowledgement.

Installation Instructions for SL, DR, EN, CP, and HiE Series Blowers

1. **Bolt It Down** - Any blower must be secured against movement prior to starting or testing to prevent injury or damage. The blower does not vibrate much more than a standard electric motor.

2. **Filtration** - All blowers should be filtered prior to starting. Care must be taken so that no foreign material enters the blower. If foreign material does enter the blower, it could cause internal damage or may exit at extremely high velocity.

   Should excessive amounts of material pass through the blower, it is suggested that the cover(s) and impeller(s) be removed periodically and cleaned to avoid impeller imbalance. Impeller

imbalance greatly speeds bearing wear, thus reducing blower life. Disassembling the blower will void warranty, so contact the factory for cleaning authorization.

3. Support the Piping - The blower flanges and nozzles are designed as connection points only and are not designed to be support members.

   Caution: Plastic piping should not be used on blowers larger than 1 HP that are operating near their maximum pressure or suction point. Blower housing and nearby piping temperatures can exceed 200°F. Access by personnel to the blower or nearby piping should be limited, guarded, or marked, to prevent danger of burns.

4. **Wiring** - Blowers must be wired and protected/fused in accordance with local and national electrical codes. All blowers must be grounded to prevent electrical shock. Slo-Blo or time delay fuses should be used to bypass the first second of start-up amperage.

5. **Pressure/Suction Maximums** - The maximum pressure and/or suction listed on the model label should not be exceeded. This can be monitored by means of a pressure or suction gage (available from Rotron), installed in the piping at the blower outlet or inlet. Also, if problems do arise, the Rotron Field representative will need to know the operating pressure/suction to properly diagnose the problem.

6. **Excess Air** - Bleed excess air off. DO NOT throttle to reduce flow. When bleeding off excess air, the blower draws less power and runs cooler.

   Note: Remote Drive (Motorless) Blowers - Properly designed and installed guards should be used on all belts, pulleys, couplings, etc. Observe maximum remote drive speed allowable. Due to the range of uses, drive guards are the responsibility of the customer or user. Belts should be tensioned using belt gauge.

Maintenance Procedure

When properly piped, filtered, and applied, little or no routine maintenance is required. Keep the filter clean. Also, all standard models in the DR, EN, CP, and HiE series have sealed bearings that require no maintenance. Bearing should be changed after 15,000 to 20,000 hours, on average. Replacement bearing information is specified on the chart below.

Bearing Part Number	Size	Seal Material	Grease	Heat Stabilized
510217 510218 510219	205 206 207	Polyacrylic	Nye Rheotemp 500 30% +/- 5% Fill	Yes – 325 F
510449 516440 516648	203 202 307	Buna N	Exxon Polyrex Grease	NO
516840 516841 516842 516843 516844 516845 516846 516847	206 207 208 210 309 310 311 313	Buna N	Exxon Polyrex Grease	NO

Troubleshooting

		POSSIBLE CAUSE	OUT OF WARRANTY REMEDY ***
IMPELLER DOES NOT TURN	Humming Sound	1. * One phase of power line not connected 2. * One phase of stator winding open 3. Bearings defective 4. Impeller jammed by foreign material 5. Impeller jammed against housing or cover 6. ** Capacitor open	1. Connect 2. Rewind or buy new motor 3. Change bearings 4. Clean and add filter 5. Adjust 6. Change capacitor
	No Sound	1. * Two phases of power line not connected 2. * Two phases of stator winding open	1. Connect 2. Rewind or buy new motor
IMPELLER TURNS	Blown Fuse	1. Insufficient fuse capacity 2. Short circuit	1. Use time delay fuse of proper rating 2. Repair
	Motor Overheated Or Protector Trips	1. High or low voltage 2. * Operating in single phase condition 3. Bearings defective 4. Impeller rubbing against housing or cover 5. Impeller or air passage clogged by foreign material 6. Unit operating beyond performance range 7. Capacitor shorted 8. * One phase of stator winding short circuited	1. Check input voltage 2. Check connections 3. Check bearings 4. Adjust 5. Clean and add filter 6. Reduce system pressure/vacuum 7. Change capacitor 8. Rewind or buy new motor
	Abnormal Sound	1. Impeller rubbing against housing or cover 2. Impeller or air passages clogged by foreign material 3. Bearings defective	1. Adjust 2. Clean and add filter 3. Change bearings
	Performance Below Standard	1. Leak in piping 2. Piping and air passages clogged 3. Impeller rotation reversed 4. Leak in blower 5. Low voltage	1. Tighten 2. Clean 3. Check wiring 4. Tighten cover, flange 5. Check input voltage

* 3 phase units

** 1 phase units

*** Disassembly and repair of new blowers or motors will void the Rotron warranty. Factory should be contacted prior to any attempt to field repair an in-warranty unit.

Blower Disassembly:

WARNING: Attempting to repair or diagnose a blower may void Rotron's warranty. It may also be difficult to successfully disassemble and reassemble the unit.

1) Disconnect the power leads. **CAUTION:** Be sure the power is disconnected before doing any work whatsoever on the unit.

2) Remove or separate piping and/or mufflers and filters from the unit.

3) Remove the cover bolts and then the cover. **NOTE:** Some units are equipped with seals. It is mandatory that these seals be replaced once the unit has been opened.

4) Remove the impeller bolt and washers and then remove the impeller. **NOTE:** Never pry on the edges of the impeller. Use a puller as necessary.

5) Carefully note the number and location of the shims. Remove and set them aside. NOTE: If the disassembly was for inspection and cleaning the unit may now be reassembled by reversing the above steps. If motor servicing or replacement and/or impeller replacement is required the same shims may not be used. It will be necessary to re-shim the impeller according to the procedure explained under assembly.

6) Remove the housing bolts and remove the motor assembly (arbor/.housing on remote drive models).

7) Arbor disassembly (Applicable on remote drive models only):
   a) Slide the bearing retraining sleeve off the shaft at the blower end.
   b) Remove the four (4) screws and the bearing retaining plate from the blower end.
   c) Lift the shaft assembly far enough out of the arbor to allow removal of the blower end snap ring.
   d) Remove the shaft assembly from the arbor.
   e) If necessary, remove the shaft dust seal from the pulley end of the arbor.

Muffler Material Replacement:

1) Remove the manifold cover bolts and them manifold cover.

2) The muffler material can now be removed and replaced if necessary. On blowers with fiberglass acoustical wrap the tubular retaining screens with the fiberglass matting before sliding the muffler pads over the screens.

3) Reassemble by reversing the procedure.

NOTE: On DR068 models with tubular mufflers it is necessary to remove the cover and impeller accessing the muffler material from the housing cavity.

Blower Reassembly:

1) Place the assembled motor (assembled arbor assembly for remote drive models) against the rear of the housing and fasten with the bolts and washer.

2) To ensure the impeller is centered within the housing cavity re-shim the impeller according to the procedure outlined below.

3) If blower had a seal replace the seal with a new one.

4) Place the impeller onto the shaft making sure the shaft key is in place and fasten with the bolt, washer and spacer as applicable. Torque the impeller bolt per the table below. Once fastened carefully rotate the impeller to be sure it turns freely.

5) Replace the cover and fasten with bolts.

6) Reconnect the power leads to the motor per the motor nameplate.

Bolt Size	Torque
1/4-20	6.25 +/- 0.25
5/16-18	11.5 +/- 0.25
3/8-16	20.0 +/- 0.5
½-13	49.0 +/- 1
5/8 –11	90.0 +/- 2

Impeller Shimming Procedure:

WARNING: This unit may be difficult to shim. Extreme care may be exercised.

Tools Needed:Machinist's Parallel Bar
Vernier Caliper with depth measuring capability
Feeler gauges or depth gauge

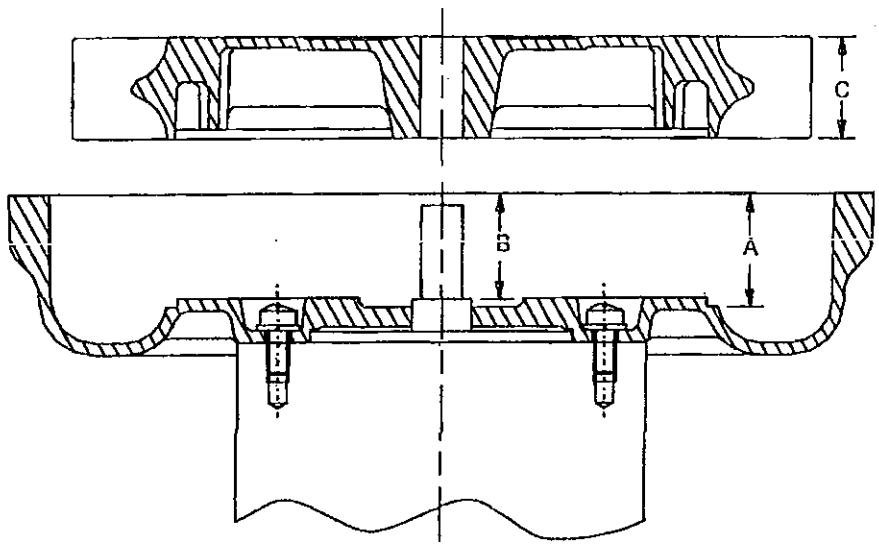
Measure the Following:

Distance from the flange face to the housing (A)
Distance from the flange face to the motor shaft shoulder (B)
Impeller Thickness (C)

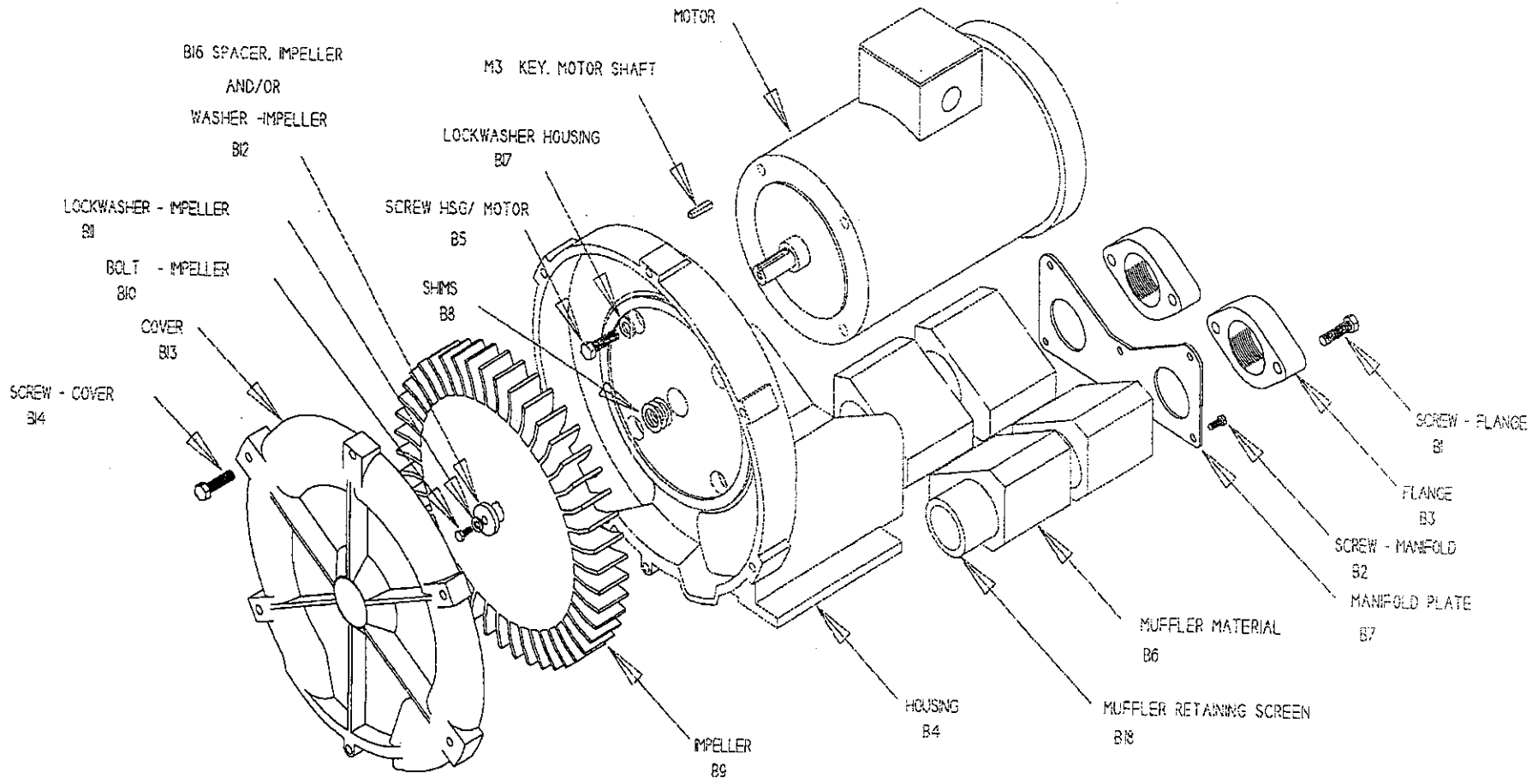
Measurements (A) and (B) are made by laying the parallel bar across the housing flange face and measuring to the proper points. Each measurement should be made at three points, and the average of the readings should be used.

Shim Thickness = B – (A+C)/2

After the impeller installation (step #4 above) the impeller/cover clearance can be checked with feeler gauges, laying the parallel bar across the housing flange face. This clearance should nominally be (A+C)/2.



ASSEMBLY DIAGRAM
DR707 - DR808



Parts Breakdown

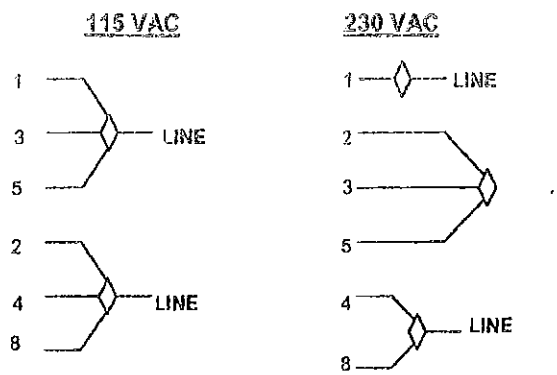
Model:	DR707	DR808	DR308
Part No.:	036789	037186	037187
	036791	037190	
	036875		
	036914		
	OBSOLETE	OBSOLETE	OBSOLETE

Item No.	Qty. Req'd	Description			
M3	1	Key Motor Shaft	510212	511532	510632
B1	4	Screw, Flange	155095	155025	155025
B2	17	Screw, Manifold	(13 pcs)120214	120214	120214
B3	2	Flange	511480	511614	511614
B4	1	Housing	515495	516503	516507
B5	4	Screw, Hsg /Motor	251792	140014	251792
B6	38	Muffler Material	(40 pcs)515493	515405	515405
B6A	2	Matting, Muffler	516665	516661	516661
B7	1	Manifold Plate	551264	523432	523432
B8	*	Shim .002"	272703	511547	272703
	*	Shim .005"	272704	511548	272704
	*	Shim .010"	272705	511549	272705
	*	Shim .020"	272706	511550	272706
	*	Shim .030"	Not Used	Not Used	Not Used
B9	1	Impeller	515461	516452	516453
B10	1	Bolt, Impeller	251791	155068	155095
B11	1	Lockwasher, Impeller	251787	251788	251787
B12		Washer, Impeller	Not Used	Not Used	Not Used
B13	1	Cover	515462	516447	516447
B14	8	Screw, Cover	(7 pcs) 120215	140016	140016
B16	1	Spacer, Impeller Bolt	478336	511529	478336
B17	4	Lockwasher, Housing	251788	Not Used	Not Used
B18	1	Screen, Muffler Retaining, Right (**)	515492	515408	515408
	1	Screen, Muffler Retaining, Left (**)	515491	515407	515407
B19	6	Bolt, Muffler Hsg/Hsg	120251	155025	155025
B20	1	Muffler Housing	515480	515370	515370
	2	Bolt, Motor/Muffler	Not Used	120325	120118
	2	Lockwasher, Motor/Muffler	Not Used	120203	Not Used
	2	Washer, Motor/Muffler	Not Used	155029	Not Used
		Spacer, Motor/Muffler	Not Used	Not Used	Not Used

Model	Part #	Motor	Wiring Diagram	Specific Parts	Bearing, Rear (M1)	Bearing, Impeller End (M2)
DR707D89X	036789	515551	C		510217	510218
DR707K72X	036791	515553	C			
DR707D5X	036875	515908	F			
DR707D86X	036914	516014	G			
DR808AY72X	037186	511570	C	510840	516844	
DR808AY86X	037190	515568	G			
DR808D89X	037187	515551	C		510217	510218

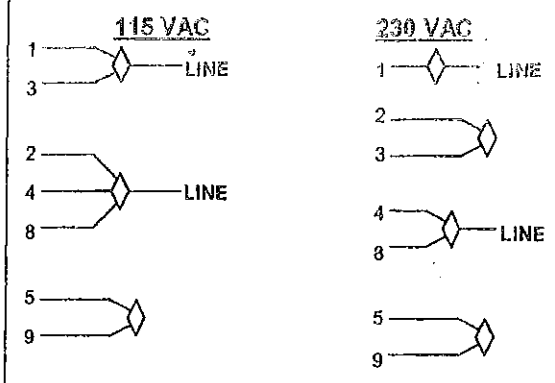
WIRING DIAGRAMS, TEFC and ODP MOTORS

A. 1Ø, 6 WIRE



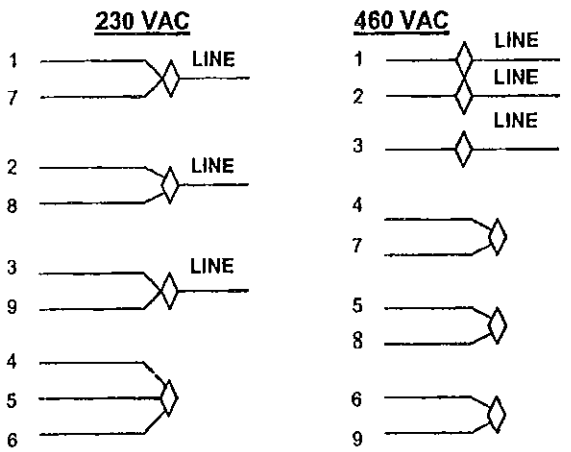
INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

B. 1Ø, 7 WIRE



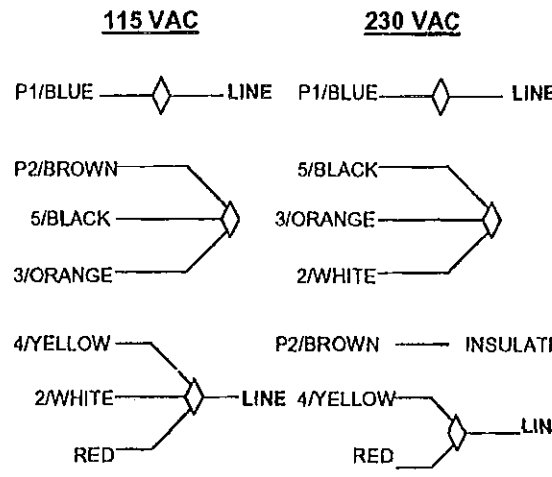
INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

C. 3Ø, 9 WIRE



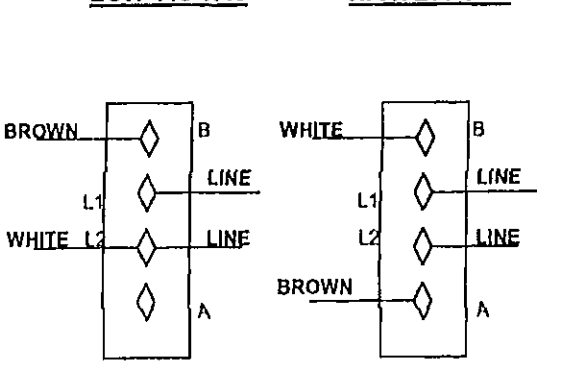
INTERCHANGE ANY TWO LEAD LINES TO REVERSE ROTATION

D. 1Ø, EMERSON 1/8 HP MOTOR



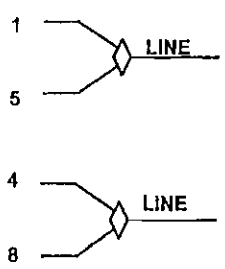
INTERCHANGE RED AND BLACK TO REVERSE ROTATION

E. 1Ø, SPA DUTY WITH TERMINAL STRIPS



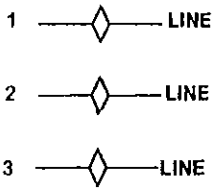
F. 1Ø, 230 VAC

SINGLE VOLTAGE



INTERCHANGE LEAD WIRES 5 & 8 TO REVERSE ROTATION

G. 3Ø, 575 VAC



INTERCHANGE ANY TWO LEAD LINES TO REVERSE ROTATION

* * * Transmission Result Report(MemoryTX) (May.28. 2003 10:25AM) * * *

1)
2)

Date/Time: May.28. 2003 10:24AM

File No.	Mode	Destination	Pg(s)	Result	Page Not Sent
7630	Memory TX	6968055	P. 2	OK	

Reason for error
E.1) Hang up or line fail
E.2) Busy
E.3) No answer
E.4) No facsimile connection

EnviroTrac
Environmental Services
80 B Air Park Drive, Ronkonkoma, NY 11779
(631) 471-1500 (631) 471-6363 fax

Fax

To: Frank Abbo — From: Dan Ruffino
Fax: 696-9155 — Pages (including cover): 2
Phone: — Date: 5/28/03
Re: Signed Contract — CC:

☐ Urgent ☐ Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

• Comments:

– Signed Contract included. Hardcopy going in the mail today.

– See you June 2nd!

Appendix B

INLET VACUUM AIR FILTERS
"CSL" Series 3/8" - 3" FPT

APPLICATIONS

- Blowers-Side Channel
- Factory Automation
- Leak Detection
- Medical
- Printing Industry
- Soil Venting/Remediation
- Vacuum Lifters
- Vacuum Packaging
- Vacuum Pumps & Systems
- Woodworking

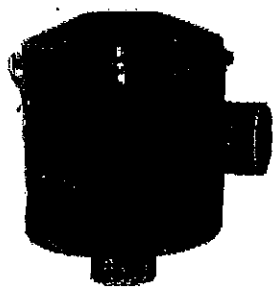
FEATURES & SPECIFICATIONS

- ;99%+ removal efficiency standard: Paper = 2 micron, Polyester = 5 micron
- Filter change out differential: 10"-15" in. H_2O above initial Delta P
- Low pressure drop
- Pressure drop graphs available upon request
- Stainless steel torsion clips for durability
- Vacuum level: Typically $1x10^{-3}$ mmHg ($1.3x10^{-3}$ mbar)
- Brazed fittings for high vacuum duty
- Fully-drawn one piece canister
- Positive sealing O-ring seal system
- Rugged all steel construction with baked enamel finish
- Temp (continuous): min -15° F (-26° C) max 220° F (104° C)

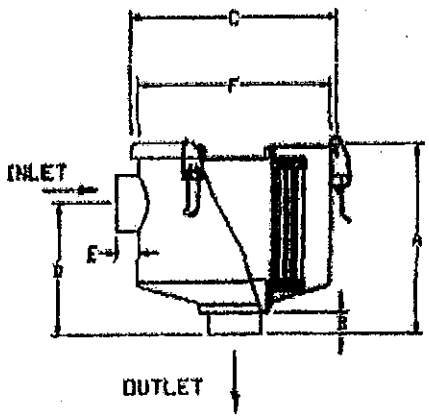
OPTIONS

- Activated carbon prefilter to reduce odor
- Alternate Top-to-canister fastening system for low pressure or pulsating systems
- Available in Stainless Steel
- Epoxy coated housings
- Extra tap fittings for pressure gauge and vacuum regulator
- Larger sizes available
- Special connections
- Support brackets
- Vacuum regulator & gauge available
- Various elements available

Line Drawing



Click to see larger image.



***All measurements are shown in American standards.**

Typical Lead Times:	
■	Normally in stock
■	1 - 2 weeks
■■■	5 - 7 weeks
■■	3 - 4 weeks
■■■■	8 + weeks

Add To Order	Model Number	Element Type	Inlet In. NPT or FLG	Outlet In. NPT or FLG	Connection Style	Dim A In.	Dim B In.	Dim C In.	Dim D In.	Dim E In.	Dim F In.	Dim G In.	Parent Flow SCFM	Element Parent Flow SCFM	Approx. Weight lbs.
■ ◇	CSL-239-300C	Polyester	3	3	Call	15.75	2.88	13.25	8.88	2.88	12	11	300	570	33

Solberg Mfg.
1151 W. Ardmore Ave. Itasca, IL 60143 (630)773-1363 Fax: (630)773-0727

Appendix C

OPERATION & MAINTENANCE MANUAL

ROTRON® INDUSTRIAL PRODUCTS
75 North Street, Saugerties, NY 12477 U.S.A.
Telephone: 845-246-3401 Fax: 845-246-3002
e-mail: rotronindustrial@ametek.com website: www.rotronindustrial.com

AMETEK

Air Flow Meter

Thank you for purchasing an AMETEK Rotron Flow Meter. When matched with the correct Rotron blower, and properly installed and maintained, this meter will quickly and accurately measure the pipe flow. To ensure good results, please take the time to read these instructions before starting the installation of your air flow meter.

Sizing for Optimal Efficiency

Current Models		Flow Range (SCFM)	Threads	Length	Width	Gauge Part #	Body Style	Prior Models	
Model	Part #							Model	Part #
FM20C030Q	550599	6-30	2.0" 11.5 NPSC	6.84"	5.49"	550321	A	FM20A030Q	550312
FM20C045Q	550600	9-45				550322		FM20A045Q	550313
FM20C065Q	550601	13-65				550323		FM20A065Q	550314
FM20C125Q	550602	25-125	2.0" 11.5 NPSC	5.34"	5.49"	550290	B	FM20A125Q	550256
FM20C175Q	550603	35-175				550291		FM20A175Q	550255
FM20C225Q	550604	45-225				550292		FM20A225Q	550254
FM30C250Q	550605	50-250	3.0" 8.0 NPSC	7.38"	7.62"	550293	C	FM30A250Q	550259
FM30C350Q	550606	70-350				550294		FM30A350Q	550258
FM30C475Q	550607	95-475				550295		FM30A475Q	550257
FM40C450Q	550608	90-450	4.0" 8.0 NPSC	7.68"	8.62"	550296	D	FM40A450Q	550262
FM40C600Q	550609	120-600				550297		FM40A600Q	550261
FM40C850Q	550610	170-850				550298		FM40A850Q	550260

Installation

1. Piping – The flow meter should be installed horizontally on the inlet side of the blower. Since this device is directional, please observe the flow direction arrow. Rotron suggests using a length of straight pipe equivalent to three to five pipe diameters prior to the meter for any elbows, valves, etc., unless there is a tee. If there is a tee, the suggested equivalent length is eight to ten pipe diameters. The flow meter should have two pipe diameters of straight pipe after the flow exits the meter before any elbows, tees, valves, etc.

2. Continuous Service – Moisture and debris should not be allowed to enter the tubes leading into the gauge, as it may affect the gauge. Orient the gauge between 10 o'clock and 2 o'clock when viewed from end. (See Figure 1).

   If the gauge does not read zero, gently press down on gauge cover while turning counterclockwise to remove cover. Zero the gauge with the Allen wrench and reattach cover.

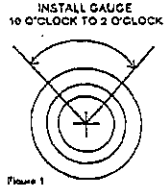


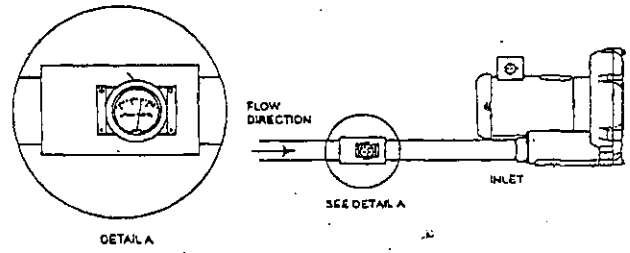
Figure 1

3. Interchangeability – Gauges within a body style are interchangeable to better match your systems actual flow rate to the Gauge Scale. For example:

Body Style	Gauges Available	Flow Range Available
A	550599	6-30 SCFM
A	550600	9-45 SCFM
A	550601	13-65 SCFM

Similar options for each body style are available. Gauges may be purchased separately and field installed without removing the flow meter from the piping.

Typical Arrangement



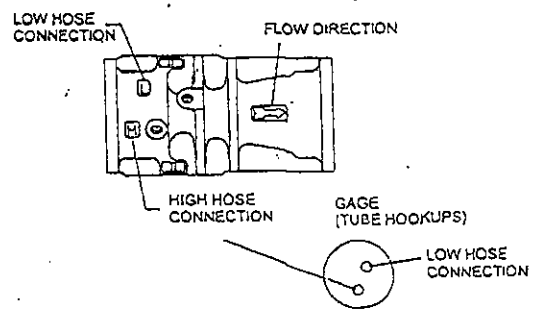
Operation

Rotron's Flow Meter is a venturi style design. After air enters the inlet, the pressure is measured in the high-pressure tap. The second tap measures the pressure at the throat. The differential between the taps registers across a specially calibrated gauge to provide accurate readings. The throat is then expanded back to the original size to keep pressure loss to under 2-4 IWG.

Maintenance

This air flow meter has been designed to require minimal maintenance. During normal operation, little maintenance is required. Care should be taken to ensure no debris enters the meter.

If the tubes become plugged, remove and clean. Do not switch the low and high hoses. Note proper orientation of hoses.



Measurement Accessories

Blower Connection Key
NPT – American National Standard Taper Pipe Thread (Male)
NPSC – American National Standard Straight Pipe Thread for Coupling (Female)
SO – Slip On (Smooth – No Threads)

Air Flow Meter

FEATURES

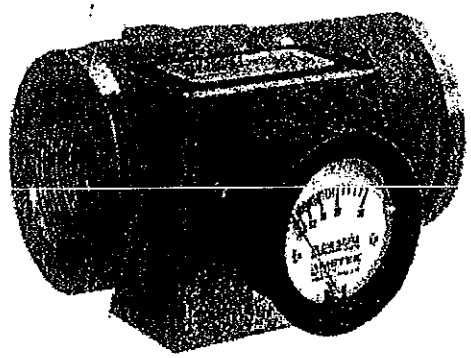
- Direct reading in SCFM
- Low pressure drop (2-4" typical) across the flow meter
- Non-clogging, low impedance air stream
- Light weight aluminum
- No moving parts
- Large easy-to-read dial
- Accurate within 2% at standard conditions
- Good repeatability
- Available in 2", 3" and 4" sizes
- Factory configured for quick installation
- .048" Allen key supplied for gauge adjustment

OPTIONS

- For 4-20 mA outputs and digital readouts see page G-9
- High temperature version (above 140°F)
- Corrosion-resistant version with Chem-Tough™ or in stainless steel
- FDA-approved Food Tough™ surface conversion
- High pressure version (100 PSI)

BENEFITS

- OPTIMIZE SYSTEM EFFICIENCY
  Measuring the correct air flow can assist you in fine-tuning to your system's optimal efficiency.
- BALANCE MULTI-PIPING SYSTEMS
  When evacuating CFM from more than one pipe, different run lengths or end system impedance can cause one pipe to handle more CFM than the other. With an accurate CFM reading, piping can be balanced by bleeding air in/out or by creating an extra impedance.
- DETECT CHANNELING OR PLUGGING
  For systems in which channeling or plugging can occur, a change in the CFM measured can help indicate the unseen changes in your system.



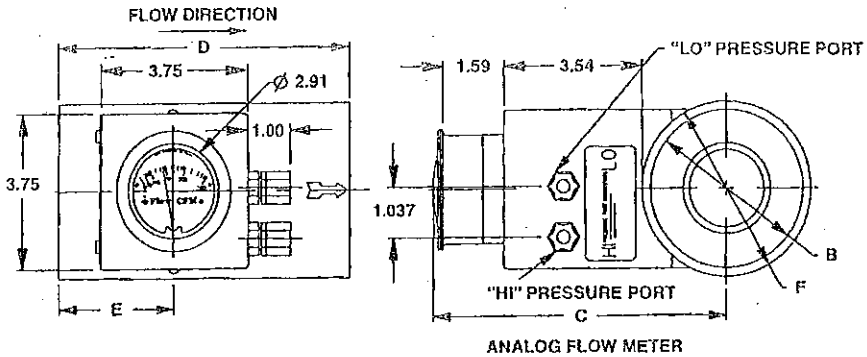
Current Models		Flow Range	B	C	D	E	F
Model	Part #	(SCFM)	Threads	Length	Width		
FM20C030Q	550599	6-30	2" - 11.5 NPSC	7.18"	7.0"	2.0"	3.75"
FM20C045Q	550600	9-45					
FM20C065Q	550601	13-65					
FM20C125Q	550602	25-125			5.6"		
FM20C175Q	550603	35-175					
FM20C225Q	550604	45-225					
FM30C250Q	550605	50-250	3" - 8 NPSC	7.52"	7.4"	2.5"	4.43"
FM30C350Q	550606	70-350					
FM30C475Q	550607	95-475					
FM40C450Q	550608	90-450	4" - 8 NPSC	8.00"	7.7"	2.7"	5.43"
FM40C600Q	550609	120-600					
FM40C850Q	550610	170-850					

Rev. 2/01

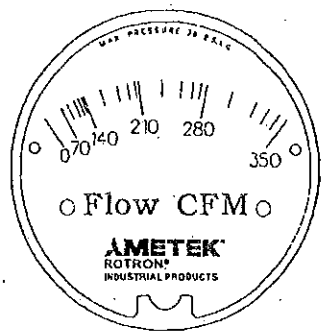
Blower Model Reference Key	
A = SPIRAL	E = DR/EN/CP 656, 6, 623, S7
B = DR/EN/CP 068, 083, 101, 202	F = DR/EN/CP 707, 808, 858, S9, P9 (Inlet Only)
C = DR/EN/CP 303, 312, 313, 353	G = DR/EN/CP 823, S13, P13 (Inlet Only)
D = DR/EN/CP 404, 454, 513, 505, 555, 523	H = DR/EN/CP 909, 979, 1223, 14, S15, P15 (Inlet Only)

Measurement Accessories

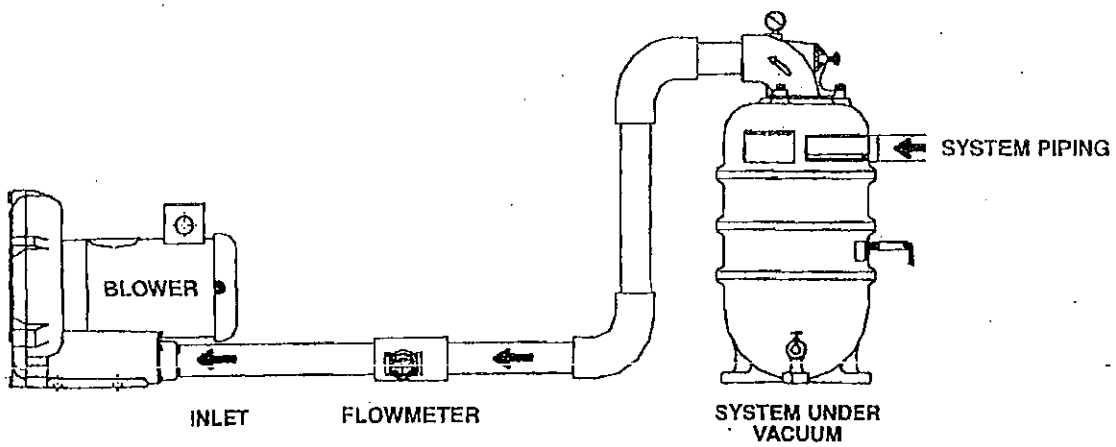
TYPICAL FLOW METER ARRANGEMENT



ANALOG FLOW METER



TYPICAL GAUGE FACE



HIGH TEMPERATURE/PRESSURE CORRECTION

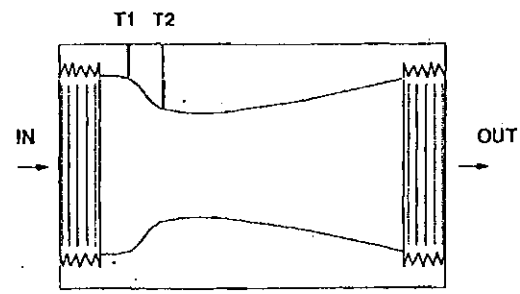
$$SCFM_2 = \frac{SCFM_1}{-\left(\frac{14.7}{Pf_2}\right) \times \left(\frac{530}{Tf_2 + 460}\right)}$$

Pf_2 = Absolute Pressure in PSIA

Tf_2 = Temperature in °F

- Use on inlet to limit need to correct for high pressure or elevated outlet temperature
- Standard model limits = 140°F and 30 PSIG

HOW IT WORKS



Rotron's flow meter is a venturi style design. After air enters the inlet, the pressure is measured in the T1 tap. The second tap, T2, measures the pressure at the throat. The differential between T1 and T2 registers across a special calibrated CFM gauge to provide accurate readings. The throat is then expanded back to the original size to keep pressure loss to under 2-4 IWG.

Appendix D

OPERATION & MAINTENANCE MANUAL

AMETEK

ROTRON® INDUSTRIAL PRODUCTS
75 North Street, Saugerties, NY 12477 U.S.A.
Telephone: 914-246-3401 Fax: 914-246-3802

Rotron Moisture Separator

Thank you for purchasing an AMETEK Rotron MS series moisture separator. When matched with the correct Rotron blower, and properly installed and maintained, this separator will effectively and efficiently remove moisture from the air stream. To ensure good results, please take the time to read these instructions before starting the installation of your moisture separator.

Sizing for Optimal Efficiency

Separator	Max. CFM	Max. Vac	Capacity	Blowers – DR, EN & CP
MS200P(S)	200	12* IHg	7 gal.	101-555, 513, 523, 623
MS200D(S)	200	22 IHg	10 gal.	101-555, 513, 523, 623
MS300P(S)	300	12* IHg	7 gal.	606, 6, 707, 823
MS300D(S)	300	22 IHg	10 gal.	606, 6, 707, 823
MS350B(S)	350	22 IHg	40 gal.	808, 1223
MS500B(S)	500	22 IHg	40 gal.	858
MS600B(S)	600	22 IHg	40 gal.	909
MS1000B(S)	1000	22 IHg	65 gal.	14
Note: "S" suffix denotes presence of XP high level switch. * Special Construction with 20 IHg capability available.				

Installation

1. **Unpacking** - For MS200/300, remove drain valve taped to packing material and box containing liquid level switch, if so equipped. For MS350/500/600, remove box containing valve hardware as well as box containing liquid level switch (if so equipped) and remove internal cardboard packaging and cable ties from screen assembly.

2. **Bolt Down** (w/ feet included) - For MS200/300 models, built-in feet or a mounting ring is included. It is recommended that these units be bolted in place. All models will only work in an upright position.

3. **Piping** - Attach to system piping with flexible couplings to minimize stress incurred by rigid system piping. The connections should be airtight but not sealed with an adhesive for ease of disassembly during routine maintenance. Install drain valve, using teflon tape on threads.

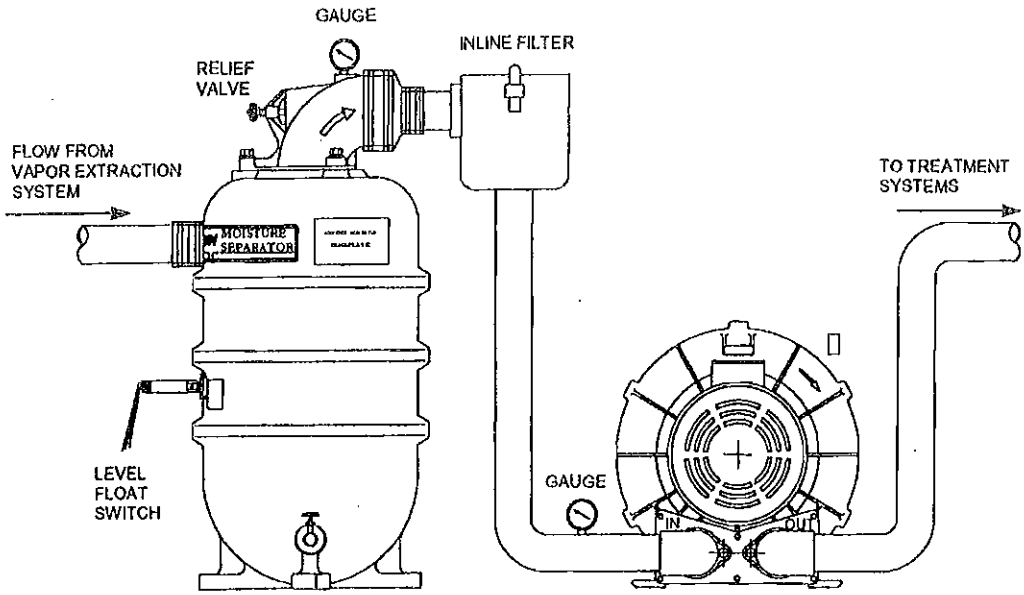
4. **Installation and Wiring of Liquid Level Switch** - Remove plug from the bulkhead fitting. Thread the switch by hand until snug with index arrow pointing down. Wire in accordance with the nameplate wiring schematic. Typically, the wiring is connected back to the starter to shut down the system but can be used for other purposes.

5. **Install/Adjust Relief Valve** - For MS500/600, first install the relief valve with teflon tape on threads. Use a wrench, but tighten only enough to prevent leakage. Next step for all MS units, back off the relief valve adjuster relaxing spring pressure. Then block the moisture separator inlet while measuring the motor current. Adjust the valve until the motor current is 90% of the max. nameplate blower amps.

6. **Continuous Service** - For cold weather service, appropriate steps should be taken to prevent freezing. Also, the maximum vacuum ratings are based on 115°F maximum. Consult factory for higher potential ambients.

Note: A moisture separator is not a substitute for an inline air filter. A Rotron inline filter should be used to remove particles that pass through the separator.

Typical Vapor Extraction System



Operation

Moisture-laden air enters the separator through the tangential inlet. Cyclonic action removes free moisture from the air stream and allows the air to discharge through the top of the separator. When the separator is full, the float valve shuts off the air flow through the separator, and the relief valve opens to limit the vacuum of the blower.

To drain the separator, turn off the blower and open the drain valve at the bottom of the separator. Caution: The liquid contained in the separator should be analyzed before it is released back into the environment. It may be considered hazardous waste in certain geographical areas and require special treatment/disposal. Once the liquid is drained, the unit can be reset by turning the blower back on.

Automatic draining options are at the discretion of the customer.

Maintenance

This MS series moisture separator has been designed to require minimal maintenance. During normal operation a layer of sludge may build up on the bottom of the separator. As necessary, the top assembly of the moisture separator should be removed and the inside cleaned out with water. Keeping the inside clean will prevent the valve from becoming clogged with sediment. The relief valve should be inspected upon emptying the separator and readjusted (per installation instruction 5) upon restart.

If you have any questions regarding this product, contact your local sales representative or our Application Engineering Department at the factory.

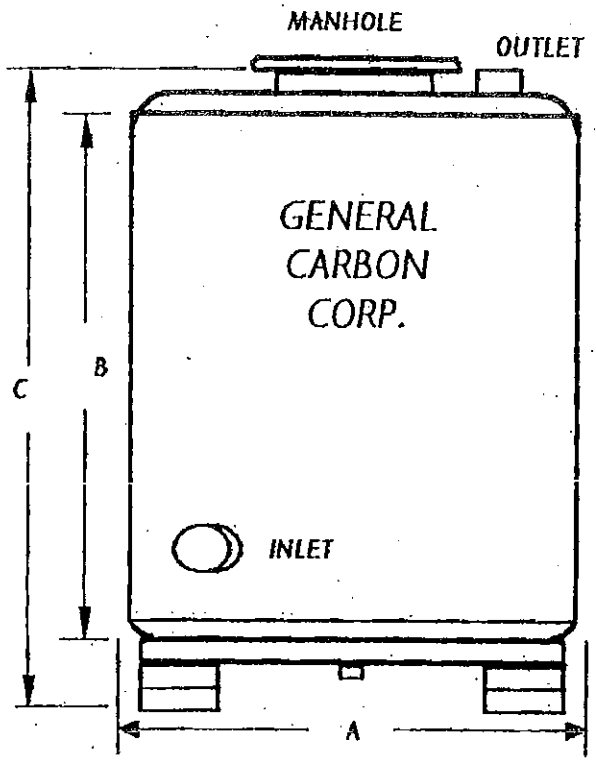
Appendix E

GENERAL CARBON CORP.

TV-ADSORBERS

VAPOR PHASE ADSORBERS; 1000, 1800, 2200

The Transportable Vapor Phase adsorbers are fabricated from mild steel and are tested to DOT shipping standards. All units have two part epoxy coatings on the inside and industrial enamel on the outside to give a long service life. 4" steel FPT inlet/outlet fittings are connected to PVC internals for corrosion resistance. The units have 4-way forklift access, a screened drain and 16-inch top manhole. GC C-40 pelletized virgin, bituminous coal base carbon is standard. Other virgin coal, coconut shell, reactivated or impregnated carbons are available.



Specifications	*TV-1000*	*TV-1800*	*TV-2200*
A-Diameter, Outside	46"	46"	54"
B-Tank Height	48"	72"	72"
C-Overall Height	62"	86"	86"
Carbon Weight, lbs.	1000	1800	2200
Flow Rate, CFM	500	500	700
Maximum Pressure, psig	12	12	12
Maximum design Temp., Deg F	140	140	140

33 Paterson Street Paterson New Jersey 07501 Tel: 973 523 2223 Fax: 973 523 1494
www.generalcarbon.com email:sales@generalcarbon.com

Installation & Start Up – TV Series adsorbers require no special procedure for start up. Remove the shipping plugs from the inlet and outlet and make the proper connections to your system. The unit is now ready for service and can be started up. Unions or quick connect fittings are recommended if the unit will be disconnected frequently. Multiple units are usually connected in series with testing advised between the units to determine when the first unit needs to be changed out.

Maintenance – When in use, the only maintenance the TV Units require is testing for contaminants in the influent and effluent streams, and checking the operating pressure of the system. Monitoring the contaminant concentration level into the last unit in a series arrangement is the recommended safeguard against having breakthrough in the final outflow. When the concentration of contaminants in the flow coming out of the lead unit equals the concentration of the flow into the unit, the unit has reached its removal capacity and should be removed from service. The working life of each adsorber is dependent upon the type of contaminant in the air as well as its concentration and the airflow rate. A pressure relief device is advised to prevent damage to the adsorber in the event of excessive pressure buildup.

Recharging – Once the carbon is saturated by contaminants, the unit should be taken off line. If connected in a series mode, the next down stream unit should be moved into the lead position and a fresh unit put at the end of the train. All shipping plugs must be replaced when the unit is to be transported. To purchase replacement carbon or to arrange for a carbon change-out, please contact our office.

Disposal – Dispose of the spent carbon in accordance with Federal, State and Local regulations.

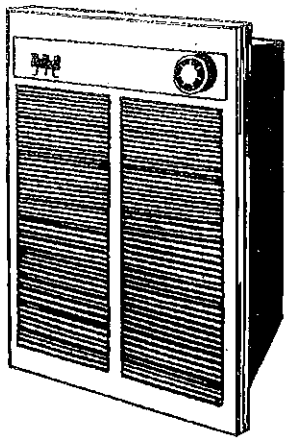
WARNING!

Wet activated carbon removes oxygen from air causing a severe hazard to workers inside carbon vessels. Confined space/low oxygen procedures should be put in place before any entry is made. Such procedures should comply with all applicable Local, State and Federal guidelines.

Appendix F

Marley
Engineered Products
An SPX Company

B2451 & B2452 Series Wall Heaters



SPECIFICATIONS					
MODEL	VOLTS	HZ	AMPS	WATTS	BTUH
B2451	120	60	12.5	1500	5120
B2452	240 208	60 60	8.3 7.2	2000 1500	6826 5120

DIMENSIONS OVERALL • Height - 14 1/4" • Width - 11" • Depth - 3 3/4"

File E21609

Installation & Maintenance Instructions

Dear Owner,

Congratulations! Thank you for purchasing this new heater manufactured by a division of Marley Engineered Products. You have made a wise investment selecting the highest quality product in the heating industry. Please carefully read the installation and maintenance instructions shown in this manual. You should enjoy years of efficient heating comfort with this product from Marley Engineered Products... the industry's leader in design, manufacturing, quality and service.

... The Employees of
Marley Engineered Products

WARNING

Read Carefully - These instructions are written to help you prevent difficulties that might arise during installation of heaters. Studying the instructions first may save you considerable time and money later. Observe the following procedures, and cut your installation time to a minimum.

TO REDUCE RISK OF FIRE OR ELECTRIC SHOCK:

1. Disconnect all power coming to heater at main service panel before wiring or servicing.
2. All wiring must be in accordance with the National and Local Electrical Codes and the heater must be grounded.
3. Verify the power supply voltage coming to heater matches the ratings printed on the heater nameplate before energizing.
4. This heater is hot when in use. To avoid burns, do not let bare skin touch hot surfaces.
5. Do not insert or allow foreign objects to enter any ventilation or exhaust opening as this may cause an electric shock, fire, or damage to the heater.
6. Do not block air intakes or exhaust in any manner. Keep combustible materials, such as crates, drapes, etc., away from heater. Do not install behind doors, furniture, towels, or boxes.
7. A heater has hot and arcing or sparking parts inside. Do not use it in areas where gasoline, paint, or flammable liquids are stored.
8. Use this heater only as described in this manual. Any other use not recommended by the manufacturer may cause fire, electric shock, or injury to persons.
9. This heater is not approved for use in corrosive atmospheres such as marine, green house, or chemical storage areas.

SAVE THESE INSTRUCTIONS

SURFACE MOUNTING:

1. Mount surface wall adapter to wall with appropriate fasteners (furnished by installer) through wall mounting holes. Adapter must be mounted a minimum of 18" above the finished floor. **NOTE: LARGE (.187 Diameter) HOLES are clearance holes for wall mounting screws and SMALL (.106 Diameter) HOLES for mounting heater to adapter.**

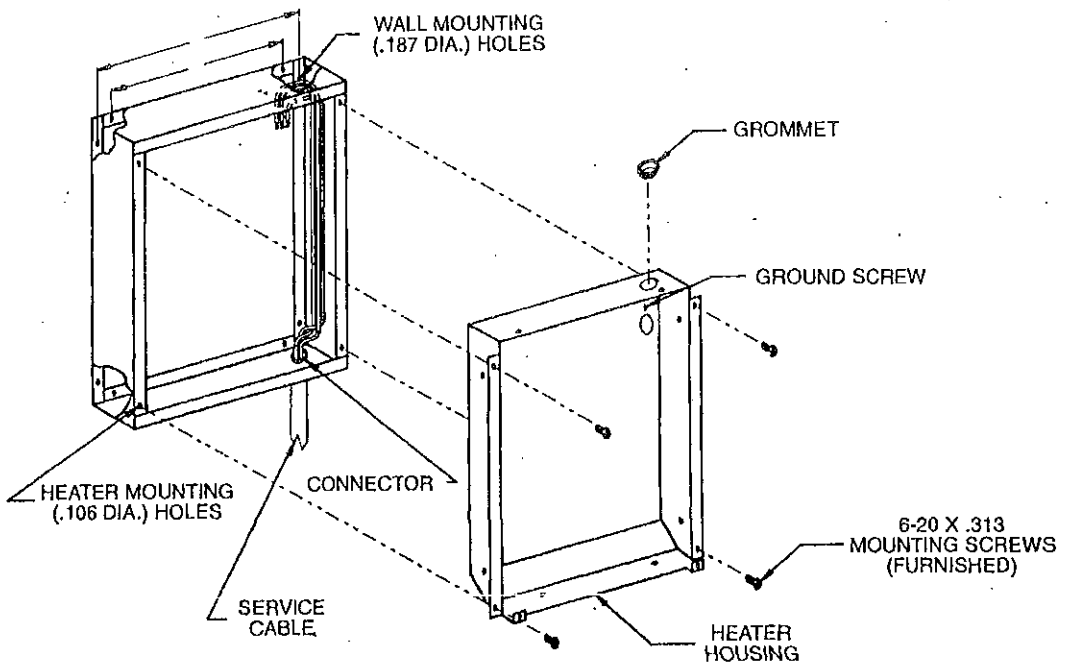
2. Allow 30" of service cable, removing 28" of outer jacket, and stripping individual conductors 1/2" from the ends.

3. Run service leads through the hole in the bottom of the surface wall adapter using an approved connector. Install provided grommet in top knockout hole in heater housing. Run cable through grommet.

4. Place heater housing inside of the adapter as shown in illustration above and secure with the (4) 6-20 x 5/16" screws. Connect ground wire under ground screw in housing.

5. Proceed to mount and wire heating unit assembly per HEATER ASSEMBLY INSTALLATION AND WIRING instructions.

FIG. 8



OPERATION

The heater is operated using two controls: A thermostat marked **Heat Control** and a three-position switch marked **HEAT, FAN** and **OFF.**

1. **OFF:** Unit is completely disconnected from power source.
2. **FAN:** Fan will circulate air in room without heat.
3. **HEAT:** Set **HEAT CONTROL** in its fully clockwise position and depress **HEAT** button. When the room reaches desired comfort level, turn the **HEAT CONTROL** knob counterclockwise until the fan stops operating. The heater will then maintain that comfort level.

   NOTE: Do not energize heater before it is fully assembled; this will cause the limit switch to trip.

LIMIT SWITCH

1. This unit is equipped with a manual-reset, high temperature limit switch. If no heat is delivered with thermostat set fully clockwise, turn thermostat fully counterclockwise, and check red reset button in center of front plate.
2. In order for heater to operate, the limit switch must be reset. Using a toothpick or similar piece of wood, push button IN where it should remain.
3. *Turn thermostat fully clockwise and repeat above steps when heater resumes normal operation.*
4. If the heater still does not function, or if after a 10-20 minute cool-down period button will not reset (remain IN), have heater checked by a qualified electrician.

NOTE: Due to the sensitivity of the limit switch, it may have tripped from vibration during shipment. It may be necessary to reset switch prior to initial start-up of the heater.

MAINTENANCE

CAUTION: Before attempting any cleaning or maintenance on this heater, open the circuit to the heater by removing the fuse or opening the circuit breaker for the heater circuit.

SIX MONTH

1. Loosen screws securing grille and remove grille. Loosen screws securing heater assembly and allow heater assembly to tilt out until it rests on guide bracket and pin.
2. Vacuum or wipe dust from inside of heater. Take caution not to bend or otherwise damage heater fan blade or other components.
3. Reassemble heater.

YEARLY

After cleaning add 2 or 3 drops of S.A.E. 10W or 20W oil to fan motor bearings.

TROUBLE-SHOOTING CHART

SYMPTOM	POSSIBLE CAUSES	CORRECTIVE ACTION
Heater does not come on.	1. Thermostat set too low (too far counterclockwise).	1. Turn the thermostat knob clockwise until heater operates.
	2. Circuit breaker in distribution panel not closed.	2. Close circuit breaker.
	3. Circuit breaker in distribution panel does not stay stay closed.	* 3. A short circuit exists in the heater wiring.
	4. Resettable temperature limit switch in heater not closed.	4. Manually close limit switch (See Operation Section "Note"). *If limit switch will not stay in, have the heater checked.
	5. Open in wiring to heater.	* 5. Open main circuit breaker. Check wiring continuity.
	6. Thermostat	* 6. Open main circuit breaker to heater, jumper across thermostat terminals. Close main circuit breaker. If heater operates, thermostat should be replaced. Remove jumper after opening main circuit breaker.
	7. Thermal Fuse (applicable units only)	* 7. Open main supply circuit to heater. Check thermal fuse. If blown, determine cause and correct. Replace thermal fuse.
Fan blade does not turn.	1. Jammed fan blade.	1. Remove fan blade obstruction.
	2. Leads not connected to fan motor.	* 2. Reconnect fan motor leads.
	3. Winding in fan motor open.	* 3. Replace fan motor.
	4. Locked motor bearing.	4. Oil motor bearings; if bearings do not unlock, replace motor.
Heater will not shut off.	1. Heat loss from room is greater than heater capacity.	1. Close doors and windows. Provide additional insulation or additional heaters.
	2. Thermostat	* 2. Rotate thermostat knob to extreme counter-clockwise position. If heater continues to run, replace thermostat.
Heater discharges smoke.	1. Dust, dirt and lint accumulate inside of heater.	1. Clean heater. See Six Month Maintenance Section for cleaning instructions.
Heater fan operating, but does not discharge warm air.	1. Open heater element.*	1. Replace heating unit assembly.
	2. Wire loose from element assembly.	* 2. Replace wire.
	3. Heater connected to wrong electrical service voltage.	* 3. Check supply voltage.

*** WARNING: MUST BE PERFORMED BY QUALIFIED ELECTRICAL PERSONNEL ONLY. CONTACT MANUFACTURER FOR INSTRUCTIONS ON RETURNING UNIT TO AN AUTHORIZED SERVICE CENTER.**

⚠ CAUTION ⚠

DISCONNECT ELECTRICAL SUPPLY BEFORE INSTALLING OR SERVICING THIS HEATER. IMPROPER INSTALLATION, OPERATION OR MAINTENANCE OF ANY ELECTRICAL HEATER CAN CAUSE FIRE OR ELECTRICAL SHOCK HAZARDS.

GENERAL

Counterflow grille louvers direct air downward for even heating throughout area. Heaters are controlled with an adjustable ther-mostat, which controls temperatures between 40° F and 90° F. The three position selector push button switch provides "OFF" position; "FAN ONLY" position; and "HEAT" position. The heaters have a fast low-mass alloy element; manual reset, and safety over-heat thermal fuse.

UNPACKING

Unpack carefully. Inspect for loose, missing, or damaged parts. In the event of missing components or hidden damage immediately contact your distributor or the delivering carrier concerning discrepancies. The motor/fan assembly has been carefully factory balanced. Care should be taken when handling to avoid damage resulting in unnecessary vibration and noise.

GENERAL SAFETY GUIDELINES

WARNING: Do not block heater in any manner.

Read instructions carefully before attempting to install, operate or service this wall heater. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

1. Follow all state and local safety codes as well as the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).
2. Before attempting any electrical connections to this heater, make sure that the circuit breaker controlling the circuit to which the heater is to be connected has been thrown to the off position. The circuit breaker panel door should be locked or tagged while heater wiring is being connected.
3. The heater must be grounded in accordance with applic able codes to the ground screw provided in the housing.
4. Protect the power supply cable from kinks, sharp objects, oil, grease, hot surfaces or chemicals.
5. Do not install the heater behind room or cabinet doors or in a position such that the air discharge can be blocked in any manner. Do not install behind towel racks, furniture, drapes or coat racks.
6. Check heater voltage on data plate and make sure that it is the same as the electric service supply.

GUIDE BRACKET ASSEMBLY

Optional tilt-out front plate makes installation easier. Guide bracket and guide screw located in bag assembly. See Fig. 1 and Fig. 2 for installation.

Larger round hole in guide bracket should be placed on locating hole (flared extrusion) on inside surface of front plate between heater assembly and motor bracket below switch (see Fig.2). Line up screw hole on guide bracket with that on plate and install black-oxide screw through front plate into guide bracket to secure it. The guide screw should be screwed into the housing from the outside panel inward (see Fig. 1). The extended threaded portion of the screw acts as the pivot arm for the guide bracket. The guide screw should line up with the large slot in the guide bracket upon installing the heater in the enclosure.

FIG. 1

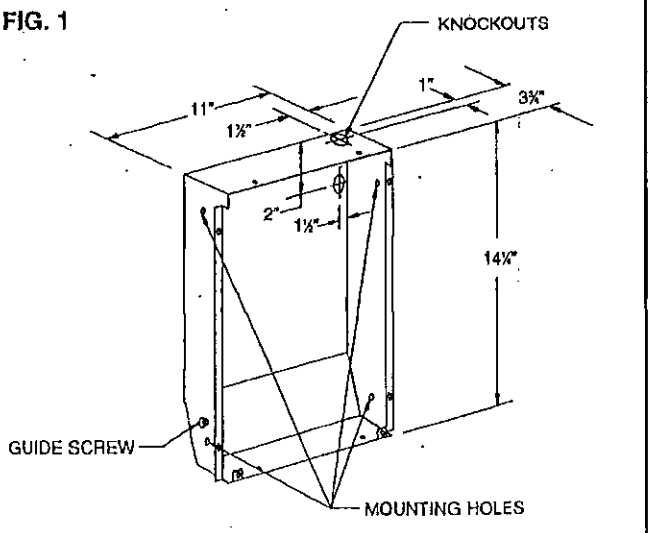
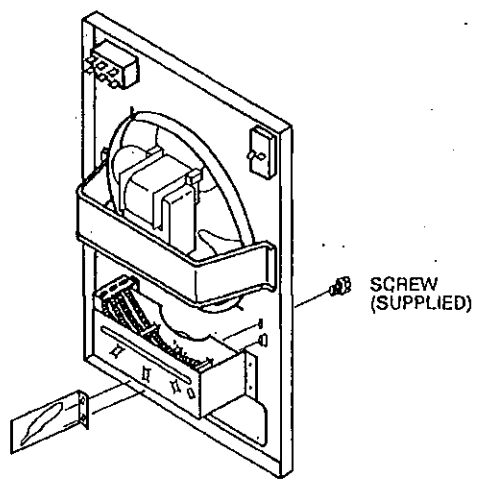


FIG. 2



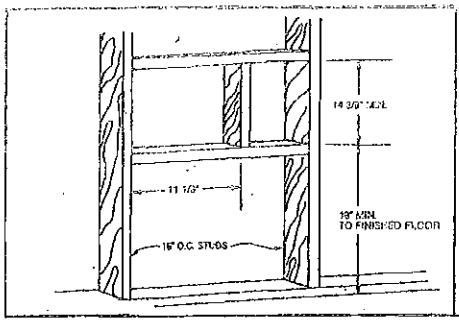


FIG. 3

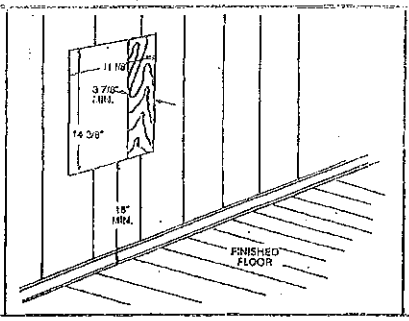


FIG. 4

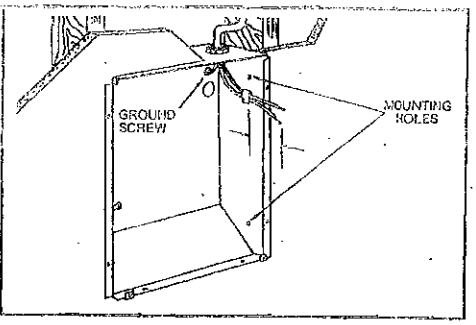


FIG. 5

LOCATION

Select the location so that any doors near the heater will not block the front of the heater when they are opened. Avoid any similar circumstances such as draperies or furniture blocking heater. Heater must be installed at least 8" from adjacent walls and 18" form the finished floor.

EXISTING CONSTRUCTION

a. Cut an 11 1/8"W x 14 3/8"H opening in the wall, with one 14 3/8" cut along the edge of a wall stud. A strip approximately 3 1/4" thick x 15" long may be nailed to the adjacent stud so that an attaching surface is provided for each side of the housing. (See Fig. 4)
b. Run service cable to wall opening, and through housing knockout, leaving at least 12" extended inside housing. Secure cable to housing using an approved connector.
c. Position housing in wall opening with knockouts at top right. Secure housing with nails or screws.
d. Complete installation as described in "NEW CONSTRUCTION".

NEW CONSTRUCTION

a. Install 2" x 4" headers as shown in Fig. 3. Note 18" minimum distance to finished floor.
b. Install housing in 11 1/8" W x 14 3/8" H space framed by 2" x 4" headers and wall stud. Observe "top" notation on label affixed to inside of housing. Before nailing or screwing housing to stud and header, determine thickness of wall paneling or drywall. Flanges of housing must be spaced away from wall studs equal to thickness of paneling or drywall. Printed tape with standard thicknesses indicated are provided at housing comers. Nail or screw housing to 2" x 4" stud and header through holes shown in Fig. 5.
c. Run service to housing and connect to desired knockout with approved connector. Leave 8" of cable extending beyond connector for connection to heater assembly. Strip outer jacket from cable back to connector. Connect ground wire under ground screw. Run cable leads under cable clamp. Cut leads 2" beyond clamp and strip wires for connection to heater. (See Fig. 5)
d. Place heater assembly in housing by slipping the two slots in the bottom of heater assembly over the two tabs provided on the housing as shown in Fig. 6. Tilt unit up until pin in housing is centered in large area of slot in guide bracket, if installed. Push guide bracket over pin and tilt heater assembly back down until it rests on end of slot in guide bracket.

FIG. 6

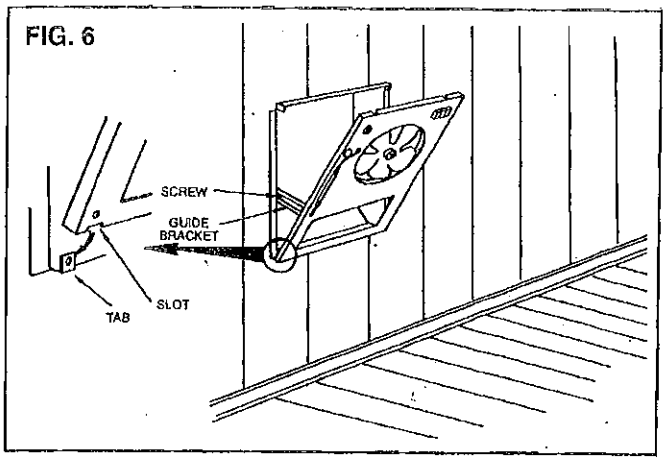
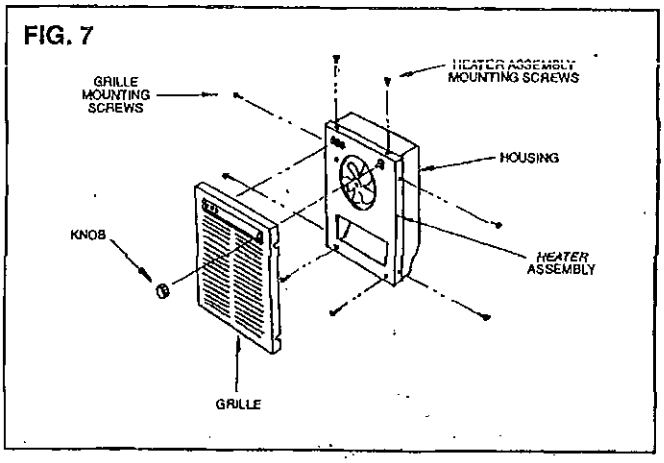
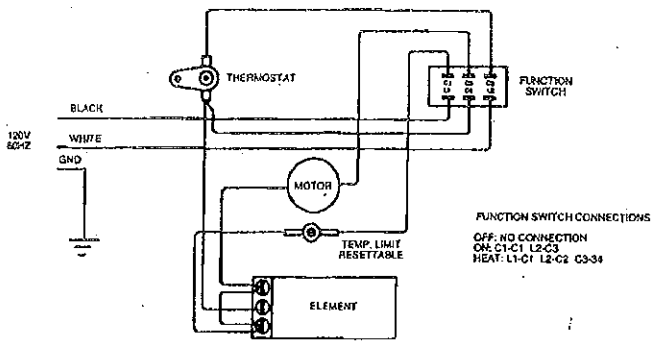


FIG. 7

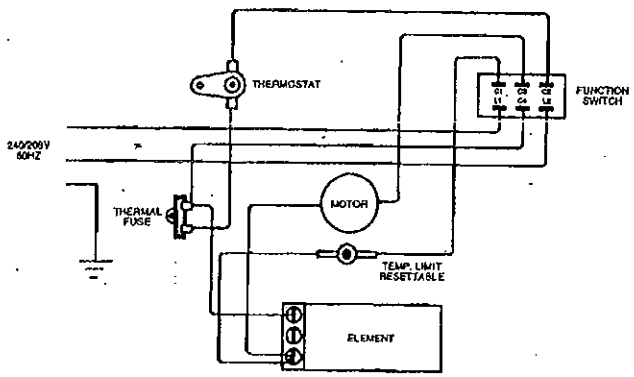


e. Unit can now be wired per local electrical code by connecting service leads from knockout to heater with an approved connector. Check nameplate to be certain proper voltage is being used.
f. *After wiring is complete, tilt heater assembly up until it is flush* with wall, fasten with four screws provided. (See Fig. 7)
g. Fasten grille to unit through two slots in each side with four screws provided. Push knob on unit. (See Fig. 7)
h. Check heater for proper operation. See operating instructions.

FIG. 9

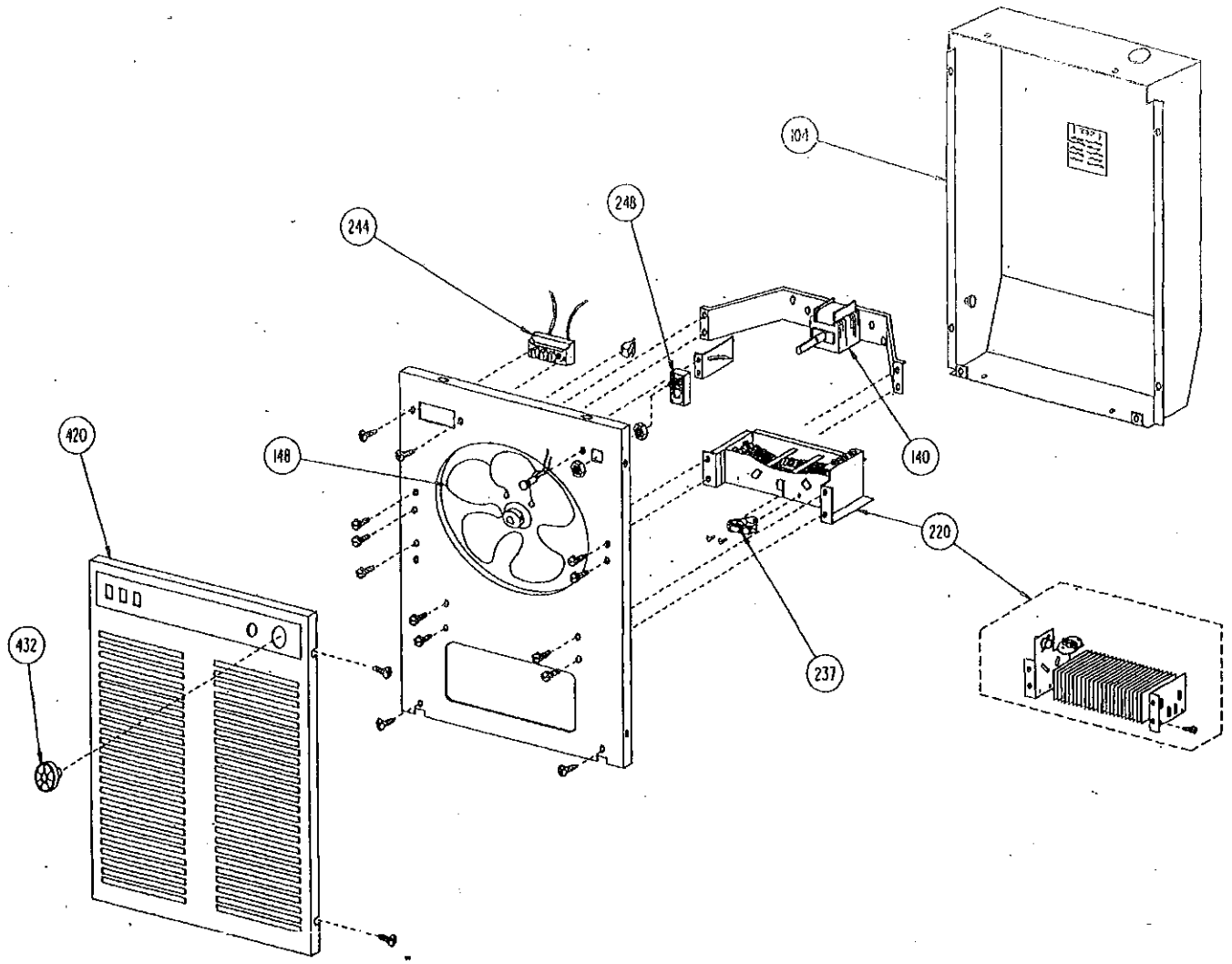


MODEL B2451



MODEL B2452

FIG. 10



REF NO	DESCRIPTION	QTY	MODEL USED ON
420	GRILLE ASSEMBLY	1	ALL
432	KNOB	1	ALL
148	BLADE, ⅞" BORE - 7⅞" DIA	1	ALL
244	SWITCH, THREE POSITION	1	ALL
248	THERMOSTAT	1	B2451, B2452
104	HOUSING ASSEMBLY	1	ALL
140	MOTOR 120V ASSY	1	B2451, B2452
220	ELEMENT ASSEMBLY	1	ALL
237	LIMIT SWITCH, MANUAL	1	B2451, B2452
	LIMIT CONTROL	1	
550	THERMAL FUSE	1	B2452

HOW TO ORDER REPAIR PARTS

In order to obtain any needed repair or replacement parts, warranty service or technical information, please contact Marley Engineered Products Service Center toll-free by calling 1-800-642-HEAT.

When ordering repair parts, always give the information listed as follows:

1. The Part Number
2. The Model Number
3. The Part Description
4. Date of Manufacture

Marley
Engineered Products
An SPX Company
470 Beauty Spot Rd. East
Bennettsville, SC 29512 USA

Part No. 5200-2537-001

ECR 35194
03-02

Appendix G

DL-125C

Programmable 2-Channel Speech Dialer

Visonic Ltd

Installation Instructions

1. INTRODUCTION

1.1 Purpose and Use

The DL-125C is an automatic programmable speech dialer with two alarm inputs. It is designed for verbal reporting of two separate events, one event per input. Each event can be reported to 4 different remote telephones, or both events can be reported to the same 4 telephones. The telephone numbers of the called parties may be frequently reprogrammed by the user.

A communication session with the first / second group of telephones is initiated by triggering alarm inputs Z-1 / Z-2, or by pressing AL-1 / AL-2 on the front panel, respectively. The alarm logic of each input is programmed separately by the installer.

Pulse or DTMF dialing can be used to establish communication with the called party, in accordance with the local telephone network. The dialer performs certain functions in response to DTMF control commands received from remote telephones.

Whenever a message is acknowledged by the called party, the dialer activates a highly sensitive microphone, to allow the called party to monitor the installation site for sound. The "listening-in" period is limited in time, but the called party can send a specific DTMF command to prolong it.

The DL-125C is packaged in a plastic case, with a built-in keypad for programming and operation (see Figure 1). 12 keys serve for entering data, and 4 are function keys. Programmed data is retained in an EEPROM, unaffected by power failures.

Operating power is obtained from the mains through an external 12 VDC power supply. The use of a 12-Volt rechargeable, sealed battery is recommended to provide operating power backup.

Two models are available:

DL-125C - allows the user to stop the communication session by pressing the STOP pushbutton.

DL-125 CA - does not allow the user to stop the communication session by pressing the STOP pushbutton. This feature is sometimes required by regulatory authorities.

1.2 Applications

- Upgrading alarm control panels that do not have a dialer. Two different events can be reported to remote telephones.
- Stand-alone 2-input 24-hour alarm system, triggered directly by a smoke/shock detectors or a panic button (loop response time 200 ms).
- Looking after infants or old, sick and disabled people. The DL-125C delivers a distress message and then allows the called party to "listen in".
- Supervising unattended technical devices or processes, with verbal reporting of equipment failures or process anomalies.
- Transmitting numeric reports to numeric pagers or voice messages to voice pagers.

1.3 Message Structure

The overall length of the speech message that can be recorded is limited to 20 seconds. Within this limit, the message can be composed of two pre-recorded segments:

- The identification segment, common to both alarm inputs. This segment usually identifies the user or the protected premises.

Note: Recording an identification segment is not obligatory. You can record a longer alarm type segment for each input instead.

- The alarm type segment, associated with a specific alarm input. This segment is used to describe the type of event reported ("fire", "intrusion", "panic", etc.).

A transmission initiated by a specific event (one of the two alarms) is composed of the identification segment and one of two alarm type segments. The order of transmission of the two segments can be selected. For instance, you can select: "The Smith residence, 25 Scarecrow Drive – Fire Alarm", or you can select: "Fire Alarm – the Smith residence, 25 Scarecrow Drive".

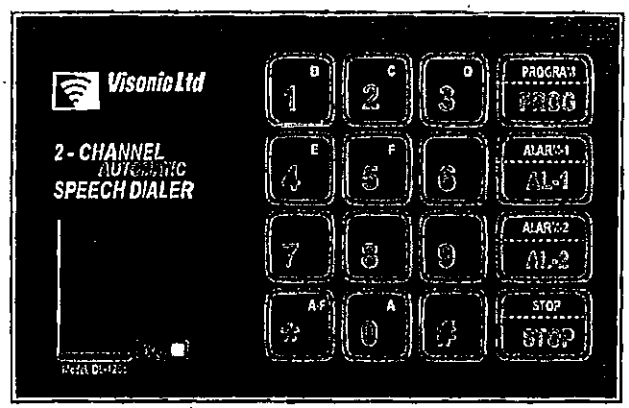


Figure 1. DL-125C, Front Panel

1.4 Communication Routine

Note: In this section, location numbers identify "memory cells" that retain programmed parameters (see Para. 4.7).

Once triggered into action, the DL-125C introduces a programmed pre-dialing pause (see Location 14 in Para. 4.7). Then it disconnects the local telephone set and engages the telephone line. The DIAL LED lights and the process continues as follows:

A. The dialer starts dialing if uninterrupted tone is detected for 2 seconds (see C below). If 5 seconds elapse with no dial tone - the dialer disengages the line, waits 5 seconds and tries again. If another 5 seconds go by without dial tone, the dialing procedure starts anyway (see B below).

B. The dialer checks whether a letter is programmed as a prefix to the first telephone number. Letter prefixes impose an additional delay before dialing (see Para. 4.2). The dialer introduces the required delay (if any) and then starts dialing.

C. The dialer dials the programmed number. During dialing, the LED either remains lighted (DTMF dialing) or flashes (pulse dialing), depending on the dialing method selected. After dialing, the dialer pauses for 5 seconds and transmits the message prepared for the called party associated with the input that had been triggered.

Note: Message structure is explained in Section 1.3.

D. The dialer now waits 3 seconds for the called party to acknowledge (the acknowledge signal is DTMF "1").

E. Upon receiving the acknowledge signal, the dialer removes the presently contacted telephone from its task list for the current event. If the "listen in" function is permitted (see Location 10 in Para. 4.7) it will continue as in Paragraphs F and G below. If not, the dialer will go "on hook" and proceed to dial the next number.

Note: Without an acknowledgement, the message will be repeated until the maximum number of message repeats is reached (see Location 20 in Para. 4.7). The DL-125 will call the remaining numbers and will then repeatedly retry the number that didn't acknowledge, until the maximum number of dialing attempts is reached (see Locations 12 and 13).

F. After acknowledgement, the dialer enables the "listen in" function for a preprogrammed period.

G. At the end of the listen-in period, a short beep sounds. If the called party keys "1" within 10 seconds, a new listen-in period begins. Otherwise", the dialer will go "on hook". The listen-in period may be prolonged as many times as necessary or terminated at any time by keying "9" twice in succession.

H. Upon conclusion of the communication session with the first telephone, the procedure in A through G above will be repeated for all remaining telephone numbers in the relevant

group (provided that the "non-backup mode" has been selected in Location 24).

Note: Location 24 allows selection of "backup" or "non-backup" mode. In the backup mode, acknowledgement from one telephone is enough to close the event. In the "non-backup" mode, acknowledgement must be obtained from all telephones in the group.

I. Once the entire communication cycle is concluded, the dialer disengages the line and reverts to the standby state. If you are using the DL-125C model, the communication routine may be aborted at any time by pressing the STOP button on the keypad. If you are using the DL-125CA model, the only way to stop the dialer is to disconnect the power, because the STOP button is disabled.

2. SPECIFICATIONS

Input Circuits: 2 normally open (N.O.) or normally closed (N.C.) inputs*.
Alarm Logic: Alarm upon circuit closure or alarm upon circuit opening*
Dialing Method: Pulse or DTMF*
Tel. Line Impedance: 600Ω, or customized to meet local requirements in country of use.
Reporting Destinations: Two groups of telephone numbers, 4 telephones in each group. Reporting to one pager requires the memory space dedicated to two telephone numbers.
Tel No. Length: 20 digits maximum.
Speech Message Duration: 20 seconds max.
No. of Dialing Attempts: 1 - 16*
No. of Message Repeats: 1 - 255*
Acknowledge Pause between Message Repeats: 3 seconds
Power Supply: 11 -14 VDC
Current Drain: 20 mA (standby), 90 mA (max.) @ 12 VDC
Operating Temperatures: 0°C to 50°C (32°F to 122°F)
Size: 150 x 105 x 35 mm (5-7/8 x 4-1/8 x 1-3/8 in.)
Weight: 235g (8.3 oz)

** Characteristics marked with an asterisk are programmable*

3. INSTALLATION

3.1 Mounting

The DL-125C may be installed as a stand-alone unit or within the housing of a host system such as an alarm control panel. The unit includes three parts: the front frame, the electronic module (complete with keypad) and the base. The base must be separated from the other two parts for installation.

A. Insert a screwdriver into the slot as shown in Figure 2, and push the flexible catch slightly inward to disengage it. Pulling the bottom of the frame upward will allow you to free the two tabs at the top and remove the frame.

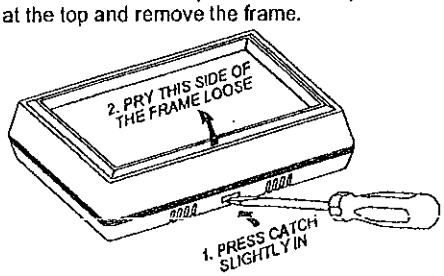


Figure 2. Removing the Front Frame

B. Insert a screwdriver blade where shown in Figure 3. Dislodge the left side of the module, swing it up and disengage the two right hand legs from their seats. The module may now be detached from the base

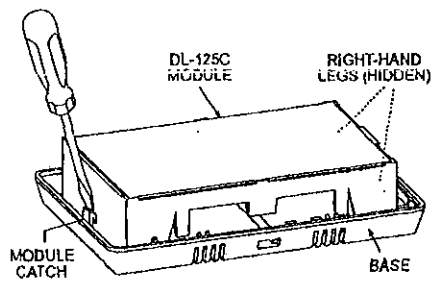


Figure 3. Separating the Module from the Base

C. Open one of the wiring knockouts (see Fig. 4). Route the wires in and secure the base to the wall or to the host system cabinet, using screws through the three round holes. Complete all wiring as instructed in Para. 3.2.

D. After wiring, re-attach the DL-125C module to the base.

E. Remount the front frame: slant it towards the top of the base and engage the two legs at the top. Swing the bottom part of the frame towards the base, and press it against the base until the bottom catch snaps into the slot.

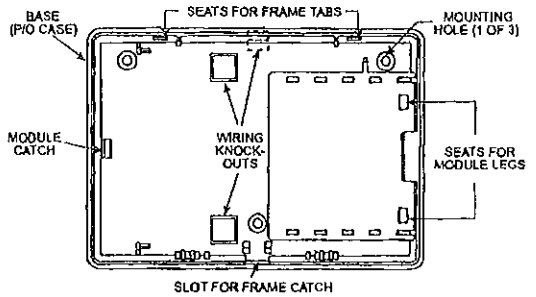


Figure 4. Base Layout

3.2 Wiring

Two wiring methods are recommended (see Figures 5 and 6).

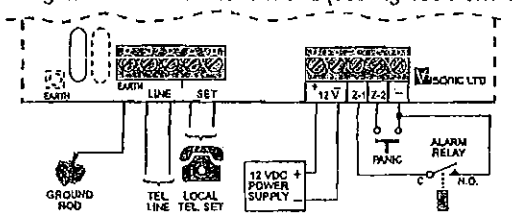


Figure 5. Wiring with Constant Supply of Operating Power

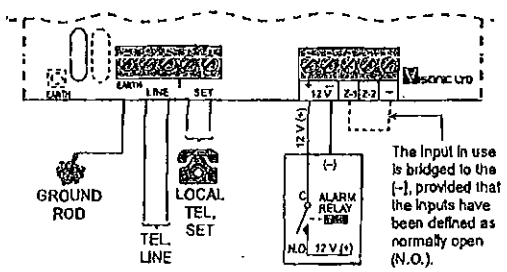


Figure 6. Wiring for Automatic Stopping by Power Cutoff

The Figure 5 wiring configuration assumes that input Z1 is triggered by an alarm relay, and input Z2 by a panic pushbutton. The dialer is constantly powered by 12 VDC.

The Figure 6 wiring configuration assumes that only input Z1 is used. The dialer will be automatically enabled upon alarm, since 12 VDC is supplied via the alarm relay, and Z1 is permanently connected to the [–] terminal. The dialer will be disabled upon stopping the alarm, since the alarm relay cuts off the power. This type of wiring is ideal when the dialer is mounted in a locked box

that prevents access to the STOP pushbutton.

Note: Both Z-1 and Z-2 can be programmed as N.O. (normally open) or N.C. (normally closed) inputs (see Locations 22 & 23 in Para. 4.7). With N.O. inputs selected, a short circuit across the relevant input will activate the dialer. With N.C. inputs selected, an open circuit across the relevant input will activate the dialer.

Use 14 gauge wire or larger to connect the EARTH terminal to the nearest electrical ground, preferably a ground rod.

Failure to earth the unit compromises safety!

The phone connected to the SET terminals will be automatically disconnected from the line whenever the dialer goes into action.

4. PROGRAMMING

4.1 Programming Fundamentals

The DL-125C employs a non-volatile EEPROM, which stores programmed data and keeps it intact even during power failures. Programming is carried out from the keypad by entering the desired variables or by setting logic flags. Every variable is programmed into a specific location in the memory, and each location is identified by a LOCATION NUMBER. A set of default parameters is programmed at the factory and saved in the EEPROM, but you may change these at will (see Para. 4.7). The programming format consists of the following successive entries:

[PROG][LOC][#][VAL][#]

[PROG] and [#] are keys provided on the keypad. [PROG] starts the programming sequence and [#] confirms the preceding entry.

<LOC> is the location number. A leading zero may be ignored, so Location 06 may be entered as a single digit – <6>.

<VAL> is the value or code entered into the selected location.

Refer to the PROGRAMMING CHART (Para. 4.7) for a full list of locations, permissible entries and function details

***Caution!** If an invalid parameter is entered at any stage, the LED will flash rapidly for 2 seconds and programming will be aborted.*

You will sometimes have to key the hexadecimal digits B, C, D and E (see Para. 4.2 and 4.5 below) These digits are marked on certain keys (see Figure 1). To start the hexadecimal mode, press [*]. The DIAL LED near the keyboard will flash rapidly. Next, press the key with the desired letter. The keypad will automatically revert to its normal numerical function, and the LED will stop flashing. Press [*] again if you wish to key another letter. Voice recording instructions are given in Paragraph 4.4.

4.2 Entering Telephone Numbers

Telephone numbers are entered in locations 1 through 4 (1st group) and 5 through 8 (2nd group). The programming format is:

[PROG][LOC][#][NUM][#]

A. Enter the programming mode by pressing the PROG key. The DIAL LED should light steadily.

B. Select the location for the telephone number you wish to program by keying its location (LOC) number. The DIAL LED should flash once for each keystroke.

C. Press [#] to confirm the location number. The LED should flash twice.

D. Key the telephone number (NUM), digit by digit. The DIAL LED should flash once for each digit. There is a 20-digit limit, including inter-digit pauses (see following note).

Note: To program pauses between dialed digits, as sometimes required when PABX systems are used, the following entries are available:

Code Letter	*Key Strokes*	*Resultant Function*
B	*[*][1]*	*wait 5 seconds or wait for dial tone, whichever comes first, and continue dialing.*
C	*[*][2]*	*wait 10 seconds and continue dialing.*
D	*[*][3]*	*wait 5 seconds for dial tone and disengage the line if none is received.*

After pressing [*], the LED indicator flashes until a letter key is pressed.

E. Having entered the last digit, finish off by keying [#] .The DIAL LED indicator will extinguish.

F. To program another telephone number, repeat the procedure outlined in steps A to E above.

4.3 Deleting Telephone Numbers

A telephone number location will "blank out" if you go through the programming process as in B above but skip the telephone number. The deleting format is therefore:

[PROG][LOC][#][#]

Note: The number already programmed into any location between 1 and 8 may be verified by using the following format:

[PROG][LOC][*]

This initiates a communication session with the particular telephone, and provides a chance to verify correctness of the programmed phone number.

4.4 Recording and Erasing

A. Recording Order

The verbal messages must be recorded in the order given below:
The identification segment first (details of user, or site, or both)
1st alarm segment second (description of 1st alarm type)
2nd alarm segment third (description of 2nd alarm type).

***Note:** Failure to comply with this rule may produce unexpected results. If so, just record again in the correct order.*

The time available for all 3 segments is 20 seconds, and the maximum length of the identification segment is 15 seconds.

B. Recording Procedure

Message Segment	Actions Required	Response
	① ☛ ② ☛ ③ ④ ⑤ ☛	
	① ☛ ② ☛ ③ ④ ⑤ ☛	

** If recording is not carried out exactly as instructed or time limits are exceeded, the DIAL LED will start flashing to indicate a recording failure. The newly recorded message as well as the old one will be lost. Record again exactly as instructed.*

C. Erasing Recorded Messages

Press [#] - the DIAL LED flashes once. Within 2 seconds, press [AL-1]+[AL-2], or [AL-1] or [AL-2] depending on which message you wish to erase. Then press [#] again without recording anything. The previous message will thereby be erased.

4.5 Dealing with Pagers

You may program the DL-125C to dial a pager's phone number and send a numeric or verbal message. Communication with a single pager requires two consecutive locations in the DL-125C memory - one for the pager's phone number and another for the numeric data sent to the pager. Since each DL-125C input has 4 memory locations for phone numbers, each input can report to one pager and 2 regular telephones or just two pagers.

If the pager's phone number is entered into Location No. 1, the numeric message for that pager must be entered into the next location (No. 2). If the pager's phone number is entered into Location No. 2, the numeric message for that pager must be entered into the next location (No. 3).

***Important!** Location No. 4 (the last location in the first group) and No. 8 (the last location in the second group) can't be used for pager phone numbers - in both cases there is no "next location" with memory space for the message.*

In the backup mode (see Para. 1.4H), it is advisable to use Locations 1 & 2 or 5 & 6 for pager data and the remaining locations for telephone numbers. The DL-125C will therefore call the pager first and, since the pager doesn't acknowledge, at least one of the telephone numbers will also be called.

Numeric pagers accept both the subscriber ID (PIN number) and a numeric message which is registered and forwarded to the subscriber. Voice pagers accept the subscriber ID (PIN number), record a verbal message and relay it to the subscriber.

Note: Some pagers have a special phone number assigned to each specific subscriber. This type of pager does not require a PIN number.

Some pagers require an asterisk (*) as a separator between the subscriber code and the message. Other pagers require the pound symbol (#). Correct programming is totally dependent on your ability to make the dialer "talk" to the paging company's computer in a language it "understands" (Fig. 7).

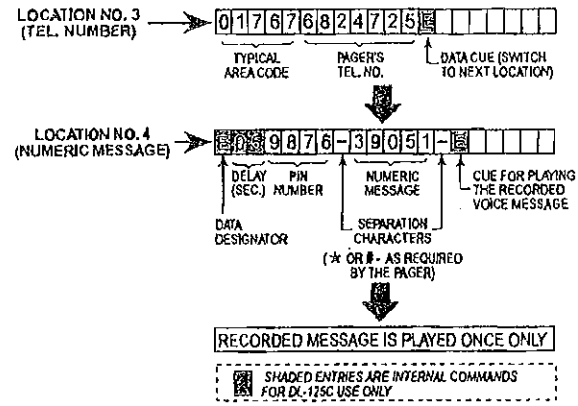


Figure 7. Typical Data Arrangement in Memory

Contact the paging company for specific interface details (PIN or no PIN, separating characters required etc.).

Figure 6 depicts a typical arrangement of data in the DL-125C memory for reporting an event to a pager. In this example, the phone number is entered into memory location No. 3, and the numeric message is entered into the memory location No. 4.

A hexadecimal E at the end of the phone number tells the dialer move to the next memory location and send the data stored in it.

A hexadecimal E at the beginning of a memory location identifies the contents of this location as pager data. A hexadecimal E after the data serves as a cue for playing the voice message.

To program communication with a pager:

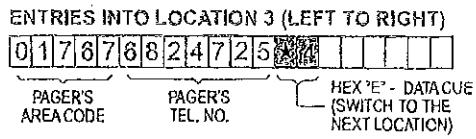
A. Reserve two consecutive memory locations in the same group of four.

B. Suppose the first location you chose is No. 3. Select it by keying [PROG], <3>, [#].

C. Suppose the area code is 01767 and the telephone number is 682-4725. Key in the data as exemplified in Figure 8.

D. Press [#] to confirm the data just entered.

E. Select the next memory location by keying: [PROG], <4>, [#].



[*][4] produces a Hexadecimal E, a cue for data in the next memory location.

***Figure 8.** Programming the Pager's 1st Location*

F. Suppose the target pager requires a 5 second interval between the end of dialing and the beginning of the message. Also suppose that the PIN number is 9876 and the message is 39051. Key the data as shown in Fig.8.

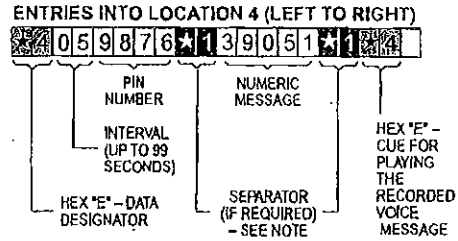


***Figure 9.** Programming the Pager's 2nd Location*

***Notes:** If the required separator is # - key [*][1]*

*If the required separator is * - key [*][2].*

In case of a pager that does not forward voice messages - skip the last [*][4].

If you need a 5-second delay anywhere within the message, key [*] [3].

G. Press [#] to confirm the data just entered.

4.6. Programming Summary

The DL-125C can be programmed equally well in the installer's office or at the installation site. Follow the PROGRAMMING CHART (Para. 4.7) row by row, and enter the appropriate variables. The code options are explained in the second column, and the full programming sequence for each variable is given in the fourth column. Each programming step is enclosed in square brackets, and may include more than one keystroke. The fifth column shows the default values, and the last column (Prog) is left blank for you to fill in your own programmed values.

Note: If no key is pressed for 30 seconds, programming will be aborted and the selected location will revert to the previously saved value.

To quit programming at any stage, press the [STOP] key.

4.7 Programming Chart

Loc No.	Description of Parameters & Code Options	Entry Limits	Programming Format	Factory Default	Prog. Record
1	1st telephone number associated with input Z-1	20 digits	[PR] [1] [#] [Num] [#]**	None	
2	2nd telephone number associated with input Z-1	20 digits	[PR] [2] [#] [Num] [#]**	None	
3	3rd telephone number associated with input Z-1	20 digits	[PR] [3] [#] [Num] [#]**	None	
4	4th telephone number associated with input Z-1	20 digits	[PR] [4] [#] [Num] [#]**	None	
5	1st telephone number associated with input Z-2	20 digits	[PR] [5] [#] [Num] [#]**	None	
6	2nd telephone number associated with input Z-2	20 digits	[PR] [6] [#] [Num] [#]**	None	
7	3rd telephone number associated with input Z-2	20 digits	[PR] 7] [#] [Num] [#]**	None	
8	4th telephone number associated with input Z-2	20 digits	[PR] [8] [#] [Num] [#]**	None	
9	Inaccessible to installers or users	--			
10	Inhibit or permit the listen-in function **0 - inhibited; 1 - permitted**	0 or 1	[PR] [10] [#] [Code] [#]	1	
11	Select Dialing method: **0 - DTMF; 1 - Pulse**	0 or 1	[PR] [11] [#] [Code] [#]	0	
12	No. of dialing attempts for alarms at input Z-1	1 - 16*	[PR] [12] [#] [Num] [#]	4	
13	No. of dialing attempts for alarms at input Z-2	1 - 16*	[PR] [13] [#] [Num] [#]	4	
14	Delay (in seconds) between trigger and action (to permit	1 - 255*	[PR] [14] [#] [Sec] [#]	3	

	the user to clear a false alarm)				
15	Order of transmission of message segments **0 - alarm type segment first:** **1 - identification segment first**	0 or 1	[PR] [15] [#] [Code] [#]	1	
16-19	Inaccessible to installers or users	--			
20	Number of recorded message repeats	1 - 255*	[PR] [20] [#] [Num] [#]	4	
21	Listen-in duration (in seconds)	1 - 255*	[PR] [21] [#] [Sec] [#]	60	
22	Z-1 input definition (Z-1 logic) **0 - N.O.; 1 - N.C.**	0 or 1	[PR] [22] [#] [Code] [#]	0	
23	Z-2 input definition (Z-2 logic) **0 - N.O.; 1 - N.C.**	0 or 1	[PR] [23] [#] [Code] [#]	0	
24	Selection of Backup or Non-backup reporting method: **0 - non-backup; 1 - backup (see note)**	0 or 1	[PR] [24] [#] [Code] [#]	1	

* The "00" value is illegal in this memory location

**When programming a 20-digit number, the LED will go off by itself after the 20th digit and the number will be saved.

Note: In the Backup reporting mode, receiving an acknowledge signal from a single telephone in a group of 4 is sufficient to consider the current event closed and call off the communication session. The remaining 3 telephones are there for backup purposes only.

In the Non-Backup mode, an acknowledge signal must be received from each telephone in the group of 4 before the current event is considered reported and closed.

5. TESTING AND CHECKOUT

After installation, programming, and message recording, correct function should be verified.

Testing can be made easier if you possess a cellular telephone and a portable AM/FM radio. For testing purposes, you can temporarily program your cellular telephone's number in Location 1 (the first telephone in the first group) and in Location 5 (the first telephone in the second group). This way you can monitor both messages and exercise remote control without bothering anyone. Switch the AM/FM radio on to play softly and put it about 2m (6 ft) away from the dialer. Then proceed as follows:

A. Trigger input Z-1 by opening or closing the circuit, as necessary.

B. If a predialing pause has not been programmed, the DIAL LED will immediately light. It will remain lighted (tone dialing) or flash (pulse dialing) indicating that the dialer has indeed begun its dialing routine.

C. If all goes well, your cellular telephone will ring. Answer the call and listen. The message should come through loud and clear. Verify that the message segments are read in the correct order, as programmed (identification segment first or alarm type segment first).

D. Wait for the 3-second interval between message repetitions and press the "**1**" key on your telephone. After that, the message should not be repeated any more.

E. If the listening-in function is permitted, you should now start hearing the radio through the telephone's earpiece.

Note: To prevent acoustic feedback, move into another room and continue monitoring from there.

F. Watch for the warning beep that sounds shortly before end of session. Press the "**1**" key on your telephone and verify that the listen-in period carries on instead of coming to an abrupt end.

G. Press the telephone's "9" key twice in succession. The dialer should terminate the communication session and go "on hook". If the dialer is in the non-backup mode ("0" has been selected Location 24), press the **STOP** button (DL-125C) or disconnect the power (DL-125CA) to prevent further dialing.

H. Reconnect the power (DL-125CA only) and trigger input Z-2 by opening or closing the circuit, as necessary.

I. Repeat steps B through G above for this input too. If all goes well, reprogram the telephone numbers in Locations 1 and 5 as requested by the user.

Note: Testing can be carried out without a cellular telephone, provided that you secure cooperation of the called parties. You must warn them in advance that you are about to test the system, explain briefly what they have to do and have them report to you later whether all went well.

6. SPECIAL NOTES

6.1 FCC Requirements

1. The Federal Communications Commission (FCC) has established Rules which permit this device to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin lines.
2. If this device is malfunctioning, it may be causing also harm to the telephone network; this device should be disconnected until the source of the problem can be determined, and until repair has been made. If this is not done, the telephone company may temporarily disconnect service.
3. The telephone company may make changes in its technical operations and procedures; if such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the changes.
4. If the telephone company requests information on what equipment is connected to their lines, inform them of:
   (a) The telephone number that this unit is connected to,
   (b) The ringer equivalence number (0.0B)
   (c) The USOC jack required (RJ-31X), and
   (d) The FCC registration number

Items (b) and (d) are indicated on the label. The ringer equivalence number (REN) is used to determine how many devices can be connected to your telephone line. In most areas, the sum of the RENs of all devices on any one line should not exceed five (5.0). If too many devices are attached, they may not ring properly.

6.2 Service Requirements

In the event of equipment malfunction, all repairs should be performed by our Company or an authorized agent. It is the responsibility of users requiring service to report the need for service to our Company or to one of our authorized distributors. Service can be obtained at: Visonic Inc. 10 Northwood Drive, Bloomfield CT. 06002-1911, U.S.A. Phone: (860) 243-0833, (800) 223-0020 Fax: (860) 242-8094

6.3 Certification in Canada

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Industry Canada does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100.

APPENDIX A. USER INFORMATION

A.1 User Guidance

We recommend to photo-copy this section for all DL-125C users - the proprietor of the protected premises and all called parties.

If programmed correctly, the DL-125C will operate automatically without user's intervention. However, the user can initiate an alarm or stop operation manually.

Pressing AL-1 will cause the dialer to call the 1st group of phone numbers and send them the relevant verbal message.

Pressing AL-2 will cause the dialer to call the 2nd group of phone numbers and send them the relevant verbal message.

Pressing STOP will cause the dialer to stop communicating, disengage the line and check both inputs. If an input is "in alarm", a new communication session will start. If both inputs are "normal", the dialer will stand by. *Note: This function is disabled in the DL-125CA.*

While listening to the incoming verbal message, the called party can exercise some control over the DL-125C by sending DTMF (touchtone) codes over the telephone line:

Serves as an acknowledgement. The DL-125C will stop sending the message and will permit "listening in". Before the listen-in period ends, the dialer beeps once. Pressing [1] again will start another listen-in period.

Serves as an acknowledgement and causes the dialer to stop sending the message and go "on hook". The dialer will then call the remaining numbers (if programmed to do so).

A.2 Data Record

AL-1 DATA

Message: _____

_____

_____

1st called party _____

2nd called party _____

3rd called party _____

4th called party _____

AL-2 DATA

Message: _____

_____

_____

1st called party _____

2nd called party _____

3rd called party _____

4th called party _____

WARRANTY

Visonic Ltd. and/or its subsidiaries and its affiliates ("the Manufacturer") warrants its products hereinafter referred to as "the Product" or "Products" to be in conformance with its own plans and specifications and to be free of defects in materials and workmanship under normal use and service for a period of twelve months from the date of shipment by the Manufacturer. The Manufacturer's obligations shall be limited within the warranty period, at its option, to repair or replace the product or any part thereof. The Manufacturer shall not be responsible for dismantling and/or reinstallation charges. To exercise the warranty the product must be returned to the Manufacturer freight prepaid and insured.

This warranty does not apply in the following cases: improper installation, misuse, failure to follow installation and operating instructions, alteration, abuse, accident or tampering, and repair by anyone other than the Manufacturer.

This warranty is exclusive and expressly in lieu of all other warranties, obligations or liabilities, whether written, oral, express or implied, including any warranty of merchantability or fitness for a particular purpose, or otherwise. In no case shall the Manufacturer be liable to anyone for any consequential or incidental damages for breach of this warranty or any other warranties whatsoever, as aforesaid.

This warranty shall not be modified, varied or extended, and the Manufacturer does not authorize any person to act on its behalf in the modification, variation or extension of this warranty. This warranty shall apply to the Product only. All products, accessories or attachments of others used in conjunction with the Product, including batteries, shall be covered solely by their own warranty, if any. The Manufacturer shall not be liable for any damage or loss whatsoever, whether directly, indirectly, incidentally, consequentially or otherwise, caused by the malfunction of the Product due to products, accessories, or attachments of others, including batteries, used in conjunction with the Products.

The Manufacturer does not represent that its Product may not be compromised and/or circumvented, or that the Product will prevent any death, personal and/or bodily injury and/or damage to property resulting from burglary, robbery, fire or otherwise, or that the Product will in all cases provide adequate warning or protection. User understands that a properly installed and maintained alarm may only reduce the risk of events such as burglary, robbery, and fire without warning, but it is not insurance or a guarantee that such will not occur or that there will be no death, personal damage and/or damage to property as a result.

The Manufacturer shall have no liability for any death, personal and/or bodily injury and/or damage to property or other loss whether direct, indirect, incidental, consequential or otherwise, based on a claim that the Product failed to function. However, if the Manufacturer is held liable, whether directly or indirectly, for any loss or damage arising under this limited warranty or otherwise, regardless of cause or origin, the Manufacturer's maximum liability shall not in any case exceed the purchase price of the Product, which shall be fixed as liquidated damages and not as a penalty, and shall be the complete and exclusive remedy against the Manufacturer.

Warning: The user should follow the installation and operation instructions and among other things test the Product and the whole system at least once a week. For various reasons, including, but not limited to, changes in environmental conditions, electric or electronic disruptions and tampering, the Product may not perform as expected. The user is advised to take all necessary precautions for his /her safety and the protection of his/her property.

6/91

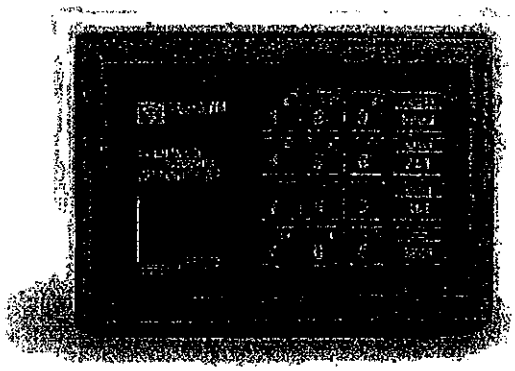
Visonic Ltd

VISONIC LTD. (ISRAEL): P.O.B 22020 TEL-AVIV 61220 ISRAEL. PHONE: (972-3) 645-6789, FAX: (972-3) 645-6788
VISONIC INC. (U.S.A.): 10 NORTHWOOD DRIVE, BLOOMFIELD CT. 06002-1911. PHONE: (860) 243-0833, (800) 223-0020 FAX: (860) 242-8094
VISONIC LTD. (UK): UNIT 1, STRATTON PARK, DUNTON LANE, BIGGLESWADE, BEDS. SG18 8QS. PHONE: (01767) 600857 FAX: (01767) 601098

CE

MADE IN ISRAEL

DL-125C
Two-channel programmable voice dialer



APPLICATIONS
Residential, commercial and industrial
Health care
Emergency reporting
Process monitoring

FEATURES
* Calls four telephone numbers per channel
* Transmits voice messages recorded in any language
* Provides two alarm inputs with separate voice message for each input
* Allows the called party to listen in and monitor the site
* EEPROM retains programmed data and voice message if power is lost

DESCRIPTION
The DL-125C is an automatic, programmable speech dialer designed for the verbal reporting of two separate events. Each event can be reported to four different remote telephones.

ADDITIONAL INFORMATION
INSTALLATION MANUAL

INSTRUCCIONES INSTALACIÓN

INSTALLATIONSANLEITUNG

SPECIFICATIONS
ELECTRICAL
Input Circuits: 2: NO or NC
Dialing Method: Pulse or DTMF*
Tel No. Length: 20 digits maximum
Reporting Destination: Calls four telephone numbers or two pagers per each input*
Voice Message: 20 seconds personally recorded message in any language, includes a common message to describe the location and two short messages to describe each of the two alarm events.
No. of Dialing Attempts: 1-16*
No. of Message Repeats: 1-225*
Acknowledge Pause Between Message Repeats: 3 seconds
Power Supply: 11-14 VDC
Current Drain: 20mA (standby), 90mA (max) @ 12VDC
ENVIRONMENTAL
Operating Temperatures: 0°C to 50°C (32°F to 122°F)
PHYSICAL
Size: 150 x 105 x 35 mm (5-7/8 x 4-1/8 x 1-3/8 in)
Weight: 235g (8.3 oz)

* This item is programmable.

Enviromac

APPENDIX E – MAINTENANCE RECORD KEEPING DATA SHEETS

Maintenance Record Keeping Data Sheet

Operator Name & Date	Time	Equipment and System Worked On	Description of Work Performed

APPENDIX F – CERTIFICATES

GROUND/WATER TREATMENT
& TECHNOLOGY, INC.

P.O. BOX 1174 DENVILLE, NEW JERSEY 07834
Phone (973)-983-0901 • Fax (973) 983-0903

SUBMITTAL COVER SHEET FROM CONTRACTOR

DATE: December 5, 2007

To: Camp, Dresser, McKee, Inc.
15 Cornell Rd
Latham, NY 12110
Attn: Mr. John Blaum, P.E.

RE: KLIEGMAN BROTHERS OU#1
CONTRACT D006547

Please find enclosed for your review five (5) copies of the following item:

ITEM: 7-Day Break for Ready Mix Concrete – Trench Restoration

SPEC SECTION: 02500

ARTICLE: 1.3

PAGE No. 02500-2

PARA. No. 1.3

DRAWING No.

LOCATION: N/A

SUBMITTAL No. 022

APPROVED BY:

Remarks:

These are transmitted as checked below:

X For approval	____ Resubmit	____ Approved as noted
____ For your use	____ Submit	____ Approved as submitted
____ As requested	____ Return	____ Returned for corrections
____ For review	____ Returned for corrections	

Sincerely,
Ground/Water Treatment & Technology, Inc.

Patrick T. Hunnewell
Dist:

MUNICIPAL TESTING LABORATORY, INC.

102 NEW SOUTH ROAD, HICKSVILLE, NEW YORK 11801, 516-938-7120, 516 938-5107 FAX, EMAIL MTL@MT-LAB.NET

REPORT OF CONCRETE OR GROUT PLACEMENT TESTS

Client:	N.Y.S. D.E.C. Ground Water Att: Pat Hunnewell	Report Date:	12/19/2007
Address:	P.O. BOX 1174, Deriville, NJ 07834	Report Number:	G1800 Lab#: 10047
Contractor:	More Trench American Corp.	Date Cast:	11/21/07
Project:	Gourmet Factory,76-01 77th Ave., Glen Dale, NY	Work Order #:	
Concrete Plant:	Farrara Bros	Yards Placed:	24

FIELD INFORMATION

Pour Location for Set # 1: Pipe trench @ parking lot

Pour Location for Set # 2:

Tests made in accordance with ASTM: X Yes Not Known Field Technician: Tramont Smith

ASTM C 39	COMPRESSIVE STRENGTH TESTS								AREA:	28.27	Cylinder Dia:	6
Cylinder ID #	Date Cast	Date Tested	Slump C143	Air C173, C231	Unit Wt. C138	Temp F. C1064	Truck No.	Tested Age	Load KN	Strength PSI	Required Strength	Type Frac
Cylinder Set # 1												
7486	11/21/07	11/28/07	3.00	5.1	147.8	65	61	7	463.8	3,660	4,000	A
7487	11/21/07	11/28/07	3.00	5.1	147.8	65	61	7	448	3,540	4,000	A
7488	11/21/07	12/19/07	3.00	5.1	147.8	65	61	28	597.7	4,720	4,000	A
7489	11/21/07	12/19/07	3.00	5.1	147.8	65	61	28	640.7	5,060	4,000	A
7490	11/21/07	12/19/07	3.00	5.1	147.8	65	61	28	612.8	4,840	4,000	A
Cylinder Set # 2												

Remarks:

Reviewed By: Laboratory Director
Richard Kasparian, P.E

GROUND/WATER TREATMENT & TECHNOLOGY, INC.

P.O. BOX 1174 DENVILLE, NEW JERSEY 07834
Phone (973)-983-0901 • Fax (973) 983-0903

February 10, 2008

Serial Letter 11-1404-036

New York State
Department of Environmental Conservation
Remedial Bureau E, 12th Floor
625 Broadway
Albany, NY 12233-7017

Attention: Mr. David Chiusano

Re: Kleigman Brothers OU#1 Remedial Action
Contract No. D006547, Site No. 2-41-031
Tracking of Ultra Low Sulfur Diesel Fuel for On-Site Equipment

Via Email & US Mail

Dear Mr. Chiusano:

As required per our contract, Ground/Water Treatment & Technology, Inc. (GWTT) instituted a policy of utilizing ultra low sulfur diesel fuel for all on site equipment, during the construction of the soil vapor extraction (SVE) system at the above-referenced site. GWTT attempted to fuel any diesel equipment maintained by our drilling subcontractors. Other than topping their diesel powered drill rigs occasionally using the on-site 100-gallon tank we maintained, this proved difficult. Due to sporadic mobilizations and demobilizations as a result of interruptions in work, the subcontractors would leave on short notice, without allowing us to fill their tanks. Both subcontractors indicated they do use ULSD fuel on their equipment. As of the date of this letter, we have not received copies of receipts indicating such.

The tracking form we maintained on site, as well as a copy of the invoice from Century Petroleum of Farmingdale, New York is attached for your records. If you have any questions regarding the attached information, please call me at (973) 983-0901 (x15).

Very truly yours,
Ground/Water Treatment & Technology, Inc.

Patrick T. Hunnewell
Construction Division Manager

attachment

Ground/Water Treatment & Technology

ULTRA LOW SULFUR DIESEL DELIVERY TRACKING FORM

DELIVERY No. 01

Date 11-16-07
Day FRIDAY
Client NYS DEC

JOB LOCATION
Kliegman Brothers OU #1
76-01 77th Avenue, Glendale, NY

Job No. 11-1404

	Type	Make	Model	Vin #	Hp Rating	Owner	Fuel delivered (gal)	By
1	BACKHOE	John Deere	310 J	JX 149110	71	Hertz Equip Rent	35	Century
2	Mini-Excavator	Bobcat	334	234513049	30.3	Hertz Equip Rent	14	
3	Service Truck	ISUZU	NPR	V7005147	3.9L	GWTT	12	
4	Transfer Tank	Westhaven	100 gal	NA	NA	GWTT	73.2	X
5	[redacted]							
6								

Acknowledged by:

for Ground/Water Treatment & Technology, Inc.

Dejidee
F.V. CAPITO

for Camp Dresser & McKee

CENTURY PETROLEUM LTD.
147 GAZZA BLVD.
FARMINGDALE, NY 11735
PHONE# (631)752-1688

*** STATEMENT ***

DETACH HERE

PLEASE DETACH AT VERTICAL PERFORATION AND RETURN ENTIRE PORTION WITH YOUR REMITTANCE

GROUND\WATER TREATMENT & TECH.,INC.
P.O. BOX 1174
DENVILLE, NJ 07834

ACCT# 118051

11/30/07

GROUND\WATER TREATME

118051 KO 11/30/07

DATE	REF #	DESCRIPTION		AMOUNT	REF #	AMOUNT
12/21/06	6765	PAYMENT ON ACCOUNT		-90.54	6765	-90.54
11/16/07	463550	ULSD CLEAR EQ	134.2 GAL	589.05	463550	589.05
76-01	77TH AVE/GLENDALE, NEW YORK					
		< BALANCE DUE >		498.51	<BAL>	498.51

WE CARRY A FULL LINE OF MOBIL & CITGO LUBRICANTS & GREASES AS WELL AS CASTROL INDUSTRIAL LUBRICANTS, AND OTHER SPECIALT ITEMS SUCH AS PUMPS, TANKS, HOSES, ANTIFREEZE, METHANOL & OIL ABSORBENTS.
Thank you for your business!
HAVE A HAPPY & HEALTHY NEW YEAR!

CURRENT	OVER 30	OVER 60	OVER 90	OVER 120
498.51	0.00	0.00	0.00	0.00

ACCT# 118051

DETACH HERE

APPENDIX G – WARRANTY CERTIFICATES

PRODUCT LEVEL CONTROL, INC.

11729 Portland Ave. South
Burnsville, MN 55337
Tel: 952-707-9191
Fax: 952-707-1075
www.productlevel.com

Warranty/Customer Support Policy

WARRANTY POLICY. PLC warrants the equipment manufactured by PLC, and not by others, to be free from defects in workmanship and material under normal use and service for a period of one (1) year from date of delivery. Use or service with corrosive or abrasive chemicals or materials is not deemed normal. Components manufactured by others, including expendable items, are warranted only in accordance with the warranty, if any, issued by such other manufacturer. Upon written notice from BUYER specifying the particular defect or defects, PLC will correct without charge any workmanship which is demonstrated to PLC's satisfaction to have been defective at time of installation or erection and will repair or replace without charge, f.o.b. PLC's factory, parts which upon inspection are found defective under normal use within the warranty period above stated. All work of removal and reinstallation or installation of parts, whether or not found defective and shipping charges for defective or replacement parts shall be at the sole expense of BUYER. The foregoing warranty shall not apply to (i) work done or materials furnished by others or (ii) equipment altered by others, unless such repairs or alterations were specifically agreed to in writing by an officer of PLC. All routine maintenance, such as lubrication, adjustments and replacement of expendable items and production consumables and the like are the responsibility of the BUYER. THE WARRANTY HEREIN IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, AND SPECIFICALLY THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, PLC SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES WHATSOEVER WITH RESPECT TO EQUIPMENT MANUFACTURED OR SUPPLIED BY, OR SERVICES RENDERED BY, PLC.

Limitations of Warranties

1. All invoices are paid consistent with PLC's Terms and Conditions including having no balances past due.
2. All parts returned for warranty will be evaluated either by PLC or the Manufacturer to be determined if covered under warranty or not covered.

Warranty Claim

- PLC will work quickly to resolve warranty claims. PLC requires notification of any equipment or part failure at time of occurrence and failure to do so may disqualify the warranty claim.
- On failed components, call PLC for a Return Material Authorization (RMA) number and PLC will immediately send a replacement part or act as a customer representative on any manufacturer warranty. PLC will forward an invoice at time of shipment. The BUYER must return the suspect part using the RMA number and PLC or the component manufacturer will make a final determination if the part is covered under warranty. If the part is covered under warranty, a credit will be issued; otherwise it is the BUYER's responsibility to pay the invoice.
- On system/equipment warranty, PLC will work closely with BUYER and take what we feel is appropriate action to bring the system/equipment up to compliance to the agreed specifications. No charges will be assessed to the customer for repairs needed to bring the system up to the agreed specifications. PLC will charge the customer if: 1) changes need to be made beyond what was specified 2) the system was incorrectly installed or 3) the equipment was subjected to extraordinary conditions.

Customer Support (post Warranty period)

For equipment and systems beyond the warranty period, upon request, PLC will provide a quotation for the BUYER 's approval. Our sales representative can provide a quotation.

APPLICABLE LAWS

All rights and obligations of the parties hereto shall be governed by and enforced in accordance with the laws of the State of Minnesota including the Minnesota Uniform Commercial Code. Any disputes under this agreement, including breach of performance hereof, shall be litigated and venued in the state or federal courts located in Hennepin County, Minnesota. PLC and BUYER hereby submit to the personal jurisdiction of such courts.

PRODUCT LEVEL CONTROL, INC.

1109 Pierson Ave. South
Danville, MN 56327
Tel: 952-707-9101
Fax: 952-707-1075
www.productlevel.com

Start Up/Service

Product Level Control, Inc. (PLC) inspects and tests all equipment before shipping to assure all performance requirements are met. It is the responsibility of the BUYER to make certain the equipment is installed properly and completely. The BUYER can request assistance from Product Level Control, Inc. for start-up services or operation and maintenance at normal service rates. Current Service Rates are listed below.

SERVICE/LABOR RATES

	Service/Travel First 8 hours	**Service/Travel Overtime**
Monday through Friday	Technician $85/hr.	Technician $125/hr
Monday through Friday	Engineer $100/hr.	Engineer $150/hr

Product Level Control Inc. serviceman will present a daily log of time worked/traveled for signature by the BUYER'S representative.

Travel expenses are in addition to the Service/Labor rates.

Time is defined as door to door.

If the BUYER requests serviceman to stay over weekend/holiday to be available on the following workday the BUYER will be billed 8 hours per day at the service rate for each weekend/holiday plus expenses.

APPENDIX D

NYSDOH Generic CAMP Appendix 1A
Appendix 1B

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPPENDIX E
Emergency Contact List

KLIEGMAN BROTHERS SMP - OU#1
76-01 77TH AVENUE, GLENDALE, NY
CONTRACT No. D006547, SITE No. 2-41-031

EMERGENCY CONTACTS LIST

Organization	Contact Name	Phone Numbers	Email address
NYSDEC			
	David Chiusano	O: (518) 402-9814 C: (518) 878-4831 F: (518) 402-9819	djchiusa@gw.dec.state.ny.us
CDM			
	John Blaum	O: (518) 782-4509 C: (518) 369-1733 F: (518) 782-4509	blaumjp@cdm.com
	Heather Hallett	O: (518) 782-4543 C: (505) 205-3353 F: (518) 782-4543	halletthl@cdm.com
Preferred Environmental Services			
	Jill Haimson	O: (516)546-1100 x32 C: (516) 647-4211 F: (516) 213-8156	jhaimson@preferredenv.com
	Bill Schlageter	O: (516)546-1100 C: (917) 715-0752 F: (516) 213-8156	bschlageter@preferredenv.com
	David Kahn	O: (516)546-1100 x28 C: (631) 813-9932 F: (516) 213-8156	dkahn@preferredenv.com
	Marc Morgenstern	O: 516-546-1100 x26 C: 516-587-9570 F: (516) 213-8156	mmorgenstem@preferredenv.com
Enviro Trac Ltd.			
	Thomas H. Bosshard	O: (631) 924-3001 C: (516) 807-8982 F: (631) 924-5001	tomb@envirotrac.com
Owner			
	Mr. Kangadis	O: (631) 631-4548 C: (646) 879-8968	
Site Phone/auto dialer		O: 718-381-5427	
Auto dialer contact			

APPPENDIX F
Sample Monthly Progress Report – December 2010

Kliegman Brothers Site OU1
Site No. 2-41-031
Site Management

Town of Glendale,
Queens County, New York

Prepared for:
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233

Prepared by:
Camp Dresser & McKee
11 British American Boulevard, Suite 200
Latham, NY 12110

Monthly Progress Report December 2010

Contents

Tables

Figures

Attachments

Section 1
Introduction

This report documents the monthly Site Management under Camp Dresser & McKee's (CDM) Contract D006131-7 for operation and maintenance (O&M) of the URS Corporation (URS) and Ground/Water Treatment & Technology (GWTT) Soil Vapor Extraction (SVE) systems at the Kliegman Brothers Site (Kliegman), located at 76-01 77th Avenue, Glendale, Queens County, NY (Site #2-41-031). CDM and our subcontractor, Preferred Environmental Services (Preferred), are providing O&M of the SVE systems through December 2010 and this report will serve to document the remedial effort.

The general configuration of the SVE system components at the Kliegman site are presented in Figure 1. The URS system was installed in 2003 and extracts soil gas through three (3) wells, SVE-1, -6S, and -6D. SVE-1 is a one-inch diameter well installed by a previous contractor to URS in anticipation of a future SVE system. SVE-1 is screened from 5 to 25 feet below ground surface (bgs). SVE-6S and -6D are both two-inch diameter wells and were installed by URS as part of that SVE system. SVE-6S and -6D are screened from 5 to 25-feet and 30 to 65-feet bgs, respectively.

URS designed this system to theoretically achieve an 80-foot radius of influence, which is the approximate distance to the nearest residence. Using an assumed value of intrinsic permeability of 1 × 10-6 cm2 and an assumed pressure of 0.5-inches of water column (W.C.) at the 80-foot radius of influence, URS specified a flow rate of 220-standard cubic feet per minute (scfm) with a vacuum at the blower suction point of 20-inches W.C., translating (after pressure losses in the lines, moisture separator, etc.) to a vacuum in the wells of 10-inches W.C.

This GWTT system was installed in 2007 and extracts soil gas through six (6) four-inch diameter wells (SVE-7S, 7D, 8S, 8D, 9S, and 10S). The shallow 7S and 8S SVE wells are screened from 5 to 25-feet bgs and the deep 7D and 8D wells from 30 to 65-feet bgs. Well SVE-9S is screened 5 to 11-feet bgs and 10-S from 5 to 12-feet bgs. All of the GWTT installed wells are connected through subsurface piping to a blower and from the extraction blower the vapors go through two 2000-lb carbon adsorbers in a lead/lag configuration (in series). There are two 10-horsepower regenerative blowers installed for use with this system, one of which is on standby for emergency use.

The GWTT system that was designed by URS is used to maintain a minimum flow of 520-standard cubic feet per minute (scfm) of soil gas with both regenerative blowers in operation. When the system is operating with both blowers on, it will produce a minimum vacuum pressure of 10-inches of water column (IWC) in the wells.

A radius of influence test was completed in January 2008. During the test, vacuum levels were measured in all soil vapor extraction (SVE) wells and all vapor monitoring (VMP) wells during a series of tests in which certain wells were opened or closed. The goal of the test was to determine what impact the pumping on each well has on

the other monitoring points and to make sure that the current soil vapor extraction systems are treating the entire site. The test showed that when SVE-7S and SVE-7D were opened and all others were closed, vacuum pressures could be measured in SVE-7S, SVE-7D, SVE-8D, VMP-1, and VMP-5 only. When SVE-8S and SVE-8D were opened and all others were closed, vacuum pressures could be measured in SVE-8S, SVE-8D, SVE-7D and VMP-5 only. When SVE-9S and SVE-10S were opened and all others were closed, vacuum pressures could be measured in SVE-9S, SVE-10S, and VMP-4 only. During these tests, vacuum pressures were not measured in VMP-2, VMP-3, SVE-1, SVE-2, or SVE-3. However, the test showed that when all SVE and VMP wells are open, vacuum pressures can be measured at each of the VMP and SVE wells on-site. Therefore, this test demonstrated that the soil vapor extraction systems are reaching all areas of the site. This test did not include readings from VMP-6 and VMP-7, which are located inside the building; however, monthly testing indicates that vacuum pressures can be measured at these wells. An additional radius of influence test will be performed and will include VMP-6 and VMP-7.

The GWTT and URS systems are operated independently of each other, but work together at the site to remediate the soil vapor. If one of the systems is taken out of service, the piping has been configured for the blower from the other systems to extract from the SVE wells of that system.

Section 2
December 2010 O&M Activities and System Modifications

Operations and maintenance (O&M) activities were performed at the Site once for the month of December on January 5, 2011. Snow and ice resulting from multiple storms during the month of December delayed the monthly sampling event until the first week of January. Preferred attempted to perform the December O&M activities on January 3, 2011, however, the lab had not included the regulators needed to collect the monthly system samples, so the sampling was rescheduled for January 5, 2011. The O&M activities included monthly monitoring, VMP readings, sub-slab readings, and system influent and effluent sampling. The carbon was changed out once for the lead unit on the GWTT system during the month on January 5, 2011. The carbon was changed out once for both the lead and lag units on the URS system on January 5, 2011.

Preferred also made site visits on December 11, 17, and 20, 2010 and on January 3, 2011 in response to system alarms. As is typical during winter, the knockout tanks on both systems have been filling up with water, which triggers the system to shut down. System performance is discussed further in Section 3.

In August 2010 the existing operations on the GWTT system were modified to focus on extracting contaminated vapors from SVE-7S and -9S by throttling the other lines, SVE-7D, SVE-10S, SVE-8D, and SVE-8S by 50 percent. These wells were chosen since they have consistently shown the highest sampling results for PCE concentrations. CDM/Preferred continued to run and monitor the system this way through September 2010 to further analyze the effects on the system performance.

After reviewing the monitoring data from August and September 2010 CDM concluded that throttling back certain wells did not increase the flow rate from the other, more highly contaminated wells as expected. Furthermore, the overall VOC removal dropped over this two-month period. Therefore, throttling back the selected wells reduced the overall flow rate of the system and hence, the overall extraction rate. On October 6, 2010 wells SVE-8S and SVE-10S were reopened to 100 percent. Wells SVE-7D and SVE-8D were left throttled back to 50 percent to minimize groundwater intake to the system.

Preferred continues to use Tedlar air bags for testing effluent air with a photoionization detector (PID) from the lead and lag units on both systems. Previously, the PID was used to test air directly at the sample ports. Both methods were used this month and the results are presented in Table 2. Using the Tedlar air bag versus testing directly at the sample ports continues to yield lower concentrations on the PID.

Hour meters on the blowers for both systems record the actual run time of the system. This is noted in Table 1 and a table of the complete summary of run time hours from January 2008 through December 2010 is provided in Attachment A.

Based on conversations with the NYSDEC, CDM scaled back the frequency of sampling starting in October 2010. Preferred now only samples the combined influent of each of the two systems monthly and does not sample each individual SVE well monthly. A full sampling round of all wells on-site will be performed every six months in January and July. Starting in November 2010, site visits and carbon change-outs have been reduced to once per month. Preferred will continue to record the velocity and temperature and measure the VOC concentration with a PID at each SVE well during the monthly site visit. These O&M changes have been made in an effort to reduce O&M Costs. Two years of weekly monitoring and monthly sampling data has been collected from each of the SVE wells and both treatment systems' influent and effluent points.

An issue with monthly monitoring is that in the winter months between December and April, the knockout tanks fill with condensate on a weekly basis and have to be drained manually. Weekly visits continue to be required to perform this operation. NYSDEC has decided not to apply for a sewer discharge permit for the knockout tank water, which was previously discussed as a possible solution, but instead to continue to send Preferred out to the Site to drain the knockout tanks as necessary.

On December 17, 2010, Preferred collected water samples from the knockout drums on each system for lab analysis of VOCs, SVOCs, and metals to determine if the knockout drum water still needs to be transported off-site as hazardous waste. The results of the knockout drum sampling are discussed in Section 4.2.

The results for the effluent samples, discussed further in Section 4.2, indicate that minimal break-through occurred in the lag carbon unit on the GWTT system (0.13 ppm of PCE) in December 2010. Therefore, change outs on the lead unit in the GWTT system will continue to be done monthly as opposed to bi-weekly. Breakthrough of PCE was observed on the lag unit of the URS system in November 2010 at a concentration of 1.6 ppm, therefore a change-out was scheduled for the lead and lag units for December. No break-through was detected in the lag unit of the URS system in December. Therefore, Preferred will plan to change out the lead unit on the URS system every two months unless breakthrough is achieved. Changing out the carbon once per month on the GWTT system and once every two months on the URS system should reduce labor hours and still prevent break-through. CDM will continue to monitor the effluent on both systems with the goal of changing out the lead unit only once per month or less frequently as influent concentrations continue to decrease.

Section 3
Monthly Operation Results

Preferred collects system performance monitoring data on a monthly basis from the SVE systems, SVE wells and VMP wells. Table 2 provides a summary of the system monitoring data collected for December and a copy of the Daily Report and System Log Sheets for December is provided in Attachment B. Preferred collected the monthly air samples on January 5, 2011 from both SVE system effluents and from each SVE well head. The results are discussed in Section 5.

3.1 Operational Run Time

The URS SVE system operated for an estimated 851.7 hours for the December 2010 operation period. The GWTT SVE system operated for 860.8 hours in December (Table 1). This equates to 84% operation for the URS system and approximately 85% operation for the GWTT system over the 42 day period. During this operating period there were no major down periods. Both systems were shut down for 5 hours on January 5, 2011 for a carbon change out. The URS system also shut down automatically four (4) times during the December 2010 operating period in response to the knockout drum filling up and was restarted during site visits on December 11, 17, and 20, 2010 and January 3, 2011 for a total down-time of 156.6 hours. The GWTT system shut down twice during the December operating period due to the knockout drum filling up and was restarted during site visits on December 17, 2010 and January 3, 2011. The total down time on the GWTT system due to the knockout drum filling up was 146 hours. See Attachment A for shutdown periods.

From January 1, 2008 to January 5, 2011, the URS system has operated for a cumulative run time of approximately 24,871 hours out of 26,225 hours, or 95% and the GWTT system operated for approximately 24,572hours or 94%.

3.2 System Performance

The GWTT system ran normally during the month of December 2010 except for the shut-downs due condensate in the knockout drum discussed previously. The carbon in the lead unit of the GWTT system was replaced on January 5, 2011.

The URS system ran normally during the month of December 2010 except for the shut-downs due to filling up of the knockout drum discussed previously. The carbon in the lead and lag units on the URS system was changed out on January 5, 2011.

3.2.1 Vacuum Levels

For the URS system, all vacuum levels are measured at the manifold within the SVE shed. Measured vacuums (at the manifold) are presented in Table 2. Vacuum levels for December were below the target level of 20 IWC for the deep and intermediate depth extraction wells SVE-6D and -6S, measured at 13 and 17 IWC, respectively. The one-inch diameter well SVE-1 was open for the duration of this reporting period and

registered an average vacuum level of 8.5 IWC. The aforementioned target vacuum level of 20 IWC is based on an assumed pressure loss of 10-inches.

For the GWTT system, the vacuum levels are measured at each SVE well using the wells' corresponding vacuum gauge. The vacuum levels were slightly higher compared to November 2010 readings in the shallow wells. Vacuum readings for December at each well are summarized in Table 2. The vacuum levels were below the target level of 20-IWC for the shallow and deep wells. This is consistent with previous readings. The measured vacuum pressures for December were 13 IWC for SVE-7S, 4 IWC for SVE-7D, 11 IWC for SVE-8S, 4 IWC for SVE-8D, 7 IWC for SVE-9S, and 5 IWC for SVE-10S.

3.2.2 Volumetric Extraction Rates

The instantaneous vapor velocity and temperature are measured with an anemometer at the system manifold for the URS system and at both the manifold and inside the well vaults for each SVE well on the GWTT system. In general, the instantaneous maximum velocities alone do not give an accurate representation of the total vapor flow rate in the manifold cross-section due to the friction of the pipe walls and the turbulence caused at each fitting. However, these readings do provide a measurement of the relative amounts of gas extracted from each well. The manifold flow rates measured in feet per second were converted to volumetric velocities in cubic feet per minute (cfm) by multiplying by the cross sectional areas of the pipes.

Both systems have venturi flow meters providing the total vapor extraction rate at the blowers. The URS meter recorded an average value of 168 cfm and the GWTT system had an average value of 285 cfm for this operating period. Using the observed vapor extraction rate, the URS system extracted a total volume of about 8.6×10^6 cubic feet of vapor and the GWTT system extracted a total volume of about 1.47×10^7 cubic feet of vapor from the wells during the December operating period for a total volume of 2.33×10^7 cubic feet of vapor.

An average flow rate was developed for each of the SVE wells by GWTT when the system was first installed by measuring the flow at each well head. Starting in October 2010, CDM will now use the flow rates recorded from the flow rate meters at the influent of each system to calculate the mass removal rate of VOCs from the SVE wells.

Section 4
PID Measurements and Analytical Results

4.1 PID Measurements

A PID was used to measure total volatile organic compound (VOC) vapors at the GWTT SVE wells and the effluent of the lead unit for both systems. The measured concentration of vapors in the SVE wells ranged from 0.1 ppm at SVE-9S and SVE-10S to 64 ppm at SVE-7S (Table 2). The combined influent VOCs for the URS and GWTT systems, which were measured at the influent to the lead unit on each system, were 25.4 ppm and 46.3 ppm, respectively. The effluent PID readings on the URS and GWTT systems were 0.1 ppm and 0 ppm respectively for the month.

4.2 Analytical Results

Preferred collected samples from the combined influent and effluent of each treatment unit on January 5, 2011. Table 3 provides a summary of the sample results for each SVE well sample collected since December 2007 and Table 4 provides the analytical summary of the URS and GWTT treatment system effluent concentrations after the lag carbon units. A copy of the analytical summary report is provided in Attachment C. The results for the effluent samples indicate minimal break-through of 0.13 ppm occurred in the lag carbon unit on the GWTT system (0.13 ppm) in December 2010, which is below the effluent discharge limit of 3 ppm. In November CDM started changing out the lead unit on the GWTT system once per month as opposed to changing out the lead unit bi-weekly, which was the previous procedure. Changing out the carbon once per month will reduce labor hours and carbon usage and still meet permit limits. No break-through was seen in the lag unit of the URS system in December. CDM plans to continue to change out the lead unit in the URS system every two months, this should be sufficient to prevent break-through. CDM will continue to monitor the effluent and change out the lead unit more or less frequently if necessary.

Figures 2 through 10 provide graphical representation of the PCE concentrations in the SVE wells since January 2008. Under the new sampling procedures instituted in October, only the combined influents on each system were sampled as opposed to sampling each extraction well. The results of the December sampling showed the URS combined influent had a concentration of 5.3 ppm and the GWTT combined influent had a concentration of 100 ppm of PCE. Sample results are presented in Tables 3 and 4 and combined influent concentrations are plotted in Figures 11 and 12.

The results of the knockout tank water sampling are included in Table 8. PCE was detected in both the URS and GWTT knockout drums at concentrations of 260 µg/L and 720 µg/L, respectively. The knockout drum water must continue to be transported off-site as hazardous waste since the GWTT concentration exceeded the RCRA criteria for non-hazardous liquid disposal of 700 µg/L.

Section 5
VOC Mass Removal Rates

The SVE well sampling conducted over the last three years indicates that the soil vapor extraction wells are effectively removing contaminants from the vadose zone. Mass removal calculations were based on analytical sample data before the vapor phase carbon adsorption system on the URS and GWTT systems. The flow rate used was as measured in front of the blower in both systems.

In the past, the mass removal rate was calculated as the sum of the removals from each of the SVE wells. An average flow rate was developed for each of the SVE wells by GWTT when the system was first installed by measuring the flow at each well head. These average flow rates were used to calculate mass removal through September 2010. Now that the monthly sampling procedure has been amended to include only the combined influents for each system, the mass removal is calculated as the sum of the removals for each of the two systems. The flow rates recorded monthly from the flow meters at the influent point of each system are now used to calculate the mass removal rates. CDM believes using the flow rates from the flow meters at the system influents will yield a more accurate estimate of mass removal. The measured flow rates are higher than the average flow rates used in the past. The result is estimates of mass removal that appear to be much higher than removal rates of previous months before October 2010.

The estimated total mass (pounds) of VOCs removed in December 2010 by both SVE systems is approximately 85 pounds over a combined run time of 1712.5 hours or 0.1 pounds per hour as presented in Table 7. A total of 9,451 pounds have been removed by both systems since December 2007. Each system's contribution to the total mass of PCE removed is presented in Table 5. Of the 85 pounds of VOCs removed in December, 84 pounds were from PCE contamination.

Prior to the operation of the new system beginning in October 2007, the URS system had removed 41,635 pounds of VOCs between August 2004 and October 2007. Approximately 50,340 pounds of VOCs have been removed through January 5, 2011. The total mass removed since the start-up of the URS system is summarized in Table 7.

Section 6
Carbon Change-out History

A carbon change out in the GWTT system lead unit is scheduled by Envirotrac Environmental Services (Envirotrac) with Siemens Water Technologies Corporation (Siemens) for every month. The carbon in the lead and lag units on the URS system is changed out monthly. This is a change from the previous procedure followed through October 2010 of changing out the carbon in the GWTT system bi-monthly and the URS system monthly. In addition, if either system's lag unit shows breakthrough of VOCs greater than three ppm, the system is shut down and the carbon in both the lead and lag units is replaced. Changing out the carbon once per month will reduce labor hours and carbon usage and still meet permit requirements. CDM will continue to monitor the effluent on both systems with the goal of changing out the lead unit only once per month or less frequently as influent concentrations continue to decrease. The threshold value of three ppm VOCs was chosen because it correlates with maximum air emission standards set by NYSDOH.

The carbon in the lead unit of the GWTT system was changed on January 5, 2011. A total of 2,000 pounds of carbon from this change-out was transported off-site for regeneration. The lead and lag units on the URS system were changed out on January 5, 2011 and 2,000 pounds of carbon was generated. Spent carbon is transported to the Siemens - Darlington Reactivation Facility located at 118 Park Road in Darlington, PA. A total of 259,000 pounds of spent carbon has been generated and transported off-site since August 2004.

Tables

Table 1

Kliegman Brothers OU1 - Site Management

Monthly Progress Report - December 2010

Site No. 2-41-031

SVE Sytem Run Time

URS SYSTEM *Time Given in decimals of an hour*				**GWTT SYSTEM** *Time Given in decimals of an hour*			
Date	**Run Time (hours)**	**Run Time (cumulative)**	**% Run**	**Date**	**Run Time (hours)**	**Run Time (cumulative)**	**% Run**
Hour Meters on Both Systems - Starting in May							
5/1/2008		716.2		5/1/2008		713.7	
5/7/2008	142.3	858.5		5/7/2008	141.3	855.0	
5/14/2008	166.9	1,025.4		5/14/2008	113.3	968.3	
5/21/2008	170.6	1,196.0		5/21/2008	170.7	1,139.0	
5/28/2008	167.7	1,363.7		5/28/2008	166.3	1,305.3	
Total hours May (27 days)	**647.5**	**1,363.7**	96%		**591.6**	**1,305.3**	88%
6/4/2008	0.5	1,364.2		6/4/2008	1.6	1,306.9	
6/11/2008	165.4	1,529.6		6/11/2008	165.1	1,472.0	
6/18/2008	168.0	1,697.6		6/18/2008	168.1	1,640.1	
6/25/2008	168.8	1,866.4		6/25/2008	168.0	1,808.1	
Total hours June (28 days)	**502.7**	**1,866.4**	75%		**502.8**	**1,808.1**	75%
7/2/2008	168.1	2,034.5		7/2/2008	1.6	1,809.7	
7/9/2008	163.7	2,198.2		7/9/2008	164.4	1,974.1	
7/16/2008	168.6	2,366.8		7/16/2008	169.7	2,143.8	
7/23/2008	170.1	2,536.9		7/23/2008	165.5	2,309.3	
7/30/2008	167.8	2,704.7		7/30/2008	167.9	2,477.2	
Total hours July (35 days)	**838.3**	**2,704.7**	100%		**669.1**	**2,477.2**	80%
8/6/2008	164.6	2,869.3		8/6/2008	166.2	2,643.4	
8/13/2008	168.2	3,037.5		8/13/2008	169.4	2,812.8	
8/20/2008	169.2	3,206.7		8/20/2008	165.0	2,977.8	
8/27/2008	167.0	3,373.7		8/27/2008	169.1	3,146.9	
Total hours August (28 days)	**669.0**	**3,373.7**	100%		**669.7**	**3,146.9**	100%
9/3/2008	165.4	3,539.1		9/3/2008	165.7	3,312.6	
9/10/2008	169.2	3,708.3		9/10/2008	169.0	3,481.6	
9/17/2008	167.2	3,875.5		9/17/2008	165.6	3,647.2	
9/24/2008	168.0	4,043.5		9/24/2008	3.7	3,650.9	
Total hours September (28 days)	**669.8**	**4,043.5**	100%		**504.0**	**3,650.9**	75%
10/3/2008	108.9	4,152.4		10/3/2008	106.9	3,757.8	
10/8/2008	119.9	4,272.3		10/8/2008	121.0	3,878.8	
10/15/2008	169.1	4,441.4		10/15/2008	165.0	4,043.8	
10/22/2008	166.3	4,607.7		10/22/2008	168.6	4,212.4	
10/29/2008	168.1	4,775.8		10/29/2008	165.8	4,378.2	
Total hours October (35 days)	**732.3**	**4,775.8**	87%		**727.3**	**4,378.2**	87%
11/5/2008	166.4	4,942.2		11/5/2008	168.8	4,547.0	
11/12/2008	170.4	5,112.6		11/12/2008	168.6	4,715.6	
11/19/2008	166.40*	5279.0*		11/19/2008	165.9	4,881.5	
11/26/2008	166.50*	5,445.5		11/26/2008	166.7	5,048.2	
Total hours November (28 days)	**669.7**	**5,445.5**	100%		**670.0**	**5,048.2**	100%
12/3/2008	167.3	5,612.8		12/3/2008	166.3	5,214.5	
12/10/2008	169.3	5,782.1		12/10/2008	167.3	5,381.8	
12/17/2008	167.6	5,949.7		12/17/2008	165.0	5,546.8	
12/24/2008	166.0	6,115.7		12/24/2008	76.2	5,623.0	
12/31/2008	166.7	6,282.4		12/31/2008	164.0	5,787.0	
Total hours December (35 days)	**669.6**	**6,282.4**	80%		**738.8**	**5,787.0**	88%
1/8/2009	193.1	6,475.5		1/8/2009	57.7	5,844.7	
1/14/2009	146.6	6,622.1		1/14/2009	84.5	5,929.2	
1/21/2009	166.9	6,789.0		1/21/2009	139.9	6,069.1	
1/28/2009	106.2	6,895.2		1/28/2009	189.8	6,258.9	
Total hours January (28 days)	**612.8**	**6,895.2**	91%		**471.9**	**6,258.9**	70%
2/4/2009	144.2	7,039.4		2/4/2009	165.5	6,424.4	
2/11/2009	166.3	7,205.7		2/11/2009	166.3	6,590.7	
2/18/2009	166.2	7,371.9		2/18/2009	166.3	6,757.0	
2/25/2009	168.5	7,540.4		2/25/2009	168.5	6,925.5	
Total hours February (28 days)	**645.2**	**7,540.4**	96%		**666.6**	**6,925.5**	99%
3/4/2009	166.0	7,706.4		3/4/2009	166.8	7,092.3	
3/11/2009	141.8	7,848.2		3/11/2009	165.6	7,257.9	
3/18/2009	166.6	8,014.8		3/18/2009	166.4	7,424.3	
3/25/2009	167.2	8,182.0		3/25/2009	167.1	7,591.4	
Total hours March (28 days)	**641.6**	**8,182.0**	95%		**665.9**	**7,591.4**	99%

Table 1

Kliegman Brothers OU1 - Site Management

Monthly Progress Report - December 2010

Site No. 2-41-031

SVE Sytem Run Time

URS SYSTEM *Time Given in decimals of an hour*				**GWTT SYSTEM** *Time Given in decimals of an hour*			
Date	**Run Time (hours)**	**Run Time (cumulative)**	**% Run**	**Date**	**Run Time (hours)**	**Run Time (cumulative)**	**% Run**
4/1/2009	167.1	8,349.1		4/1/2009	167.1	7,758.5	
4/8/2009	167.6	8,516.7		4/8/2009	167.7	7,926.2	
4/15/2009	167.0	8,683.7		4/15/2009	166.4	8,092.6	
4/22/2009	166.0	8,849.7		4/22/2009	168.2	8,260.8	
4/29/2009	167.7	9,017.4		4/29/2009	165.2	8,426.0	
Total hours April (35 days)	**835.4**	**9,017.4**	99%		**834.6**	**8,426.0**	99%
5/6/2009	168.0	9,185.4		5/6/2009	167.6	8,593.6	
5/13/2009	167.2	9,352.6		5/13/2009	167.5	8,761.1	
5/20/2009	167.7	9,520.3		5/20/2009	167.3	8,928.4	
5/27/2009	168.0	9,688.3		5/27/2009	167.0	9,095.4	
Total hours May (28 days)	**670.9**	**9,688.3**	100%		**669.4**	**9,095.4**	100%
6/3/2009	166.8	9,855.1		6/3/2009	168.7	9,264.1	
6/10/2009	165.6	10,020.7		6/10/2009	163.7	9,427.8	
6/17/2009	167.6	10,188.3		6/17/2009	167.6	9,595.4	
6/24/2009	168.4	10,356.7		6/24/2009	166.7	9,762.1	
Total hours June (28 days)	**668.4**	**10,356.7**	99%		**666.7**	**9,762.1**	99%
7/1/2009	167.8	10,524.5		7/1/2009	167.7	9,929.8	
7/8/2009	166.9	10,691.4		7/8/2009	166.8	10,096.6	
7/15/2009	168.1	10,859.5		7/15/2009	168.2	10,264.8	
7/22/2009	167.7	11,027.2		7/22/2009	164.4	10,429.2	
7/29/2009	168.4	11,195.6		7/29/2009	167.9	10,597.1	
Total hours July (35 days)	**838.9**	**11,195.6**	100%		**835.0**	**10,597.1**	99%
8/5/2009	165.3	11,360.9		8/5/2009	165.8	10,762.9	
8/12/2009	170.2	11,531.1		8/12/2009	168.9	10,931.8	
8/19/2009	166.8	11,697.9		8/19/2009	167.0	11,098.8	
8/26/2009	168.2	11,866.1		8/26/2009	168.3	11,267.1	
Total hours August (28 days)	**670.5**	**11,866.1**	100%		**670.0**	**11,267.1**	100%
9/2/2009	165.5	12,031.6		9/2/2009	165.1	11,432.2	
9/9/2009	168.4	12,200.0		9/9/2009	168.5	11,600.7	
9/16/2009	168.8	12,368.8		9/16/2009	167.7	11,768.4	
9/23/2009	166.0	12,534.8		9/23/2009	166.0	11,934.4	
9/30/2009	167.6	12,702.4		9/30/2009	167.3	12,101.7	
Total hours September (35 days)	**836.3**	**12,702.4**	100%		**834.6**	**12,101.7**	99%
10/7/2009	167.9	12,870.3		10/7/2009	168.0	12,269.7	
10/14/2009	168.8	13,039.1		10/14/2009	187.2	12,456.9	
10/21/2009	167.3	13,206.4		10/21/2009	147.7	12,604.6	
10/30/2009	214.7	13,421.1		10/30/2009	214.8	12,819.4	
Total hours October (30 days)	**718.7**	**13,421.1**	100%		**717.7**	**12,819.4**	100%
11/4/2009	121.1	13,542.2		11/4/2009	121.0	12,940.4	
11/11/2009	167.3	13,709.5		11/11/2009	166.5	13,106.9	
11/18/2009	168.7	13,878.2		11/18/2009	168.5	13,275.4	
11/25/2009	165.2	14,043.4		11/25/2009	164.9	13,440.3	
Total hours November (26 days)	**622.3**	**14,043.4**	100%		**620.9**	**13,440.3**	100%
12/2/2009	168.3	14,211.7		12/2/2009	168.5	13,608.8	
12/9/2009	169.0	14,380.7		12/9/2009	167.4	13,776.2	
12/16/2009	136.4	14,517.1		12/16/2009	165.6	13,941.8	
12/24/2009	83.3	14,600.4		12/24/2009	82.6	14,024.4	
12/30/2009	55.7	14,656.1		12/30/2009	0.0	14,024.4	
Total hours December (35 days)	**612.7**	**14,656.1**	73%		**584.1**	**14,024.4**	70%
1/6/2010	85.3	14,741.4		1/6/2010	0.3	14,024.7	
1/13/2010	78.4	14,819.8		1/13/2010	165.7	14,190.4	
1/20/2010	140.4	14,960.2		1/20/2010	166.5	14,356.9	
1/27/2010	141.9	15,102.1		1/27/2010	167.6	14,524.5	
Total hours January (28 days)	**446.0**	**15,102.1**	66%		**500.1**	**14,524.5**	74%
2/3/2010	129.8	15,231.9		2/3/2010	167.0	14,691.5	
2/12/2010	177.2	15,409.1		2/12/2010	215.9	14,907.4	
2/17/2010	110.8	15,519.9		2/17/2010	117.7	15,025.1	
2/24/2010	168.8	15,688.7		2/24/2010	168.8	15,193.9	
Total hours February (28 days)	**586.6**	**15,688.7**	87%		**669.4**	**15,193.9**	100%

Table 1

Kliegman Brothers OU1 - Site Management

Monthly Progress Report - December 2010

Site No. 2-41-031

SVE Sytem Run Time

URS SYSTEM *Time Given in decimals of an hour*				**GWTT SYSTEM** *Time Given in decimals of an hour*			
Date	**Run Time (hours)**	**Run Time (cumulative)**	**% Run**	**Date**	**Run Time (hours)**	**Run Time (cumulative)**	**% Run**
3/3/2010	166.0	15,854.7		3/3/2010	194.2	15,359.8	
3/10/2010	169.0	16,023.7		3/10/2010	168.5	15,528.3	
3/17/2010	165.3	16,189.0		3/17/2010	165.8	15,694.1	
3/24/2010	167.4	16,356.4		3/24/2010	167.4	15,861.5	
3/31/2010	168.4	16,524.8		3/31/2010	165.4	16,026.9	
Total hours March (35 days)	**836.1**	**16,524.8**	100%		**861.3**	**16,055.2**	100%
4/7/2010	167.3	16,692.1		4/7/2010	167.6	16,194.5	
4/14/2010	167.0	16,859.1		4/14/2010	167.0	16,361.5	
4/21/2010	168.0	17,027.1		4/21/2010	167.1	16,528.6	
4/28/2010	167.8	17,194.9		4/28/2010	166.5	16,695.1	
Total hours April (28 days)	**670.1**	**17,194.9**	100%		**668.2**	**16,695.1**	99%
5/5/2010	168.1	17,363.0		5/5/2010	168.2	16,863.3	
5/12/2010	164.0	17,527.0		5/12/2010	163.8	17,027.1	
5/19/2010	167.6	17,694.6		5/19/2010	168.0	17,195.1	
5/26/2010	167.3	17,861.9		5/26/2010	166.4	17,361.5	
Total hours May (28 days)	**667.0**	**17,861.9**	99%		**666.4**	**17,361.5**	99%
6/2/2010	167.8	18,029.7		6/2/2010	168.0	17,529.5	
6/9/2010	167.2	18,196.9		6/9/2010	167.0	17,696.5	
6/16/2010	169.2	18,366.1		6/16/2010	169.3	17,865.8	
6/23/2010	166.7	18,532.8		6/23/2010	164.9	18,030.7	
6/30/2010	170.0	18,702.8		6/30/2010	169.8	18,200.5	
Total hours June (35 days)	**840.9**	**18,702.8**	100%		**839.0**	**18,200.5**	100%
7/8/2010	191.9	18,894.7		7/8/2010	190.1	18,390.6	
7/14/2010	179.2	19,073.9		7/14/2010	139.8	18,530.4	
7/21/2010	132.3	19,206.2		7/21/2010	167.4	18,697.8	
7/28/2010	166.7	19,372.9		7/28/2010	167.1	18,864.9	
Total hours July (28 days)	**670.1**	**19,372.9**	100%		**664.4**	**18,864.9**	99%
8/4/2010	167.6	19,540.5		8/4/2010	167.3	19,032.2	
8/11/2010	168.0	19,708.5		8/11/2010	167.7	19,199.9	
8/18/2010	168.1	19,876.6		8/18/2010	167.0	19,366.9	
8/25/2010	168.0	20,044.6		8/25/2010	168.0	19,534.9	
Total hours August (28 days)	**671.7**	**20,044.6**	100%		**670.0**	**19,534.9**	100%
9/1/2010	165.2	20,209.8		9/1/2010	165.2	19,700.1	
9/8/2010	167.6	20,377.4		9/8/2010	167.6	19,867.7	
9/15/2010	167.5	20,544.9		9/15/2010	165.1	20,032.8	
9/22/2010	169.2	20,714.1		9/22/2010	169.2	20,202.0	
9/29/2010	165.0	20,879.1		9/29/2010	164.2	20,366.2	
Total hours September (35 days)	**834.5**	**20,879.1**	99%		**831.3**	**20,366.2**	99%
10/6/2010	169.3	21,048.4		10/6/2010	169.4	20,535.6	
10/13/2010	167.6	21,216.0		10/13/2010	167.3	20,702.9	
10/20/2010	167.2	21,383.2		10/20/2010	166.8	20,869.7	
10/27/2010	164.0	21,547.2		10/27/2010	164.4	21,034.1	
Total hours October (28 days)	**668.1**	**21,547.2**	99%		**667.9**	**21,034.1**	99%
11/24/2010	672.0	22219.2*		11/24/2010	671.3	21,705.4	
Total hours November (28 days)	**672.0**	**22,219.2**	100%		**671.3**	**21,705.4**	100%
1/5/2011	851.7	23,070.9		1/5/2011	860.8	22,566.2	
Total hours December (42 days)	**851.7**	**23,070.9**	84%		**860.8**	**22,566.2**	85%

* Indicates value was estimated because correct value was not recorded

Table 2
Kleigman Brothers Site OU1 - Site Management
Monthly Progress Report - December 2010
SVE System - Weekly Site Monitoring Data Summary

GWTT SVE EQUIPMENT DATA

HOURS: 22,566.2

DATE	TIME	PI 201 in w.c.	PI 202 in. W.c	PI 203 in. w.c.	FI 201 scfm	TI 201 deg F	FI 101 cf/min	FI 102 cf/min	FI 103 cf/min	AP 101		AP 102		AP 103		Comments
										Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	
1/5/2011	6:50	54	47	26	285	113	50	50	100	>15,000	43.1	>15,000	43.6	2,979	44.4	AP 102 velocity consistently above 15,000 fpm. AP 101 velocity increased

VMP WELL DATA

VMP-1

DATE	TIME	WH VAC. In. w.c
1/3/2011		

Comments: Monitoring point under significant snow and ice. On sidewalk.

VMP-2

TIME	WH VAC. In. w.c
13:44	0.14

Comments: Measurement collected on 1/3/11.

VMP-3

TIME	WH VAC. In. w.c
13:46	0.01

Comments: Measurement collected on 1/3/11.

VMP-4

DATE	TIME	WH VAC. In. w.c
1/3/2011	13:50	0.01

Comments: Measurement collected or

VMP-5

TIME	WH VAC. In. w.c
13:42	0.29

Comments: Measurement collected on 1/3/11.

VMP-6

DATE	TIME	WH VAC. In. w.c
1/5/2011	7:59	0.22

VMP-7

DATE	TIME	WH VAC. In. w.c
1/5/2011	8:03	0.18

Comments:

SS-1

DATE	TIME	WH VAC In. w.c
1/5/2011	7:56	0.5

SS-2

DATE	TIME	WH VAC In. w.c
1/5/2011	7:58	0.31

SS-3

DATE	TIME	WH VAC In. w.c
1/5/2011	8:05	0.25

Comments:

GWTT SVE WELL DATA

SVE-7S

DATE	TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
				VELOCITY ft/min	TEMP deg F
1/3/2011	13:24	64	13	260	45.4

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

SVE-7D

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:26	52.2	4	1,022	46.3

Comments: Valve at well head is open 50%. Measurement collected on 1/3/11.

SVE-8S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:22	0.4	11	331	46.2

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

SVE-8D

DATE	TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
				VELOCITY ft/min	TEMP deg F
1/3/2011	13:18	8.6	4	255	50.7

Comments: Valve at well head is open 50%. Measurement collected on 1/3/11.

SVE-9S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:14	0.1	7	202	43.3

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

SVE-10S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:12	0.1	5	230	45.3

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

Sampling completed 01/05/2011

AIR SAMPLING INFORMATION

Time	Canister ID / Pressure	Sample ID	Start Vacuum ("HG)	End Vacuum ("HG)
7:35	1523/5036	URS Influent/3L	-28	-5
7:38	1253/5029	URS Effluent/6L	-25	-5
7:45	1763/5038	GWTT Effluent/6L	-27	-5
7:47	1480/5030	GWTT Influent/3L	-25	-5

NOTES: As per NYSDEC request, sampling reduced to influent and effluent on treatment systems only

Table 2
Kleigman Brothers Site OU1 - Site Management
Monthly Progress Report - December 2010
SVE System - Weekly Site Monitoring Data Summary

URS SVE System Data

HOURS: 22,219.20

DATE	TIME	SVE-1 in. w.c.	SVE-6D in. w.c.	SVE-6S in. w.c.	P-101 in. w.c.	P-102 in. w.c.	P-103 in. w.c.	SVE-1 ft/min	SVE-6D ft/min	SVE-6S ft/min	T-1 deg F	F-1 scfm	Comments:
1/5/2011	7:21	16	25	17	34	39	8.7	>15,000	>15,000	1,941	110	168	Velocity on SVE-1 consistently above 15,000 fpm. Velocity on SVE-6D increased since last O&M measurement.

URS SVE WELL DATA

URS SVE-1

DATE	TIME	WH VAC. In. w.c
1/5/2011	7:21	7 to 10

Comments: SVE-1 was under significant ice.

URS SVE-6D

TIME	WH VAC. In. w.c
13:38	13

Comments: Measurement collected on 1/3/11.

URS SVE- 6S

TIME	WH VAC. In. w.c
13:38	17

Comments: Measurement collected on 1/3/11.

GAC ADSORBERS

GWTT System

DATE	TIME	TI 203 deg F	FI 203 cf/min	PI 210 in. w.c	GAC LEAD INF ppm	GAC LEAD EFF ppm	GAC LAG EFF/STACK ppm	Comments:
1/5/11	7:48	110	290	1	46.3	0.3	0.0	Readings taken directly from sample port
	7:49				44.0	0.3	0.0	Readings taken from Tedlar air Bag

System Notes - GWTT

Replaced FI203 flow meter. System shut down and restarted to replace Lead Gac No. 2

Cumulative Hours To Date: 24,869.12 Hours
Condensate in K/O Drum: 10 Gallons

Which is the Lead Adsorber? **GAC 2**
Dilution: *Open* or Closed _____%

URS System

DATE	TIME	GAC LEAD INF ppm	GAC LEAD EFF ppm	GAC LAG EFF/STACK ppm	Comments:
1/5/11	7:50	25.4	2.4	0.0	Readings taken directly from sample port. Influent reading lower than last O&M measurement.
	7:51	20.1	3.0	0.1	Readings taken from Tedlar air Bag. Influent reading lower than last O&M measurement.

System Notes - URS

Cumulative Hours To Date: 25,203.6 Hours
Condensate in K/O Drum: 5 Gallons

Which is the Lead Adsorber? **GAC 1**
Dilution: Open or *Closed* _____%

Amount Condensate Collected in 55 Gallon Drums to Date: 726.5 Gal
Drums Currently Onsite: 3 Drums in use: 1

Overall log notes/comments

WH: Well Head
WH VAC: Well Head Vacuum
WH AP: Well Head Anemometer Point (Velocity)
VOC: Volatile Organic Compound concentration
in. w.c: inches of water column
ppm: parts per million
SVE: Soil Vapor Extraction
P: Pressure
VMP: Vapor Monitoring Point
INF: Influent
EFF: Effluent
GAC: Granular Activated Carbon
cf/min: Cubic Feet Per Minute (flow rate)
ft/min: Feet per Minute (velocity)
deg F: degrees Fahrenheit
AP: Anemometer Point (at manifold)
F: Flow
T: Temperature

* (1) additional drum of spent carbon filters is currently onsite.

Table 3
Kliegman Brother Site - OU#1 Site Management
Monthly Progress Report - December 2010
Analytical Summary Results by SVE Well

	Concentration (ug/m^3) in system URS-SVE-6S																			
Compounds	**12/13/07**	**12/20/07**	**1/4/08**	**1/9/08**	**1/23/08**	**2/6/08**	**2/20/08**	**3/6/08**	**3/20/08**	**5/21/08**	**6/18/08**	**7/23/08**	**8/20/2008**	**9/17/2008**	**10/15/2008**	**11/26/2008**	**12/24/2008**	**1/21/2009**	**2/18/2009**	**3/18/2009**
Trichlorofluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	160.00	820.00	ND	39.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	257.71	63.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	617.62	261.30	466.00	29.00	0.00	1,300.00	480.00	2,200.00	2,700.00	170.00	63.00	2,200.00	1,400.00	6,400.00	710.00	1,500.00	1,200	1,500	720	500
Carbon Tetrachloride	1,824.21	81.78	0.00	0.00	0.00	0.00	0.00	330.00	0.00	ND	47.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.00	0.00	0.00	0.00	0.00	0.00	0.00	140.00	0.00	ND	51.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	818.40	818.41	0.00	52.00	0.00	270.00	0.00	1,300.00	130.00	ND	150.00	120.00	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene (Trichloroethene)	2,418.40	1,934.72	0.00	34.00	0.00	0.00	0.00	2,900.00	130.00	ND	680.00	270.00	ND	ND	130.00	ND	ND	ND	ND	ND
Toluene	0.00	94.21	0.00	0.00	0.00	1,400.00	0.00	89.00	430.00	ND	0.00	130.00	ND	2,900.00	740.00	1,000.00	ND	440	ND	ND
Tetrachloroethylene (Tetrachloroethene)	745,930.47	230,560.33	362,000.00	94,000.00	470,000.00	480,000.00	360,000.00	320,000.00	350,000.00	330,000.00	64,000.00	310,000.00	220,000.00	180,000.00	170,000.00	210,000.00	290,000	260,000	240,000	200,000
1,1-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	130.00	0.00	ND	25.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	370.00	0.00	ND	29.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	0.00	0.00	0.00	14.00	0.00	0.00	0.00	710.00	150.00	ND	110.00	ND	ND	ND	59.00	ND	ND	ND	ND	ND
Methylene Chloride	0.00	0.00	500.00	78.00	0.00	940.00	0.00	0.00	8,400.00	1,600.00	0.00	5,700.00	880.00	2,700.00	860.00	1,100.00	2,500	3,700	ND	1,000
m,p-Xylene	0.00	0.00	0.00	0.00	0.00	760.00	0.00	0.00	510.00	ND	0.00	ND	ND	ND	190.00	ND	ND	ND	ND	ND
o-Xylene	0.00	0.00	0.00	0.00	0.00	310.00	0.00	0.00	200.00	ND	0.00	ND	ND	ND	90.00	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	766.81	0.00	0.00	0.00	0.00	0.00	0.00	120.00	210.00	ND	0.00	190.00	ND	ND	130.00	ND	ND	ND	ND	ND
Tetrahydrofuran	4,031.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	300.00	ND	0.00	ND	ND	ND	110.00	ND	ND	ND	ND	ND
Vinyl Chloride	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	180.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	700.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	260.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	0.00	0.00	0.00	24.00	0.00	2,500.00	0.00	0.00	890.00	300.00	0.00	390.00	ND	950.00	180.00	ND	ND	1,100	ND	ND
Heptane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	0.00	0.00	0.00	0.00	0.00	21,000.00	0.00	410.00	1,800.00	ND	0.00	690.00	ND	2,600.00	560.00	2,100.00	ND	ND	ND	ND
Propylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	0.00	0.00	0.00	0.00	0.00	1,400.00	250.00	920.00	580.00	ND	0.00	2,800.00	490.00	5,100.00	360.00	ND	ND	ND	ND	ND
Ethyl Acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.00	0.00	0.00	0.00	0.00	270.00	0.00	0.00	150.00	ND	0.00	ND	ND	ND	73.00	ND	ND	ND	ND	ND
4-Ethyl Toluene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	160.00	ND	0.00	160.00	ND	ND	84.00	ND	ND	ND	ND	ND
Hexane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	970.00	480.00	0.00	220.00	ND	ND	48.00	ND	560	430	ND	ND
1,3,5-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
Monthly Progress Report - December 2010
Analytical Summary Results by SVE Well

Concentration (ug/m^3) in system URS-SVE-6S																		
Compounds	**4/15/2009**	**5/13/2009**	**6/10/2009**	**7/8/2009**	**8/5/2009**	**9/2/2009**	**10/14/2009**	**11/25/2009**	**12/24/2009**	**1/20/2010**	**2/24/2010**	**3/17/2010**	**4/21/2010**	**5/26/2010**	**6/30/2010**	**7/21/2010**	**8/18/2010**	**9/15/2010**
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	630	310	330	570	ND	ND	ND	ND	ND	ND	ND	ND	ND	410	1,200	820	22.0	860
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.6	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	4	710	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene (Trichloroethene)	ND	110.00	ND	ND	ND	ND	ND	ND	ND	94	2,600	ND	ND	73	84	120	17.0	93
Toluene	160	230	ND	ND	190.00	ND	890	ND	ND	9	ND	ND	ND	ND	ND	83	3.6	78
Tetrachloroethylene (Tetrachloroethene)	51,000	180,000	190,000	200,000	180,000	130,000	180,000	230,000	200,000	17,000	210,000	140,000	120,000	120,000	130,000	150,000	14,000.0	140,000
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	87	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	ND	75.00	ND	ND	ND	ND	ND	ND	ND	ND	160	ND	ND	48	48	71	10.0	48
Methylene Chloride	6,000	470	2,200	2,900	940	ND	ND	4,500.00	ND	ND	1,900	1,100	ND	810	240	1,100	ND	2,300
m,p-Xylene	170.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	51.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.7	37
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	140.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	38.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	23	ND	2.2	ND
Ethanol	220	ND	ND	ND	ND	ND	ND	ND	ND	ND	310	ND	ND	ND	7,400	320	15.0	360
Heptane	790.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	300.00	ND	ND	ND	ND	ND	470.00	ND	ND	ND	ND	ND	ND	33	ND	ND	1.4	36
Propylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	330.00	120.00	ND	470	300	500	260	230	ND	ND	240	230	300	270	390	540	ND	ND
Ethyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	18	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	110.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	82	ND	ND	ND	ND	ND	ND	ND	ND	8.7	540	ND	ND	130	ND	120	ND	320
1,3,5-Trimethylbenzene	150.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
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Analytical Summary Results by SVE Well

	Concentration (ug/m3) in system SVE-9S																			
Compounds	12/13/07	12/20/07	1/4/08	1/9/08	1/23/08	2/6/08	2/20/08	3/6/08	3/20/08	5/21/08	6/18/08	7/23/08	8/20/2008	9/17/2008	10/15/2008	11/26/2008	12/24/2008	1/21/2009	2/18/2008	3/18/2009
Trichlorofluoromethane	674.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	3,647.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	2,137.91	5,701.10	0.00	0.00	0.00	5,000.00	3,200.00	1,400.00	2,000.00	310.00	2,500.00	1,800.00	1,800.00	11,000.00	380.00	3,400.00	1,800	2,800	ND	380
Carbon Tetrachloride	16,355.01	61,016.77	41,800.00	20,000.00	8,200.00	6,300.00	3,500.00	3,100.00	2,500.00	1,800.00	1,300.00	1,700.00	1,300.00	ND	580.00	ND	ND	ND	220	240
Chloroform	976.69	8,301.84	0.00	5,100.00	0.00	720.00	410.00	260.00	200.00	ND	0.00	ND	ND	ND	100.00	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	10,912.07	0.00	0.00	0.00	0.00	0.00	0.00	360.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene (Trichloroethene)	16,122.70	42,993.87	30,500.00	9,500.00	5,700.00	2,900.00	1,800.00	2,300.00	1,500.00	1,400.00	1,900.00	2,000.00	1,400.00	ND	910.00	ND	ND	ND	270	430
Toluene	0.00	0.00	0.00	0.00	0.00	4,600.00	200.00	0.00	1,300.00	ND	0.00	ND	ND	ND	110.00	2,100.00	ND	ND	430	ND
Tetrachloroethylene (Tetrachloroethene)	3,119,345.60	6,713,374.23	11,300,000.00	3,400,000.00	2,100,000.00	1,100,000.00	1,200,000.00	900,000.00	820,000.00	670,000.00	720,000.00	740,000.00	610,000.00	330,000.00	420,000.00	150,000.00	130,000	130,000	130,000	110,000
1,1-Dichloroethane	1,011.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	0.00	0.00	48,800.00	16,000.00	8,300.00	4,100.00	2,900.00	2,400.00	2,100.00	2,200.00	2,500.00	3,300.00	2,700.00	1,800.00	ND	ND	ND	ND	480	540
Methylene Chloride	0.00	0.00	0.00	1,900.00	0.00	1,600.00	0.00	130.00	4,700.00	1,000.00	1,800.00	2,900.00	920.00	ND	510.00	1,800.00	2,400	6,100	3,700	750
m,p-Xylene	0.00	0.00	0.00	0.00	0.00	960.00	0.00	0.00	1,500.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	0.00	0.00	0.00	0.00	0.00	390.00	0.00	0.00	600.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	5,013.78	0.00	0.00	0.00	0.00	220.00	200.00	0.00	120.00	ND	330.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	17,635.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	590.00	0.00	0.00	630.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	409.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	91.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	0.00	0.00	0.00	0.00	0.00	3,600.00	1,800.00	0.00	210.00	ND	520.00	ND	ND	5,200.00	ND	ND	ND	ND	240	270
Heptane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	0.00	0.00	0.00	0.00	0.00	120,000.00	1,200.00	170.00	140.00	ND	5,900.00	ND	ND	2,200.00	140.00	3,700.00	ND	ND	180	ND
Propylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	67.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	0.00	0.00	0.00	0.00	0.00	4,000.00	1,600.00	610.00	530.00	140.00	970.00	1,800.00	530.00	2,900.00	210.00	ND	ND	ND	330	87
Ethyl Acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.00	0.00	0.00	0.00	0.00	370.00	0.00	0.00	380.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	160.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	0.00	0.00	0.00	0.00	0.00	350.00	190.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	0.00	0.00	0.00	0.00	0.00	0.00	240.00	0.00	220.00	330.00	250.00	ND	ND	ND	ND	ND	ND	760	ND	ND
1,3,5-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
Monthly Progress Report - December 2010
Analytical Summary Results by SVE Well

	Concentration (ug/m3) in system SVE-9S																	
Compounds	**4/15/2009**	**5/13/2009**	**6/10/2009**	**7/8/2009**	**8/5/2009**	**9/2/2009**	**10/14/2009**	**11/25/2009**	**12/24/2009**	**1/20/2010**	**2/24/2010**	**3/17/2010**	**4/21/2010**	**5/26/2010**	**6/30/2010**	**7/21/2010**	**8/18/2010**	**9/15/2010**
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	520	920	340	1,000	ND	ND	ND	ND	ND	460	ND	ND	39	100	230	ND	ND	1000
Carbon Tetrachloride	190	200	ND	ND	ND	ND	340	ND	ND	110	240	110	140.00	210	630	850	97	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	59	24	36	71	130	210	25	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	550	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene (Trichloroethene)	340	520	680	1,100	980	1,100	710	3,200	310	310	670	380	610	860	3,200	2,900	290	630
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	120.00	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (Tetrachloroethene)	110,000	100,000	210,000	190,000	200,000	190,000	200,000	170,000	51,000	39,000	950,000	45,000	77,000	110,000	220,000	290,000	26,000	86000
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	1,100.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	2,000.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	610	ND	1,300	2,700	ND	2,000	1,100	1,700	840	520	1,200	780	1,000	2,000	4,900	4,100	400	910
Methylene Chloride	13,000	1,300	2,300	2,900	880	ND	ND	3,100	ND	4,200	33	ND	ND	ND	ND	ND	ND	2300
m,p-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	16	13	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	45	ND	ND	ND	8	11	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	ND	250	ND	ND	ND	ND	ND	ND	ND	660	ND	ND	ND	ND	ND	ND	ND	ND
Heptane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	98	640	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Propylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	100	430	250	500	210	460	260	260	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	62	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	110	ND	ND	ND	ND	ND	ND	ND	ND	150	ND	ND	ND	ND	ND	ND	ND	290
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14	20	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
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Analytical Summary Results by SVE Well

	Concentration (ug/m3) in system SVE-10S																			
Compounds	**12/13/07**	**12/20/07**	**1/4/08**	**1/9/08**	**1/23/08**	**2/6/08**	**2/20/08**	**3/6/08**	**3/20/08**	**5/21/08**	**6/18/08**	**7/23/08**	**8/20/2008**	**9/17/2008**	**10/15/2008**	**11/26/2008**	**12/24/2008**	**1/21/2009**	**2/18/2009**	**3/18/2009**
Trichlorofluoromethane	280.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	900.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	4,361.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	1,425.28	0.00	0.00	0.00	0.00	0.00	2,400.00	2,300.00	0.00	ND	2,900.00	1,500.00	1,300.00	21,000.00	4,500.00	ND	3,200	5,500.00	3,600	ND
Carbon Tetrachloride	10,693.66	14,467.89	0.00	10,000.00	3,700.00	6,300.00	2,700.00	3,000.00	1,900.00	1,700.00	1,200.00	1,300.00	650.00	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	6,001.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene (Trichloroethene)	10,748.47	2,257.18	0.00	0.00	0.00	0.00	0.00	0.00	560.00	630.00	920.00	1,100.00	610.00	ND	750.00	ND	ND	ND	ND	ND
Toluene	0.00	0.00	0.00	0.00	0.00	2,100.00	0.00	0.00	400.00	ND	0.00	ND	ND	15,000.00	850.00	1,800.00	ND	ND	ND	ND
Tetrachloroethylene (Tetrachloroethene)	6,577,750.51	6,103,067.49	9,490,000.00	11,000,000.00	3,100,000.00	3,000,000.00	3,000,000.00	2,200,000.00	390,000.00	1,200,000.00	1,800,000.00	1,600,000.00	970,000.00	870,000.00	810,000.00	280,000.00	280,000	240,000.00	1,100,000	240,000
1,1-Dichloroethane	323.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	0.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	1,100.00	1,300.00	2,000.00	2,800.00	1,400.00	ND	920.00	ND	ND	ND	ND	ND
Methylene Chloride	0.00	0.00	0.00	1,900.00	0.00	2,100.00	0.00	0.00	4,500.00	530.00	850.00	4,900.00	740.00	16,000.00	8,500.00	ND	3,500	ND	ND	ND
m,p-Xylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	350.00	ND	0.00	ND	ND	ND	1,800.00	ND	ND	ND	ND	ND
o-Xylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.00	ND	0.00	ND	ND	ND	1,200.00	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	2,654.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	180.00	ND	280.00	ND	ND	ND	420.00	ND	ND	ND	ND	ND
Tetrahydrofuran	38,421.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.00	ND	0.00	ND	ND	ND	1,600.00	ND	ND	ND	ND	ND
Vinyl Chloride	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	240.00	ND	0.00	ND	ND	8,500.00	7,700.00	ND	ND	ND	ND	ND
Heptane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	0.00	0.00	0.00	0.00	0.00	30,000.00	0.00	0.00	2,200.00	ND	1,200.00	ND	ND	15,000.00	1,900.00	3,000.00	ND	ND	ND	ND
Propylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	0.00	0.00	0.00	0.00	0.00	3,200.00	0.00	0.00	440.00	ND	490.00	1,100.00	730.00	17,000.00	4,000.00	ND	ND	ND	ND	ND
Ethyl Acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	270.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	5,800.00	ND	ND	ND	390.00	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	500.00	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	2,200.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
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Analytical Summary Results by SVE Well

	Concentration (ug/m3) in system SVE-10S																	
Compounds	**4/15/2009**	**5/13/2009**	**6/10/2009**	**7/8/2009**	**8/5/2009**	**9/2/2009**	**10/14/2009**	**11/25/2009**	**12/24/2009**	**1/20/2010**	**2/24/2010**	**3/17/2010**	**4/21/2010**	**5/26/2010**	**6/30/2010**	**7/21/2010**	**8/18/2010**	**9/15/2010**
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	2,800	340	750	ND	ND	ND	ND	ND	250	ND	ND	ND	ND	ND	ND	1,100	910
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	96	170	220	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12	14	18	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene (Trichloroethene)	ND	ND	ND	ND	660	2,600	ND	ND	ND	170	190	150	230	570	1,200	1,100	550	660
Toluene	ND	ND	ND	530	ND	ND	ND	ND	ND	130	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (Tetrachloroethene)	250,000	190,000	250,000	290,000	330,000	340,000	290,000	260,000	91,000	70,000	100,000	71,000	85,000	140,000	230,000	230,000	140,000	170,000
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	ND	ND	510	890	1,100	2,300	770	700	440	450	560	400.00	620.00	1,800	2,900	2,400	890	1,200
Methylene Chloride	7,600	4,100	2,400	5,000	1,800	ND	ND	7,100	ND	4,800	3,000	350	ND	ND	ND	ND	ND	2,000
m,p-Xylene	ND	ND	ND	950	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,400	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	300	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	ND	1,400	ND	ND	ND	ND	1,100	ND	ND	530	860.00	ND	ND	ND	ND	ND	ND	ND
Heptane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	ND	7,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Propylene	ND	ND	ND	360	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	690	190	420	510	340	450	ND	ND	ND	ND	160	280	ND	ND	ND	360	ND
Ethyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	150	1,800	ND	ND	ND	ND	ND	87	260
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
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Analytical Summary Results by SVE Well

	Concentration (ug/m3) in system SVE-7D																			
Compounds	**12/13/07**	**12/20/07**	**1/4/08**	**1/9/08**	**1/23/08**	**2/6/08**	**2/20/08**	**3/6/08**	**3/20/08**	**5/21/08**	**6/18/08**	**7/23/08**	**8/20/2008**	**9/17/2008**	**10/15/2008**	**11/26/2008**	**12/24/2008**	**1/21/2009**	**2/18/2009**	**3/18/2009**
Trichlorofluoromethane	0.00	0.00	0.00	270.00	0.00	400.00	0.00	0.00	700.00	440.00	450.00	550.00	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	0.00	8,076.56	0.00	2,400.00	0.00	3,400.00	1,300.00	1,100.00	4,800.00	ND	1,200.00	2,600.00	2,900.00	2,600.00	ND	1,600.00	1,300	2,000	910	640
Carbon Tetrachloride	0.00	0.00	0.00	350.00	0.00	0.00	0.00	0.00	330.00	600.00	390.00	430.00	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.00	0.00	140.00	110.00	240.00	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	1,145.77	4,255.71	0.00	570.00	280.00	380.00	350.00	140.00	400.00	3,500.00	2,500.00	3,000.00	ND	ND	ND	ND	ND	1,800	ND	ND
Trichloroethylene (Trichloroethene)	0.00	21,496.93	7,420.00	2,800.00	1,900.00	2,800.00	1,400.00	100.00	2,500.00	6,800.00	5,400.00	4,600.00	1,200.00	280.00	580.00	ND	ND	2,800	830	980
Toluene	0.00	0.00	0.00	0.00	0.00	5,100.00	830.00	0.00	240.00	250.00	58.00	130.00	ND	ND	290.00	970.00	ND	780	ND	ND
Tetrachloroethylene (Tetrachloroethene)	650,993.87	2,034,355.83	71,900.00	520,000.00	380,000.00	220,000.00	570,000.00	120,000.00	240,000.00	230,000.00	150,000.00	180,000.00	190,000.00	180,000.00	320,000.00	380,000.00	120,000	250,000	250,000	240,000
1,1-Dichloroethane	0.00	0.00	506.00	0.00	0.00	0.00	0.00	0.00	0.00	290.00	220.00	260.00	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.00	0.00	698.00	0.00	0.00	0.00	0.00	0.00	140.00	1,100.00	940.00	1,300.00	ND	ND	ND	ND	ND	880	ND	ND
cis-1,2-Dichloroethylene	872.26	0.00	1,500.00	1,100.00	690.00	1,100.00	820.00	690.00	810.00	970.00	840.00	600.00	550.00	ND	ND	ND	ND	450	ND	ND
Methylene Chloride	0.00	0.00	0.00	1,800.00	0.00	1,500.00	0.00	0.00	3,400.00	400.00	1,300.00	5,200.00	1,700.00	1,400.00	1,000.00	1,000.00	2,700	4,600	800	960
m,p-Xylene	0.00	0.00	0.00	0.00	0.00	1,200.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	0.00	0.00	0.00	0.00	0.00	460.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	7,078.28	0.00	0.00	0.00	0.00	230.00	0.00	31.00	190.00	ND	170.00	230.00	ND	260.00	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	15,746.42	0.00	0.00	0.00	0.00	0.00	0.00	110.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	294.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	160.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	85.00	420.00	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	350.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	140.00	ND	52.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	0.00	0.00	0.00	330.00	0.00	3,700.00	710.00	0.00	550.00	ND	230.00	450.00	ND	570.00	ND	ND	ND	950	ND	ND
Heptane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	0.00	0.00	0.00	220.00	0.00	76,000.00	16,000.00	87.00	1,600.00	ND	2,200.00	820.00	ND	620.00	ND	1,700.00	ND	ND	ND	ND
Propylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	0.00	0.00	0.00	1,100.00	0.00	2,900.00	1,400.00	0.00	1,900.00	ND	270.00	2,500.00	820.00	1,300.00	ND	ND	ND	ND	ND	ND
Ethyl Acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	270.00	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.00	0.00	0.00	0.00	0.00	430.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	0.00	0.00	0.00	0.00	0.00	390.00	0.00	0.00	0.00	ND	61.00	160.00	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	810.00	590.00	470.00	220.00	ND	ND	ND	ND	610	570	ND	ND
1,3,5-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	210.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetra chloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	620.00	ND	ND	ND	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
Monthly Progress Report - December 2010
Analytical Summary Results by SVE Well

	Concentration (ug/m3) in system SVE-7D																	
Compounds	**4/15/2009**	**5/13/2009**	**6/10/2009**	**7/8/2009**	**8/5/2009**	**9/2/2009**	**10/20/2009**	**11/25/2009**	**12/24/2009**	**1/20/2010**	**2/24/2010**	**3/17/2010**	**4/21/2010**	**5/26/2010**	**6/30/2010**	**7/21/2010**	**8/18/2010**	**9/15/2010**
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	37	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	400	4,500	350	660	ND	ND	ND	ND	ND	ND	190	350	ND	ND	1,700	830	2,700	950
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	51	ND	ND	50	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	69	ND	62	58	ND	ND	ND	ND
Trichloroethylene (Trichloroethene)	460	ND	390	560	380	280	ND	ND	ND	380	690	470	310	410	250	260	56	540
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	130	ND	ND	ND	ND	ND	20.00	1,300
Tetrachloroethylene (Tetrachloroethene)	210,000	190,000	210,000	170,000	210,000	200,000	220,000	270,000	280,000	160,000	220,000	210,000	200,000	230,000	310,000	250,000	22,000	160,000
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	150	ND	ND	ND	ND	ND	ND	ND	ND	ND	270	140	78	100	0	78	30	150
Methylene Chloride	4,100	6,900	2,200	2,700	840	ND	ND	7,200	ND	5,200	1,200	530	ND	280	280	1,000	480	2,100
m,p-Xylene	ND	4,400.00	ND	440	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330
o-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	74
2-Butanone (Methyl ethyl ketone)	ND	1,100.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	56	35
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	270	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	98	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	23	0	42	ND
Ethanol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	140	ND	ND	ND	19,000	310	470	490
Heptane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	36	61	ND	110	27
Propylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	76.00	ND	170	410	280	450	250	470	ND	ND	240	210	280	180	320	540	910	ND
Ethyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	91	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	190	47	ND	ND	69	ND	110	860	280
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	69	ND	ND	ND
1,1,2,2-Tetra chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,300

Table 3
Kliegman Brother Site - OU#1 Site Management
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	Concentration (ug/m3) in system SVE-7S																			
Compounds	**12/13/07**	**12/20/07**	**1/4/08**	**1/9/08**	**1/23/08**	**2/6/08**	**2/20/08**	**3/6/08**	**3/20/08**	**5/21/08**	**6/18/08**	**7/23/08**	**8/20/2008**	**9/17/2008**	**10/15/2008**	**11/26/2008**	**12/24/2008**	**1/21/2009**	**2/18/2009**	**3/18/2009**
Trichlorofluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	4,513.37	2,280.44	0.00	0.00	0.00	0.00	2,700.00	2,600.00	0.00	ND	5,500.00	2,700.00	2,000.00	47,000.00	7,700.00	13,000.00	11,000	13,000	ND	2,500
Carbon Tetrachloride	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	1,309.45	5,237.79	0.00	4,800.00	2,500.00	3,000.00	2,600.00	0.00	2,300.00	ND	0.00	1,400.00	1,300.00	ND	5,800.00	ND	ND	ND	ND	ND
Trichloroethylene (Trichloroethene)	1,504.79	4,191.90	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	2,400.00	1,900.00	ND	18,000.00	ND	ND	ND	ND	ND
Toluene	0.00	0.00	0.00	0.00	0.00	3,300.00	0.00	0.00	0.00	ND	0.00	ND	ND	80,000.00	6,900.00	6,800.00	ND	ND	ND	ND
Tetrachloroethylene (Tetrachloroethene)	1,898,732.11	6,781,186.09	10,500,000.00	22,000,000.00	11,000,000.00	5,000,000.00	7,300,000.00	3,700,000.00	3,600,000.00	2,900,000.00	4,800,000.00	5,600,000.00	4,900,000.00	3,500,000.00	3,900,000.00	940,000.00	690,000	1,800,000	2,000,000	710,000
1,1-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	0.00	0.00	0.00	5,400.00	6,300.00	7,900.00	5,700.00	4,500.00	7,700.00	4,000.00	4,900.00	5,700.00	4,900.00	ND	5,600.00	ND	ND	ND	ND	ND
Methylene Chloride	312.66	0.00	0.00	1,900.00	0.00	1,800.00	0.00	0.00	3,100.00	8,600.00	0.00	8,100.00	1,100.00	8,300.00	13,000.00	9,000.00	15,000	21,000	10,000	6,300
m,p-Xylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	15,000.00	1,900.00	ND	ND	ND	ND	ND
o-Xylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	6,900.00	890.00	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	17,105.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	5,400.00	1,200.00	ND	ND	ND	ND	ND
Tetrahydrofuran	55,427.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	319.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	5,100.00	ND	ND	ND	ND	ND	ND
Vinyl Chloride	319.55	2,811.86	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	490.00	540.00	ND	ND	ND	ND	ND	ND	ND
Benzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	0.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	2,500.00	0.00	ND	ND	29,000.00	3,800.00	ND	ND	ND	ND	ND
Heptane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	0.00	0.00	0.00	0.00	0.00	280,000.00	0.00	0.00	0.00	ND	3,900.00	ND	ND	26,000.00	5,200.00	24,000.00	ND	ND	ND	ND
Propylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	0.00	0.00	0.00	0.00	0.00	2,000.00	0.00	0.00	0.00	3,300.00	0.00	3,300.00	980.00	16,000.00	4,400.00	ND	6,000	ND	ND	ND
Ethyl Acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	6,700.00	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,600.00	0.00	ND	ND	ND	1,200.00	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 3
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	Concentration (ug/m3) in system SVE-7S																	
Compounds	**4/15/2009**	**5/13/2009**	**6/10/2009**	**7/8/2009**	**8/5/2009**	**9/2/2009**	**10/14/2009**	**11/25/2009**	**12/24/2009**	**1/20/2010**	**2/24/2010**	**3/17/2010**	**4/21/2010**	**5/26/2010**	**6/30/2010**	**7/21/2010**	**8/18/2010**	**9/15/2010**
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	680	7,600	2,300	6,200	ND	ND	ND	ND	ND	ND	ND	3,000	2,400	ND	4,000	1,400	ND	9000
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	320	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	340.00	ND	1400
Trichloroethylene (Trichloroethene)	520	ND	ND	ND	4,000	ND	ND	ND	ND	ND	570	ND	ND	ND	890	1,700	570	1900
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	700
Tetrachloroethylene (Tetrachloroethene)	1,900,000	1,800,000	1,800,000	1,800,000	5,000,000	1,600,000	1,500,000	1,700,000	1,200,000	740,000	1,200,000	830,000	490,000	860,000	1,300,000	1,600,000	990,000	680,000
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	890	ND	1,600	ND	7,700	ND	ND	ND	ND	ND	1,200	ND	640	990	ND	4,000	1,000	980
Methylene Chloride	4,900	13,000	11,000	48,000	8,000	ND	23,000	31,000	ND	3,600	20,000	4,700	ND	ND	ND	1,700	ND	25000
m,p-Xylene	ND	ND	ND	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,000	ND	ND	ND	ND	ND	ND	ND	310
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	ND	4,400	ND	ND	ND	ND	ND	ND	ND	ND	6,100	ND	ND	ND	7,200	0	ND	6100
Heptane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	ND	ND	ND	ND	ND	ND	9,600	ND	ND	ND	ND	ND	3,100	ND	ND	ND	ND	ND
Propylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	2,100	ND	ND	ND	19,000	1,900	ND	ND	1,300	1,700	2,300	900	ND	850	370	ND
Ethyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11,000	ND	ND	ND	ND	ND	ND	3000
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,900.00	0.00	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
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Analytical Summary Results by SVE Well

	Concentration (ug/m^3) in system URS-SVE-6D																			
Compounds	**12/13/07**	**12/20/07**	**1/4/08**	**1/9/08**	**1/23/08**	**2/6/08**	**2/20/08**	**3/6/08**	**3/20/08**	**5/21/08**	**6/18/08**	**7/23/08**	**8/20/2008**	**9/17/2008**	**10/15/2008**	**11/26/2008**	**12/24/2008**	**1/21/2009**	**2/18/2009**	**3/18/2009**
Trichlorofluoromethane	0.00	140.49	0.00	54.00	0.00	0.00	73.00	83.00	0.00	ND	74.00	1,100.00	ND	ND	ND	ND	280	140	ND	ND
1,1-Dichloroethene	376.66	91.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	225.67	0.00	494.00	0.00	0.00	2,800.00	460.00	54.00	1,600.00	140.00	5,400.00	2,900.00	1,700.00	2,300.00	2,700.00	1,100.00	750	780	520	260
Carbon Tetrachloride	4,529.08	125.81	218.00	65.00	0.00	0.00	0.00	75.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.00	175.80	0.00	82.00	0.00	0.00	0.00	81.00	280.00	ND	0.00	110.00	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	2,182.41	523.78	208.00	380.00	0.00	0.00	150.00	350.00	650.00	160.00	160.00	ND	ND	ND	100.00	ND	ND	ND	130	ND
Trichloroethylene (Trichloroethene)	5,911.66	1,934.72	860.00	1,100.00	0.00	300.00	470.00	1,700.00	1,700.00	660.00	250.00	420.00	ND	480.00	500.00	290.00	370	590	470	ND
Toluene	0.00	94.21	0.00	0.00	0.00	3,300.00	0.00	0.00	83.00	130.00	130.00	330.00	ND	ND	2,900.00	960.00	180	460	430	ND
Tetrachloroethylene (Tetrachloroethene)	1,695,296.52	250,903.89	174,000.00	110,000.00	89,000.00	85,000.00	100,000.00	100,000.00	88,000.00	71,000.00	220,000.00	41,000.00	64,000.00	59,000.00	68,000.00	60,000.00	130,000	61,000	84,000	28,000
1,1-Dichloroethane	0.00	0.00	0.00	55.00	0.00	0.00	0.00	36.00	390.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.00	0.00	0.00	29.00	0.00	0.00	0.00	47.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	0.00	0.00	309.00	170.00	0.00	87.00	95.00	460.00	280.00	85.00	130.00	ND	ND	ND	72.00	ND	92	190	150	ND
Methylene Chloride	0.00	0.00	556.00	19.00	0.00	1,500.00	340.00	0.00	1,700.00	480.00	3,900.00	7,600.00	760.00	1,600.00	1,300.00	740.00	2,600	2,700	450	720
m,p-Xylene	0.00	0.00	418.00	0.00	0.00	1,600.00	0.00	0.00	220.00	ND	0.00	320.00	ND	ND	510.00	ND	ND	ND	ND	ND
o-Xylene	0.00	0.00	418.00	0.00	0.00	650.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	240.00	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	0.00	0.00	0.00	0.00	0.00	250.00	0.00	0.00	150.00	48.00	330.00	200.00	ND	ND	460.00	180.00	ND	ND	ND	ND
Tetrahydrofuran	1,511.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	130.00	ND	700	ND	ND	ND
Vinyl Chloride	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	52.00	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.00	0.00	0.00	28.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	290.00	ND	ND	ND	ND	470	ND	ND	ND
Chloromethane	0.00	0.00	0.00	0.00	0.00	96.00	0.00	0.00	0.00	ND	54.00	110.00	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	290.00	77.00	260.00	610.00	ND	520.00	1,300.00	270.00	460	ND	360	190
Heptane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	0.00	0.00	0.00	0.00	0.00	2,800.00	44.00	0.00	230.00	ND	1,500.00	590.00	ND	ND	4,800.00	2,000.00	150	ND	180	ND
Propylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	0.00	0.00	0.00	0.00	0.00	2,400.00	160.00	0.00	1,200.00	ND	360.00	3,000.00	1,100.00	1,200.00	1,500.00	240.00	210	160	280	100
Ethyl Acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	0.00	0.00	0.00	0.00	0.00	72.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.00	0.00	0.00	0.00	0.00	570.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	220.00	ND	ND	ND	ND	ND
4-Ethyl Toluene	0.00	0.00	0.00	0.00	0.00	270.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	100	ND	ND	ND
Styrene	0.00	0.00	0.00	0.00	0.00	310.00	0.00	0.00	0.00	72.00	0.00	ND	ND	ND	85.00	ND	ND	ND	ND	ND
Hexane	0.00	0.00	0.00	0.00	0.00	180.00	44.00	0.00	140.00	77.00	12,000.00	2,000.00	ND	ND	46.00	ND	540	350	210	ND
1,3,5-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	310.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	290	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	1,900.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	120.00	ND	ND	ND	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
Monthly Progress Report - December 2010
Analytical Summary Results by SVE Well

Concentration (ug/m^3) in system URS-SVE-6D																		
Compounds	**4/15/2009**	**5/13/2009**	**6/10/2009**	**7/8/2009**	**8/5/2009**	**9/2/2009**	**10/14/2009**	**11/25/2009**	**12/24/2009**	**1/20/2010**	**2/24/2010**	**3/17/2010**	**4/21/2010**	**5/26/2010**	**6/30/2010**	**7/21/2010**	**8/18/2010**	**9/15/2010**
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	69	ND	99	11	ND	16	16	23
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	530	680	320	ND	700.00	ND	860.00	1,400	ND	590	290	430	2,700	ND	ND	ND	21	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18	ND	18	13	13
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	31	26	42	25	32
1,1,1-Trichloroethane	ND	ND	ND	ND	1,800.00	ND	ND	ND	ND	ND	ND	ND	ND	42	36	47	35	95
Trichloroethylene (Trichloroethene)	220.00	240.00	210.00	200	2,300	190	140	250	190	200	180	150	130	200	200	270	190	280
Toluene	ND	ND	ND	160	ND	ND	360	330	ND	170	ND	ND	38	ND	ND	ND	ND	ND
Tetrachloroethylene (Tetrachloroethene)	53,000	74,000	80,000	66,000	54,000	61,000	61,000	77,000	110,000	39,000	54,000	55,000	39,000	48,000	53,000	37,000	35,000	8,600
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6	ND	ND	4.50	10
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3	25
cis-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	27	22	33	23	28
Methylene Chloride	18,000	1,100	1,100	1,500	500	ND	1,200	4,400	ND	1,500	2,200	670	6,000	ND	15	14	ND	9
m,p-Xylene	910.00	ND	ND	ND	ND	590	310	2,400	ND	53	98	ND	ND	ND	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND	ND	160	100	920	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	ND	220.00	ND	ND	ND	ND	ND	79	ND	1,900	ND	ND	ND	ND	ND	ND	4	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	210	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	150.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	790	ND	ND	ND	ND	ND	42	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	65	ND	100	10	11	12	10	10
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	29	ND	54	ND	ND	ND	ND	ND
Ethanol	120	320	ND	ND	390	ND	320.00	ND	ND	620	680	230	230	ND	ND	ND	ND	ND
Heptane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	600	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	180.00	ND	ND	1,300	ND	ND	240.00	ND	ND	ND	ND	ND	59	ND	ND	ND	2	ND
Propylene	ND	ND	ND	98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	130	ND	280	920	240	540	770	660	73	73	220	190	350	ND	ND	ND	ND	ND
Ethyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	53	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	530	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	110.00	ND	ND	1,700	ND	ND	210.00	160	ND	190	860	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
Monthly Progress Report - December 2010
Analytical Summary Results by SVE Well

	Concentration (ug/m3) in system URS-SVE-1																			
Compounds	**12/13/07**	**12/20/07**	**1/4/08**	**1/9/08**	**1/23/08**	**2/6/08**	**2/20/08**	**3/6/08**	**3/20/08**	**5/21/08**	**6/18/08**	**7/23/08**	**8/20/2008**	**9/17/2008**	**10/15/2008**	**11/26/2008**	**12/24/2008**	**1/21/2009**	**2/18/2009**	**3/18/2009**
Trichlorofluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	297.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	570.11	59.39	3,160.00	1500.00	0.00	0.00	610.00	2,600.00	2,500.00	ND	3,000.00	1,500.00	1,900	11000.00	810.00	3,300.00	1,900.00	2,300.00	1,400	ND
Carbon Tetrachloride	2,264.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.00	19.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	1,200.33	267.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene (Trichloroethene)	3,009.57	1,289.82	0.00	0.00	0.00	0.00	220.00	250.00	240.00	430.00	790.00	880.00	630	ND	730.00	ND	ND	ND	ND	ND
Toluene	0.00	0.00	0.00	0.00	0.00	0.00	560.00	610.00	450.00	ND	160.00	1,300.00	ND	2900.00	620.00	1,700.00	ND	ND	ND	ND
Tetrachloroethylene (Tetrachloroethene)	881,554.19	678,118.61	922,000.00	1300000.00	810,000.00	430,000.00	830,000.00	280,000.00	790,000.00	540,000.00	780,000.00	640,000.00	680,000	440000.00	650,000.00	520,000.00	510,000.00	500,000.00	440,000	340,000
1,1-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	310.00	120.00	190.00	500.00	510.00	440	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	0.00	0.00	4,060.00	2600.00	0.00	1,800.00	0.00	240.00	2,300.00	ND	1,200.00	3,800.00	1,000	3900.00	910.00	2,700.00	2,400.00	3,100.00	ND	2,600
m,p-Xylene	0.00	0.00	0.00	0.00	0.00	0.00	540.00	0.00	570.00	ND	0.00	1,300.00	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	0.00	0.00	0.00	0.00	0.00	0.00	190.00	0.00	220.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	530.87	0.00	0.00	0.00	0.00	0.00	0.00	5,800.00	310.00	ND	250.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	3,401.23	0.00	0.00	0.00	0.00	0.00	0.00	840.00	88.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	250.00	190.00	220.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	140.59	51.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.00	111.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	0.00	0.00	0.00	690.00	0.00	0.00	240.00	330.00	540.00	ND	0.00	ND	ND	ND	450.00	ND	ND	ND	ND	ND
Heptane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	0.00	0.00	0.00	180.00	0.00	21,000.00	0.00	8,900.00	2,500.00	ND	1,300.00	ND	ND	3000.00	550.00	4,400.00	ND	ND	ND	ND
Propylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	0.00	0.00	0.00	720.00	0.00	1,300.00	190.00	1,500.00	1,700.00	270.00	920.00	1,100.00	740	4500.00	330.00	ND	ND	ND	ND	ND
Ethyl Acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	160.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	350.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	0.00	0.00	0.00	0.00	0.00	0.00	180.00	0.00	130.00	ND	9,400.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	3,700.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
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Analytical Summary Results by SVE Well

	Concentration (ug/m3) in system URS-SVE-1																	
Compounds	**4/15/2009**	**5/13/2009**	**6/10/2009**	**7/8/2009**	**8/5/2009**	**9/2/2009**	**10/14/2009**	**11/25/2009**	**12/24/2009**	**1/20/2010**	**2/24/2010**	**3/17/2010**	**4/21/2010**	**5/26/2010**	**6/30/2010**	**7/21/2010**	**8/18/2010**	**9/15/2010**
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	82	64
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	510	3,800	950	820	ND	ND	ND	2,700	ND	ND	ND	ND	ND	660	1,900	730	1,600	550
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene (Trichloroethene)	ND	ND	ND	710	ND	ND	ND	ND	ND	ND	ND	170	ND	230	440	600	270	220
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	78	1,400	0	69	ND
Tetrachloroethylene (Tetrachloroethene)	320,000	390,000	470,000	460,000	440,000	350,000	300,000	400,000	240,000	190,000	350,000	820,000	410,000	360,000	400,000	410,000	150,000	210,000
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	240	220	260	130	130
Methylene Chloride	15,000	7,300	4,500	5,100	1,700	ND	2,100	7,100	ND	11,000	1,800	330	ND	1,200	290	930	1,100	240
m,p-Xylene	8,800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	2,400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	44	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	21	ND
Ethanol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,300	400	340	210
Heptane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	ND	6,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	48	32
Propylene	ND	ND	ND	350	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	1,300	690	540	370	520	320	890	ND	450	240	260	320	700	360	480	440	ND
Ethyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	810	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	290	660	ND	ND	150	151	152	570	930
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 3
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	Concentration (ug/m3) in system SVE-8S																			
Compounds	**12/13/07**	**12/20/07**	**1/4/08**	**1/9/08**	**1/23/08**	**2/6/08**	**2/20/08**	**3/6/08**	**3/20/08**	**5/21/08**	**6/18/08**	**7/23/08**	**8/20/08**	**9/17/08**	**10/15/2008**	**11/26/2008**	**12/24/2008**	**1/21/2009**	**2/18/2009**	**3/18/2009**
Trichlorofluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	230.00	800.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
1,1-Dichloroethene	6,740.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Acetone	522.60	18,053.50	0.00	4,800.00	0.00	0.00	3,200.00	2,200.00	1,900.00	1,200.00	1,400.00	1,600.00	2,900.00	8,100.00	700.00	1,500.00	NS	1,800	910	310
Carbon Tetrachloride	5,032.31	8,806.54	0.00	0.00	0.00	0.00	0.00	1,900.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Chloroform	0.00	0.00	0.00	0.00	0.00	0.00	0.00	460.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
1,1,1-Trichloroethane	17,459.30	3,273.62	0.00	0.00	0.00	0.00	0.00	7,100.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Trichloroethylene (Trichloroethene)	50,517.79	53,742.33	0.00	6,900.00	4,800.00	2,400.00	1,200.00	17,000.00	740.00	820.00	1,900.00	1,600.00	980.00	ND	840.00	ND	NS	ND	130	180
Toluene	0.00	0.00	0.00	0.00	0.00	3,800.00	210.00	170.00	260.00	ND	0.00	ND	ND	2,600.00	ND	1,100.00	NS	710	160	ND
Tetrachloroethylene (Tetrachloroethene)	8,815,541.92	12,884,253.58	9,150,000.00	13,000,000.00	5,500,000.00	3,000,000.00	2,100,000.00	990,000.00	430,000.00	500,000.00	600,000.00	600,000.00	340,000.00	170,000.00	190,000.00	100,000.00	NS	69,000	37,000	37,000
1,1-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	850.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
1,1-Dichloroethylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,600.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
cis-1,2-Dichloroethylene	0.00	0.00	52,700.00	30,000.00	19,000.00	10,000.00	5,500.00	7,400.00	3,400.00	3,500.00	8,500.00	8,100.00	4,500.00	4,300.00	3,200.00	810.00	NS	940	530	670
Methylene Chloride	0.00	0.00	0.00	3,900.00	0.00	1,900.00	0.00	760.00	3,300.00	210.00	530.00	3,600.00	1,000.00	4,300.00	270.00	1,100.00	NS	4,400	460	810
m,p-Xylene	0.00	0.00	0.00	0.00	0.00	0.00	420.00	0.00	220.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
o-Xylene	0.00	0.00	0.00	0.00	0.00	0.00	180.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	162.21	0.00	0.00	0.00	0.00	0.00	0.00	200.00	0.00	ND	230.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Tetrahydrofuran	23,934.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
1,2,4-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	300.00	120.00	ND	0.00	ND	ND	ND	ND	ND	NS	950	ND	ND
Vinyl Chloride	2,147.24	1,687.12	0.00	0.00	0.00	0.00	0.00	88.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Benzene	0.00	0.00	0.00	0.00	0.00	0.00	130.00	110.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Dichlorodifluoromethane	0.00	0.00	0.00	0.00	0.00	0.00	230.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Chloromethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Ethanol	0.00	0.00	0.00	2,100.00	2,000.00	0.00	3,200.00	370.00	0.00	ND	0.00	ND	ND	2,200.00	220.00	ND	NS	950	320	440
Heptane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
2-Hexanone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Isopropyl Alcohol	0.00	0.00	0.00	0.00	0.00	28,000.00	0.00	470.00	260.00	ND	4,400.00	ND	ND	2,900.00	ND	2,300.00	NS	ND	ND	ND
Propylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Tertiary Butyl Alcohol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Carbon Disulfide	0.00	0.00	0.00	0.00	0.00	2,400.00	1,000.00	1,300.00	670.00	220.00	380.00	1,400.00	710.00	6,800.00	71.00	ND	NS	ND	200	ND
Ethyl Acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
1,2,4-Trichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Chloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Cyclohexne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Ethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	180.00	100.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
4-Ethyl Toluene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Styrene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
Hexane	0.00	0.00	0.00	0.00	0.00	0.00	350.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	500	500	ND
1,3,5-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	0.00	0.00	0.00	0.00	0.00	0.00	210.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
1,2-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	89.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND
tras-1,2-Dichloroethylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	0.00	ND	ND	ND	ND	ND	NS	ND	ND	ND

Table 3
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	Concentration (ug/m3) in system SVE-8S																	
Compounds	**4/15/2009**	**5/13/2009**	**6/10/2009**	**7/8/2009**	**8/5/2009**	**9/2/2009**	**10/14/2009**	**11/25/2009**	**12/24/2009**	**1/20/2010**	**2/24/2010**	**3/17/2010**	**4/21/010**	**5/26/2010**	**6/30/2010**	**7/21/2010**	**8/18/2010**	**9/15/2010**
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	58.00	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	700	1,300	230	890	ND	ND	ND	3,000	ND	ND	76	44	110	150	130	240	1,300	1,000
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	5.8	10	12	19	30	51	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	150	ND	ND	ND	37	5.5	8.2	17.0	29.0	ND	ND
Trichloroethylene (Trichloroethene)	170	710	570	1,400	1,200	980	ND	570	250	710	160	360	420	780	1,700	2,300	840	550
Toluene	120	ND	ND	ND	ND	ND	ND	99	ND	ND	ND	ND	ND	ND	ND	ND	ND	75.00
Tetrachloroethylene (Tetrachloroethene)	40,000	67,000	86,000	110,000	110,000	86,000	66,000	47,000	29,000	18,000	29,000	31,000	40,000	59,000	130,000	170,000	120,000	47,000
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	83	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	880	ND	3,100	1,700	4,800	ND	1,100	940	1,200	710	830	1,500	1,800	2,500	6,100	7,800	2,400	1,900
Methylene Chloride	14,000	1,400	940	1,900	890	ND	ND	5,200	ND	ND	18	ND	ND	ND	ND	23	1,400	2,800
m,p-Xylene	ND	ND	350	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	ND	170	ND	ND	ND	ND	ND	68	ND	ND	ND	ND	ND	ND	ND	ND	ND	42.00
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	290	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.1	3.8	4.3	3	8	19	16	ND	ND
Benzene	66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.5	5.0	ND	11.0	ND	ND
Dichlorodifluoromethane	130	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	58	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	ND	430	ND	230	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	260	460
Heptane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	140	ND	ND	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	38.00	33.00
Propylene	ND	ND	ND	82	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	140	120	130	560	300	410	ND	1,500	98	ND	ND	ND	ND	ND	ND	ND	300	ND
Ethyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	120	ND	89	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	140	ND	ND	86	ND	ND	ND	230	ND	ND	ND	ND	ND	ND	ND	ND	340	370
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.70	14.00	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.6	ND	ND	ND	ND	ND

Table 3
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	Concentration (ug/m3) in system SVE-8D																			
Compounds	**12/13/07**	**12/20/07**	**1/4/08**	**1/9/08**	**1/23/08**	**2/6/08**	**2/20/08**	**3/6/08**	**3/20/08**	**5/21/08**	**6/18/08**	**7/23/08**	**8/20/08**	**9/17/08**	**10/15/2008**	**11/26/2008**	**12/24/2008**	**1/21/2009**	**2/18/2009**	**3/18/2009**
Trichlorofluoromethane	786.75	0.00	663.00	2.10	0.00	1,700.00	680.00	820.00	1,300.00	NS	0.00	140.00	ND	280.00	400.00	310.00	ND	ND	470	200
1,1-Dichloroethene	9,119.10	3,568.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	2,375.46	1,852.86	938.00	29.00	0.00	3,300.00	1,300.00	0.00	1,300.00	NS	880.00	2,100.00	1,700.00	2,400.00	2,500.00	1,300.00	1,100	980	630	270
Carbon Tetrachloride	3,019.39	0.00	1,480.00	0.00	0.00	1,600.00	1,100.00	2,300.00	2,200.00	NS	370.00	420.00	670.00	440.00	580.00	420.00	ND	ND	530	360
Chloroform	0.00	0.00	557.00	0.00	0.00	460.00	350.00	460.00	350.00	NS	0.00	ND	ND	ND	140.00	ND	ND	ND	170	150
1,1,1-Trichloroethane	24,006.54	7,092.84	11,800.00	0.00	0.00	4,800.00	3,000.00	8,400.00	10,000.00	NS	600.00	840.00	4,100.00	2,700.00	3,500.00	2,600.00	ND	ND	3,600	2,700
Trichloroethylene (Trichloroethene)	20,422.09	18,809.82	23,200.00	0.00	0.00	1,500.00	8,000.00	23,000.00	15,000.00	NS	1,400.00	1,200.00	6,800.00	5,600.00	5,800.00	4,900.00	700	410	6,200	6,200
Toluene	0.00	0.00	0.00	1.70	0.00	7,100.00	360.00	0.00	230.00	NS	42.00	ND	ND	1,300.00	2,300.00	1,200.00	ND	640	ND	160
Tetrachloroethylene (Tetrachloroethene)	1,152,801.64	630,650.31	396,000.00	63.00	230,000.00	180,000.00	300,000.00	170,000.00	330,000.00	NS	99,000.00	95,000.00	98,000.00	84,000.00	110,000.00	81,000.00	94,000	75,000	74,000	67,000
1,1-Dichloroethane	890.44	0.00	1,930.00	0.00	0.00	870.00	560.00	820.00	780.00	NS	53.00	ND	520.00	300.00	290.00	260.00	ND	ND	380	340
1,1-Dichloroethylene	0.00	0.00	4,120.00	0.00	0.00	2,100.00	1,400.00	3,100.00	3,700.00	NS	300.00	440.00	1,900.00	1,000.00	1,400.00	1,100.00	ND	ND	1,900	1,200
cis-1,2-Dichloroethylene	0.00	0.00	1,700.00	0.00	0.00	1,700.00	1,700.00	2,700.00	1,500.00	NS	170.00	170.00	810.00	650.00	810.00	560.00	490	370	570	520
Methylene Chloride	0.00	0.00	0.00	2.20	0.00	1,900.00	0.00	0.00	1,800.00	NS	600.00	4,400.00	1,100.00	1,400.00	1,300.00	890.00	2,200	3,600	4,600	770
m,p-Xylene	0.00	0.00	0.00	0.00	0.00	1,600.00	0.00	0.00	250.00	NS	0.00	ND	ND	ND	400.00	ND	ND	ND	ND	ND
o-Xylene	0.00	0.00	0.00	0.00	0.00	620.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	170.00	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	1,091.24	0.00	0.00	4.20	0.00	280.00	0.00	0.00	200.00	NS	150.00	ND	ND	ND	470.00	190.00	ND	ND	ND	ND
Tetrahydrofuran	3,527.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	0.00	290.00	0.00	110.00	NS	0.00	ND	ND	ND	120.00	ND	ND	ND	ND	ND
Vinyl Chloride	0.00	0.00	0.00	0.51	0.00	0.00	0.00	38.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.00	0.00	0.00	0.70	0.00	150.00	0.00	33.00	0.00	NS	0.00	ND	ND	ND	56.00	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.00	0.00	0.00	2.60	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	51.00	ND	360	ND	160	ND
Chloromethane	0.00	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.00	NS	34.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	0.00	0.00	0.00	11.00	0.00	0.00	700.00	0.00	270.00	NS	110.00	320.00	ND	680.00	1,100.00	400.00	460	ND	ND	210
Heptane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	0.00	0.00	0.00	2.30	0.00	6,200.00	4,000.00	35.00	2,300.00	NS	1,000.00	ND	ND	1,000.00	4,900.00	2,000.00	ND	ND	ND	ND
Propylene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	0.00	0.00	0.00	0.00	0.00	3,000.00	1,700.00	0.00	610.00	NS	340.00	3,300.00	850.00	2,300.00	1,100.00	310.00	250	210	370	71
Ethyl Acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.00	0.00	0.00	0.00	0.00	580.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	170.00	ND	ND	ND	ND	ND
4-Ethyl Toluene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	0.00	0.00	0.00	0.00	0.00	470.00	0.00	0.00	200.00	NS	100.00	ND	ND	ND	86.00	ND	ND	ND	ND	ND
Hexane	0.00	0.00	0.00	0.00	0.00	0.00	250.00	0.00	97.00	NS	56.00	ND	ND	ND	59.00	ND	490	430	ND	ND
1,3,5-Trimethylbenzene	0.00	0.00	0.00	0.00	0.00	240.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65.00	0.00	NS	0.00	ND	ND	ND	140.00	ND	ND	ND	ND	ND

Table 3
Kliegman Brother Site - OU#1 Site Management
Monthly Progress Report - December 2010
Analytical Summary Results by SVE Well

	Concentration (ug/m3) in system SVE-8D																	
Compounds	**4/15/2009**	**5/13/2009**	**6/10/2009**	**7/8/2009**	**8/5/2009**	**9/2/2009**	**10/20/2009**	**11/25/2009**	**12/24/2009**	**1/20/2010**	**2/24/2010**	**3/17/2010**	**4/21/2010**	**5/26/2010**	**6/30/2010**	**7/21/2010**	**8/18/2010**	**9/15/2010**
Trichlorofluoromethane	200	220	220	270	170	130	ND	170	ND	250	260	160.00	140	230	160	210	150	140
1,1-Dichloroethene	ND	ND	ND	72	ND	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	610	560	290	420	ND	ND	ND	2,700	ND	650	150	550	140	ND	ND	ND	1,000	26
Carbon Tetrachloride	280	290	280	290	200	200	160	250	ND	320	370	230	210	390	230	350	280	300
Chloroform	110	140	110	150	ND	ND	ND	110	ND	150	230	130	120	170	130	200	130	220
1,1,1-Trichloroethane	2,500	2,900	2,500	3,000	2,300	2,200	1,800	9,400	140	5,100	5,300	2,900	2,500	4,300	3,400	4,600	4,000	3,700
Trichloroethylene (Trichloroethene)	4,900	5,600	4,400	5,000	4,400	3,800	3,000	16,000	640	5,000	6,100	4,800	3,700	3,700	5,400	6,500	4,300	4,300
Toluene	83	ND	ND	ND	130	ND	ND	300	ND	110	45	82	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (Tetrachloroethene)	62,000	76,000	55,000	56,000	44,000	42,000	46,000	76,000	46,000	27,000	49,000	39,000	38,000	41,000	44,000	200,000	37,000	34,000
1,1-Dichloroethane	260	280	220	290	220	ND	150	710	ND	350	480	260	210	350	270	420	290	470
1,1-Dichloroethylene	1,200	920	1,100	1,500	890	830	750	1,000	ND	1,700	1,900	960	830	1,500	1,200	1,800	1,300	1,800
cis-1,2-Dichloroethylene	520	640	420	530	450	410	270	730	210	360	560	340	400	670	510	810	320	510
Methylene Chloride	20,000	1,100	1,000	1,500	430	ND	ND	4,200	ND	5,700	2,500	640	640	16	17	23	360	24
m,p-Xylene	170	ND	230	ND	ND	ND	ND	ND	ND	87	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	ND	ND	650	ND	ND	ND	ND	160	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	390	ND	ND	ND	ND	ND	ND	ND	ND	52	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9	7	7	ND	7
Benzene	ND	ND	ND	ND	ND	ND	ND	160	ND	54	ND	ND	ND	9	7	12	ND	10
Dichlorodifluoromethane	150	ND	ND	ND	ND	ND	ND	ND	ND	110	100	ND	53	73	44	61	ND	48
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	ND	200	ND	180	ND	ND	ND	ND	ND	640	790	ND	ND	ND	ND	ND	ND	ND
Heptane	ND	ND	ND	ND	ND	ND	ND	2,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	140	ND	ND	ND	ND	ND	120	ND	ND	ND	ND	ND	57	ND	ND	ND	ND	ND
Propylene	ND	ND	ND	ND	ND	ND	ND	520	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	140	170	220	310	180	370	190	790	72	ND	190	370	210	ND	ND	ND	220	ND
Ethyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30	ND	ND	35	31	33	ND	41
Cyclohexne	ND	ND	ND	ND	ND	ND	ND	ND	ND	27	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	160	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	160	ND	ND	ND	ND	ND	ND	2,000	ND	220	1,700	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	16	13	19	ND	10
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12
trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.3

Table 4
Kliegman Brother Site OU1-Site Management
Monthly Progress Report- December 2010
SVE Systems- Effluent VOC Summary

	URS System Effluent Concentration (ug/m^3)																						
Compounds	12/13/2007	12/20/2007	1/4/2008	1/9/2008	1/15/2008	1/23/2008	1/30/2008	2/6/2008	2/15/2008	2/20/2008	2/29/2008	3/6/2008	3/13/2008	3/20/2008	4/16/2008	5/21/2008	6/18/2008	7/23/2008	8/20/2008	9/17/2008	10/15/2008	11/26/2008	12/24/2008
Trichlorofluoromethane	0.0	0.0	0.0	0.0	0.0	0.0	8.3	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	0.0	5947.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Acetone	297.0	0.0	0.0	74.0	30.9	7.0	11.0	0.0	22.0	60.0	55.0	240.0	3100.0	1800.0	9.9	0.0	14.0	15.0	4.3	86.0	5.4	4.8	1.6
Carbon Tetrachloride	0.0	0.0	0.0	0.0	0.0	0.8	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Chloroform	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.0	16368.1	0.0	22.0	0.0	1.1	5.9	5.9	0.0	0.0	0.0	77.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Trichloroethylene (Trichloroethene)	0.0	21496.9	0.0	30.0	1.1	15.0	5.9	3.3	0.0	0.0	0.0	170.0	0.0	0.0	1.9	0.0	0.0	ND	1.3	ND	ND	1.5	ND
Toluene	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.1	0.0	0.0	2.3	0.0	200.0	410.0	0.2	0.0	0.0	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (Tetrachloroethene	57676.0	352621.7	121.0	15000.0	745.9	3800.0	140.0	3900.0	320.0	1100.0	130.0	60000.0	2100.0	7600.0	570.0	2000.0	1300.0	160.0	79.0	2800.0	530.0	2.6	1900.0
1,1-Dichloroethane	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.0	0.0	0.0	0.0	0.0	0.0	3.9	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	0.0	0.0	0.0	0.0	0.0	3.4	6.6	3.4	0.0	0.0	0.0	170.0	0.0	0.0	0.2	0.0	0.0	ND	1.0	ND	ND	ND	ND
Methylene Chloride	0.0	0.0	10.0	180.0	13.2	1.8	6.3	3.3	0.0	0.0	0.0	0.0	5200.0	10000.0	0.5	7.5	6.3	8.6	7.2	ND	1.9	2.8	6.4
m,p-Xylene	0.0	0.0	8.7	0.0	1.3	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	430.0	0.6	0.0	0.0	ND	ND	ND	ND	ND	ND
o-Xylene	0.0	0.0	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	180.0	0.3	0.0	0.0	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	0.0	0.0	3.8	0.0	1.8	3.0	1.6	87.0	0.0	0.0	12.0	0.0	170.0	210.0	2.8	0.0	2.5	4.2	ND	ND	1.2	0.4	ND
Tetrahydrofuran	147.0	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	200.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.0	0.0	0.0	0.0	0.8	4.6	1.9	2.6	130.0	0.0	0.9	0.0	0.0	0.0	0.3	0.0	8.3	2.2	1.1	ND	0.4	ND	ND
Benzene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	70.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.0	0.0	0.0	0.0	2.5	9.5	8.6	7.4	0.0	0.0	6.8	0.0	0.0	0.0	6.1	12.0	7.1	6.8	9.5	ND	12.0	10.0	8.3
Chloromethane	0.0	0.0	0.0	0.0	0.0	0.8	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	ND	ND	ND	ND	ND	ND
Ethanol	0.0	0.0	15.0	190.0	0.0	1.3	4.0	0.0	0.0	0.0	31.0	0.0	0.0	350.0	2.9	0.0	3.8	4.7	ND	42.0	ND	0.9	1.6
Heptane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
2-Hexanone	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.8	ND	ND	ND	ND	ND
Isopropyl Alcohol	0.0	0.0	5.2	0.0	0.0	3.3	0.7	1.2	0.0	0.0	2.7	26.0	1000.0	3400.0	0.2	0.0	0.0	1.7	ND	ND	0.6	0.3	ND
Propylene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Carbon Disulfide	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3700.0	1300.0	0.0	0.0	0.0	ND	ND	ND	ND	1.6	ND
Ethyl Acetate	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	1.9	ND	ND
1,2,4-Trichlorobenzene	0.0	0.0	0.0	0.0	3.0	1.5	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	ND	ND	ND	ND	ND	ND
Chloroethane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Cyclohexane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	190.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Hexane	0.0	0.0	0.0	0.0	0.0	0.0	0.9	82.0	0.0	0.0	0.0	0.0	140.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	2.2	ND
Ethylbenzene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	110.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Styrene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	220.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Chlorobenzene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Bromoform	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Bromomethane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	ND	ND	ND	ND	ND	ND
1,4 Dichlorobenzene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND

Table 4
Kliegman Brother Site OU1-Site Management
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SVE Systems- Effluent VOC Summary

	URS System Effluent Concentration (ug/m3)																							
Compounds	1/21/2009	2/18/2009	3/18/2009	4/15/2009	5/13/2009	6/10/2009	7/8/2009	8/5/2009	9/2/2009	10/14/2009	11/25/2009	12/24/2009	1/20/2010	2/24/2010	3/17/2010	4/21/2010	5/26/2010	6/30/2010	7/21/2010	8/18/2010	9/15/2010	10/27/2010	11/24/2010	1/5/2011
Trichlorofluoromethane	5.0	ND	1.2		0.0	0.0	ND	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.0
1,1-Dichloroethene	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	3.1	5.4	23.0	1.8	14.0	16.0	8.8	39.0	9.7	3.8	3.5	ND	4.0	15.0	18.0	43.0	6.9	17.0	9.1	9.9	5.9	8.6	5.0	2.8
Carbon Tetrachloride	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8
1,1,1-Trichloroethane	0.4	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	2.9
Trichloroethylene (Trichloroethene)	ND	1.0	1.0	ND	4.9	0.0	ND	5.0	ND	ND	ND	0.6	ND	ND	4.1	ND	ND	1.0	0.0	ND	ND	ND	5.8	0.9
Toluene	0.5	ND	32.0	0.7	1.3	12.0	ND	3.9	ND	ND	ND	ND	6.3	0.6	ND	0.5	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (Tetrachloroethene)	100.0	600.0	150.0	140.0	350.0	410.0	520.0	5200.0	ND	360.0	850.0	1900.0	540.0	650.0	510.0	950.0	240.0	880.0	8.5	67.0	39.0	2.0	1600.0	ND
1,1-Dichloroethane	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5
1,1-Dichloroethylene	0.6	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4
cis-1,2-Dichloroethylene	ND	ND	ND	ND	0.0	0.0	ND	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.93	0.87
Methylene Chloride	14.0	2.8	3.0	5.9	3.2	3.5	5.4	4.5	ND	ND	4.9	ND	3.1	4.0	ND	ND	6.6	8.5	10.0	7.6	4.2	1.9	11.0	7.9
m,p-Xylene	ND	ND	4.0	ND	57.0	1.5	ND	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND	1.3	ND	4.1	ND	ND
o-Xylene	ND	ND	1.6	ND	12.0	0.5	0.5	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.9	ND	1.8	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	0.2	1.1	2.8	ND	1.8	4.8	2.8	7.5	3.1	1.4	0.5	0.7	1.2	3.4	1.4	26.0	0.7	2.8	2.0	2.6	1.0	1.1	0.44	ND
Tetrahydrofuran	ND	ND	1.2	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	6.5	ND	7.9	0.8	ND	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	1.0	0.7	ND	ND	0.7	0.0	ND	ND	ND	ND	ND	ND	0.3	0.9	1.0	3.3	ND	ND	0.5	0.4	ND	2.0	ND	ND
Benzene	ND	ND	1.5	ND	0.0	0.3	ND	0.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	8.9	5.7	2.0	4.0	8.1	5.4	8.9	1.2	9.1	10.0	8.0	8.0	8.8	7.7	5.8	15.0	9.4	7.4	9.2	7.6	8.8	17.0	7.6	5.5
Chloromethane	ND	ND	1.0	ND	0.0	0.0	ND	1.2	ND	ND	ND	ND	ND	ND	ND	0.7	ND	ND	ND	ND	ND	0.9	ND	ND
Ethanol	2.7	2.4	230.0	1.7	3.2	19.0	3.7	28.0	3.8	ND	2.0	ND	2.3	6.3	3.2	7.4	3.3	4.7	2.4	2.2	ND	4.2	5.8	ND
Heptane	ND	ND	1.4	3.1	1.3	0.3	ND	0.7	ND	ND	ND	ND	ND	ND	ND	5.9	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	0.8	ND	0.0	0.8	0.5	1.3	1.1	0.5	ND	ND	ND	0.5	ND	8.8	ND	1.0	ND	0.6	ND	0.5	ND	ND
Isopropyl Alcohol	0.5	ND	18.0	ND	0.0	2.8	0.9	3.1	ND	ND	ND	ND	ND	ND	0.7	ND	1.0	1.0	0.6	0.5	ND	0.8	0.73	ND
Propylene	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.7	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	0.6	ND	ND	ND	0.0	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Acetate	ND	ND	11.0	ND	0.0	31.0	ND	2.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.9	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	3.0	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	0.8	ND	2.6	0.9	0.0	0.0	ND	0.2	ND	ND	ND	ND	5.2	ND	ND	0.4	1.1	0.0	0.8	ND	ND	ND	3.3	ND
Ethylbenzene	0.2	ND	1.8	ND	11.0	0.6	ND	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.5	ND	ND	ND
4-Ethyl Toluene	ND	ND	2.1	ND	7.2	0.0	ND	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	0.8	ND	0.0	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	2.4	ND	4.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	0.5	ND	0.4	ND	0.0	0.4	ND	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4 Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	0.7	ND	ND	ND	ND	ND	ND	ND	ND	0.67	ND

Table 4
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SVE Systems- Effluent VOC Summary

	GWTT System Effluent Concentration (ug/m^3)																						
Compounds	12/13/2007	12/20/2007	1/4/2008	1/9/2008	1/15/2008	1/23/2008	1/30/2008	2/6/2008	2/15/2008	2/20/2008	2/29/2008	3/6/2008	3/13/2008	3/20/2008	4/16/2008	5/21/2008	6/18/2008	7/23/08	8/20/2008	9/17/2008	10/15/2008	11/26/2008	12/24/2008
Trichlorofluoromethane	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	330.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Acetone	8825.0	0.0	5.7	120.0	92.6	55.0	0.0	940.0	46.0	30.0	3.2	1800.0	2700.0	0.0	25.0	0.0	35.0	25.0	29.0	120.0	11.0	4.2	21.0
Carbon Tetrachloride	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	2800.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Chloroform	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	370.0	5700.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	3400.0	0.0	0.0	0.0	0.0	0.0	0.6	ND	ND	ND	ND	ND
Trichloroethylene	0.0	1612.3	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.6	6500.0	0.0	0.0	0.0	0.0	1.4	1.5	ND	ND	1.0	1.0	ND
Toluene	0.0	0.0	0.0	0.0	1.5	0.0	0.0	840.0	0.0	0.0	0.0	170.0	5300.0	120.0	1.3	0.0	0.0	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	87990.0	250903.9	140.0	2100.0	3.4	54.0	1200000.0	5600.0	280.0	2800.0	36.0	790000.0	4600.0	1700.0	22.0	4500.0	1800.0	900.0	390.0	4900.0	2200.0	0.8	260.0
1,1-Dichloroethane	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	280.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	780.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.5	6100.0	0.0	0.0	0.0	0.0	0.0	2.3	1.3	ND	ND	ND	ND
Methylene Chloride	0.0	0.0	5.9	2.5	6.3	1.2	0.0	920.0	0.0	0.0	0.0	270.0	4900.0	800.0	0.7	0.0	5.7	3.7	1.8	ND	4.1	1.9	1.9
m,p-Xylene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	430.0	430.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
o-Xylene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	180.0	180.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	677.0	0.0	0.0	4.0	8.6	3.8	0.0	120.0	0.0	0.0	0.8	120.0	180.0	0.0	5.7	0.0	8.8	10.0	14.0	20.0	8.3	1.0	4.6
Tetrahydrofuran	1119.0	0.0	0.0	0.0	1.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	350.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.0	0.0	9.5	260.0	186.6	320.0	0.0	82.0	0.0	0.0	48.0	56.0	0.0	0.0	20.0	81.0	140.0	86.0	71.0	110.0	44.0	14.0	ND
Benzene	1787.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.0	0.0	0.0	14.0	10.9	11.0	0.0	0.0	0.0	0.0	5.9	0.0	310.0	0.0	5.1	16.0	11.0	10.0	12.0	23.0	23.0	33.0	2.5
Chloromethane	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.6	0.0	0.0	0.7	ND	ND	ND	0.4	1.4
Ethanol	0.0	0.0	0.0	4.0	0.0	26.0	0.0	1200.0	0.0	0.0	2.2	250.0	530.0	0.0	2.9	0.0	9.9	8.6	5.4	64.0	6.8	2.0	8.3
Heptane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.6	3.6	ND	1.2	ND	ND
2-Hexanone	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	3.1	4.2	5.5	ND	4.3	ND	1.3
Isopropyl Alcohol	0.0	0.0	0.0	1.1	0.0	1.9	0.0	8800.0	0.0	0.0	0.7	460.0	9300.0	3500.0	0.3	0.0	2.2	1.3	1.0	ND	1.0	0.4	0.9
Propylene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	7.8	ND	ND	ND	ND
Tertiary Butyl Alcohol	0.0	0.0	0.0	0.0	28.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Carbon Disulfide	0.0	0.0	0.0	0.0	0.0	5.1	0.0	560.0	0.0	0.0	0.0	1400.0	3400.0	420.0	0.0	0.0	0.0	ND	ND	ND	ND	1.5	ND
Ethyl Acetate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	ND	ND	ND	ND	ND	ND
Chloroethane	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	10.0	1.4	3.3	ND	ND	ND	ND
Cyclohexane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Hexane	351.7	527.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Ethylbenzene	312.2	476.0	0.0	0.0	0.8	0.0	0.0	160.0	0.0	0.0	0.0	0.0	140.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	0.0	441.0	0.0	0.0	0.7	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Styrene	1063.4	1573.0	0.0	0.0	2.6	0.0	0.0	130.0	0.0	0.0	0.0	0.0	530.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	687.1	1030.0	0.0	0.0	1.7	0.0	0.0	110.0	0.0	0.0	0.0	0.0	0.0	120.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	818.0	1226.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Chlorobenzene	462.2	693.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Bromoform	652.8	951.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
Bromomethane	0.0	543.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND
1,4 Dichlorobenzene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ND	ND	ND	ND	ND	ND

Table 4
Kliegman Brother Site OU1-Site Management
Monthly Progress Report- December 2010
SVE Systems- Effluent VOC Summary

	GWTT System Effluent Concentration (ug/m3)																							
Compounds	1/21/2009	2/18/2009	3/18/2009	4/15/2009	5/13/2009	6/10/2009	7/8/2009	8/5/2009	9/2/2009	10/14/2009	11/25/2009	12/24/2009	1/20/2010	2/24/2010	3/17/2010	4/21/2010	5/26/2010	6/30/2010	7/21/2010	8/18/2010	9/15/2010	10/27/2010	11/24/2010	1/5/2011
Trichlorofluoromethane	ND	ND	ND	ND	0.0	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	0.6	0.6	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	ND	ND	ND	ND	ND	ND	ND
Acetone	4.0	12.0	20.0	6.8	26.0	34.0	27.0	53.0	25.0	38.0	15.0	15.0	6.4	170.0	31.0	ND	89.0	76.0	41.0	20.0	12.0	8.4	15.0	17.0
Carbon Tetrachloride	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	0.8	0.6	ND	ND	0.0	0.4	0.8	0.8	1.7	ND	ND	ND	ND	0.8	0.8	1.3	ND	4.2	ND	0.6	ND	ND	ND	33.0
Toluene	1.2	ND	ND	ND	0.0	37.0	0.5	0.5	0.6	ND	0.6	ND	0.5	0.7	0.6	ND	0.8	1.0	3.8	1.2	0.5	ND	0.48	ND
Tetrachloroethylene	58.0	530.0	240.0	130.0	690.0	260.0	1100.0	740.0	2400.0	770.0	940.0	250.0	510.0	1500.0	1600.0	3300.0	1500.0	5700.0	18.0	210.0	72.0	5.7	19.0	130.0
1,1-Dichloroethane	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	ND	ND	ND	ND	0.0	0.0	ND	ND	0.7	ND	ND	ND	ND	ND	ND	0.4	ND	1.0	ND	ND	ND	ND	ND	0.8
Methylene Chloride	1.2	ND	1.9	4.6	3.0	4.0	4.8	1.6	ND	ND	10.0	ND	ND	2.0	ND	ND	ND	1.0	4.1	ND	ND	1.7	8.2	1.7
m,p-Xylene	ND	ND	ND	ND	0.0	3.4	ND	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND	0.0	1.2	ND	0.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Methyl ethyl ketone)	1.3	5.1	9.2	2.8	16.0	12.0	16.0	31.0	9.1	12.0	4.9	7.6	4.6	31.0	5.6	0.8	52.0	47.0	15.0	8.1	5.4	1.3	13.0	3.5
Tetrahydrofuran	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	0.0	1.4	0.6	0.8	ND	ND	ND	ND	ND	ND	ND	ND	0.9	1.3	1.4	ND	ND	ND	ND	ND
Vinyl Chloride	ND	2.2	5.1	5.5	21.0	10.0	11.0	15.0	11.0	5.8	5.1	ND	4.8	5.4	4.5	ND	7.5	10.0	6.1	4.9	0.6	ND	2.0	2.5
Benzene	ND	ND	ND	ND	0.0	0.5	ND	0.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3	ND	ND	ND	ND
Dichlorodifluoromethane	14.0	32.0	32.0	25.0	32.0	26.0	26.0	24.0	24.0	17.0	21.0	0.7	28.0	27.0	25.0	4.6	25.0	18.0	11.0	11.0	2.4	8.8	13.0	26.0
Chloromethane	0.4	ND	ND	ND	0.0	0.0	0.7	ND	ND	1.3	0.7	0.3	0.5	ND	1.9	ND	1.4	1.7	ND	ND	0.3	ND	0.54	ND
Ethanol	2.8	ND	12.0	2.0	5.5	44.0	13.0	21.0	6.2	6.7	12.0	11.0	4.9	14.0	4.5	ND	15.0	29.0	14.0	8.4	4.3	3.1	6.5	24.0
Heptane	ND	ND	1.1	1.1	4.4	1.5	2.3	6.7	2.0	1.9	0.5	1.0	0.6	4.0	1.1	ND	10.0	7.5	2.3	0.8	0.5	ND	1.2	ND
2-Hexanone	ND	1.0	1.9	0.9	8.1	2.7	4.5	8.7	0.9	4.2	2.3	1.9	1.9	2.2	1.1	ND	15.0	22.0	6.2	2.8	2.0	ND	5.9	ND
Isopropyl Alcohol	ND	ND	0.7	0.7	0.0	6.6	1.2	1.2	ND	0.6	1.0	0.6	ND	ND	1.3	ND	ND	1.6	2.5	0.8	0.4	0.8	0.49	2.80
Propylene	ND	ND	ND	ND	0.0	0.0	ND	ND	7.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	0.7	ND	ND	0.0	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.6
Ethyl Acetate	ND	ND	ND	ND	0.0	68.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.9	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	3.4	0.0	ND	ND	ND	0.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	5.2	3.5	5.5	1.1	3.3	ND	ND	ND	ND	0.9	0.7	ND	6.6	22.0	5.3	2.1	ND	ND	7.1	9.2
Cyclohexane	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	0.3	ND	ND	0.6	0.0	0.0	ND	0.5	1.2	ND	1.3	ND	ND	ND	ND	ND	0.6	1.0	2.5	0.4	ND	ND	1.1	ND
Ethylbenzene	ND	ND	ND	ND	0.0	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl Toluene	ND	ND	ND	ND	0.0	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	0.0	0.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	0.0	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	0.0	0.8	ND	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4 Dichlorobenzene	ND	ND	ND	ND	ND	ND	0.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	1.0	1.0	ND	ND	ND	ND	ND
Vinyl Acetate	ND	ND	ND	ND	0.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	0.7	ND	ND	ND	ND	ND	ND	ND	2.5	ND

Table 4
Kliegman Brother Site OU1-Site Management
Monthly Progress Report- December 2010
SVE Systems- Effluent VOC Summary

	URS System Influent Concentration (ug/m^3)					
Compounds	10/27/2010	11/24/2010	1/5/2011			
Trichlorofluoromethane	ND	6.0	ND			
1,1-Dichloroethene	ND	ND	ND			
Acetone	ND	ND	ND			
Carbon Tetrachloride	ND	6.9	ND			
Chloroform	15.0	17.0	ND			
1,1,1-Trichloroethane	23.0	30.0	ND			
Trichloroethylene (Trichloroethene)	140.0	190.0	7.1			
Toluene	ND	ND	ND			
Tetrachloroethylene (Tetrachloroethene)	92,000.0	130,000.0	5,300.0			
1,1-Dichloroethane	ND	ND	ND			
1,1-Dichloroethylene	ND	ND	ND			
cis-1,2-Dichloroethylene	26.0	30.00	ND			
Methylene Chloride	ND	ND	ND			
m,p-Xylene	ND	ND	ND			
o-Xylene	ND	ND	ND			
2-Butanone (Methyl ethyl ketone)	ND	ND	ND			
Tetrahydrofuran	ND	ND	ND			
1,2,4-Trimethylbenzene	ND	ND	ND			
Vinyl Chloride	ND	ND	ND			
Benzene	ND	ND	ND			
Dichlorodifluoromethane	ND	7.5	ND			
Chloromethane	ND	ND	ND			
Ethanol	ND	ND	29.0			
Heptane	ND	ND	ND			
2-Hexanone	ND	ND	ND			
Isopropyl Alcohol	ND	ND	ND			
Propylene	ND	ND	ND			
Tertiary Butyl Alcohol	ND	ND	ND			
Carbon Disulfide	ND	ND	ND			
Ethyl Acetate	ND	ND	ND			
1,2,4-Trichlorobenzene	ND	ND	ND			
Chloroethane	ND	ND	ND			
Cyclohexane	ND	ND	ND			
Hexane	ND	ND	ND			
Ethylbenzene	ND	ND	ND			
4-Ethyl Toluene	ND	ND	ND			
Styrene	ND	ND	ND			
1,3,5-Trimethylbenzene	ND	ND	ND			
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND			
Chlorobenzene	ND	ND	ND			
Bromoform	ND	ND	ND			
Bromomethane	ND	ND	ND			
1,4 Dichlorobenzene	ND	ND	ND			

Table 4
Kliegman Brother Site OU1-Site Management
Monthly Progress Report- December 2010
SVE Systems- Effluent VOC Summary

	GWTT System Influent Concentration (ug/m^3)					
Compounds	10/27/2010	11/24/2010	1/5/2011			
Trichlorofluoromethane	69.0	37.0	31.0			
1,1-Dichloroethene	ND	ND	ND			
Acetone	ND	36.0	ND			
Carbon Tetrachloride	160.0	110.0	70.0			
Chloroform	87.0	61.0	26.0			
1,1,1-Trichloroethane	1400.0	980.0	760.0			
Trichloroethylene (Trichloroethene)	2,600.0	1,900.0	ND			
Toluene	ND	30.0	ND			
Tetrachloroethylene (Tetrachloroethe	180,000.0	190,000.0	100,000.0			
1,1-Dichloroethane	110.0	76.0	39.0			
1,1-Dichloroethylene	420.0	320.0	230.0			
cis-1,2-Dichloroethylene	590.0	470.0	180.0			
Methylene Chloride	ND	7.8	ND			
m,p-Xylene	ND	ND	ND			
o-Xylene	ND	ND	ND			
2-Butanone (Methyl ethyl ketone)	ND	ND	ND			
Tetrahydrofuran	ND	4.1	ND			
1,2,4-Trimethylbenzene	ND	ND	ND			
Vinyl Chloride	ND	2.7	ND			
Benzene	ND	3.5	ND			
Dichlorodifluoromethane	24.0	15.0	14.0			
Chloromethane	ND	ND	ND			
Ethanol	ND	ND	ND			
Heptane	ND	ND	ND			
2-Hexanone	ND	ND	ND			
Isopropyl Alcohol	ND	ND	ND			
Propylene	ND	ND	ND			
Tertiary Butyl Alcohol	ND	ND	ND			
Carbon Disulfide	ND	ND	ND			
Ethyl Acetate	ND	ND	ND			
1,2,4-Trichlorobenzene	ND	ND	ND			
Chloroethane	15.0	11.0	ND			
Cyclohexane	ND	ND	ND			
Hexane	ND	22.0	ND			
Ethylbenzene	ND	ND	ND			
4-Ethyl Toluene	ND	ND	ND			
Styrene	ND	ND	ND			
1,3,5-Trimethylbenzene	ND	ND	ND			
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND			
Chlorobenzene	ND	ND	ND			
Bromoform	ND	ND	ND			
Bromomethane	ND	ND	ND			
1,4 Dichlorobenzene	ND	ND	ND			
Bromodichloromethane	28	ND	ND			
1,2-Dichloroethane	ND	4.5	ND			

Table 5
Kliegman Brothers OU1-Site Management
Monthly Progress Report- December 2010
VOC Removal Calculations

1/5/2011	URS System Run Time Interval	**851.70**	hours	GWTT System Run Time Interval	**860.80**	hours
	URS System Run Time Total	**23,070.90**	hours	GWTT System Run Time Total	**22,566.20**	hours

Well ID				**URS INFLUENT**		**GWTT INFLUENT**	
				Flow Rate (cfm)	**168**	**Flow Rate (cfm)**	**285**
Compounds		Cummulative Mass Extracted (lbs.)	Cummulative Mass Extracted (ug/m3)	Conc. (ug/m^3)	Mass (lbs.) Extracted	Conc. (ug/m^3)	Mass (lbs.) Extracted
Trichlorofluoromethane		0.0253	31.00	0.00	0.00	31.00	0.03
1,1-Dichloroethene		0.0000	0.00	0.00	0.00	0.00	0.00
Acetone		0.0000	0.00	0.00	0.00	0.00	0.00
Carbon Tetrachloride		0.0571	70.00	0.00	0.00	70.00	0.06
Chloroform		0.0212	26.00	0.00	0.00	26.00	0.02
1,1,1-Trichloroethane		0.0000	0.00	0.00	0.00	0.00	0.00
Trichloroethylene (Trichloroethene)		0.6642	817.10	7.10	0.00	810.00	0.66
Toluene		0.0000	0.00	0.00	0.00	0.00	0.00
Tetrachloroethylene (Tetrachloroethene)		84.2316	105,300.00	5,300.00	2.67	100,000.00	81.56
1,1-Dichloroethane		0.0318	39.00	0.00	0.00	39.00	0.03
1,1-Dichloroethylene		0.1876	230.00	0.00	0.00	230.00	0.19
cis-1,2-Dichloroethylene		0.1468	180.00	0.00	0.00	180.00	0.15
Methylene Chloride		0.0000	0.00	0.00	0.00	0.00	0.00
m,p-Xylene		0.0000	0.00	0.00	0.00	0.00	0.00
o-Xylene		0.0000	0.00	0.00	0.00	0.00	0.00
2-Butanone (Methyl ethyl ketone)		0.0000	0.00	0.00	0.00	0.00	0.00
Tetrahydrofuran		0.0000	0.00	0.00	0.00	0.00	0.00
1,2,4-Trimethylbenzene		0.0000	0.00	0.00	0.00	0.00	0.00
Vinyl Chloride		0.0000	0.00	0.00	0.00	0.00	0.00
Benzene		0.0000	0.00	0.00	0.00	0.00	0.00
Dichlorodifluoromethane		0.0114	14.00	0.00	0.00	14.00	0.01
Chloromethane		0.0000	0.00	0.00	0.00	0.00	0.00
Ethanol		0.0146	29.00	29.00	0.01	0.00	0.00
Heptane		0.0000	0.00	0.00	0.00	0.00	0.00
2-Hexanone		0.0000	0.00	0.00	0.00	0.00	0.00
Isopropyl Alcohol		0.0000	0.00	0.00	0.00	0.00	0.00
Propylene		0.0000	0.00	0.00	0.00	0.00	0.00
Tertiary Butyl Alcohol		0.0000	0.00	0.00	0.00	0.00	0.00
Carbon Disulfide		0.0000	0.00	0.00	0.00	0.00	0.00
Ethyl Acetate		0.0000	0.00	0.00	0.00	0.00	0.00
1,2,4-Trichlorobenzene		0.0000	0.00	0.00	0.00	0.00	0.00
Chloroethane		0.0000	0.00	0.00	0.00	0.00	0.00
Cyclohexane		0.0000	0.00	0.00	0.00	0.00	0.00
Hexane		0.0000	0.00	0.00	0.00	0.00	0.00
Ethylbenzene		0.0000	0.00	0.00	0.00	0.00	0.00
4-Ethyl Toluene		0.0000	0.00	0.00	0.00	0.00	0.00
Styrene		0.0000	0.00	0.00	0.00	0.00	0.00
1,3,5-Trimethylbenzene		0.0000	0.00	0.00	0.00	0.00	0.00
4-Methyl-2-Pentanone (MIBK)		0.0000	0.00	0.00	0.00	0.00	0.00
Chlorobenzene		0.0000	0.00	0.00	0.00	0.00	0.00
Bromoform		0.0000	0.00	0.00	0.00	0.00	0.00
Bromomethane		0.0000	0.00	0.00	0.00	0.00	0.00
1,4 Dichlorobenzene		0.0000	0.00	0.00	0.00	0.00	0.00
Bromodichloromethane		0.0000	0.00	0.00	0.00	0.00	0.00
1,2-Dichloroethane		0.0000	0.00	0.00	0.00	0.00	0.00

TOTAL VOC REMOVAL (Interval Total)	85	lbs.	
TOTAL VOC REMOVAL (OVERALL TOTAL)	9343	lbs.	
TOTAL VOC REMOVAL (Overall Total) from November 2010	9258	lbs	9343.39

TABLE 6
KLIEGMAN BROTHER SITE OU1 - SITE MANAGEMENT
VOC Removal Calculation Summary Through December 2010

Date - 12/13/2007	URS System Run Time Interval	20.00	hours	GWTT System Run Time Interval	20.00	hours
	URS System Run Time Total	20.00	hours	GWTT System Run Time Total	20.00	hours
TOTAL VOC REMOVAL (INTERVAL TOTAL)	75.76	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**75.76**	**lbs.**				
Date - 12/20/2007	URS System Run Time Interval	66.58	hours	GWTT System Run Time Interval	66.58	hours
	URS System Run Time Total	86.58	hours	GWTT System Run Time Total	86.58	hours
TOTAL VOC REMOVAL (Interval Total)	482.96	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**558.72**	**lbs.**				
Date - 1/4/2008	URS System Run Time Interval	76.25	hours	GWTT System Run Time Interval	76.75	hours
	URS System Run Time Total	162.83	hours	GWTT System Run Time Total	163.33	hours
TOTAL VOC REMOVAL (Interval Total)	502.34	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**1061.06**	**lbs.**				
Date - 1/9/2008	URS System Run Time Interval	117.00	hours	GWTT System Run Time Interval	120.00	hours
	URS System Run Time Total	279.83	hours	GWTT System Run Time Total	283.33	hours
TOTAL VOC REMOVAL (Interval Total)	720.83	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**1781.89**	**lbs.**				
Date - 1/23/2008	URS System Run Time Interval	333.33	hours	GWTT System Run Time Interval	311.50	hours
	URS System Run Time Total	613.17	hours	GWTT System Run Time Total	594.83	hours
TOTAL VOC REMOVAL (Interval Total)	795.60	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**2577.49**	**lbs.**				
Date - 2/6/2008	URS System Run Time Interval	260.00	hours	GWTT System Run Time Interval	285.25	hours
	URS System Run Time Total	873.17	hours	GWTT System Run Time Total	880.08	hours
TOTAL VOC REMOVAL (Interval Total)	638.05	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**3215.55**	**lbs.**				
Date - 2/20/2008	URS System Run Time Interval	235.00	hours	GWTT System Run Time Interval	235.50	hours
	URS System Run Time Total	1108.17	hours	GWTT System Run Time Total	1115.58	hours
TOTAL VOC REMOVAL (Interval Total)	852.87	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**4068.42**	**lbs.**				
Date - 3/6/2008	URS System Run Time Interval	360.00	hours	GWTT System Run Time Interval	355.00	hours
	URS System Run Time Total	1468.17	hours	GWTT System Run Time Total	1470.58	hours
TOTAL VOC REMOVAL (Interval Total)	479.86	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**4548.28**	**lbs.**				
Date - 3/20/2008	URS System Run Time Interval	336.00	hours	GWTT System Run Time Interval	332.50	hours
	URS System Run Time Total	1804.17	hours	GWTT System Run Time Total	1803.08	hours
TOTAL VOC REMOVAL (Interval Total)	136.15	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**4684.43**	**lbs.**				
Date - 5/21/2008	URS System Run Time Interval	647.50	hours	GWTT System Run Time Interval	591.60	hours
	URS System Run Time Total	1363.70	hours	GWTT System Run Time Total	1305.30	hours
TOTAL VOC REMOVAL (Interval Total)	224.39	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**4908.82**	**lbs.**				
Date - 6/18/2008	URS System Run Time Interval	502.70	hours	GWTT System Run Time Interval	502.80	hours
	URS System Run Time Total	1866.40	hours	GWTT System Run Time Total	1808.10	hours
TOTAL VOC REMOVAL (Interval Total)	320.29	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**5229.11**	**lbs.**				
7/23/2008	URS System Run Time Interval	838.30	hours	GWTT System Run Time Interval	669.10	hours
	URS System Run Time Total	2704.70	hours	GWTT System Run Time Total	2477.20	hours
TOTAL VOC REMOVAL (Interval Total)	393.97	lbs.				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**5622.97**	**lbs.**				

TABLE 6
KLIEGMAN BROTHER SITE OU1 - SITE MANAGEMENT
VOC Removal Calculation Summary Through December 2010

8/27/2008	URS System Run Time Interval	669.00	hours	GWTT System Run Time Interval	669.70	hours	
	URS System Run Time Total	3373.70	hours	GWTT System Run Time Total	3146.90	hours	
TOTAL VOC REMOVAL (Interval Total)	320.42	lbs.	Total Both Systems Run Time Interval	1338.70			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**5943.39**	**lbs.**					
9/24/2008	URS System Run Time Interval	669.80	hours	GWTT System Run Time Interval	504.00	hours	
	URS System Run Time Total	4043.50	hours	GWTT System Run Time Total	3650.90	hours	
TOTAL VOC REMOVAL (Interval Total)	247.00	lbs.	Total Both Systems Run Time Interval	1173.80			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**6190.39**	**lbs.**					
10/15/2008	URS System Run Time Interval	732.30	hours	GWTT System Run Time Interval	727.30	hours	
	URS System Run Time Total	4775.80	hours	GWTT System Run Time Total	4378.20	hours	
TOTAL VOC REMOVAL (Interval Total)	271.00	lbs.	Total Both Systems Run Time Interval	1459.60			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**6461.00**	**lbs.**					
11/26/2008	URS System Run Time Interval	669.70	hours	GWTT System Run Time Interval	670.00	hours	
	URS System Run Time Total	5445.5	hours	GWTT System Run Time Total	5048.20	hours	
TOTAL VOC REMOVAL (Interval Total)	108	lbs.	Total Both Systems Run Time Interval	1339.70			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**6569**	**lbs.**					
12/24/2008	URS System Run Time Interval	**669.60**	hours	GWTT System Run Time Interval	**738.80**	hours	
	URS System Run Time Total	**6282.4**	hours	GWTT System Run Time Total	**5787.00**	hours	
TOTAL VOC REMOVAL (Interval Total)	66	lbs.	Total Both Systems Run Time Interval	1408.40			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**6635**	**lbs.**					
1/21/2009	URS System Run Time Interval	**612.80**	hours	GWTT System Run Time Interval	**471.90**	hours	
	URS System Run Time Total	**6895.2**	hours	GWTT System Run Time Total	**6258.90**	hours	
TOTAL VOC REMOVAL (Interval Total)	73	lbs.	Total Both Systems Run Time Interval	1084.70			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**6708**	**lbs.**					
2/18/2009	URS System Run Time Interval	**645.20**	hours	GWTT System Run Time Interval	**666.60**	hours	
	URS System Run Time Total	**7540.4**	hours	GWTT System Run Time Total	**6258.90**	hours	
TOTAL VOC REMOVAL (Interval Total)	164	lbs.	Total Both Systems Run Time Interval	1311.80			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**6897**	**lbs.**					
3/18/2009	URS System Run Time Interval	**641.60**	hours	GWTT System Run Time Interval	**665.90**	hours	
	URS System Run Time Total	**8182**	hours	GWTT System Run Time Total	**7591.40**	hours	
TOTAL VOC REMOVAL (Interval Total)	74	lbs.	Total Both Systems Run Time Interval	1307.50			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**6897**	**lbs.**					
4/15/2009	URS System Run Time Interval	**835.40**	hours	GWTT System Run Time Interval	**834.60**	hours	
	URS System Run Time Total	**9017.4**	hours	GWTT System Run Time Total	**8426.00**	hours	
TOTAL VOC REMOVAL (Interval Total)	156	lbs.	Total Both Systems Run Time Interval	1670.00			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**7127**	**lbs.**					
5/13/2009	URS System Run Time Interval	**670.90**	hours	GWTT System Run Time Interval	**669.40**	hours	
	URS System Run Time Total	**9688.3**	hours	GWTT System Run Time Total	**9095.40**	hours	
TOTAL VOC REMOVAL (Interval Total)	119	lbs.	Total Both Systems Run Time Interval	1340.30			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**7246**	**lbs.**					
6/10/2009	URS System Run Time Interval	**668.40**	hours	GWTT System Run Time Interval	**667.50**	hours	
	URS System Run Time Total	**10356.7**	hours	GWTT System Run Time Total	**9762.10**	hours	
TOTAL VOC REMOVAL (Interval Total)	127	lbs.	Total Both Systems Run Time Interval	1335.90			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**7373**	**lbs.**					
7/8/2009	URS System Run Time Interval	**838.90**	hours	GWTT System Run Time Interval	**835.00**	hours	
	URS System Run Time Total	**11195.6**	hours	GWTT System Run Time Total	**0.00**	hours	
TOTAL VOC REMOVAL (Interval Total)	159	lbs.	Total Both Systems Run Time Interval	1673.90			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**7532**	**lbs.**					
8/5/2009	URS System Run Time Interval	**670.50**	hours	GWTT System Run Time Interval	**670.00**	hours	
	URS System Run Time Total	**11866.1**	hours	GWTT System Run Time Total	**11267.1**	hours	
TOTAL VOC REMOVAL (Interval Total)	267	lbs.	Total Both Systems Run Time Interval	1340.50			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**7799**	**lbs.**					
9/2/2009	URS System Run Time Interval	**836.30**	hours	GWTT System Run Time Interval	**834.60**	hours	
	URS System Run Time Total	**12702.4**	hours	GWTT System Run Time Total	**12101.7**	hours	
TOTAL VOC REMOVAL (Interval Total)	147	lbs.	Total Both Systems Run Time Interval	1670.90			
TOTAL VOC REMOVAL (OVERALL TOTAL)	**7946**	**lbs.**					

TABLE 6
KLIEGMAN BROTHER SITE OU1 - SITE MANAGEMENT
VOC Removal Calculation Summary Through December 2010

10/14/2009	URS System Run Time Interval	**718.70**	hours	GWTT System Run Time Interval	**717.70**	hours		
	URS System Run Time Total	**13421.10**	hours	GWTT System Run Time Total	**12819.40**	hours		
TOTAL VOC REMOVAL (Interval Total)	123	lbs.	Total Both Systems Run Time Interval	1436.40				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**8069**	**lbs.**						
11/25/2009	URS System Run Time Interval	**622.30**	hours	GWTT System Run Time Interval	**620.90**	hours		
	URS System Run Time Total	**14043.40**	hours	GWTT System Run Time Total	**13440.30**	hours		
TOTAL VOC REMOVAL (Interval Total)	119	lbs.	Total Both Systems Run Time Interval	1243.20				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**8188**	**lbs.**						
12/24/2009	URS System Run Time Interval	**612.70**	hours	GWTT System Run Time Interval	**584.10**	hours		
	URS System Run Time Total	**14656.10**	hours	GWTT System Run Time Total	**14024.40**	hours		
TOTAL VOC REMOVAL (Interval Total)	77	lbs.	Total Both Systems Run Time Interval	1196.80				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**8265**	**lbs.**						
1/20/2010	URS System Run Time Interval	**446.00**	hours	GWTT System Run Time Interval	**500.10**	hours		
	URS System Run Time Total	**15102.10**	hours	GWTT System Run Time Total	**14524.50**	hours		
TOTAL VOC REMOVAL (Interval Total)	42	lbs.	Total Both Systems Run Time Interval	946.10				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**8314**	**lbs.**						
2/24/2010	URS System Run Time Interval	**586.60**	hours	GWTT System Run Time Interval	**669.40**	hours		
	URS System Run Time Total	**15688.70**	hours	GWTT System Run Time Total	**15193.90**	hours		
TOTAL VOC REMOVAL (Interval Total)	89	lbs.	Total Both Systems Run Time Interval	1256.00				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**8396**	**lbs.**						
3/31/2010	URS System Run Time Interval	**836.10**	hours	GWTT System Run Time Interval	**861.30**	hours		
	URS System Run Time Total	**16524.80**	hours	GWTT System Run Time Total	**16026.90**	hours		
TOTAL VOC REMOVAL (Interval Total)	86	lbs.	Total Both Systems Run Time Interval	1697.40				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**8482**	**lbs.**						
4/21/2010	URS System Run Time Interval	**670.10**	hours	GWTT System Run Time Interval	**668.20**	hours		
	URS System Run Time Total	**17194.90**	hours	GWTT System Run Time Total	**16666.80**	hours		
TOTAL VOC REMOVAL (Interval Total)	77	lbs.	Total Both Systems Run Time Interval	1338.30				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**8559**	**lbs.**						
5/26/2010	URS System Run Time Interval	**667.00**	hours	GWTT System Run Time Interval	**666.40**	hours		
	URS System Run Time Total	**17861.90**	hours	GWTT System Run Time Total	**17361.50**	hours		
TOTAL VOC REMOVAL (Interval Total)	73	lbs.	Total Both Systems Run Time Interval	1333.40				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**8632**	**lbs.**						
6/30/2010	URS System Run Time Interval	**840.90**	hours	GWTT System Run Time Interval	**839.00**	hours		
	URS System Run Time Total	**18702.80**	hours	GWTT System Run Time Total	**18200.50**	hours		
TOTAL VOC REMOVAL (Interval Total)	148	lbs.	Total Both Systems Run Time Interval	1679.90				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**8780**	**lbs.**						
7/28/2010	URS System Run Time Interval	**670.10**	hours	GWTT System Run Time Interval	**664.40**	hours		
	URS System Run Time Total	**19372.90**	hours	GWTT System Run Time Total	**18864.90**	hours		
TOTAL VOC REMOVAL (Interval Total)	133	lbs.	Total Both Systems Run Time Interval	1334.50				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**8914**	**lbs.**						
8/18/2010	URS System Run Time Interval	**671.70**	hours	GWTT System Run Time Interval	**670.00**	hours		
	URS System Run Time Total	**20044.60**	hours	GWTT System Run Time Total	**19534.90**	hours		
TOTAL VOC REMOVAL (Interval Total)	60	lbs.	Total Both Systems Run Time Interval	1341.70				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**8974**	**lbs.**						
9/29/2010	URS System Run Time Interval	**834.50**	hours	GWTT System Run Time Interval	**831.30**	hours		
	URS System Run Time Total	**20879.10**	hours	GWTT System Run Time Total	**20366.20**	hours		
TOTAL VOC REMOVAL (Interval Total)	63	lbs.	Total Both Systems Run Time Interval	1665.80				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**9037**	**lbs.**						
10/27/2010	URS System Run Time Interval	**668.10**	hours	GWTT System Run Time Interval	**667.90**	hours		
	URS System Run Time Total	**21547.20**	hours	GWTT System Run Time Total	**21034.10**	hours		
TOTAL VOC REMOVAL (Interval Total)	154	lbs.	Total Both Systems Run Time Interval	1336.00				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**9191**	**lbs.**						
11/24/2010	URS System Run Time Interval	**672.00**	hours	GWTT System Run Time Interval	**671.30**	hours		
	URS System Run Time Total	**22219.20**	hours	GWTT System Run Time Total	**21705.40**	hours		
TOTAL VOC REMOVAL (Interval Total)	67	lbs.	Total Both Systems Run Time Interval	1343.30				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**9258**	**lbs.**						
1/5/2011	URS System Run Time Interval	**851.70**	hours	GWTT System Run Time Interval	**860.80**	hours		
	URS System Run Time Total	**23070.90**	hours	GWTT System Run Time Total	**22566.20**	hours		
TOTAL VOC REMOVAL (Interval Total)	85	lbs.	Total Both Systems Run Time Interval	1712.50				
TOTAL VOC REMOVAL (OVERALL TOTAL)	**9343**	**lbs.**						

Table 7
Kliegman Brothers OU1- Site Management
Monthly Progress Report - December 2010
Site No. 2-41-031
Overall VOC Removal Summary

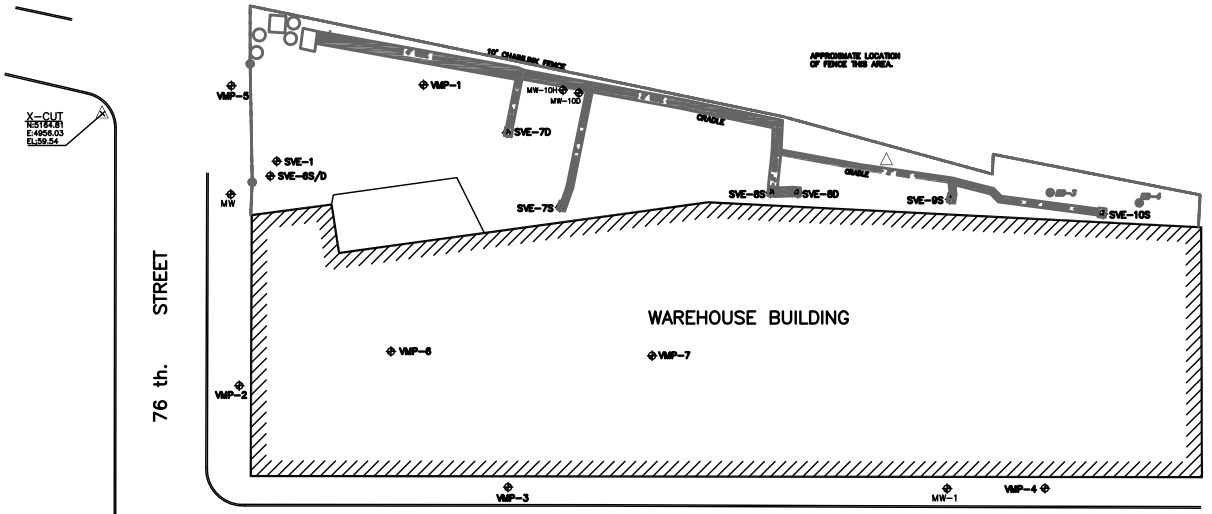
Month	Operational Period		Run Time (Hrs.)		Run Time %		Lbs VOCs Removed	Carbon Saturated (in 1000 lb)	Lbs VOCs Removed per Hr.
	From	To	GWTT	URS	GWTT	URS			
1	8/23/2004	9/24/2004		537		69.7%	15,200	13	28.305
2	9/24/2004	10/25/2004		669		89.4%	6023	11	9.003
3	10/25/2004	11/22/2004		443		66.1%	2587	5	5.840
4	11/22/2004	12/24/2004		444		58.6%	1779	6	4.007
5	12/24/2004	1/25/2005		498		63.3%	1986	3	3.988
6	1/25/2005	2/23/2005		419		57.5%	1300	2	3.103
7	2/23/2005	3/29/2005		466		56.7%	843	2	1.809
8	3/30/2005	4/21/2005		390		71.9%	681	2	1.746
9	4/22/2005	6/3/2005		696		67.2%	1199	2	1.723
10	6/3/2005	6/27/2005		287		66.8%	582	1	2.028
11	6/27/2005	8/1/2005		774		78.1%	1114	2	1.439
12	8/1/2005	9/2/2005		485		63.4%	720	2	1.485
13	9/2/2005	10/6/2005		579		71.0%	671	2	1.159
14	10/6/2005	11/1/2005		362		58.0%	307	1	0.848
15	11/1/2005	12/8/2005		736		83.0%	508	2	0.690
16-18	12/8/2005	3/13/2006		1340		58.8%	756	2	0.564
19-21	3/13/2006	6/14/2006		1561		73.3%	942	3	0.603
22-24	6/14/2006	8/7/2006		1176		99.5%	719	2	0.611
25-27	8/7/2006	12/14/2006		1278		39.8%	878	3	0.687
28-30	12/14/2006	3/5/2007		1767		91.1%	706	3	0.400
31-33	3/5/2007	6/1/2007		1869		88.3%	903	3	0.483
34-36	6/1/2007	9/12/2007		1801		72.8%	1231	3	0.684
37	12/12/2007	12/31/2007	99	99	22%	22%	558.7	2	5.643
38	1/1/2008	1/31/2008	675	688	91%	92%	2019	5	2.935
39	2/1/2008	2/29/2008	552	537	74%	72%	616	5	1.147
40	3/1/2008	3/31/2008	741	744	100%	100%	795.6	5	1.069
41	4/1/2008	4/30/2008	717	714	96%	96%	224	2	0.314
42	5/1/2008	5/31/2008	591	647.5	79%	87%	224	2	0.346
43	5/31/2008	6/25/2008	503	502.7	75%	75%	320	3	0.637
44	6/25/2008	7/30/2008	669.10	838.30	80%	100%	394	10	0.470
45	7/30/2008	8/27/2008	669.70	669.00	100%	100%	320.4	5	0.479
46	8/27/2008	9/24/2008	504.00	669.80	75%	100%	247	5	0.369
47	9/24/2008	10/29/2008	727.30	732.30	87%	87%	271	5	0.370
48	10/30/2008	11/26/2008	670.00	669.70	80%	80%	108	5	0.162
49	11/27/2008	12/31/2008	738.80	669.60	80%	88%	66	7	0.099
50	1/1/2009	1/28/2009	471.90	612.80	70%	91%	73	5	0.119
51	1/29/2009	2/25/2009	666.60	645.20	99%	96%	164	5	0.254
52	2/26/2009	3/25/2009	665.90	641.60	99%	95%	74	5	0.115
53	3/26/2009	4/29/2009	834.6	835.4	99%	99%	156	5	0.187
54	4/30/2009	5/27/2009	669.40	670.90	100%	100%	119	5	0.178
55	5/28/2009	6/24/2009	667.50	668.40	99%	99%	127	5	0.190
56	6/25/2009	7/29/2009	835.00	838.90	99%	100%	159	8	0.190
57	7/30/2009	8/26/2009	670.00	670.50	100%	100%	267	5	0.398
58	8/27/2009	9/30/2009	834.60	836.30	99%	100%	147	5	0.176
59	10/1/2009	10/30/2009	0.00	0.00	0%	0%	0	5	0.000
60	10/31/2009	11/25/2009	620.90	622.30	100%	100%	119	5	0.191
61	11/26/2009	12/30/2009	584.10	612.70	70%	73%	77	5	0.126
62	12/30/2009	1/27/2010	500.10	446.00	66%	74%	42	5	0.094
63	1/28/2010	2/24/2010	669.40	586.60	100%	87%	89	5	0.152
64	2/24/2010	3/31/2010	861.30	836.10	100%	100%	86	5	0.103
65	3/31/2010	4/28/2010	668.20	670.10	95%	100%	77	5	0.115
66	4/28/2010	5/26/2010	666.40	667.00	99%	99%	73	5	0.109
67	5/26/2010	6/30/2010	839.00	840.90	100%	100%	148	8	0.176
68	6/30/2010	7/28/2010	664.40	670.10	100%	99%	133	5	0.198
69	7/28/2010	8/25/2010	670.00	671.70	100%	100%	60	5	0.089
70	8/25/2010	9/29/2010	831.30	834.50	99%	99%	63	5	0.075
71	9/29/2010	10/27/2010	667.90	668.10	99%	99%	154	6	0.231
72	10/27/2010	11/24/2010	671.30	672.00	100%	100%	67	2	0.100
73	11/24/2010	1/5/2011	860.80	851.70	85%	84%	85	4	0.100
		TOTALS:	**23,947.30**	**42,828**			**50,358**	**259**	**0.754**

Notes:
Data is absent from 9/12/07 to 12/13/07 due to construction that took place for the new system
Data is absent from 12/2010 due to a later reading in January from snow issues

Table 8
Kliegman Brothers OU1- Site Management
Monthly Progress Report - December 2010
Site No. 2-41-031
Analytical Summary of Knockout Tank Sampling

		Knock Out Tank Water Sample Concentrations	
System		**URS**	**GWTT**
Compounds	**Unit**	12/17/2010	12/17/2010
cis-1,2-Dichloroethylene	µg/L	ND	5.3
1,4-Dioxane	µg/L	67.0	ND
1,1,1,2-Tetrachloroethane	µg/L	1.1	1.5
Tetrachloroethylene	µg/L	260.0	720.0
1,1,1-Trichloroethane	µg/L	ND	2.8
Trichloroethylene	µg/L	ND	10.0
Barium	µg/L	56.0	<50
Chromium	µg/L	15.0	<5.0
Copper	µg/L	6100.0	41.0
Lead	µg/L	19.0	ND
Manganese	µg/L	180.0	24.0
Zinc	µg/L	600.0	56.0
Aluminum	mg/L	4.0	ND
Calcium	mg/L	20.0	0.3
Iron	mg/L	22.0	1.3
Magnesium	mg/L	2.2	ND
Mercury	mg/L	ND	0.0
Potassium	mg/L	3.2	ND
Sodium	mg/L	25.0	ND

Figures



NOTES:

1. BASE PLAN FROM A DECEMBER 12, 2007 AND JUNE 24, 2008 SURVEY BY HIRANI ENGINEERING & LAND SURVEYING.
2. HORIZONTAL DATUM IS ASSUMED, BASED ON SITE SURVEY CONTROL INDICATED.
3. VERTICAL DATUM IS BOROUGH QUEENS TOPOGRAPHICAL BUREAU.
4. ANY ALTERATION OR ADDITION TO THIS SURVEY IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW, EXCEPT PER SECTION 7209—SUBDIVISION 2

REFERENCES:

1. SYSTEM PIPING LAYOUT GWTT JOB NO. 11-1404, PREPARED FOR GROUND/WATER TREATMENT AND TECHNOLOGY, DATED OCT 2007, BY URS CORPORATION

LEGEND:

- VAPOR WELL LOCATION
- SOIL SAMPLING WELL
- CONCRETE CURB
- CHAINLINK FENCE
- TOP OF CURB
- BOTTOM OF CURB
- SPOT ELEVATION
- BASELINE COORDINATES (N:XXXX.XX, E:XXXX.XX, EL:XX.XX)

1" = 20'
10 0 20

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: X
DRAWN BY: X
SHEET CHK'D BY: X
CROSS CHK'D BY: X
APPROVED BY:
DATE: SEPTEMBER 2008

CDM
Camp Dresser & McKee
One Cambridge Place, 50 Hampshire Street
Cambridge, MA 02139
Tel (617) 452-6000
consulting • engineering • construction • operations

TOWN OF GLENDALE
QUEENS COUNTY, NEW YORK
KLIEGMAN BROTHERS SITE OU1
SITE NO. 2-41-031

MONTHLY PROGRESS REPORT

PROJECT NO. 0807-8560
FILE NAME: FIG_1
SHEET NO.
FIG. 1

\\Alb2wr1\common\NYSDEC\DC Contract\DCW#7 - Kliegman Brothers\DWG\ FIG_1 09/19/08 12:08 holnesrw

Figure 2
SVE-6S PCE Concentrations

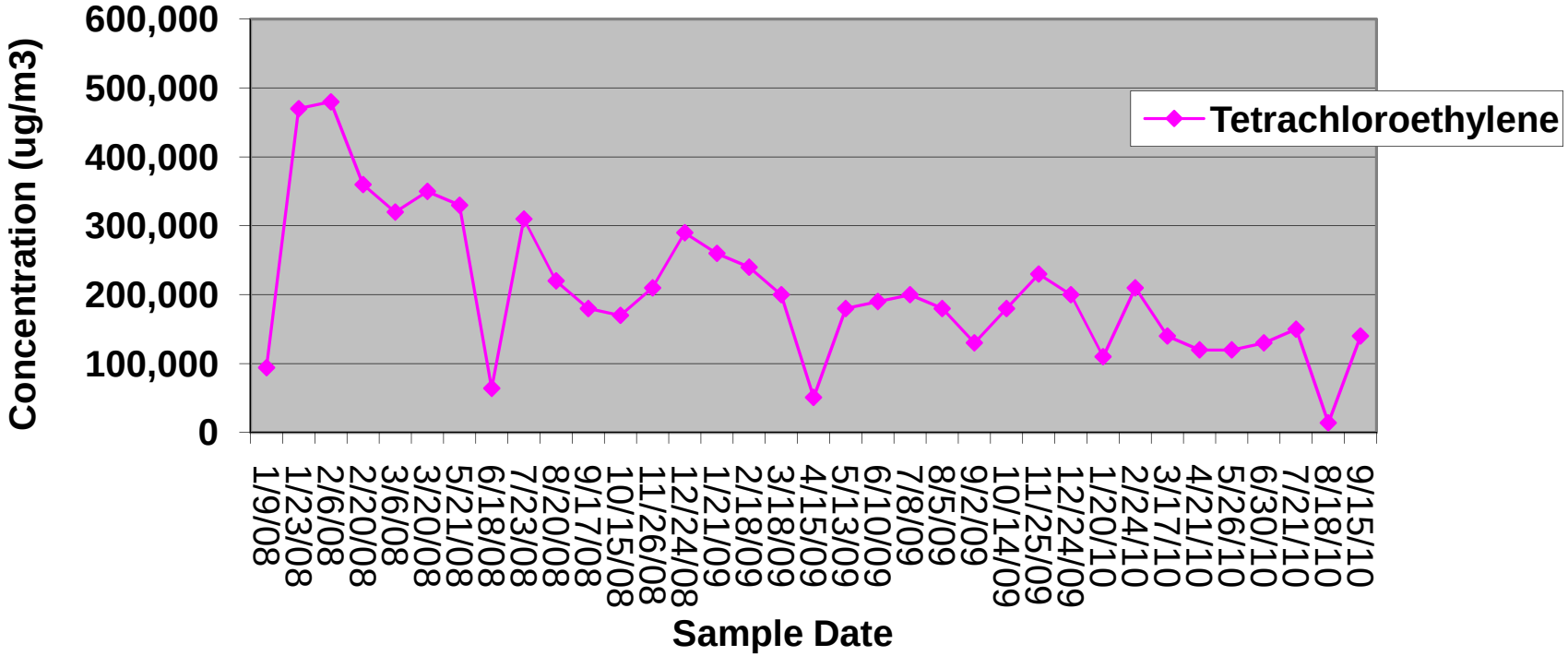


Figure 3
SVE-6D PCE Concentrations

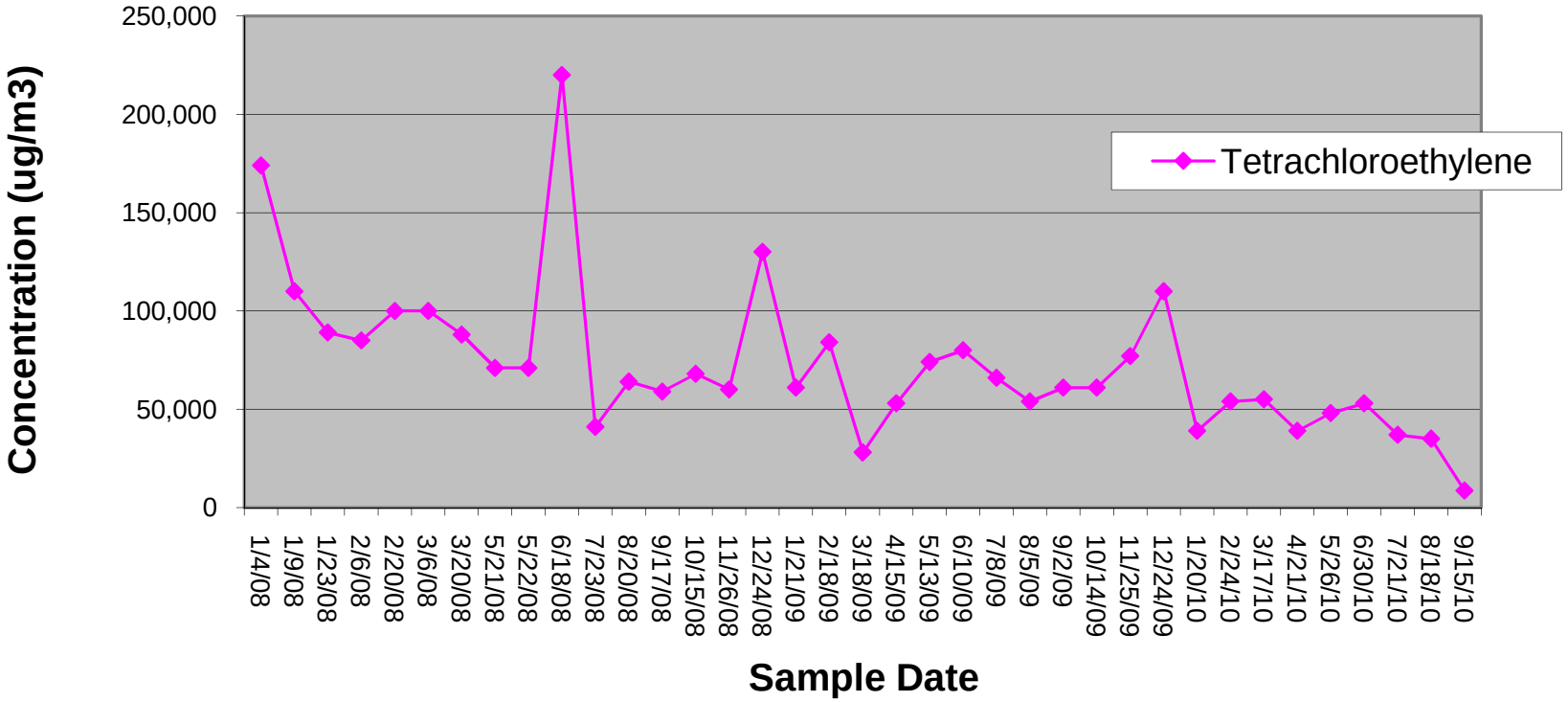


Figure 4
SVE-1 PCE Concentrations

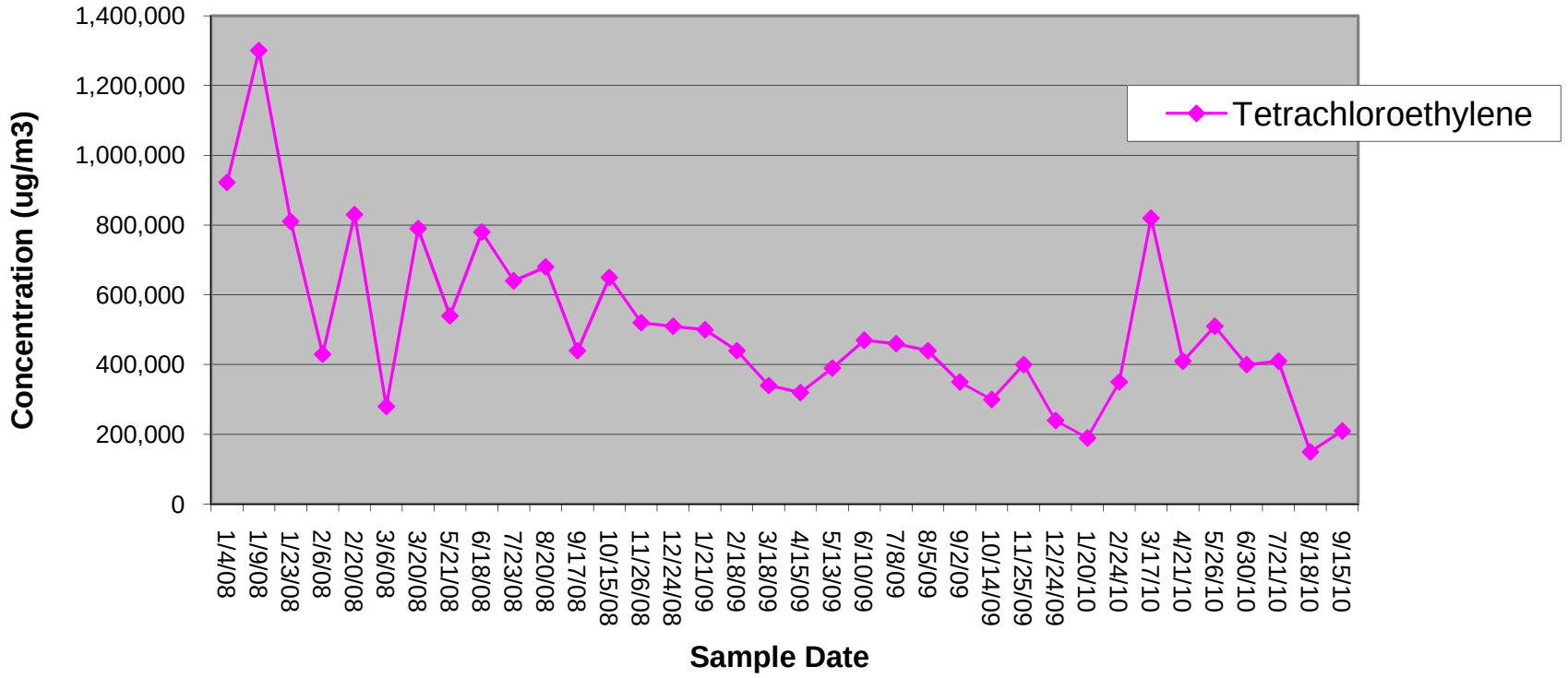


Figure 5
SVE-9S PCE Concentrations

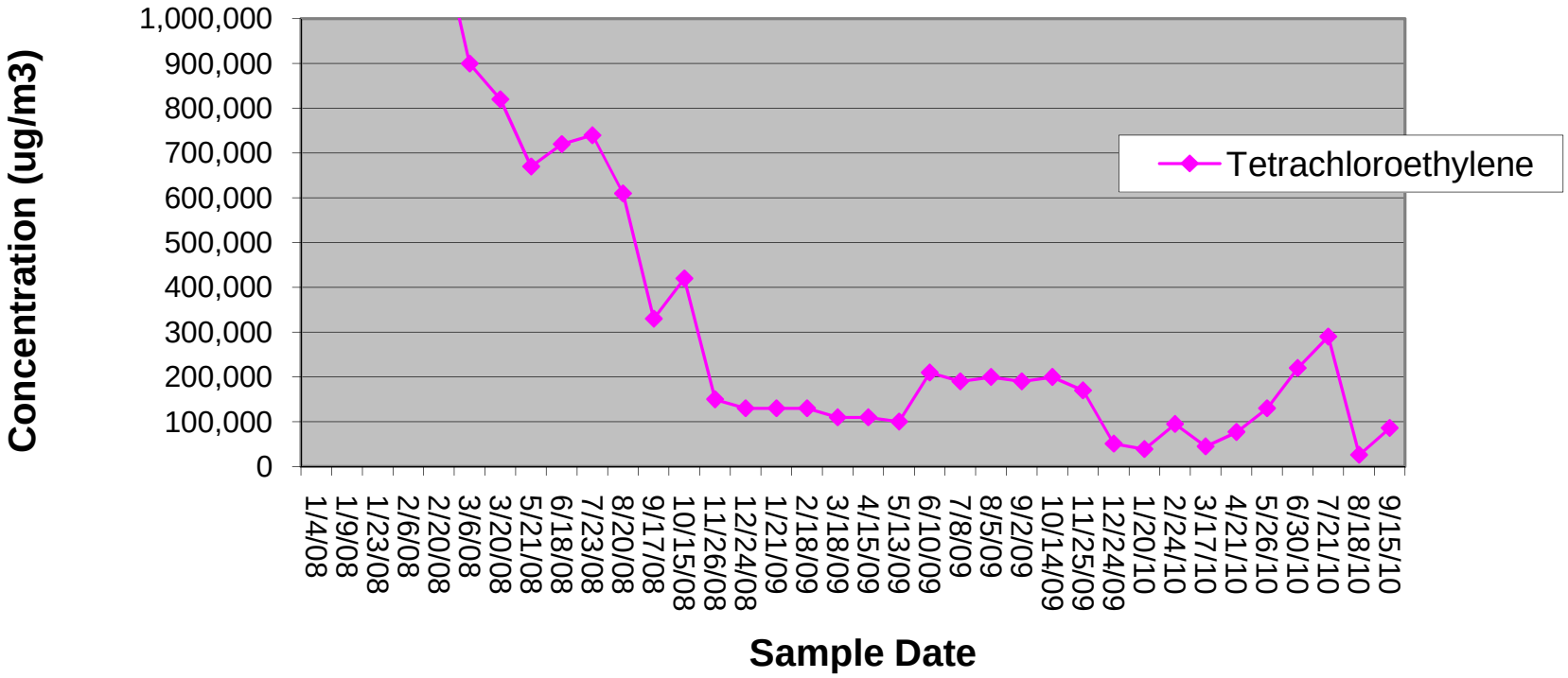


Figure 6
SVE-10S PCE Concentrations

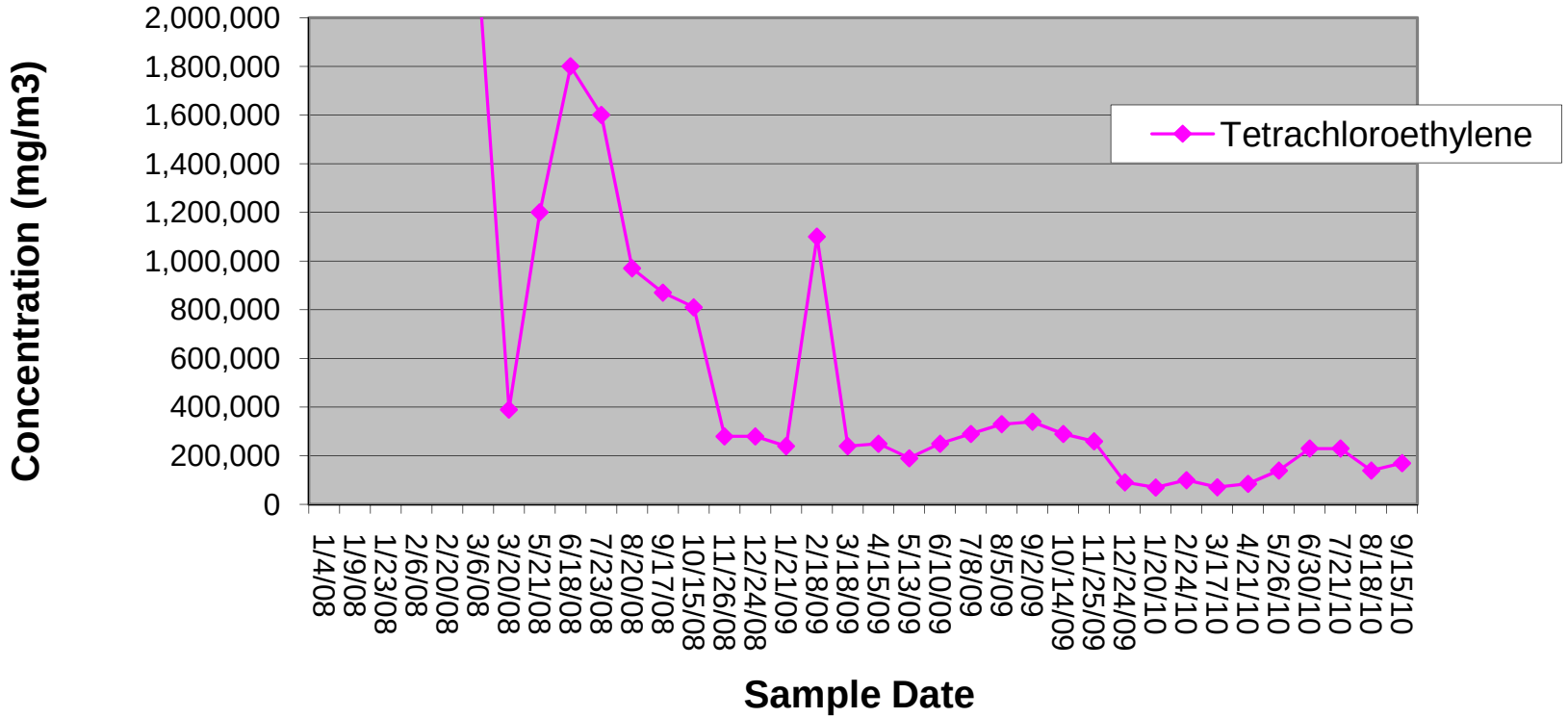


Figure 7
SVE-8S PCE Concentrations

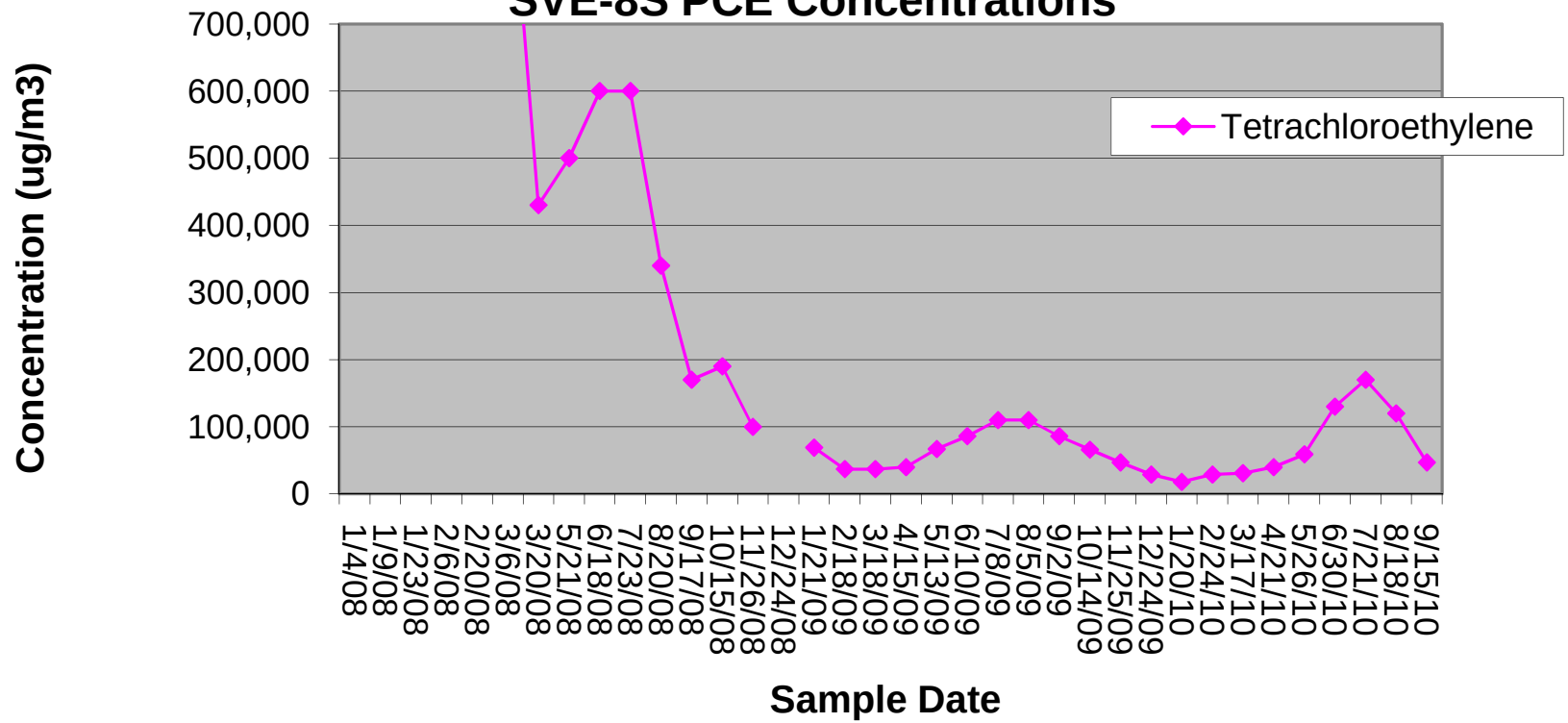
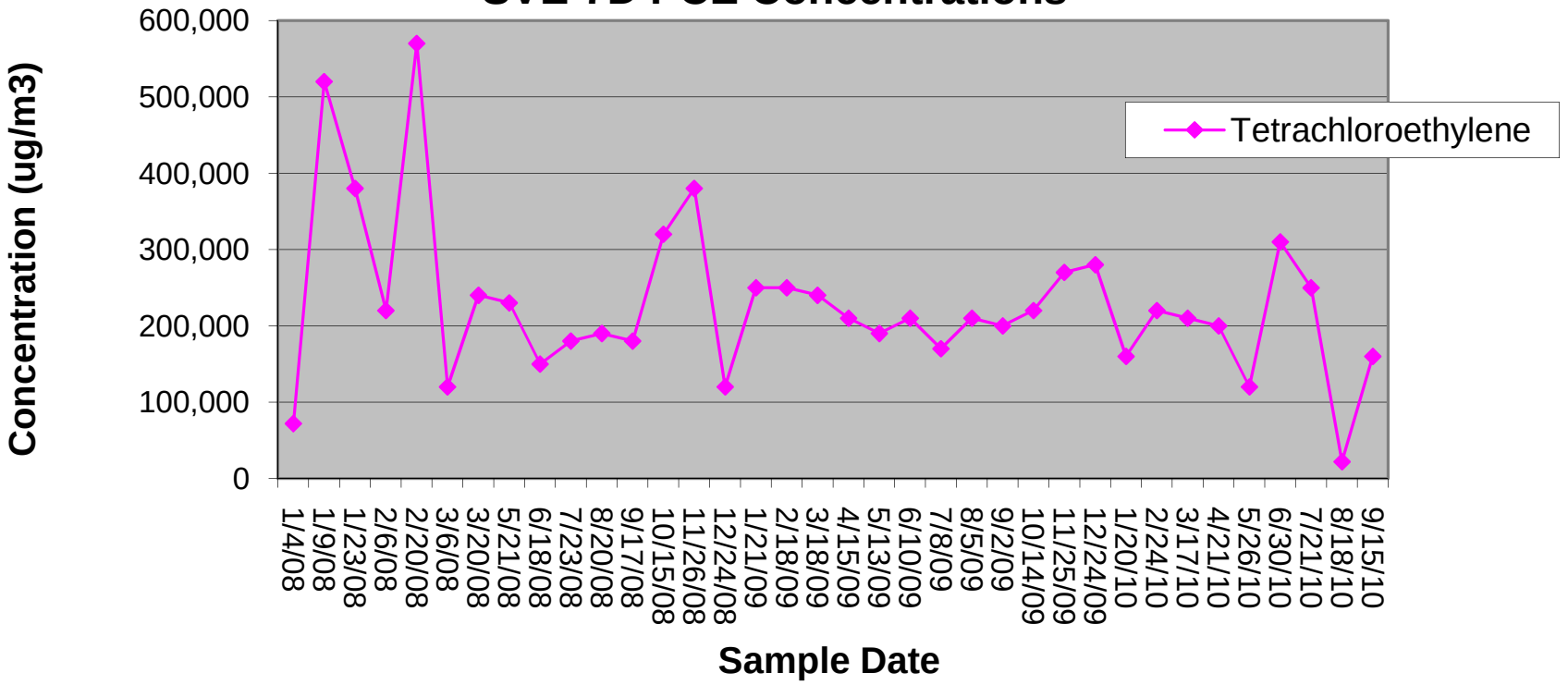


Figure 8
SVE-7D PCE Concentrations



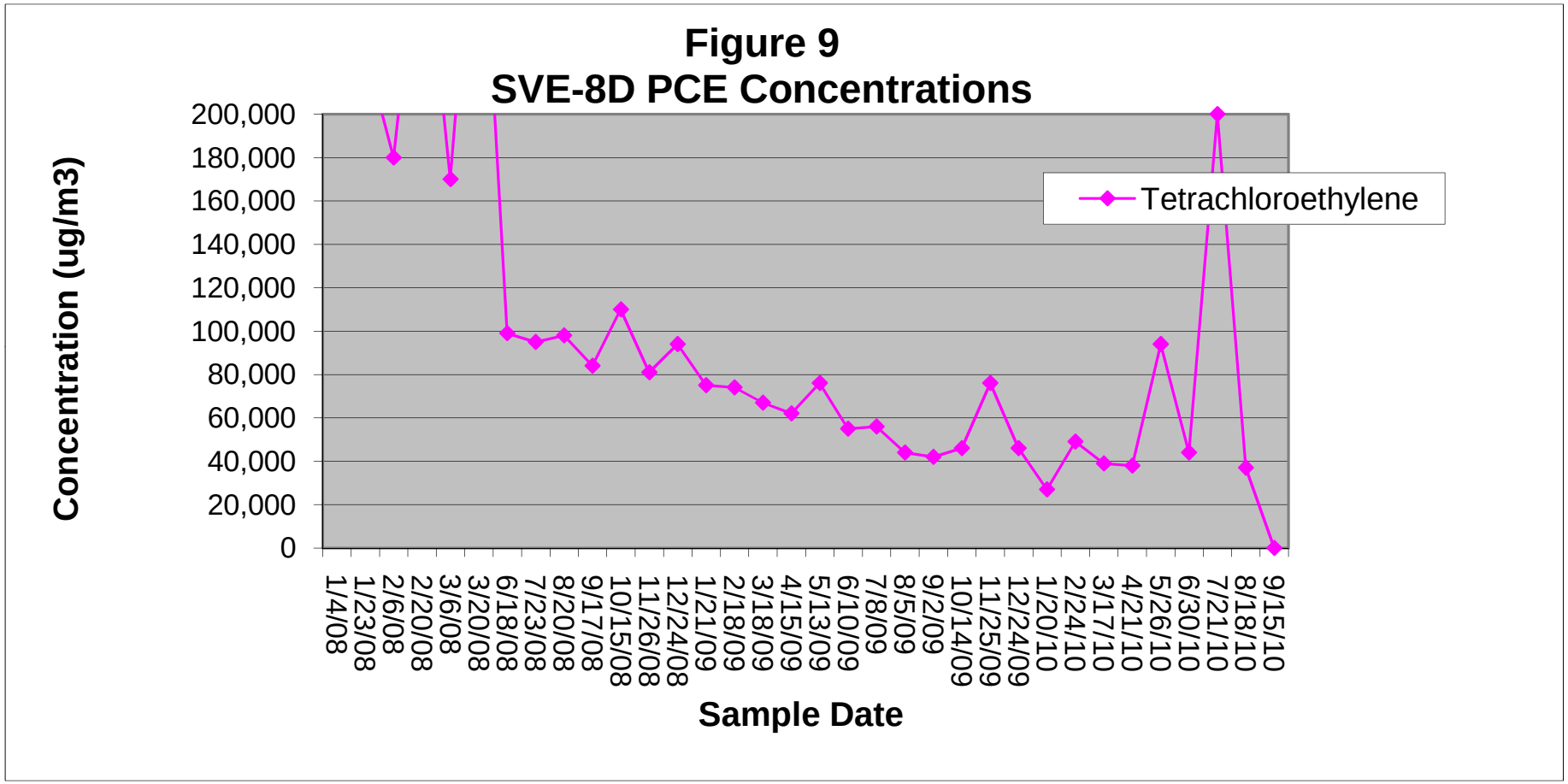


Figure 9
SVE-8D PCE Concentrations
Concentration (ug/m3)
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Tetrachloroethylene
1/4/08
1/23/08
2/6/08
2/20/08
3/6/08
3/20/08
6/18/08
7/23/08
8/20/08
9/17/08
10/15/08
11/26/08
12/24/08
1/21/09
2/18/09
3/18/09
4/15/09
5/13/09
6/10/09
7/8/09
8/5/09
9/2/09
10/14/09
11/25/09
12/24/09
1/20/10
2/24/10
3/17/10
4/21/10
5/26/10
6/30/10
7/21/10
8/18/10
9/15/10
Sample Date

Figure 10
SVE-7S PCE Concentrations

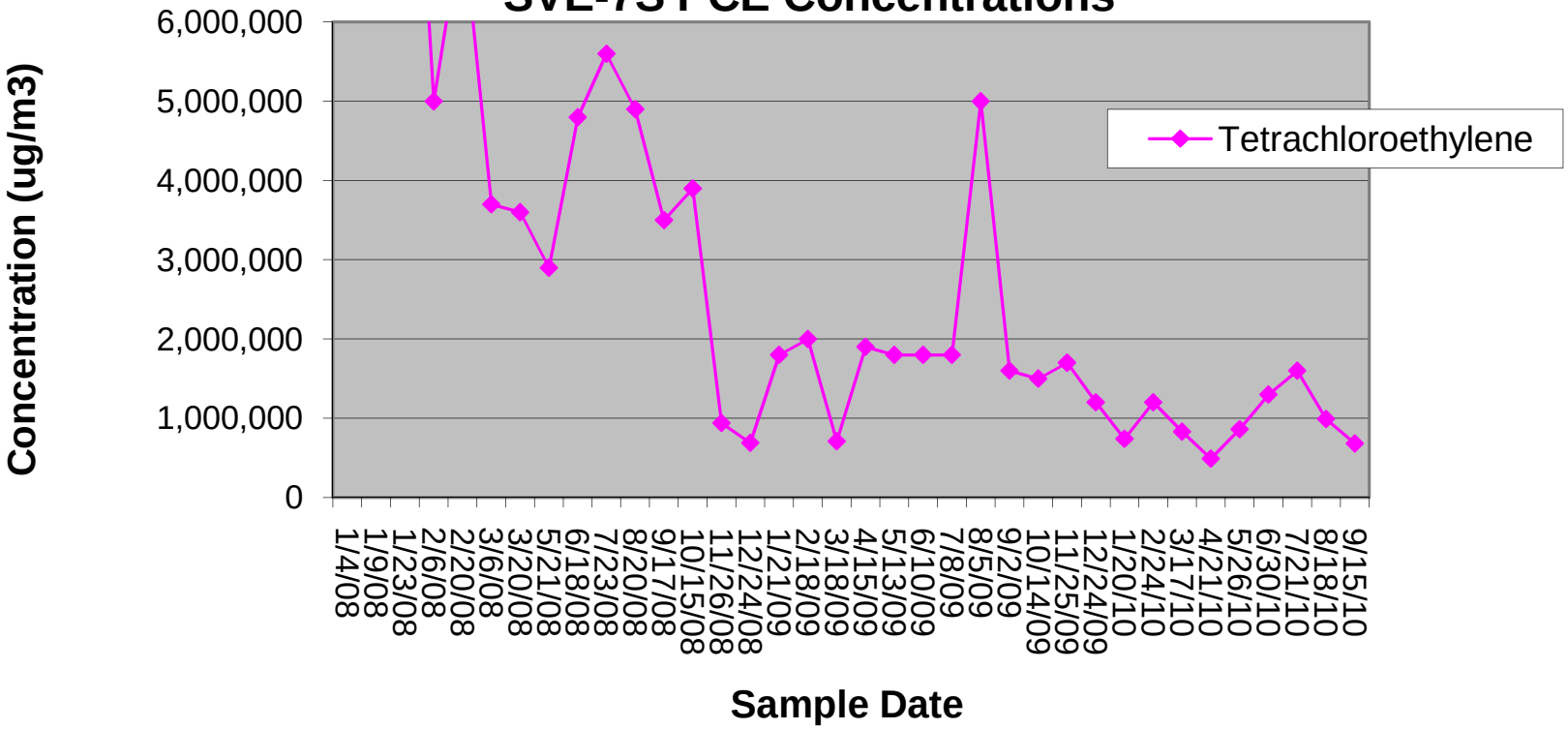


Figure 11
GWTT Combined Influent PCE Concentrations

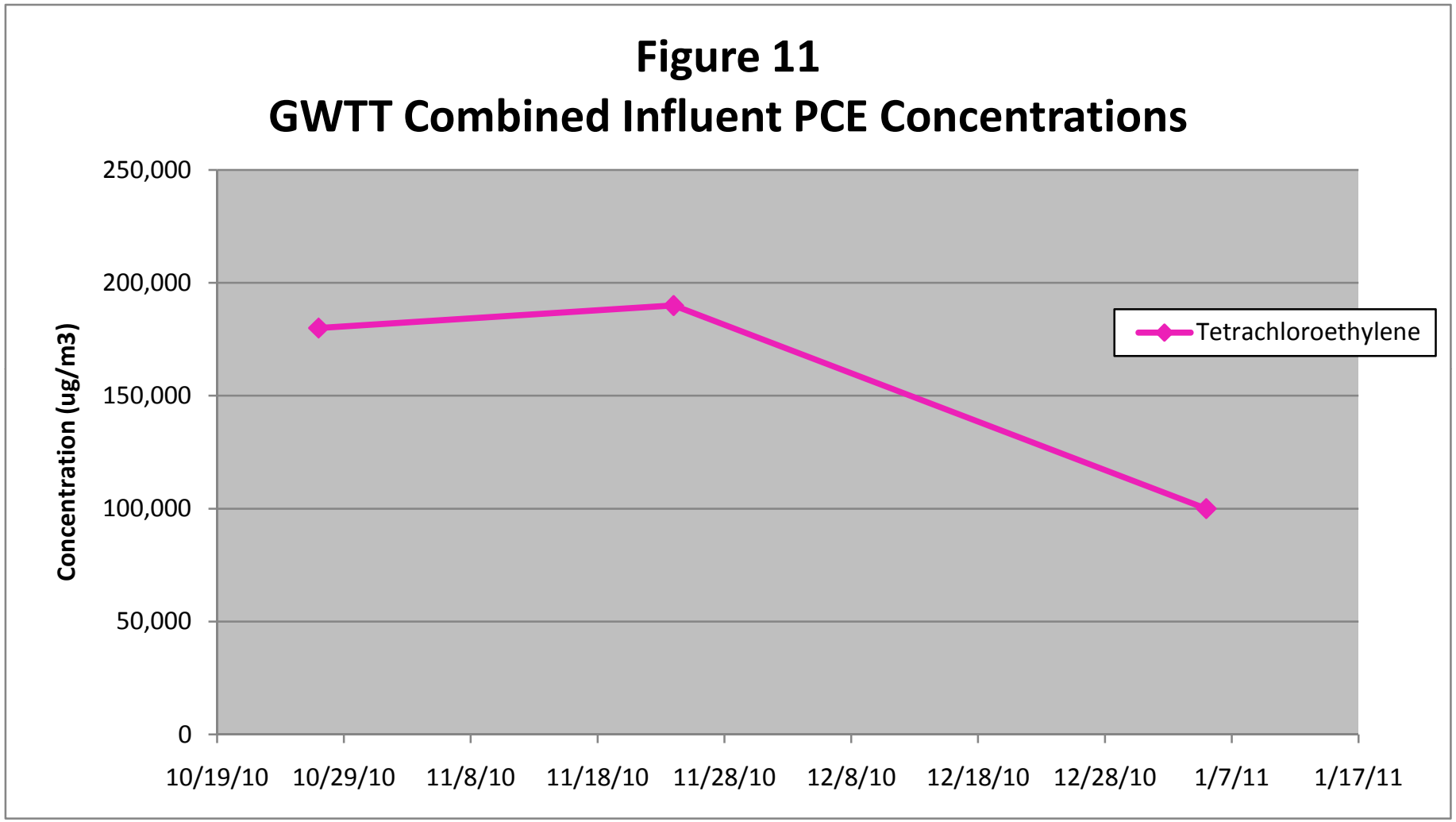
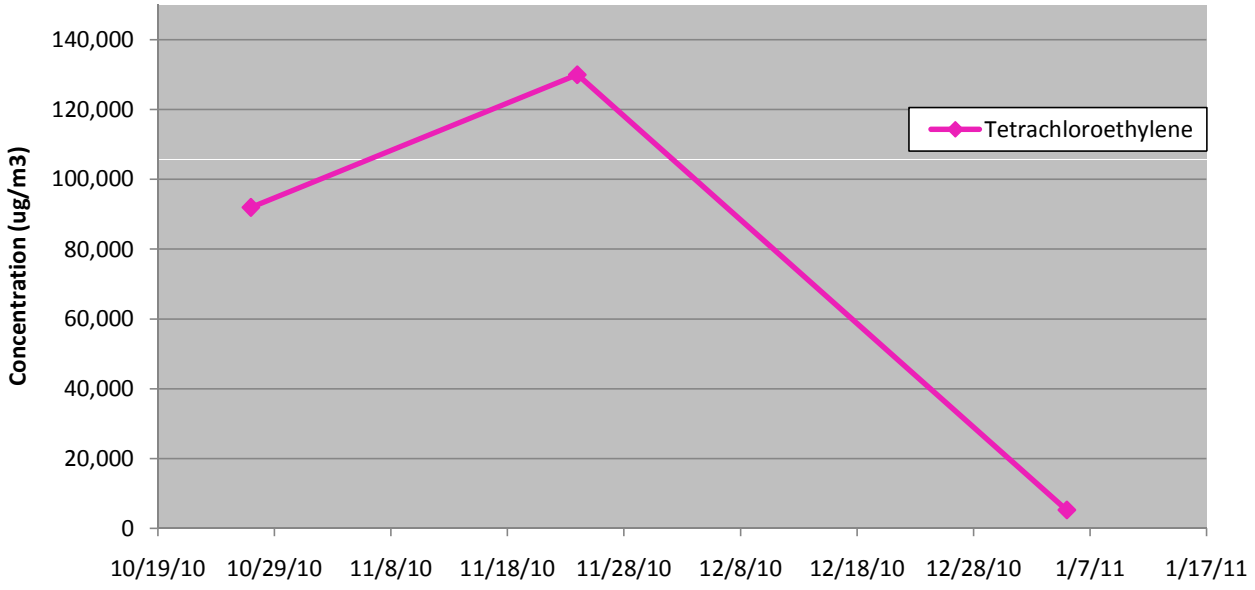


Figure 12
URS Combined Influent PCE Concentrations



Attachments

Attachment A
SVE System Run Time Summary

Attachment A
Kliegman Brothers OU1 - Site Management
Site No. 2-41--031
Monthly Progress Report - December 2010
SVE System Run Time Hour Summary

URS SYSTEM
Time Given in decimals of an hour

Date	Run Time (interval)	Run Time (cumulative)	Shut Down (hr)	Description	
1/1/2008	0	99			
1/2/2008	17	116			
1/3/2008	23	139	1.00	High Water KOT	
1/4/2008	24	163			
1/5/2008	24	187			
1/6/2008	24	211			
1/7/2008	22	232	2.50	Carbon Change Out Lead Unit, KOT	
1/8/2008	24	256	0.50		
1/9/2008	24	280		**Wells 1/9**	117.00
1/10/2008	24	304		**GAC 1/9**	117.00
1/11/2008	24	328			
1/12/2008	24	352			
1/13/2008	24	376			
1/14/2008	24	400			
1/15/2008	22	422	2.25	**GAC 1/15**	141.75
1/16/2008	24	446		1/15 GWTT ROI Test	
1/17/2008	24	469	0.25	Drain KOT	
1/18/2008	24	493			
1/19/2008	24	517			
1/20/2008	24	541			
1/21/2008	24	565	0.17		
1/22/2008	24	589		**GAC 1/23**	191.58
1/23/2008	24	613		**Wells 1/23**	333.33
1/24/2008	16	629		System Shut down	
1/25/2008	15	643			
1/26/2008	24	667			
1/27/2008	24	691			
1/28/2008	24	715			
1/29/2008	24	739			
1/30/2008	24	763		**GAC 1/30**	174.00
1/31/2008	24	787			
2/1/2008	19	806	5.00		
2/2/2008	24	830			
2/3/2008	24	854			
2/4/2008	12	866			
2/5/2008	0	866			
2/6/2008	7	873		**Wells 2/6**	260.00
2/7/2008	24	897			
2/8/2008	24	921			
2/9/2008	24	945			
2/10/2008	24	969			
2/11/2008	24	993			
2/12/2008	24	1017			
2/13/2008	24	1041			
2/14/2008	24	1065			
2/15/2008	12	1077		**GAC 2/15**	314.00
2/16/2008	0	1077			
2/17/2008	0	1077			
2/18/2008	0	1077			
2/19/2008	7	1084			
2/20/2008	24	1108		**Wells 2/20**	235.00
2/21/2008	24	1132		**GAC 2/20**	31.00
2/22/2008	24	1156			
2/23/2008	24	1180			
2/24/2008	24	1204			
2/25/2008	24	1228			
2/26/2008	24	1252			
2/27/2008	24	1276			
2/28/2008	24	1300			
2/29/2008	24	1324		**GAC 2/29**	216.00
3/1/2008	24	1348			
3/2/2008	24	1372			
3/3/2008	24	1396			
3/4/2008	24	1420			
3/5/2008	24	1444			
3/6/2008	24	1468		**Wells 3/6**	360.00
3/7/2008	24	1492		**GAC 3/6**	144.00
3/8/2008	24	1516			
3/9/2008	24	1540			
3/10/2008	24	1564			
3/11/2008	24	1588			
3/12/2008	24	1612			
3/13/2008	24	1636		**GAC 3/13**	168.00
3/14/2008	24	1660			
3/15/2008	24	1684			
3/16/2008	24	1708			
3/17/2008	24	1732			
3/18/2008	24	1756			
3/19/2008	24	1780			
3/20/2008	24	1804		**Wells 3/20**	336.00
3/21/2008	24	1828		**GAC 3/20**	168.00
3/22/2008	24	1852			
3/23/2008	24	1876			
3/24/2008	24	1900			
3/25/2008	24	1924			
3/26/2008	24	1948			
3/27/2008	24	1972			
3/28/2008	24	1996			

GWTT SYSTEM
Time Given in decimals of an hour

Date	Run Time (day/week)	Run Time (cumulative)	Shut Down	Description	
1/1/2008	0	99			
1/2/2008	16	115	0.50	Leaking Lid on Unit #1	
1/3/2008	24	139			
1/4/2008	24	163		**Wells 1/4**	64.25
1/5/2008	24	187		**GAC 1/4**	64.25
1/6/2008	24	211			
1/7/2008	24	235			
1/8/2008	24	259			
1/9/2008	24	283		**Wells 1/9**	120.00
1/10/2008	24	307		**GAC 1/9**	120.00
1/11/2008	24	331			
1/12/2008	24	355			
1/13/2008	24	379			
1/14/2008	24	403			
1/15/2008	10	414		**GAC 1/15**	130.25
1/16/2008	24	438		1/15 GWTT Breakthrough	
1/17/2008	13	451			
1/18/2008	24	475			
1/19/2008	24	499			
1/20/2008	24	523			
1/21/2008	24	547			
1/22/2008	24	571		**GAC 1/23**	181.25
1/23/2008	24	595		**Wells 1/23**	311.50
1/24/2008	24	619			
1/25/2008	24	643			
1/26/2008	24	667			
1/27/2008	24	691			
1/28/2008	24	715			
1/29/2008	24	739			
1/30/2008	12	751		**GAC 1/30**	155.75
1/31/2008	24	775			
2/1/2008	24	799			
2/2/2008	24	823			
2/3/2008	24	847			
2/4/2008	24	871			
2/5/2008	0	871			
2/6/2008	10	880		**Wells 2/6**	285.25
2/7/2008	24	904			
2/8/2008	24	928			
2/9/2008	24	952			
2/10/2008	24	976			
2/11/2008	24	1000			
2/12/2008	24	1024			
2/13/2008	24	1048			
2/14/2008	24	1072			
2/15/2008	12	1084		**GAC 2/15**	333.50
2/16/2008	0	1084			
2/17/2008	0	1084			
2/18/2008	0	1084			
2/19/2008	8	1092			
2/20/2008	24	1116		**Wells 2/20**	235.50
2/21/2008	24	1140		**GAC 2/20**	31.50
2/22/2008	24	1164			
2/23/2008	24	1188			
2/24/2008	24	1212			
2/25/2008	24	1236			
2/26/2008	24	1260			
2/27/2008	24	1284			
2/28/2008	24	1308			
2/29/2008	19	1327	5.00	**GAC 2/29**	211.00
3/1/2008	24	1351			
3/2/2008	24	1375			
3/3/2008	24	1399			
3/4/2008	24	1423			
3/5/2008	24	1447			
3/6/2008	24	1471		**Wells 3/6**	355.00
3/7/2008	21	1491	3.50	**GAC 3/6**	144.00
3/8/2008	24	1515		3/7 4000# carbon Change out	
3/9/2008	24	1539			
3/10/2008	24	1563			
3/11/2008	24	1587			
3/12/2008	24	1611			
3/13/2008	24	1635		**GAC 3/13**	164.50
3/14/2008	24	1659			
3/15/2008	24	1683			
3/16/2008	24	1707			
3/17/2008	24	1731			
3/18/2008	24	1755			
3/19/2008	24	1779			
3/20/2008	24	1803		**Wells 3/20**	332.50
3/21/2008	24	1827		**GAC 3/20**	168.00
3/22/2008	24	1851			
3/23/2008	24	1875			
3/24/2008	24	1899			
3/25/2008	24	1923			
3/26/2008	24	1947			
3/27/2008	24	1971			
3/28/2008	24	1995			

Attachment A
Kliegman Brothers OU1 - Site Management
Site No. 2-41--031
Monthly Progress Report - December 2010
SVE System Run Time Hour Summary

URS SYSTEM
Time Given in decimals of an hour

Date	Run Time (interval)	Run Time (cumulative)	Shut Down (hr)	Description
3/29/2008	24	2020		
3/30/2008	24	2044		
3/31/2008	24	2068		
4/1/2008	24	2092		
4/2/2008	24	2116		
4/3/2008	24	2140		
4/4/2008	24	2164		
4/5/2008	24	2188		
4/6/2008	24	2212		
4/7/2008	24	2236		
4/8/2008	24	2260		
4/9/2008	24	2284		
4/10/2008	18	2302	3.00	
4/11/2008	24	2326		
4/12/2008	24	2350		
4/13/2008	24	2374		
4/14/2008	24	2398		
4/15/2008	24	2422		
4/16/2008	24	2446		**GAC 4/16** 642.00
4/17/2008	24	2470		
4/18/2008	24	2494		
4/19/2008	24	2518		
4/20/2008	24	2542		
4/21/2008	24	2566		
4/22/2008	24	2590		
4/23/2008	24	2614		
4/24/2008	24	2638		
4/25/2008	24	2662		
4/26/2008	24	2686		
4/27/2008	24	2710		
4/28/2008	24	2734		
4/29/2008	24	2758		
4/30/2008	24	2782		
Switch to Hour Meters on Both Systems				
5/1/2008		716		
5/7/2008	142	859		
5/14/2008	167	1025		
5/21/2008	171	1196		
5/28/2008	168	1364		Shutdown- Breakthrough
6/4/2008	1	1364	168.00	Change Carbon - Restart
6/11/2008	165	1530		
6/18/2008	168	1698		
6/25/2008	169	1866		
7/2/2008	168	2035	3.00	Change Carbon - Restart
7/9/2008	164	2198		
7/16/2008	169	2367		
7/23/2008	170	2537	1.85	System shut down for unknown reason
7/30/2008	168	2705	1.50	Change Carbon - Restart
8/6/2008	165	2869		
8/13/2008	168	3038		
8/20/2008	169	3207		
8/27/2008	167	3374	1.83	Change Carbon - Restart
9/3/2008	165	3539		
9/10/2008	169	3708	1.04	Change Carbon - Restart
9/17/2008	167	3876		
9/24/2008	168	4044	3.15	Change Carbon - Restart
10/3/2008	109	4152		
10/8/2008	120	4272		
10/15/2008	169	4441		
10/22/2008	166	4608	1.5	Change Carbon - Restart
10/29/2008	168	4776		
11/5/2008	166	4942		
11/12/2008	170	5113		
11/19/2008	166.4*	5279.0*	1.5	Change Carbon - Restart
11/26/2008	166.5*	5446		
12/3/2008	167	5613	0.08	Knockout drum drainage
12/10/2008	169	5782	0.08	Knockout drum drainage
12/17/2008	168	5950	2	Change Carbon - Restart
12/24/2008	166	6116	0.08	Knockout drum drainage
12/31/2008	167	6282		
1/8/2009	193	6476		
1/14/2009	147	6622	1	Change Carbon - Restart
1/21/2009	167	6789	3	Knockout drum drainage
1/28/2009	106	6895	0.17	Knockout drum drainage, change filter
2/4/2009	144	7039		
2/11/2009	166	7206	1	Change Carbon - Restart
2/18/2009	166	7372	0.1	Knockout drum drainage
2/25/2009	169	7540	2.5	System repairs
3/4/2009	166	7706	0.08	Knockout drum drainage
3/11/2009	142	7848	2	Change Carbon - Restart
3/18/2009	167	8015	0.33	Cleaning knockout drum
3/25/2009	167	8182	1.58	Knockout drum drainage and high level float repair
4/1/2009	167	8349		
4/8/2009	168	8517	1	Carbon Change and replacing knockout drum

GWTT SYSTEM
Time Given in decimals of an hour

Date	Run Time (day/week)	Run Time (cumulative)	Shut Down	Description
3/29/2008	24	2019		
3/30/2008	24	2043		
3/31/2008	24	2067		
4/1/2008	24	2091		
4/2/2008	24	2115		
4/3/2008	24	2139		
4/4/2008	24	2163		
4/5/2008	24	2187		
4/6/2008	24	2211		
4/7/2008	24	2235		
4/8/2008	24	2259		
4/9/2008	24	2283		
4/10/2008	21	2304	3.00	
4/11/2008	24	2328		
4/12/2008	24	2352		
4/13/2008	24	2376		
4/14/2008	24	2400		
4/15/2008	24	2424		
4/16/2008	24	2448		**GAC 4/16** 645.00
4/17/2008	24	2472		
4/18/2008	24	2496		
4/19/2008	24	2520		
4/20/2008	24	2544		
4/21/2008	24	2568		
4/22/2008	24	2592		
4/23/2008	24	2616		
4/24/2008	24	2640		
4/25/2008	24	2664		
4/26/2008	24	2688		
4/27/2008	24	2712		
4/28/2008	24	2736		
4/29/2008	24	2760		
4/30/2008	24	2784		
5/1/2008		714		
5/7/2008	141	855		
5/14/2008	113	968		
5/21/2008	171	1139		
5/28/2008	166	1305		Shutdown - Breakthrough
6/4/2008	2	1307	168.00	Change Carbon - Restart
6/11/2008	165	1472		
6/18/2008	168	1640		
6/25/2008	168	1808		Shutdown - Breakthrough
7/2/2008	2	1810	3.00	Change Carbon - Restart
7/9/2008	164	1974		
7/16/2008	170	2144	2.00	Change Carbon - Restart
7/23/2008	166	2309		
7/30/2008	168	2477	1.50	Change Carbon - Restart
8/6/2008	166	2643		
8/13/2008	169	2813	1.00	Change Carbon - Restart
8/20/2008	165	2978		
8/27/2008	169	3147	1.83	Change Carbon - Restart
9/3/2008	166	3313		
9/10/2008	169	3482	1.04	Change Carbon - Restart
9/17/2008	166	3647		Shutdown- Breakthrough
9/24/2008	4	3651	164.3	Change Carbon - Restart
10/3/2008	107	3758		
10/8/2008	121	3879	1.83	Change Carbon - Restart
10/15/2008	165	4044		
10/22/2008	169	4212	1.5	Change Carbon - Restart
10/29/2008	166	4378		
11/5/2008	169	4547	1.5	Change Carbon - Restart
11/12/2008	169	4716		
11/19/2008	166	4882	1.5	Change Carbon - Restart
11/26/2008	167	5048	1.42	High water alarm
12/3/2008	166	5215	2.08	Change carbon & knockout drum drainage
12/10/2008	167	5382	0.92	Knockout drum drainage
12/17/2008	165	5547	1.5	Change Carbon - Restart
12/24/2008	76	5623	91.8	Unexplained shutdown
12/31/2008	164	5787	1.88	Knockout drum drainage
1/8/2009	58	5845	134.3	Shut down on arrival, reason unknown
1/14/2009	85	5929	83.5	Shut down on arrival, reason unknown, carbon change
1/21/2009	140	6069	3	Drain knockout drum, maintenance
1/28/2009	190	6259	2	Carbon change
2/4/2009	166	6424	1	Knockout drum drainage
2/11/2009	166	6591	1	Change Carbon - Restart
2/18/2009	166	6757		
2/25/2009	169	6926	1.5	Change Carbon - Restart
3/4/2009	167	7092		
3/11/2009	166	7258	2	Carbon Change - Restart
3/18/2009	166	7424	0.67	Cleaning Knockout Drum
3/25/2009	167	7591	1.5	Carbon Change - Restart
4/1/2009	167	7759		
4/8/2009	168	7926	1.5	Carbon Change - Restart

Attachment A
Kliegman Brothers OU1 - Site Management
Site No. 2-41--031
Monthly Progress Report - December 2010
SVE System Run Time Hour Summary

URS SYSTEM
Time Given in decimals of an hour

Date	Run Time (interval)	Run Time (cumulative)	Shut Down (hr)	Description
4/15/2009	167	8684	2	Knockout drum repair
4/22/2009	166	8850		
4/29/2009	168	9017		
5/6/2009	168	9185	1.25	Carbon Change and knockout drum inspection- Restart
5/13/2009	167	9353		
5/20/2009	168	9520		
5/27/2009	168	9688		
6/3/2009	167	9855	4	Carbon Change-Restart
6/10/2009	166	10021		
6/17/2009	168	10188		
6/24/2009	168	10357		
7/1/2009	168	10525	1	Carbon Change-Restart
7/8/2009	167	10691	0.05	Check condition of air filter
7/15/2009	168	10860		
7/22/2009	168	11027		
7/29/2009	168	11196	1.7	Carbon Change-Restart
8/5/2009	165	11361		
8/12/2009	170	11531		
8/19/2009	167	11698		
8/26/2009	168	11866	2.5	Carbon Change-Restart
9/2/2009	166	12032		
9/9/2009	168	12200		
9/16/2009	169	12369		
9/23/2009	166	12535	1	Carbon Change-Restart
9/30/2009	168	12702		
10/7/2009	168	12870		
10/14/2009	169	13039		
10/21/2009	167	13206	1.25	Carbon Change-Restart
10/30/2009	215	13421		
11/4/2009	121	13542		
11/11/2009	167	13710		
11/18/2009	169	13878	1.25	Carbon Change-Restart
11/25/2009	165	14043		
12/2/2009	168	14212		
12/9/2009	169	14381	0.2	Inspect KO drum and filters.
12/16/2009	136	14517	32.5	Circuit Breaker Tripped, Carbon Change-Restart
12/24/2009	83	14600	108	Circuit Breaker Tripped
12/30/2009	56	14656	88.5	Circuit Breaker Tripped
1/6/2010	85	14741	82.70	Down at arrival due to high water level in KO Tank
1/13/2010	78	14820	89.60	Carbon Change - Restarted
1/20/2010	140	14960	27.60	
1/27/2010	142	15102	26.10	Drained KO tank - Restarted
2/3/2010	130	15232	0.10	Drained KO tank - Restarted
2/12/2010	177	15409	3.75	Carbon Change - Restarted
2/17/2010	111	15520		Down at arrival due to high water level in KO Tank
2/24/2010	169	15689		Drained KO tank - Restarted
3/3/2010	166	15855	0.10	Drained KO tank - Restarted
3/10/2010	169	16024	2.00	Carbon Change - Restarted
3/17/2010	165	16189	0.10	Drained KO tank - Restarted
3/24/2010	167	16356		
3/31/2010	168	16525	0.10	Repair relieve valve on KO tank
4/7/2010	167	16692	0.50	Carbon Change - Restarted
4/14/2010	167	16859		
4/21/2010	168	17027		
4/28/2010	168	17195		
5/5/2010	168	17363	3.28	Carbon Change-Restart
5/19/2010	332	17695		
6/2/2010	168	18030	3.28	Carbon Change-Restart
6/9/2010	167	18197		
6/16/2010	169	18366		
6/23/2010	167	18533		
6/30/2010	170	18703	1.00	Carbon Change-Restart
7/8/2010	192	18895		
7/14/2010	179	19074		
7/21/2010	132	19206		
7/28/2010	167	19373	1.00	Carbon Change-Restart
8/4/2010	168	19541		
8/11/2010	168	19709		
8/18/2010	168	19877		
8/25/2010	168	20045	2.00	Carbon Change-Restart
9/1/2010	165	20210		
9/8/2010	168	20377		
9/15/2010	168	20545		
9/22/2010	169	20714	1.50	Carbon Change-Restart
9/29/2010	165	20879		
10/6/2010	169	21048	0.8	Carbon Change-Restart
10/13/2010	168	21216	0.25	Fix air leak on effluent piping
10/20/2010	167	21383	4.3	Carbon Change-Restart
10/27/2010	164	21547		
11/24/2010	672	22219		

GWTT SYSTEM
Time Given in decimals of an hour

Date	Run Time (day/week)	Run Time (cumulative)	Shut Down	Description
4/15/2009	166	8093		
4/22/2009	168	8261	3	Carbon Change - Restart
4/29/2009	165	8426		
5/6/2009	168	8594	1	Carbon Change Restart
5/13/2009	168	8761		
5/20/2009	167	8928	1	Carbon Change - Restart
5/27/2009	167	9095		
6/3/2009	169	9264	4	Carbon Change-Restart
6/10/2009	164	9428		
6/17/2009	168	9595	2	Carbon Change-Restart
6/24/2009	167	9762		
7/1/2009	168	9930	1	Carbon Change-Restart
7/8/2009	167	10097		
7/15/2009	168	10265	3.5	Carbon Change-Restart
7/22/2009	164	10429		
7/29/2009	168	10597	1.5	Carbon Change-Restart
8/5/2009	166	10763		
8/12/2009	169	10932	1	Carbon Change-Restart
8/19/2009	167	11099		
8/26/2009	168	11267	3	Carbon Change-Restart
9/2/2009	165	11432		
9/9/2009	169	11601	1	Carbon Change-Restart
9/16/2009	168	11768		
9/23/2009	166	11934	1	Carbon Change-Restart
9/30/2009	167	12102		
10/7/2009	168	12270	1.5	Carbon Change-Restart
10/14/2009	187	12457		
10/21/2009	148	12605	0.5	Carbon Change-Restart
10/30/2009	215	12819		
11/4/2009	121	12940	1	Carbon Change-Restart
11/11/2009	167	13107		
11/18/2009	169	13275	1.5	Carbon Change-Restart
11/25/2009	165	13440		
12/2/2009	169	13609	1.25	Carbon Change-Restart
12/9/2009	167	13776	1.5	System Maintenance
12/16/2009	166	13942	1	Carbon Change-Restart
12/24/2009	83	14024	108	Circuit Breaker Tripped
12/30/2009	0	14024	144	Circuit Breaker Tripped
1/6/2010	0	14025	167.7	Down at arrival due to high water level in KO tank
1/13/2010	166	14190	2.30	Carbon Change - Restarted
1/20/2010	167	14357	1.50	Drained KO tank - Restarted
1/27/2010	168	14525	0.40	Carbon Change - Restarted
2/3/2010	167	14692		
2/12/2010	216	14907	2.75	Carbon Change - Restarted
2/17/2010	118	15025		
2/24/2010	169	15194	1.25	Carbon Change - Restarted
3/3/2010	166	15360		
3/10/2010	169	15528	1.50	Carbon Change - Restarted
3/17/2010	166	15694		
3/24/2010	167	15862	3.00	Carbon Change - Restarted
3/31/2010	165	16027		
4/7/2010	168	16195	0.75	Carbon Change - Restarted
4/14/2010	167	16362		
4/21/2010	167	16529	0.10	Carbon Change - Restarted
4/28/2010	167	16695		
5/5/2010	168	16863	3.28	Carbon Change-Restart
5/19/2010	332	17195	1.00	Carbon Change Restart
6/2/2010	168	17530	1.28	Carbon Change-Restart
6/9/2010	167	17697		
6/16/2010	169	17866	1.50	Carbon Change-Restart
6/23/2010	165	18031		
6/30/2010	170	18201	3.56	Carbon Change Restart
7/8/2010	190	18391	3.00	PVC Pipe repair-Restart
7/14/2010	140	18530	1.00	Carbon Change-Restart
7/21/2010	167	18698		
7/28/2010	167	18865	1.00	Carbon Change-Restart
8/4/2010	167	19032		
8/11/2010	168	19200	1.00	Carbon Change-Restart
8/18/2010	167	19367		
8/25/2010	168	19535	2.00	Carbon Change-Restart
9/1/2010	165	19700		
9/8/2010	168	19868	2.30	Carbon Change-Restart
9/15/2010	165	20033		
9/22/2010	169	20202	0.50	Carbon Change-Restart
9/29/2010	164	20366		
10/6/2010	169	20536	0.8	Carbon Change-Restart
10/13/2010	167	20703		
10/20/2010	167	20870	4.2	Carbon Change-Restart
10/27/2010	164	21034		
11/24/2010	671	21705	1.3	Carbon Change-Restart

Project: Kliegman Brother's Site OU1 - Site Management
Contractors: Camp Dresser & McKee, Preferred Environmental Services,
and Envirotrac Environmental Ltd.
CDM Job No: D-006131-7
Site No: 2-41-031
CDM Project Manager: John Blaum

CDM
15 British American Boulevard
Airport Park
Latham, NY 12110
Telephone: 518.782.4500
Fax: 518.786.3810

DAILY REPORT

Day:	S	M	T	W	TH	F	S

Date: 11-Dec-10
REPORT No.
PAGE No. 1

PREPARED BY: MM TITLE: Site Rep.

WEATHER	Bright Sun	Partly Cloudy	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Light	Moderate	High		
HUMIDITY	Dry	Moderate	Humid		
WIND DIR	NE	NW	SE	SW	
	N	S	E	W	

AVERAGE FIELD FORCE

Name of Contractor	Title	Hours Worked	Remarks
William Schlageter	Technician	12:47-13:38	Preferred

VISITORS

Name	Time (From - To)	Representing	Remarks

EQUIPMENT AT THE SITE

I = Idle W = Working

1. Camera - W	3. Pressure Gauges - W	
2. PID - W	4. Velocity & Temperature Meter - W	

OPERATION & MAINTENANCE ACTIVITIES

CDM/Preferred Site Representative: William Schlageter - Preferred

DESCRIPTION OF WORK PERFORMED AND OBSERVED

12:47 - WJS On-site.

12:48 - URS system down upon arrival with knock out alarm activated - URS system hours were 22590.6. GWTT system was running properly.

12:58 - Set up pump and purged approximately 7 gallons of knockout water from URS tank into 55-gallon drum.

13:15 - All water removed from URS knock out tank system restarted.

13:16 - Start purging 22 gallons of water from GWTT knock out drum to 55-gallon drum while system is still running.

13:37 - All water removed from GWTT knockout tank. two full and one 1/3 full, 55-gallon drums containing knock out water onsite.

13:38 - WJS offsite. Door is secured.

☐ - Designates report is continued on additional pages

CDM/Preferred Site Representative: William Schlageter

Project Manager: **J. Blaum**

Project: Kliegman Brother's Site OU1 - Site Management
Contractors: Camp Dresser & McKee, Preferred Environmental Services,
and Envirotrac Environmental Ltd.
CDM Job No: D-006131-7
Site No: 2-41-031
CDM Project Manager: John Blaum

CDM
15 British American Boulevard
Airport Park
Latham, NY 12110
Telephone: 518.782.4500
Fax: 518.786.3810

DAILY REPORT

Day: S | M | T | **W** | TH | F | S
Date: 17-Dec-10
REPORT No.
PAGE No. 1

PREPARED BY: MM TITLE: Site Rep.

WEATHER	Bright Sun	Partly Cloudy	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Light	Moderate	High		
HUMIDITY	Dry	Moderate	Humid		
WIND DIR	NE	NW	SE	SW	
	N	S	E	W	

AVERAGE FIELD FORCE

Name of Contractor	Title	Hours Worked	Remarks
Marc Morgenstern	Technician	09:55-11:00	Preferred

VISITORS

Name	Time (From - To)	Representing	Remarks
Leonard Sukdheo	Onsite upon arrival and departure	Gourmet Factory	Working in building

EQUIPMENT AT THE SITE

I = Idle W = Working

1. Camera - W	3. Pressure Gauges - W	
2. PID - W	4. Velocity & Temperature Meter - W	

OPERATION & MAINTENANCE ACTIVITIES

CDM/Preferred Site Representative: Marc Morgenstern - Preferred

DESCRIPTION OF WORK PERFORMED AND OBSERVED

09:55 - MM Onsite, roll up gate opened upon arrival. Fill out sampling labels.

10:03 - URS system down upon arrival with knock out alarm activated - URS system hours were 22699.7. GWTT system was running properly - GWTT system hours were 22259.3

10:10 - Set up pump and purged knockout water from URS tank into 55-gallon drum.

10:13 - Collected water sample from URS system while purging.

10:16 - All water removed from URS knock out tank, restart system.

10:30 - Start purging GWTT knock out tank into 55-gallon drum while system is still running.

10:35 - Collect water sample from GWTT system while purging.

10:50 - All water removed from GWTT knockout tank. two full and one 1/4 full, 55-gallon drums containing knock out water onsite.

11:00 -MM offsite. Gate still opened upon departure, as Gourmet Factory workers still onsite. Samples shipped to Contest Monday December 20, 2010.

☐ - Designates report is continued on additional pages

CDM/Preferred Site Representative: Marc Morgenstern Project Manager: **J. Blaum**

CHAIN OF CUSTODY RECORD

con-test ANALYTICAL LABORATORY
Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com
www.contestlabs.com
39 Spruce Street
East longmeadow, MA 01028

Company Name: CDM
Address: 1 Woodward Avenue, Suite 1500
Detroit, MI 48226
Attention: Phillip Dixon
Project Location: 76-01 77th Avenue, Glendale, NY
Sampled By: Marc Morgenstern (Preferred)

Telephone: 313-963-1313
Project # Kliegman OU #1
Client PO# D-006131-2

DATA DELIVERY (check all that apply)
○ FAX ◉ EMAIL ○ WEBSITE
Fax #
Email: Dixonpj@cdm.com and halletthl@cdm.com
Format: ◉ PDF ◉ EXCEL ○ GIS
○ OTHER
○ "Enhanced Data Package"

Project Proposal Provided? (for billing purposes)
○ yes _____ proposal date

Con-Test Lab ID (laboratory use only)	Client Sample ID / Description	Collection Beginning Date/Time	Collection Ending Date/Time	Composite	Grab	*Matrix Code	Conc Code	VOCs (Per Phillip Dixon - CDM)	SVOCs (Per Phillip Dixon - CDM)	Metals (Per Phillip Dixon - CDM)									
								4	2	1									# of Containers
								HCL	None	HNO3									** Preservation
								V	A	P									***Container Code
	URS Knock Out	12-17-10/10:13	12-17-10/10:13		X	GW	u	✓	✓	✓									
	GWTT Knock Out	12-17-10/10:35	12-17-10/10:35		X	GW	u	✓	✓	✓									

ANALYSIS REQUESTED

Dissolved Metals
○ Field Filtered
○ Lab to Filter

***Cont. Code:**
A=amber glass
G=glass
P=plastic
ST=sterile
V= vial
S=summa can
T=tedlar bag
O=Other

****Preservation**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium bisulfate
X = Na hydroxide
T = Na thiosulfate
O = Other_____

Matrix Code:
GW= groundwater
WW= wastewater
DW= drinking water
A = air
S = soil/solid
SL = sludge
O = other_____

Comments:
PG= Pressure Gauge Identification
Data Enhancement/RCP = Category B

Please use the following codes to let Con-Test know if a specific sample may be high in concentration in Matrix/Conc. Code Box:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature)	Date/Time:
	12/21/10/1150
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Turnaround ††
◉ 7-Day
☐ 10-Day
☐ Other ____
RUSH †
☐ †24-Hr ☐ †48-Hr
☐ †72-Hr ☐ †4-Day
† Require lab approval

Detection Limit Requirements
Massachusetts: _____
_____
_____
Connecticut: _____
_____
_____
Other: _____

Is your project MCP or RCP ?
○ MCP Form Required
◉ RCP Form Required
○ MA State DW Form Required PWSID # _____

nelac AIHA NELAC & AIHA Certified
WBE/DBE Certified

†† TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

PLEASE BE CAREFUL NOT TO CONTAMINATE THIS DOCUMENT

SPH22

FedEx. US Airbill
Express

FedEx Tracking Number 8729 9003 8512

Form ID No. 0215

1 From *Please print and press hard.*

Date 12/20/10 Sender's FedEx Account Number SENDER'S IF 3194-5042-4 NY

Sender's Name Mark Morgenstern Phone (516) 546-1100

Company PREFERRED ENVIRONMENTAL SVCS

Address 323 MERRICK AVE Dept./Floor/Suite/Room

City NORTH MERRICK State NY ZIP 11566

2 Your Internal Billing Reference First 24 characters will appear on invoice Kleg Lu Original

3 To

Recipient's Name Log-In Dept. Phone (413) 525-2332

Company Con-Test Analytical Laboratory

Address 39 Spruce Street Dept./Floor/Suite/Room

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address

Use this line for the HOLD location address or for continuation of your shipping address.

City East Longmeadow State MA ZIP 01028

HOLD Weekday FedEx location address REQUIRED. NOT available for FedEx First Overnight.

HOLD Saturday FedEx location address REQUIRED. Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

0423722303

4a Express Package Service * To most locations. *Packages up to 150 lbs.*

- ☐ FedEx Priority Overnight — Next business morning.* Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- ☒ FedEx Standard Overnight — Next business afternoon.* Saturday Delivery NOT available.
- ☐ FedEx First Overnight — Earliest next business morning delivery to select locations.*
- ☐ FedEx 2Day — Second business day.* Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- ☐ FedEx Express Saver — Third business day.* Saturday Delivery NOT available.

4b Express Freight Service ** To most locations. *Packages over 150 lbs.*

- ☐ FedEx 1Day Freight — Next business day.** Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected. FedEx 1Day Freight Booking No. LALL 1200 222 0007
- ☐ FedEx 2Day Freight — Second business day.** Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- ☐ FedEx 3Day Freight — Third business day.** Saturday Delivery NOT available.

5 Packaging * Declared value limit $500.

☐ FedEx Envelope* ☐ FedEx Pak* Includes FedEx Small Pak and FedEx Large Pak. ☐ FedEx Box ☐ FedEx Tube ☒ Other

6 Special Handling and Delivery Signature Options

☐ SATURDAY Delivery NOT available for FedEx Standard Overnight, FedEx Express Saver, or FedEx 3Day Freight.

☐ No Signature Required — Package may be left without obtaining a signature for delivery.
☐ Direct Signature — Someone at recipient's address may sign for delivery. Fee applies.
☐ Indirect Signature — If no one is available at recipient's address, someone at a neighboring address may sign for delivery. For residential deliveries only. Fee applies.

Does this shipment contain dangerous goods?

One box must be checked.

☒ No ☐ Yes As per attached Shipper's Declaration ☐ Yes Shipper's Declaration not required. ☐ Dry Ice Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging or placed in a FedEx Express Drop Box.

☐ Cargo Aircraft Only

7 Payment *Bill to:*

☒ Sender Acct. No. in Section 1 will be billed. Enter FedEx Acct. No. or Credit Card No. below. ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

FedEx Acct. No. / Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value†
1	42.85 lbs.	$ ____ .00

†Our liability is limited to $100 unless you declare a higher value. See back for details. By using this Airbill you agree to the service conditions on the back of this Airbill and in the current FedEx Service Guide, including terms that limit our liability.

605

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PULL AND RETAIN THIS COPY BEFORE AFFIXING TO THE PACKAGE. NO POUCH NEEDED.

Project: Kliegman Brother's Site OU1 - Site Management
Contractors: Camp Dresser & McKee, Preferred Environmental Services, and Envirotrac Environmental Ltd.
CDM Job No: D-006131-7
Site No: 2-41-031
CDM Project Manager: John Blaum

CDM
15 British American Boulevard
Airport Park
Latham, NY 12110
Telephone: 518.782.4500
Fax: 518.786.3810

DAILY REPORT

Day: S | **M** | T | W | TH | F | S
Date: 20-Dec-10
REPORT No.
PAGE No. 1

PREPARED BY: MM TITLE: Site Rep.

WEATHER	Bright Sun	Partly Cloudy	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Light	Moderate	High		
HUMIDITY	Dry	Moderate	Humid		
WIND DIR	NE	NW	SE	SW	
	N	S	E	W	

AVERAGE FIELD FORCE

Name of Contractor	Title	Hours Worked	Remarks
Marc Morgenstern	Technician	13:25-1400	Preferred

VISITORS

Name	Time (From - To)	Representing	Remarks

EQUIPMENT AT THE SITE

I = Idle W = Working

1. Camera - W	3. Pressure Gauges - W	
2. PID - W	4. Velocity & Temperature Meter - W	

OPERATION & MAINTENANCE ACTIVITIES

CDM/Preferred Site Representative: Marc Morgenstern - Preferred

DESCRIPTION OF WORK PERFORMED AND OBSERVED

13:25 - MM Onsite.

13:26 - URS system down upon arrival with knock out alarm activated - URS system hours were 22770.3. GWTT system was running properly.

13:33 - Set up pump and purged 7 gallons of knockout water from URS tank into 55-gallon drum.

13:37 - All water removed from URS knock out tank, system restarted.

13:45 - Start purging 14 gallons of KO water GWTT knock out tank into 55-gallon drum while system is still running.

13:52 - All water removed from GWTT knockout tank. two full and one 3/4 full, 55-gallon drums containing knock out water onsite.

14:00 - MM offsite. Door is secured.

☐ - Designates report is continued on additional pages

CDM/Preferred Site Representative: Marc Morgenstern Project Manager: **J. Blaum**

Project: Kliegman Brother's Site OU1 - Site Management
Contractors: Camp Dresser & McKee, Preferred Environmental Services, and Envirotrac Environmental Ltd.
CDM Job No: D-006131-7
Site No: 2-41-031
CDM Project Manager: John Blaum

CDM
15 British American Boulevard
Airport Park
Latham, NY 12110
Telephone: 518.782.4500
Fax: 518.786.3810

DAILY REPORT

Day:	S	M	T	W	TH	F	S

Date: 3-Jan-11
REPORT No. 133
PAGE No. 1

PREPARED BY: Marc Morgenstern TITLE: Site Rep.

WEATHER	Bright Sun	Partly Cloudy	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Light	Moderate	High		
HUMIDITY	Dry	Moderate	Humid		
WIND DIR	NE	NW	SE	SW	
	N	S	E	W	

AVERAGE FIELD FORCE

Name of Contractor	Title	Hours Worked	Remarks
Marc Morgenstern	Technician	12:30-14:22	Preferred

VISITORS

Name	Time (From - To)	Representing	Remarks

EQUIPMENT AT THE SITE

I = Idle W = Working

1. Camera - W	3. Pressure Gauges - W	5. Forklift - W
2. PID - W	4. Velocity & Temperature Meter - W	

OPERATION & MAINTENANCE ACTIVITIES

CDM/Preferred Site Representative: Marc Morgenstern - Preferred

DESCRIPTION OF WORK PERFORMED AND OBSERVED

12:30 -MM of Preferred arrives onsite. Both systems are down upon arrival due to knock out tank high level alarms. URS Hrs - 23,028.2 GWTT Hrs - 22,524.0

12:38 - Monthly O&M begins - start purging knock out water from both systems into 55-gallon drums.

12:41 - GWTT system restarted.

12:46 - URS system restarted. Start collecting system measurements.

13:50 - Monthly O&M complete.

14:14 - After setting up summa canisters, Preferred noticed that no gauges were sent with summa canisters for monthly sampling. Per Phillip Dixon, no samples were collected.

14:22 - Preferred offsite and front door locked.

[x] - Designates report is continued on additional pages

CDM/Preferred Site Representative: **Marc Morgenstern (Preferred)** Project Manager: **J. Blaum**

CDM

15 British American Boulevard, Airport Park, Latham, NY 12110 tel: (518) 782-4500 fax: (518) 786-3810

PREFERRED ENVIRONMENTAL SERVICES

323 Merrick Avenue - North Merrick, New York 11566 Tel: (516) 546-1100 Fax : (516) 213-8156

KLIEGMAN BROTHERS OU #1
Contract No. D006547, Site No. 2-41-031
Monitoring Table November 24, 2010

DATE: January 3, 2011 **DAY:** Monday **TECHNICIAN:** Marc Morgenstern

Weather: Sunny 30°F

GWTT EQUIPMENT INFORMATION

B-201 **STATUS:** **ON** OFF **HOURS:** 22,524.0

TIME	PI 201 in w.c.	PI 202 in. w.c.	PI 203 in. w.c.	FI 201 scfm	TI 201 deg F	FI 101 cf/min	FI 102 cf/min	FI 103 cf/min	AP 101		AP 102		AP 103		Comments
									Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	
13:00	54	46	25	285	108	50	40	100	2,215	41.7	>15,000	41.1	2,484	44	System down upon arrival due to knock out high level alarm. AP 102 velocity consistently above 15,000 fpm

B-202 **STATUS:** ON **OFF** **HOURS:** 195.9

TIME	PI 204 in w.c.	PI 205 in. w.c.	PI 206 in. w.c.	FI 202 scfm	TI 202 deg F	FI 101 cf/min	FI 102 cf/min	FI 103 cf/min	AP 101		AP 102		AP 103		Comments
									Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

DATE: January 3, 2011 **DAY:** Monday **TECHNICIAN:** Marc Morgenstern

Weather: Sunny 30°F

NEW VMP WELL INFORMATION

VMP-1

TIME	WH VOC ppm	WH VAC. In. w.c.

Comments: Monitoring point under significant snow and ice.

VMP-2

TIME	WH VOC ppm	WH VAC. In. w.c.
13:44	0.0	0.14

Comments:

VMP-3

TIME	WH VOC ppm	WH VAC. In. w.c.
13:46	0.0	0.01

Comments:

VMP-4

TIME	WH VOC ppm	WH VAC. In. w.c.
13:50	0.0	0.01

Comments:

VMP-5

TIME	WH VOC ppm	WH VAC. In. w.c.
13:42	0.0	0.29

Comments:

SS-1

TIME	WH VOC	WH VAC In. W.C.

SS-2

TIME	WH VOC	WH VAC In. W.C.

SS-3

TIME	WH VOC	WH VAC In. W.C.

Comments: Access was not available to monitoring points inside building.

VMP-6

TIME	WH VOC	WH VAC In. W.C.

VMP-7

TIME	WH VOC	WH VAC In. W.C.

DATE: January 3, 2011 **DAY:** Monday **TECHNICIAN:** Marc Morgenstern

Weather: Sunny 30°F

NEW SVE WELL INFORMATION

SVE-7S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:24	64.2	13	260	45.4

Comments: Valve at well head is open 100%.

SVE-7D

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:26	52.2	4	1,022	46.3

Comments: Valve at well head is open 50%.

SVE-8S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:22	0.4	11	331	46.2

Comments: Valve at well head is open 100%.

SVE-8D

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:18	8.6	4	255	50.7

Comments: Valve at well head is open 50%.

SVE-9S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:14	0.1	7	202	43.3

Comments: Valve at well head is open 100%.

SVE-10S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:12	0.1	5	230	45.3

Comments: WH Vac and Velocity significantly lower than last O&M measurements, likely due to recent system restart. Valve at well head is open 100%

AIR SAMPLING INFORMATION

Was sampling completed today: Yes **No**

Time	Canister ID / Pressure Gauge ID	Sample ID / Canister Size	Start Pressure ("HG)	End Pressure ("HG)

Time	Canister ID / Pressure Gauge ID	Sample ID / Canister Size	Start Pressure	End Pressure
NA	NA	NA	NA	NA

Gauges not provided with summa canisters therefore, no sampling conducted

DATE: **January 3, 2011** **DAY:** **Monday** **TECHNICIAN:** **Marc Morgenstern**

Weather: **Sunny 30°F**

URS EQUIPMENT INFORMATION

RB-1 **STATUS:** ***ON*** **OFF** **HOURS:** **23,028.2**

TIME	SVE-1 in. w.c.	SVE-6D in. w.c.	SVE-6S in. w.c.	P-101 in. w.c.	P-102 in. w.c.	P-103 in. w.c.	SVE-1 ft/min	SVE-6D ft/min	SVE-6S ft/min	T-1 deg F	F-1 scfm	Comments:
13:10	16	24	17	35	39	8.9	>15,000	2,589	1,550	95	157	System down upon arrival due to knock out high level alarm. Velocity on SVE-1 consistently above 15,000 fpm. Velocity on SVE-6D and 6S increased since last O&M measurements.

EXISTING URS WELL INFORMATION

URS SVE-1

TIME	WH VOC ppm	WH VAC. In. w.c.

Comments: SVE-1 was under significant snow and ice.

URS SVE-6D

TIME	WH VOC ppm	WH VAC. In. w.c.
13:38	0.0	13

Comments:

URS SVE-6S

TIME	WH VOC ppm	WH VAC. In. w.c.
13:38	0.0	17

Comments:

DATE: January 3, 2010 **DAY:** Monday **TECHNICIAN:** Marc Morgenstern

Weather: Sunny 30°F

GAC ADSORBERS

GWTT System

TIME	TI 203 deg F	FI 203 cf/min	PI 210 in. w.c.	GAC LEAD INF ppm	GAC LEAD EFF ppm	GAC LAG EFF/STACK ppm	Comments:
14:14	102	290	1	160	0.8	0.0	Readings taken directly from sample port
14:16				141.0	0.4	0.0	Readings taken from Tedlar air Bag

System Notes

System down upon arrival due to knock out high level alarm.

Cumulative Hours To Date : 24,814.73 Hours

Condensate in K/O Drum: 20 Gallons

Which is the Lead Absorber? **GAC 1** or GAC 2

Dilution: *Open* or ***Closed*** _____%

URS System

TIME	GAC LEAD INF ppm	GAC LEAD EFF ppm	GAC LAG EFF/STACK ppm	Comments:
14:10	144	3.1	0.0	Readings taken directly from sample port
14:12	120.0	3.0	0.0	Readings taken from Tedlar air Bag

System Notes

System down upon arrival due to knock out high level alarm.

Cumulative Hours To Date: 25,149.48 Hours

Condensate in K/O Drum: 8 Gallons

Which is the Lead Absorber? **GAC 1** or GAC 2

Dilution: Open or ***Closed*** _____%

Amount Condensate Collected in 55 gallon drums to date: 726.5

Drums currently onsite for condensate collection: 3 Drums In Use: 3

*** (1) one additional drum of spent carbon filters is currently onsite.**

Overall log notes/comments	
WH: Well Head	INF: Influent
WH VAC: Well Head Vacuum	EFF: Effluent
WH AP: Well Head Anemometer Point (Velocity)	GAC: Granular Activated Carbon
VOC: Volatile Organic Compound concentration	cf/min: Cubic Feet Per Minute (flow rate)
in. w.c.: inches of water column	ft/min: Feet per Minute (velocity)
ppm: parts per million	deg F: degrees Fahrenheit
SVE: Soil Vapor Extraction	AP: Anemometer Point (at manifold)
VMP: Vapor Monitoring Point	

GWTT Blower Test Data for B-202	
Date	**Test Length**
5/13/2009	18 Minutes
12/9/2009	51 Minutes
12/24/2009	In Operation
1/6/2010	Out of Operation
4/14/2010	48 Minutes
9/22/2010	58 Minutes

During Testing, Filters and KO Drums are checked on Both Systems

GWTT Blower Lubrication Data (B-201)		
DATE	**No. Pumps from Grease Gun**	**Was Noise Alleviated?**
10/7/2009	3	Yes
10/21/2009	4	Yes
11/18/2009	4	Yes
12/9/2009	4	Yes
1/6/2010	8	No
3/24/2010	8	Yes
9/22/2010	5	Yes

One pump from the grease gun delivers approximately

PHOTOGRAPHIC LOG
Date: 1-3-11
CDM Job No. D-006131-7
KLIEGMAN BROTHERS OU#1
SITE No. 2-41-031

PHOTO	DATE	TIME	DESCRIPTION	COMMENTS
Picture 001.jpg	1/3/2011	PM	Knock out water was drained from both systems into a 55-gallon drum.	
Picture 014.jpg	1/3/2011	PM	Velocity measurements were collected from the well heads of the GWTT system.	

Photos (1.3.11)

Picture 001.jpg - Knock out water was drained from both systems into a 55-gallon drum.

Picture 014.jpg - Velocity measurements were collected from the well heads of the GWTT system.

Project: Kliegman Brother's Site OU1 - Site Management
Contractors: Camp Dresser & McKee, Preferred Environmental Services, and Envirotrac Environmental Ltd.
CDM Job No: D-006131-7
Site No: 2-41-031
CDM Project Manager: John Blaum

CDM
15 British American Boulevard
Airport Park
Latham, NY 12110
Telephone: 518.782.4500
Fax: 518.786.3810

DAILY REPORT

Day:	S	M	T	W	TH	F	S

Date: 5-Jan-11
REPORT No. 134
PAGE No. 1

PREPARED BY: MM TITLE: Site Rep.

WEATHER	Bright Sun	Partly Cloudy	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Light	Moderate	High		
HUMIDITY	Dry	Moderate	Humid		
WIND DIR	NE	NW	SE	SW	
	N	S	E	W	

AVERAGE FIELD FORCE

Name of Contractor	Title	Hours Worked	Remarks
Marc Morgenstern	Technician	6:40-15:05	Preferred

VISITORS

Name	Time (From - To)	Representing	Remarks
Mr. Kangadis	7:17 - 7:19	Gourmet Factory	Provided Access to interior building
Mike Allegro	7:15 - 15:05	Envirotrac Ltd.	Carbon change out activities
Dale Konas	8:10 - 8:32	Envirotrac Ltd.	Replacement of FI203 flow meter
Dave Webber	8:10 - 8:32	Envirotrac Ltd.	Replacement of FI203 flow meter
Mike Bomislawsaki	8:32 - 15:05	AARCO Environmental Services Corp.	Carbon change out activities
Bryan Wyble	8:32 - 15:05	AARCO Environmental Services Corp.	Carbon change out activities
Tom Slee	8:32 - 15:05	AARCO Environmental Services Corp.	Carbon change out activities

EQUIPMENT AT THE SITE

I = Idle W = Working

1. Camera - W	3. Pressure Gauges - W	5. Forklift - W
2. PID - W	4. Velocity & Temperature Meter - W	6. Skid Steer - W

OPERATION & MAINTENANCE ACTIVITIES

CDM/Preferred Site Representative: Marc Morgenstern - Preferred

DESCRIPTION OF WORK PERFORMED AND OBSERVED

6:40 - Preferred arrives onsite and opens front rollup gate. Both systems running upon arrival.

6:55 - O&M starts

7:15 - Mike Allegro of Envirotrac arrives onsite for carbon change out activities.

7:17 - Mr. Kangadis onsite to open building for indoor monitoring, as it was not completed during previous O&M event. Mr. Kangadis immediately leaves site.

7:30 - System air samples collected.

8:05 - O&M Complete. Preferred locks building door per Mr. Kangadis.

8:10 - Dale Konas and Dave Weber of Envirotrac arrive onsite to replace the FI203 flow meter in the GWTT system.

8:32 - AARCO onsite with box truck, Guzzler, and roll-off truck containing the forklift and skid steer. Flow meter, FI203, replaced and the two Envirotrac technicians offsite.

8:45 - AARCO starts snow removal with skid steer to gain access to the carbon vessels.

9:00 - AARCO unloads 3,000 lbs of new carbon and 4 drums for knock out water storage from box truck.

9:10 - Both systems shut down for carbon change out.

9:38 - Airline valve broke on Guzzler truck, AARCO leaves site to purchase replacement part.

9:41 - Both system knock out drums drained into onsite 55-gallon drum while systems are down.

10:39 - Horwith Trucking Inc. onsite w/ 8,000 lbs of new carbon.

11:50 - AARCO unloads new carbon from Horwith truck.

12:10 - Guzzler repaired - removing of spent carbon started from both URS Gac #1 and #2 and from GWTT Lead Gac #1started.

12:27 - Decanting of spent carbon into 4 containment bags started.

13:25 - Decanting of spent carbon complete. 6 bags (6,000 lbs) of spent carbon are loaded onto the Horwith Truck. Manifest No. 000171738JJK. Truck EPA ID No. PAD146714878

14:06 - GWTT system restarted with new Lead Gac No. 2

14:17 - URS system restarted with new Lead Gac No. 1 and Lag Gac. No. 2.

14:40 - Four 55-gallon drums of knock out water loaded onto AARCO box truck. Manifest No. 003190355 FLE. Truck EPA ID No. NYR000107326. Additionally, AARCO loads 7,000 lbs of new carbon into box truck for future use.

15:05 - All Parties offsite. Preferred closes front rollup gate.

☐ - Designates report is continued on additional pages

CDM/Preferred Site Representative: Marc Morgenstern Project Manager: **J. Blaum**

CHAIN OF CUSTODY RECORD

con-test ANALYTICAL LABORATORY
Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com
www.contestlabs.com
39 Spruce Street
East longmeadow, MA 01028

Company Name: CDM
Telephone: 313-963-1313
Address: 1 Woodward Avenue, Suite 1500
Detroit, MI 48226
Project # Kliegman OU #1
Client PO# D-006131-2
Attention: Phillip Dixon
Project Location: 76-01 77th Avenue, Glendale, NY
Sampled By: Marc Morgenstern (Preferred)

Project Proposal Provided? (for billing purposes)
○ yes _____ proposal date

DATA DELIVERY (check all that apply)
○ FAX ◉ EMAIL ○ WEBSITE
Fax #
Email: Dixonpj@cdm.com and halletthl@cdm.com
Format: ◉ PDF ◉ EXCEL ○ GIS
○ OTHER _____
○ "Enhanced Data Package"

Con-Test Lab ID (laboratory use only)	Client Sample ID / Description	Collection Beginning Date/Time	Collection Ending Date/Time	Composite	Grab	*Matrix Code	Conc Code	TO-15	# of Containers	** Preservation	***Container Code
	GWTT EFFLUENT / (Canister ID=1763 PG=5038)	1-5-11 / 7:45	1-5-11 / 7:45			O	u	✓	4	None	S
	URS EFFLUENT / (Canister= 1253 PG=5029)	1-5-11 / 7:38	1-5-11 / 7:38			O	u	✓	4	None	S
	GWTT INFLUENT / (Canister ID=1480 PG=5030)	1-5-11 / 7:47	1-5-11 / 7:47			O	u	✓	4	None	S
	URS INFLUENT / (Canister ID=1523 PG=5036	1-5-11 / 7:35	1-5-11 / 7:35			O	u	✓	4	None	S

ANALYSIS REQUESTED

Dissolved Metals
○ Field Filtered
○ Lab to Filter

***Cont. Code:**
A=amber glass
G=glass
P=plastic
ST=sterile
V= vial
S=summa can
T=tedlar bag
O=Other

****Preservation**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium bisulfate
X = Na hydroxide
T = Na thiosulfate
O = Other_____

*Matrix Code:
GW= groundwater
WW= wastewater
DW= drinking water
A = air
S = soil/solid
SL = sludge
O = other SOIL GAS

Comments:
PG= Pressure Gauge Identification
Data Enhancement/RCP = Category B

Please use the following codes to let Con-Test know if a specific sample may be high in concentration in Matrix/Conc. Code Box:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Turnaround ††
◉ 7-Day
❐ 10-Day
❐ Other ____
RUSH †
❐ †24-Hr ❐ †48-Hr
❐ †72-Hr ❐ †4-Day
† Require lab approval

Detection Limit Requirements
Massachusetts:
Connecticut:
Other:

Is your project MCP or RCP ?
○ MCP Form Required
◉ RCP Form Required
○ MA State DW Form Required PWSID # _____

nelac AIHA NELAC & AIHA Certified
WBE/DBE Certified

†† TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

PLEASE BE CAREFUL NOT TO CONTAMINATE THIS DOCUMENT

SPH22

SPH22

21

100

FedEx® US Airbill
Express

FedEx Tracking Number 8729 9003 8534

Form ID No. 0215

From *Please print and press hard.*

Date 11/6/11

Sender's FedEx Account Number 3194-5042-4

Sender's Name Marc Morgenstern Phone 516) 546 -1100

Company PREFERRED ENVIRONMENTAL SVCS

Address 323 MERRICK AVE

Dept/Floor/Suite/Room

City NORTH MERRICK State NY ZIP 11566

Your Internal Billing Reference
First 24 characters will appear on invoice

To

Recipient's Name Log-In Dept Phone (413) 525-2332

Company Con-test Analytical Laboratory

Address 39 Spruce Street

We cannot deliver to P.O. boxes or P.O. ZIP codes. Dept/Floor/Suite/Room

Address

Use this line for the HOLD location address or for continuation of your shipping address.

East Long Meadow State MA ZIP 01028

0423722303

HOLD Weekday
FedEx location address REQUIRED. NOT available for FedEx First Overnight.

HOLD Saturday
FedEx location address REQUIRED. Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

4a Express Package Service * To most locations. *Packages up to 150 lbs.*

- ☐ FedEx Priority Overnight — Next business morning.* Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- ☒ FedEx Standard Overnight — Next business afternoon.* Saturday Delivery NOT available.
- ☐ FedEx First Overnight — Earliest next business morning delivery to select locations.*
- ☐ FedEx 2Day — Second business day.* Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- ☐ FedEx Express Saver — Third business day.* Saturday Delivery NOT available.

4b Express Freight Service ** To most locations. *Packages over 150 lbs.*

- ☐ FedEx 1Day Freight — Next business day.** Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
  FedEx 1Day Freight Booking No.
- ☐ FedEx 2Day Freight — Second business day.** Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- ☐ FedEx 3Day Freight — Third business day.** Saturday Delivery NOT available.

5 Packaging * Declared value limit $500.

- ☐ FedEx Envelope*
- ☐ FedEx Pak* — Includes FedEx Small Pak and FedEx Large Pak.
- ☐ FedEx Box
- ☐ FedEx Tube
- ☒ Other

6 Special Handling and Delivery Signature Options

- ☐ SATURDAY Delivery — NOT available for FedEx Standard Overnight, FedEx Express Saver, or FedEx 3Day Freight.
- ☐ No Signature Required — Package may be left without obtaining a signature for delivery.
- ☐ Direct Signature — Someone at recipient's address may sign for delivery. *Fee applies.*
- ☐ Indirect Signature — If no one is available at recipient's address, someone at a neighboring address may sign for delivery. For residential deliveries only. *Fee applies.*

Does this shipment contain dangerous goods?
One box must be checked.

- ☒ No
- ☐ Yes — As per attached Shipper's Declaration.
- ☐ Yes — Shipper's Declaration not required.
- ☐ Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging or placed in a FedEx Express Drop Box.

☐ Cargo Aircraft Only

7 Payment *Bill to:*

- ☒ Sender — Acct. No. in Section 1 will be billed.
- ☐ Recipient
- ☐ Third Party
- ☐ Credit Card
- ☐ Cash/Check

Enter FedEx Acct. No. or Credit Card No. below.

FedEx Acct. No. / Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value†
	____ lbs.	$ ____ .00

†Our liability is limited to $100 unless you declare a higher value. See back for details. By using this Airbill you agree to the service conditions on the back of this Airbill and in the current FedEx Service Guide, including terms that limit our liability.

605

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PULL AND RETAIN THIS COPY BEFORE AFFIXING TO THE PACKAGE. NO POUCH NEEDED.

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	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
				000171738 JJK

GENERATOR

5. Generator's Name and Mailing Address

Generator's Site Address (if different than mailing address)

Generator's Phone:

6. Transporter 1 Company Name — U.S. EPA ID Number

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address — U.S. EPA ID Number

Facility's Phone:

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
	1.					
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information

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 — Signature — Month Day Year

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 — Signature — Month Day Year

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.

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 Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

GENERATOR'S INITIAL COPY

HORWITH TRUCKS, INC.

ROUTE 329 BOX 7, NORTHAMPTON, PA 18067
1-800-220-8807

MANIFEST # #1511

TRUCK # 589 TR # Von # 851

DRIVER D. Gorr

PICK UP: 1/5 (DATE) / 9A (TIME) / _____ (WO #) _____ (PO #)

NAME: Siemens CODE

ADDRESS: 624 Evans

Elizabeth, NJ

TIME IN: _____ TIME OUT: _____ TOTAL TIME: _____ $ _____

DELAY EXPLANATION: _____

X _____ 1/5/11
SIGNATURE: (PICK-UP)

~~RE-MANIFEST:~~ Stop #2 1/5 (NAME) 9A Klegmon Bos (ADDRESS) Queens, NY 0001711385JK

TIME IN: _____ TIME OUT: _____ TOTAL TIME: _____ $ _____

DELAY EXPLANATION: Delivery + Pickup Driver Unload & Load

X As Agent for NYSDEC
SIGNATURE: (INTERMEDIATE)

UNLOAD: 1/5 (DATE) _____ (TIME)

☐ OTHER Horwith Yard (Today) $ _____

CWM ☐	GROWS ☐	MICHIGAN ☐ DISPOSAL	AMERICAN ☐ LANDFILL	CLEAN ☐ HARBORS	SUPERIOR ☐ ONYX
Model City, NY	Morrisville, PA	Belleville, MI	Waynesburg, OH	Corunna, Ontario, Canada	Kersey, PA

TIME IN: _____ TIME OUT: _____ TOTAL TIME: _____ $ _____

DELAY EXPLANATION: _____

_____

_____
SIGNATURE: (UNLOADING SITE)

$ _____ $ _____

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	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NYD[illegible]	1	[illegible]	003195355 FLE

GENERATOR

5. Generator's Name and Mailing Address
NYSDEC
625 BROADWAY
ALBANY NY 12233 (518)402-9814
Generator's Phone:

Generator's Site Address (if different than mailing address)
NYSDEC
76-01 77TH AVENUE
GLENDALE NY 11385 (518)402-9814

6. Transporter 1 Company Name
[illegible]
U.S. EPA ID Number
[illegible]

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
CHEMICAL POLLUTION CONTROL LLC
120 SOUTH FOURTH STREET
Facility's Phone: BAY SHORE, NY 11706 (631) 586-9330
U.S. EPA ID Number
NYD[illegible]

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. NA3077 HAZARDOUS WASTE, LIQUID, N.O.S. (TETRACHLOROETHYLENE, WATER) 9 PGIII		CM		G	D039		
X	2. NA3077 HAZARDOUS WASTE, SOLID, N.O.S. (TETRACHLOROETHYLENE) 9 PGIII (D039)		DM		P	D039	F002	
	3.							
	4.							

14. Special Handling Instructions and Additional Information
[illegible]

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 | Signature | Month | Day | Year

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 | Signature | Month | Day | Year

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	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 | Day | Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

GENERATOR'S INITIAL COPY

CHEMICAL POLLUTION CONTROL, LLC OF NEW YORK-A PSC, LLC COMPANY

NOTIFICATION FOR WASTES RESTRICTED FROM LAND DISPOSAL

Generator Name: NYSDEC Manifest # 003190251 FLS Line Item # (s) ~~1,2~~ 1 only

EPA ID# NYR000125959

1) **Identify** by placing the line item number(s) in the corresponding box(es) which wastes are wastewaters or non-wastewaters according to the definition in 6 NYCRR 376.1(b)(1)(vi) Wastewater _____ Non-wastewater ✓

2) **Identify** all of the NY State/USEPA waste codes* and subcategories that apply to this shipment, as defined by 6 NYCRR 371 / 6 NYCRR 376 / 40 CFR 261/40 CFR 268

*For waste streams which carry the waste codes D001, D002 or D012 through D043, the Underlying Hazardous Constituents (UHC) found in 40 CFR 268.48 must be identified. Include a copy of the Underlying Hazardous Constituents (U.H.C.) Form or list the U.H.C. on this form for the waste stream. If the waste requires identification of the U.H.C. but none are present, place an 'X' in the space provided under 'No UHC'.

Line Item	Waste Code	Description	No UHC	Line Item	Waste Code	Description	No UHC
~~1~~	D039	Tetrachloroethylene					
~~1,2~~	P002	spent Solvent.					

3) **List the line item number next to the applicable category.**

✓ **A. RESTRICTED WASTE REQUIRES TREATMENT**
This waste must be treated to the applicable standards set forth in 6 NYCRR 376 or 40 CFR 268.32.

___ **B. RESTRICTED WASTE IS SUBJECT TO A VARIANCE**
This waste is subject to exemption from a prohibition on the type of land disposal utilized for the waste, such as a case-by-case extension under 268.5, an exemption under 268.6, or a nationwide capacity variance [see 268.7(a)(3)]. All variances are regulated under 6 NYCRR 376.1(a)(5).
Please list the date the waste is subject to the prohibitions _____

___ **C: LAB PACK QUALIFYING FOR ALTERNATIVE TREATMENT UNDER 6 NYCRR 376.4(C)(3)/40 CFR 268.42(C)**
This waste contains wastes listed in 6 NYCRR 376, Appendix 38, as applicable.
"I certify under penalty of law that I personally have examined and am familiar with the waste and that the lab pack contains only wastes which have not been excluded under appendix IV to 40 CFR 268 or solid wastes not subject to regulation under 40 CFR 261. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment."

4) **Identify** the line item(s) in the corresponding space(s) below for which attachments are included in this notification by writing in the line item number next to the applicable attachment.

_____ U.H.C _____ NY376 _____ ANALYSIS _____ OTHER (SPECIFY) _____

Waste analysis is attached where available, otherwise, the information contained herein is based upon my thorough knowledge of the waste(s).
I hereby certify that I believe that the information I submitted is true, accurate and complete.

Signature Mark Monsterra Agent for NYSDEC Title Hydrogeologist Date 1/5/11

(Rev. 12/09) Form #2317

CDM

15 British American Boulevard, Airport Park, Latham, NY 12110 tel: (518) 782-4500 fax: (518) 786-3810

PREFERRED ENVIRONMENTAL SERVICES

323 Merrick Avenue - North Merrick, New York 11566 Tel: (516) 546-1100 Fax : (516) 213-8156

KLIEGMAN BROTHERS OU #1
Contract No. D006547, Site No. 2-41-031
Monitoring Table January 5, 2011

DATE: January 05, 2011 **DAY:** Wednesday **TECHNICIAN:** Marc Morgenstern

Weather: Partly Cloudy 30°F

GWTT EQUIPMENT INFORMATION

B-201 **STATUS:** **ON** OFF **HOURS:** 22,566.2

TIME	PI 201 in w.c.	PI 202 in. w.c.	PI 203 in. w.c.	FI 201 scfm	TI 201 deg F	FI 101 cf/min	FI 102 cf/min	FI 103 cf/min	AP 101		AP 102		AP 103		Comments
									Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	
6:50	54	47	26	285	113	50	50	100	>15,000	43.1	>15,000	43.6	2,979	44.4	AP 102 velocity consistently above 15,000 fpm. AP 101 velocity increased since last O&M measurement.

B-202 **STATUS:** ON **OFF** **HOURS:** 195.9

TIME	PI 204 in w.c.	PI 205 in. w.c.	PI 206 in. w.c.	FI 202 scfm	TI 202 deg F	FI 101 cf/min	FI 102 cf/min	FI 103 cf/min	AP 101		AP 102		AP 103		Comments
									Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

DATE: January 05, 2011 **DAY:** Wednesday **TECHNICIAN:** Marc Morgenstern

Weather: Partly Cloudy 30°F

NEW VMP WELL INFORMATION

VMP-1

TIME	WH VOC ppm	WH VAC. In. w.c.

Comments: Monitoring point under significant snow and ice. On sidewalk.

VMP-2

TIME	WH VOC ppm	WH VAC. In. w.c.
13:44	0.0	0.14

Comments: Measurement collected on 1/3/11.

VMP-3

TIME	WH VOC ppm	WH VAC. In. w.c.
13:46	0.0	0.01

Comments: Measurement collected on 1/3/11.

VMP-4

TIME	WH VOC ppm	WH VAC. In. w.c.
13:50	0.0	0.01

Comments: Measurement collected on 1/3/11.

VMP-5

TIME	WH VOC ppm	WH VAC. In. w.c.
13:42	0.0	0.29

Comments: Measurement collected on 1/3/11.

SS-1

TIME	WH VOC	WH VAC In. W.C.
7:56	0.0	0.5

SS-2

TIME	WH VOC	WH VAC In. W.C.
7:58	0.0	0.31

SS-3

TIME	WH VOC	WH VAC In. W.C.
8:05	0.1	0.25

Comments:

VMP-6

TIME	WH VOC	WH VAC In. W.C.
7:59	0.0	0.22

VMP-7

TIME	WH VOC	WH VAC In. W.C.
8:03	0.0	0.18

DATE: January 05, 2011 **DAY:** Wednesday **TECHNICIAN:** Marc Morgenstern

Weather: Partly Cloudy 30°F

NEW SVE WELL INFORMATION

SVE-7S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:24	64.2	13	260	45.4

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

SVE-7D

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:26	52.2	4	1,022	46.3

Comments: Valve at well head is open 50%. Measurement collected on 1/3/11.

SVE-8S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:22	0.4	11	331	46.2

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

SVE-8D

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:18	8.6	4	255	50.7

Comments: Valve at well head is open 50%. Measurement collected on 1/3/11.

SVE-9S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:14	0.1	7	202	43.3

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

SVE-10S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:12	0.1	5	230	45.3

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

AIR SAMPLING INFORMATION

Was sampling completed today: **Yes** No

Time	Canister ID / Pressure Gauge ID	Sample ID / Canister Size	Start Pressure ("HG)	End Pressure ("HG)
7:35	1523/5036	URS Influent/3L	-28	-5
7:38	1253/5029	URS Effluent/6L	-25	-5
7:45	1763/5038	GWTT Effluent/6L	-27	-5
7:47	1480/5030	GWTT Influent/3L	-25	-5

Time	Canister ID / Pressure Gauge ID	Sample ID / Canister Size	Start Pressure	End Pressure
NA	NA	NA	NA	NA

DATE: January 05, 2011 **DAY:** Wednesday **TECHNICIAN:** Marc Morgenstern

Weather: Partly Cloudy 30°F

URS EQUIPMENT INFORMATION

RB-1 STATUS: ***ON*** **OFF** **HOURS:** 23,070.9

TIME	SVE-1 in. w.c.	SVE-6D in. w.c.	SVE-6S in. w.c.	P-101 in. w.c.	P-102 in. w.c.	P-103 in. w.c.	SVE-1 ft/min	SVE-6D ft/min	SVE-6S ft/min	T-1 deg F	F-1 scfm	Comments:
7:21	16	25	17	34	39	8.7	>15,000	>15,000	1,941	110	168	Velocity on SVE-1 and SVE-6D consistently above 15,000 fpm. Velocity on SVE-6D increased since last O&M measurement.

EXISTING URS WELL INFORMATION

URS SVE-1

TIME	WH VOC ppm	WH VAC. In. w.c.

Comments: SVE-1 was under significant ice.

URS SVE-6D

TIME	WH VOC ppm	WH VAC. In. w.c.
13:38	0.0	13

Comments: Measurement collected on 1/3/11.

URS SVE-6S

TIME	WH VOC ppm	WH VAC. In. w.c.
13:38	0.0	17

Comments: Measurement collected on 1/3/11.

DATE: _January 11, 2011__ **DAY:** Wednesday **TECHNICIAN:** Marc Morgenstern

Weather: Partly Cloudy 30°F

GAC ADSORBERS

GWTT System

TIME	TI 203 deg F	FI 203 cf/min	PI 210 in. w.c.	GAC LEAD INF ppm	GAC LEAD EFF ppm	GAC LAG EFF/STACK ppm	Comments:
7:48	110	290	1	46.3	0.3	0.0	Readings taken directly from sample port
7:49				44.0	0.3	0.0	Readings taken from Tedlar air Bag

System Notes

Replaced FI203 flow meter.

Cumulative Hours To Date : 24,869.12 Hours

Condensate in K/O Drum: 10 Gallons

Which is the Lead Absorber? GAC 1 or **GAC 2**

Dilution: *Open* or ***Closed*** _____%

URS System

TIME	GAC LEAD INF ppm	GAC LEAD EFF ppm	GAC LAG EFF/STACK ppm	Comments:
7:50	25.4	2.4	0.0	Readings taken directly from sample port. Influent reading lower than last O&M Measurement.
7:51	20.1	3.0	0.1	Readings taken from Tedlar Bag. Influent reading lower than last O&M Measurement.

System Notes

Cumulative Hours To Date: 25,203.6 Hours

Condensate in K/O Drum: 5 Gallons

Which is the Lead Absorber? **GAC 1** or GAC 2

Dilution: Open or ***Closed*** _____%

Amount Condensate Collected in 55 gallon drums to date: 726.5

Drums currently onsite for condensate collection: 3 Drums In Use: 1

*** (1) one additional drum of spent carbon filters is currently onsite.**

Overall log notes/comments	
WH: Well Head	INF: Influent
WH VAC: Well Head Vacuum	EFF: Effluent
WH AP: Well Head Anemometer Point (Velocity)	GAC: Granular Activated Carbon
VOC: Volatile Organic Compound concentration	cf/min: Cubic Feet Per Minute (flow rate)
in. w.c.: inches of water column	ft/min: Feet per Minute (velocity)
ppm: parts per million	deg F: degrees Fahrenheit
SVE: Soil Vapor Extraction	AP: Anemometer Point (at manifold)
VMP: Vapor Monitoring Point	

GWTT Blower Test Data for B-202	
Date	**Test Length**
5/13/2009	18 Minutes
12/9/2009	51 Minutes
12/24/2009	In Operation
1/6/2010	Out of Operation
4/14/2010	48 Minutes
9/22/2010	58 Minutes

During Testing, Filters and KO Drums are checked on Both Systems

GWTT Blower Lubrication Data (B-201)		
DATE	**No. Pumps from Grease Gun**	**Was Noise Alleviated?**
10/7/2009	3	Yes
10/21/2009	4	Yes
11/18/2009	4	Yes
12/9/2009	4	Yes
1/6/2010	8	No
3/24/2010	8	Yes
9/22/2010	5	Yes

One pump from the grease gun delivers approximately

PHOTOGRAPHIC LOG
Date: 1-5-11
CDM Job No. D-006131-7
KLIEGMAN BROTHERS OU#1
SITE No. 2-41-031

PHOTO	DATE	TIME	DESCRIPTION	COMMENTS
Picture 001.jpg	1/11/2011	AM	An air sample was collected from the URS system effluent port.	
Picture 002.jpg	1/11/2011	PM	Spent carbon bags were properly labeled and placed into a truck for offsite disposal.	

Project: Kliegman Brother's Site OU1 - Site Management
Contractors: Camp Dresser & McKee, Preferred Environmental Services, and Envirotrac Environmental Ltd.
CDM Job No: D-006131-7
Site No: 2-41-031
CDM Project Manager: John Blaum

CDM
15 British American Boulevard
Airport Park
Latham, NY 12110
Telephone: 518.782.4500
Fax: 518.786.3810

DAILY REPORT

Day:	S	M	T	W	TH	F	S

Date: 5-Jan-11
REPORT No. 134
PAGE No. 1

PREPARED BY: MM TITLE: Site Rep.

WEATHER	Bright Sun	Partly Cloudy	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Light	Moderate	High		
HUMIDITY	Dry	Moderate	Humid		
WIND DIR	NE	NW	SE	SW	
	N	S	E	W	

AVERAGE FIELD FORCE

Name of Contractor	Title	Hours Worked	Remarks
Marc Morgenstern	Technician	6:40-15:05	Preferred

VISITORS

Name	Time (From - To)	Representing	Remarks
Mr. Kangadis	7:17 - 7:19	Gourmet Factory	Provided Access to interior building
Mike Allegro	7:15 - 15:05	Envirotrac Ltd.	Carbon change out activities
Dale Konas	8:10 - 8:32	Envirotrac Ltd.	Replacement of FI203 flow meter
Dave Webber	8:10 - 8:32	Envirotrac Ltd.	Replacement of FI203 flow meter
Mike Bomislawsaki	8:32 - 15:05	AARCO Environmental Services Corp.	Carbon change out activities
Bryan Wyble	8:32 - 15:05	AARCO Environmental Services Corp.	Carbon change out activities
Tom Slee	8:32 - 15:05	AARCO Environmental Services Corp.	Carbon change out activities

EQUIPMENT AT THE SITE

I = Idle W = Working

1. Camera - W	3. Pressure Gauges - W	5. Forklift - W
2. PID - W	4. Velocity & Temperature Meter - W	6. Skid Steer - W

OPERATION & MAINTENANCE ACTIVITIES

CDM/Preferred Site Representative: Marc Morgenstern - Preferred

DESCRIPTION OF WORK PERFORMED AND OBSERVED

6:40 - Preferred arrives onsite and opens front rollup gate. Both systems running upon arrival.

6:55 - O&M starts

7:15 - Mike Allegro of Envirotrac arrives onsite for carbon change out activities.

7:17 - Mr. Kangadis onsite to open building for indoor monitoring, as it was not completed during previous O&M event. Mr. Kangadis immediately leaves site.

7:30 - System air samples collected.

8:05 - O&M Complete. Preferred locks building door per Mr. Kangadis.

8:10 - Dale Konas and Dave Weber of Envirotrac arrive onsite to replace the FI203 flow meter in the GWTT system.

8:32 - AARCO onsite with box truck, Guzzler, and roll-off truck containing the forklift and skid steer. Flow meter, FI203, replaced and the two Envirotrac technicians offsite.

8:45 - AARCO starts snow removal with skid steer to gain access to the carbon vessels.

9:00 - AARCO unloads 3,000 lbs of new carbon and 4 drums for knock out water storage from box truck.

9:10 - Both systems shut down for carbon change out.

9:38 - Airline valve broke on Guzzler truck, AARCO leaves site to purchase replacement part.

9:41 - Both system knock out drums drained into onsite 55-gallon drum while systems are down.

10:39 - Horwith Trucking Inc. onsite w/ 8,000 lbs of new carbon.

11:50 - AARCO unloads new carbon from Horwith truck.

12:10 - Guzzler repaired - removing of spent carbon started from both URS Gac #1 and #2 and from GWTT Lead Gac #1started.

12:27 - Decanting of spent carbon into 4 containment bags started.

13:25 - Decanting of spent carbon complete. 6 bags (6,000 lbs) of spent carbon are loaded onto the Horwith Truck. Manifest No. 000171738JJK. Truck EPA ID No. PAD146714878

14:06 - GWTT system restarted with new Lead Gac No. 2

14:17 - URS system restarted with new Lead Gac No. 1 and Lag Gac. No. 2.

14:40 - Four 55-gallon drums of knock out water loaded onto AARCO box truck. Manifest No. 003190355 FLE. Truck EPA ID No. NYR000107326. Additionally, AARCO loads 7,000 lbs of new carbon into box truck for future use.

15:05 - All Parties offsite. Preferred closes front rollup gate.

☐ - Designates report is continued on additional pages

CDM/Preferred Site Representative: Marc Morgenstern Project Manager: **J. Blaum**

CDM

15 British American Boulevard, Airport Park, Latham, NY 12110 tel: (518) 782-4500 fax: (518) 786-3810

PREFERRED ENVIRONMENTAL SERVICES

323 Merrick Avenue - North Merrick, New York 11566 Tel: (516) 546-1100 Fax : (516) 213-8156

KLIEGMAN BROTHERS OU #1
Contract No. D006547, Site No. 2-41-031
Monitoring Table January 5, 2011

DATE: January 05, 2011 **DAY:** Wednesday **TECHNICIAN:** Marc Morgenstern

Weather: Partly Cloudy 30°F

GWTT EQUIPMENT INFORMATION

B-201 **STATUS:** **ON** OFF **HOURS:** 22,566.2

TIME	PI 201 in w.c.	PI 202 in. w.c.	PI 203 in. w.c.	FI 201 scfm	TI 201 deg F	FI 101 cf/min	FI 102 cf/min	FI 103 cf/min	AP 101		AP 102		AP 103		Comments
									Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	
6:50	54	47	26	285	113	50	50	100	>15,000	43.1	>15,000	43.6	2,979	44.4	AP 102 velocity consistently above 15,000 fpm. AP 101 velocity increased since last O&M measurement.

B-202 **STATUS:** ON **OFF** **HOURS:** 195.9

TIME	PI 204 in w.c.	PI 205 in. w.c.	PI 206 in. w.c.	FI 202 scfm	TI 202 deg F	FI 101 cf/min	FI 102 cf/min	FI 103 cf/min	AP 101		AP 102		AP 103		Comments
									Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	Velocity ft/min	Temp deg F	
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

DATE: January 05, 2011 **DAY:** Wednesday **TECHNICIAN:** Marc Morgenstern

Weather: Partly Cloudy 30°F

NEW VMP WELL INFORMATION

VMP-1

TIME	WH VOC ppm	WH VAC. In. w.c.

Comments: Monitoring point under significant snow and ice. On sidewalk.

VMP-2

TIME	WH VOC ppm	WH VAC. In. w.c.
13:44	0.0	0.14

Comments: Measurement collected on 1/3/11.

VMP-3

TIME	WH VOC ppm	WH VAC. In. w.c.
13:46	0.0	0.01

Comments: Measurement collected on 1/3/11.

VMP-4

TIME	WH VOC ppm	WH VAC. In. w.c.
13:50	0.0	0.01

Comments: Measurement collected on 1/3/11.

VMP-5

TIME	WH VOC ppm	WH VAC. In. w.c.
13:42	0.0	0.29

Comments: Measurement collected on 1/3/11.

SS-1

TIME	WH VOC	WH VAC In. W.C.
7:56	0.0	0.5

SS-2

TIME	WH VOC	WH VAC In. W.C.
7:58	0.0	0.31

SS-3

TIME	WH VOC	WH VAC In. W.C.
8:05	0.1	0.25

Comments:

VMP-6

TIME	WH VOC	WH VAC In. W.C.
7:59	0.0	0.22

VMP-7

TIME	WH VOC	WH VAC In. W.C.
8:03	0.0	0.18

DATE: January 05, 2011 **DAY:** Wednesday **TECHNICIAN:** Marc Morgenstern

Weather: Partly Cloudy 30°F

NEW SVE WELL INFORMATION

SVE-7S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:24	64.2	13	260	45.4

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

SVE-7D

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:26	52.2	4	1,022	46.3

Comments: Valve at well head is open 50%. Measurement collected on 1/3/11.

SVE-8S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:22	0.4	11	331	46.2

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

SVE-8D

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:18	8.6	4	255	50.7

Comments: Valve at well head is open 50%. Measurement collected on 1/3/11.

SVE-9S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:14	0.1	7	202	43.3

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

SVE-10S

TIME	WH VOC ppm	WH VAC in. w.c.	WH AP	
			VELOCITY ft/min	TEMP deg F
13:12	0.1	5	230	45.3

Comments: Valve at well head is open 100%. Measurement collected on 1/3/11.

AIR SAMPLING INFORMATION

Was sampling completed today: **Yes** No

Time	Canister ID / Pressure Gauge ID	Sample ID / Canister Size	Start Pressure ("HG)	End Pressure ("HG)
7:35	1523/5036	URS Influent/3L	-28	-5
7:38	1253/5029	URS Effluent/6L	-25	-5
7:45	1763/5038	GWTT Effluent/6L	-27	-5
7:47	1480/5030	GWTT Influent/3L	-25	-5

Time	Canister ID / Pressure Gauge ID	Sample ID / Canister Size	Start Pressure	End Pressure
NA	NA	NA	NA	NA

DATE: January 05, 2011 **DAY:** Wednesday **TECHNICIAN:** Marc Morgenstern

Weather: Partly Cloudy 30°F

URS EQUIPMENT INFORMATION

RB-1 STATUS: ***ON*** **OFF** **HOURS:** 23,070.9

TIME	SVE-1 in. w.c.	SVE-6D in. w.c.	SVE-6S in. w.c.	P-101 in. w.c.	P-102 in. w.c.	P-103 in. w.c.	SVE-1 ft/min	SVE-6D ft/min	SVE-6S ft/min	T-1 deg F	F-1 scfm	Comments:
7:21	16	25	17	34	39	8.7	>15,000	>15,000	1,941	110	168	Velocity on SVE-1 and SVE-6D consistently above 15,000 fpm. Velocity on SVE-6D increased since last O&M measurement.

EXISTING URS WELL INFORMATION

URS SVE-1

TIME	WH VOC ppm	WH VAC. In. w.c.

Comments: SVE-1 was under significant ice.

URS SVE-6D

TIME	WH VOC ppm	WH VAC. In. w.c.
13:38	0.0	13

Comments: Measurement collected on 1/3/11.

URS SVE-6S

TIME	WH VOC ppm	WH VAC. In. w.c.
13:38	0.0	17

Comments: Measurement collected on 1/3/11.

DATE: _January 11, 2011__ **DAY:** Wednesday **TECHNICIAN:** Marc Morgenstern

Weather: Partly Cloudy 30°F

GAC ADSORBERS

GWTT System

TIME	TI 203 deg F	FI 203 cf/min	PI 210 in. w.c.	GAC LEAD INF ppm	GAC LEAD EFF ppm	GAC LAG EFF/STACK ppm	Comments:
7:48	110	290	1	46.3	0.3	0.0	Readings taken directly from sample port
7:49				44.0	0.3	0.0	Readings taken from Tedlar air Bag

System Notes

Replaced FI203 flow meter.

Cumulative Hours To Date : 24,869.12 Hours

Condensate in K/O Drum: 10 Gallons

Which is the Lead Absorber? GAC 1 or **GAC 2**

Dilution: *Open* or ***Closed*** _____%

URS System

TIME	GAC LEAD INF ppm	GAC LEAD EFF ppm	GAC LAG EFF/STACK ppm	Comments:
7:50	25.4	2.4	0.0	Readings taken directly from sample port. Influent reading lower than last O&M Measurement.
7:51	20.1	3.0	0.1	Readings taken from Tedlar Bag. Influent reading lower than last O&M Measurement.

System Notes

Cumulative Hours To Date: 25,203.6 Hours

Condensate in K/O Drum: 5 Gallons

Which is the Lead Absorber? **GAC 1** or GAC 2

Dilution: Open or ***Closed*** _____%

Amount Condensate Collected in 55 gallon drums to date: 726.5

Drums currently onsite for condensate collection: 3 Drums In Use: 1

*** (1) one additional drum of spent carbon filters is currently onsite.**

Overall log notes/comments	
WH: Well Head	INF: Influent
WH VAC: Well Head Vacuum	EFF: Effluent
WH AP: Well Head Anemometer Point (Velocity)	GAC: Granular Activated Carbon
VOC: Volatile Organic Compound concentration	cf/min: Cubic Feet Per Minute (flow rate)
in. w.c.: inches of water column	ft/min: Feet per Minute (velocity)
ppm: parts per million	deg F: degrees Fahrenheit
SVE: Soil Vapor Extraction	AP: Anemometer Point (at manifold)
VMP: Vapor Monitoring Point	

GWTT Blower Test Data for B-202	
Date	**Test Length**
5/13/2009	18 Minutes
12/9/2009	51 Minutes
12/24/2009	In Operation
1/6/2010	Out of Operation
4/14/2010	48 Minutes
9/22/2010	58 Minutes

During Testing, Filters and KO Drums are checked on Both Systems

GWTT Blower Lubrication Data (B-201)		
DATE	**No. Pumps from Grease Gun**	**Was Noise Alleviated?**
10/7/2009	3	Yes
10/21/2009	4	Yes
11/18/2009	4	Yes
12/9/2009	4	Yes
1/6/2010	8	No
3/24/2010	8	Yes
9/22/2010	5	Yes

One pump from the grease gun delivers approximately

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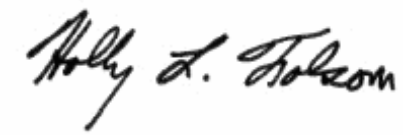
January 3, 2011

Phillip Dixon
Camp, Dresser & McKee - NY
11 British American Boulevard, Suite 200
Latham, NY 12110

Project Location: 76-01 77th Avenue, Glendale NY
Client Job Number:
Project Number: Kliegman OU #1
Laboratory Work Order Number: 10L0668

Enclosed are results of analyses for samples received by the laboratory on December 21, 2010. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Holly L. Folsom
Project Manager

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Camp, Dresser & McKee - NY
11 British American Boulevard, Suite 200
Latham, NY 12110
ATTN: Phillip Dixon

REPORT DATE: 1/3/2011

PURCHASE ORDER NUMBER: D-006131-2

PROJECT NUMBER: Kliegman OU #1

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 10L0668

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: 76-01 77th Avenue, Glendale NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
URS Knock Out	10L0668-01	Ground Water		SW-846 6010B	
				SW-846 6020A	
				SW-846 7470A	
				SW-846 8260B	
				SW-846 8270C	
GWTT Knock Out	10L0668-02	Ground Water		SW-846 6010B	
				SW-846 6020A	
				SW-846 7470A	
				SW-846 8260B	
				SW-846 8270C	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 6010B

Qualifications:

Sample to spike ratio is greater than or equal to 4:1. Spiked amount is not representative of the native amount in the sample. Appropriate or meaningful recoveries cannot be calculated.

Analyte & Samples(s) Qualified:

Iron

10L0668-01RE1[URS Knock Out]

SW-846 8260B

Qualifications:

Continuing calibration did not meet method specifications and was biased on the high side for this compound. Significant uncertainty is associated with the reported value which is likely to be biased on the high side.

Analyte & Samples(s) Qualified:

1,1,1-Trichloroethane

10L0668-02[GWTT Knock Out], B024170-BS1

Response factor is less than method specified minimum acceptable value. Reduced precision and accuracy are associated with reported result.

Analyte & Samples(s) Qualified:

1,4-Dioxane, tert-Butyl Alcohol (TBA)

10L0668-01[URS Knock Out], 10L0668-02[GWTT Knock Out], B024170-BLK1, B024170-BS1

Continuing calibration did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Bromomethane, Carbon Tetrachloride, tert-Butyl Alcohol (TBA)

B024170-BS1

SW-846 8270C

Qualifications:

Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

3-Nitroaniline

10L0668-01[URS Knock Out], 10L0668-02[GWTT Knock Out], B024085-BLK1, B024085-BS1, B024085-BSD1

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:

4-Chloroaniline

B024085-BS1

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD outside of control limits. Reduced precision anticipated for any reported result for this compound.

Analyte & Samples(s) Qualified:

Benzidine

B024085-BS1

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

Benzidine

10L0668-01[URS Knock Out], 10L0668-02[GWTT Knock Out], B024085-BLK1, B024085-BSD1

Continuing calibration did not meet method specifications and was biased on the low side for this compound. Significant uncertainty is associated with the reported value which is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

2-Chloronaphthalene, 4-Nitroaniline, 4-Nitrophenol, Benzoic Acid, Bis(2-chloroisopropyl)ether, Hexachlorocyclopentadiene, N-Nitrosodimethylamine, Pyridine

10L0668-01[URS Knock Out], 10L0668-02[GWTT Knock Out], B024085-BLK1, B024085-BS1, B024085-BSD1

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Daren J. Damboragian
Laboratory Manager

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 76-01 77th Avenue, Glendale NY Sample Description: Work Order: 10L0668

Date Received: 12/21/2010

Field Sample #: URS Knock Out Sampled: 12/17/2010 10:13

Sample ID: 10L0668-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Acrylonitrile	ND	5.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Benzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Bromobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Bromochloromethane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Bromodichloromethane	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Bromoform	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Bromomethane	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
2-Butanone (MEK)	ND	20	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
tert-Butyl Alcohol (TBA)	ND	20	µg/L	1	V-16	SW-846 8260B	12/22/10	12/22/10 23:37	TJR
n-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
sec-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
tert-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Carbon Disulfide	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Carbon Tetrachloride	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Chlorobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Chlorodibromomethane	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Chloroethane	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Chloroform	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Chloromethane	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
2-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
4-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,2-Dibromoethane (EDB)	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Dibromomethane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,2-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,3-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,4-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
trans-1,4-Dichloro-2-butene	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,1-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,2-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,1-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
cis-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
trans-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,3-Dichloropropane	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
2,2-Dichloropropane	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,1-Dichloropropene	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
cis-1,3-Dichloropropene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
trans-1,3-Dichloropropene	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR

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Project Location: 76-01 77th Avenue, Glendale NY Sample Description: Work Order: 10L0668

Date Received: 12/21/2010

Field Sample #: URS Knock Out Sampled: 12/17/2010 10:13

Sample ID: 10L0668-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Diethyl Ether	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Diisopropyl Ether (DIPE)	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,4-Dioxane	67	50	µg/L	1	V-16	SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Ethylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Hexachlorobutadiene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
2-Hexanone (MBK)	ND	10	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Isopropylbenzene (Cumene)	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Methylene Chloride	ND	5.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Naphthalene	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
n-Propylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Styrene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,1,1,2-Tetrachloroethane	1.1	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Tetrachloroethylene	260	10	µg/L	10		SW-846 8260B	12/23/10	12/23/10 16:46	TJR
Tetrahydrofuran	ND	10	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Toluene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,2,3-Trichlorobenzene	ND	5.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,2,4-Trichlorobenzene	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,3,5-Trichlorobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,1,1-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,1,2-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Trichloroethylene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,2,3-Trichloropropane	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
Vinyl Chloride	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
m+p Xylene	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR
o-Xylene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/22/10 23:37	TJR

Surrogates	% Recovery	Recovery Limits	Flag	
1,2-Dichloroethane-d4	101	70-130		12/22/10 23:37
1,2-Dichloroethane-d4	96.3	70-130		12/23/10 16:46
Toluene-d8	95.0	70-130		12/23/10 16:46
Toluene-d8	101	70-130		12/22/10 23:37
4-Bromofluorobenzene	101	70-130		12/22/10 23:37
4-Bromofluorobenzene	100	70-130		12/23/10 16:46

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 76-01 77th Avenue, Glendale NY Sample Description: Work Order: 10L0668

Date Received: 12/21/2010

Field Sample #: URS Knock Out Sampled: 12/17/2010 10:13

Sample ID: 10L0668-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Acenaphthylene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Acetophenone	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Aniline	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Anthracene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Benzidine	ND	10	µg/L	1	R-05	SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Benzo(a)anthracene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Benzo(a)pyrene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Benzo(b)fluoranthene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Benzo(g,h,i)perylene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Benzo(k)fluoranthene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Benzoic Acid	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Bis(2-chloroethoxy)methane	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Bis(2-chloroethyl)ether	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Bis(2-chloroisopropyl)ether	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Bis(2-Ethylhexyl)phthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
4-Bromophenylphenylether	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Butylbenzylphthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Carbazole	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
4-Chloroaniline	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
4-Chloro-3-methylphenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2-Chloronaphthalene	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2-Chlorophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
4-Chlorophenylphenylether	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Chrysene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Dibenz(a,h)anthracene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Dibenzofuran	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Di-n-butylphthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
1,2-Dichlorobenzene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
1,3-Dichlorobenzene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
1,4-Dichlorobenzene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
3,3-Dichlorobenzidine	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2,4-Dichlorophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Diethylphthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2,4-Dimethylphenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Dimethylphthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
4,6-Dinitro-2-methylphenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2,4-Dinitrophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2,4-Dinitrotoluene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2,6-Dinitrotoluene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Di-n-octylphthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
1,2-Diphenylhydrazine (as Azobenzene)	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Fluoranthene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 76-01 77th Avenue, Glendale NY Sample Description: Work Order: 10L0668

Date Received: 12/21/2010

Field Sample #: URS Knock Out Sampled: 12/17/2010 10:13

Sample ID: 10L0668-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Fluorene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Hexachlorobenzene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Hexachlorobutadiene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Hexachlorocyclopentadiene	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Hexachloroethane	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Indeno(1,2,3-cd)pyrene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Isophorone	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
1-Methylnaphthalene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2-Methylnaphthalene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2-Methylphenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
3/4-Methylphenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Naphthalene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2-Nitroaniline	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
3-Nitroaniline	ND	10	µg/L	1	L-04	SW-846 8270C	12/22/10	12/30/10 21:25	BGL
4-Nitroaniline	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Nitrobenzene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2-Nitrophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
4-Nitrophenol	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:25	BGL
N-Nitrosodimethylamine	ND	5.0	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:25	BGL
N-Nitrosodiphenylamine	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
N-Nitrosodi-n-propylamine	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Pentachloronitrobenzene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Pentachlorophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Phenanthrene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Phenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Pyrene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
Pyridine	ND	5.0	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:25	BGL
1,2,4,5-Tetrachlorobenzene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
1,2,4-Trichlorobenzene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2,4,5-Trichlorophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL
2,4,6-Trichlorophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:25	BGL

Surrogates	% Recovery	Recovery Limits	Flag	
2-Fluorophenol	34.8	15-110		12/30/10 21:25
Phenol-d6	24.2	15-110		12/30/10 21:25
Nitrobenzene-d5	60.2	30-130		12/30/10 21:25
2-Fluorobiphenyl	71.7	30-130		12/30/10 21:25
2,4,6-Tribromophenol	97.8	15-110		12/30/10 21:25
Terphenyl-d14	76.1	30-130		12/30/10 21:25

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 76-01 77th Avenue, Glendale NY Sample Description: Work Order: 10L0668

Date Received: 12/21/2010

Field Sample #: URS Knock Out Sampled: 12/17/2010 10:13

Sample ID: 10L0668-01

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aluminum	4.0	0.050	mg/L	1		SW-846 6010B	12/28/10	12/30/10 17:02	OP
Antimony	ND	5.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Arsenic	ND	2.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Barium	56	50	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Beryllium	ND	2.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Cadmium	ND	2.5	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Calcium	20	0.15	mg/L	1		SW-846 6010B	12/28/10	12/30/10 17:02	OP
Chromium	15	5.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Cobalt	ND	5.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Copper	6100	500	µg/L	100		SW-846 6020A	12/28/10	12/29/10 11:34	KSH
Iron	22	0.050	mg/L	1	MS-19	SW-846 6010B	1/3/11	1/3/11 16:22	OP
Lead	19	5.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Magnesium	2.2	0.15	mg/L	1		SW-846 6010B	12/28/10	12/30/10 17:02	OP
Manganese	180	5.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Mercury	ND	0.00010	mg/L	1		SW-846 7470A	12/27/10	12/27/10 16:19	CWB
Nickel	ND	25	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Potassium	3.2	2.0	mg/L	1		SW-846 6010B	12/28/10	1/3/11 11:04	OP
Selenium	ND	25	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Silver	ND	2.5	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Sodium	25	2.0	mg/L	1		SW-846 6010B	12/28/10	12/30/10 17:02	OP
Thallium	ND	1.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Vanadium	ND	25	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH
Zinc	600	50	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:18	KSH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 76-01 77th Avenue, Glendale NY Sample Description: Work Order: 10L0668

Date Received: 12/21/2010

Field Sample #: GWTT Knock Out Sampled: 12/17/2010 10:35

Sample ID: 10L0668-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Acrylonitrile	ND	5.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Benzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Bromobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Bromochloromethane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Bromodichloromethane	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Bromoform	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Bromomethane	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
2-Butanone (MEK)	ND	20	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
tert-Butyl Alcohol (TBA)	ND	20	µg/L	1	V-16	SW-846 8260B	12/22/10	12/23/10 0:06	TJR
n-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
sec-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
tert-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Carbon Disulfide	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Carbon Tetrachloride	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Chlorobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Chlorodibromomethane	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Chloroethane	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Chloroform	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Chloromethane	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
2-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
4-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,2-Dibromoethane (EDB)	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Dibromomethane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,2-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,3-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,4-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
trans-1,4-Dichloro-2-butene	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,1-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,2-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,1-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
cis-1,2-Dichloroethylene	5.3	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
trans-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,3-Dichloropropane	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
2,2-Dichloropropane	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,1-Dichloropropene	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
cis-1,3-Dichloropropene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
trans-1,3-Dichloropropene	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 76-01 77th Avenue, Glendale NY Sample Description: Work Order: 10L0668

Date Received: 12/21/2010

Field Sample #: GWTT Knock Out Sampled: 12/17/2010 10:35

Sample ID: 10L0668-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Diethyl Ether	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Diisopropyl Ether (DIPE)	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,4-Dioxane	ND	50	µg/L	1	V-16	SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Ethylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Hexachlorobutadiene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
2-Hexanone (MBK)	ND	10	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Isopropylbenzene (Cumene)	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Methylene Chloride	ND	5.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Naphthalene	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
n-Propylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Styrene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,1,1,2-Tetrachloroethane	1.5	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Tetrachloroethylene	720	100	µg/L	100		SW-846 8260B	12/23/10	12/23/10 17:18	TJR
Tetrahydrofuran	ND	10	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Toluene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,2,3-Trichlorobenzene	ND	5.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,2,4-Trichlorobenzene	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,3,5-Trichlorobenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,1,1-Trichloroethane	2.8	1.0	µg/L	1	V-06	SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,1,2-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Trichloroethylene	10	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,2,3-Trichloropropane	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
Vinyl Chloride	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
m+p Xylene	ND	2.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR
o-Xylene	ND	1.0	µg/L	1		SW-846 8260B	12/22/10	12/23/10 0:06	TJR

Surrogates	% Recovery	Recovery Limits	Flag	
1,2-Dichloroethane-d4	98.3	70-130		12/23/10 17:18
1,2-Dichloroethane-d4	101	70-130		12/23/10 0:06
Toluene-d8	100	70-130		12/23/10 0:06
Toluene-d8	94.6	70-130		12/23/10 17:18
4-Bromofluorobenzene	101	70-130		12/23/10 0:06
4-Bromofluorobenzene	101	70-130		12/23/10 17:18

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 76-01 77th Avenue, Glendale NY Sample Description: Work Order: 10L0668

Date Received: 12/21/2010

Field Sample #: GWTT Knock Out Sampled: 12/17/2010 10:35

Sample ID: 10L0668-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Acenaphthylene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Acetophenone	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Aniline	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Anthracene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Benzidine	ND	10	µg/L	1	R-05	SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Benzo(a)anthracene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Benzo(a)pyrene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Benzo(b)fluoranthene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Benzo(g,h,i)perylene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Benzo(k)fluoranthene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Benzoic Acid	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Bis(2-chloroethoxy)methane	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Bis(2-chloroethyl)ether	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Bis(2-chloroisopropyl)ether	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Bis(2-Ethylhexyl)phthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
4-Bromophenylphenylether	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Butylbenzylphthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Carbazole	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
4-Chloroaniline	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
4-Chloro-3-methylphenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2-Chloronaphthalene	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2-Chlorophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
4-Chlorophenylphenylether	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Chrysene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Dibenz(a,h)anthracene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Dibenzofuran	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Di-n-butylphthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
1,2-Dichlorobenzene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
1,3-Dichlorobenzene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
1,4-Dichlorobenzene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
3,3-Dichlorobenzidine	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2,4-Dichlorophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Diethylphthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2,4-Dimethylphenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Dimethylphthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
4,6-Dinitro-2-methylphenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2,4-Dinitrophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2,4-Dinitrotoluene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2,6-Dinitrotoluene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Di-n-octylphthalate	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
1,2-Diphenylhydrazine (as Azobenzene)	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Fluoranthene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 76-01 77th Avenue, Glendale NY Sample Description: Work Order: 10L0668

Date Received: 12/21/2010

Field Sample #: GWTT Knock Out Sampled: 12/17/2010 10:35

Sample ID: 10L0668-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Fluorene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Hexachlorobenzene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Hexachlorobutadiene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Hexachlorocyclopentadiene	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Hexachloroethane	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Indeno(1,2,3-cd)pyrene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Isophorone	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
1-Methylnaphthalene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2-Methylnaphthalene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2-Methylphenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
3/4-Methylphenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Naphthalene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2-Nitroaniline	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
3-Nitroaniline	ND	10	µg/L	1	L-04	SW-846 8270C	12/22/10	12/30/10 21:56	BGL
4-Nitroaniline	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Nitrobenzene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2-Nitrophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
4-Nitrophenol	ND	10	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:56	BGL
N-Nitrosodimethylamine	ND	5.0	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:56	BGL
N-Nitrosodiphenylamine	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
N-Nitrosodi-n-propylamine	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Pentachloronitrobenzene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Pentachlorophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Phenanthrene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Phenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Pyrene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
Pyridine	ND	5.0	µg/L	1	V-05	SW-846 8270C	12/22/10	12/30/10 21:56	BGL
1,2,4,5-Tetrachlorobenzene	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
1,2,4-Trichlorobenzene	ND	5.0	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2,4,5-Trichlorophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL
2,4,6-Trichlorophenol	ND	10	µg/L	1		SW-846 8270C	12/22/10	12/30/10 21:56	BGL

Surrogates	% Recovery	Recovery Limits	Flag	
2-Fluorophenol	31.9	15-110		12/30/10 21:56
Phenol-d6	23.2	15-110		12/30/10 21:56
Nitrobenzene-d5	55.0	30-130		12/30/10 21:56
2-Fluorobiphenyl	68.9	30-130		12/30/10 21:56
2,4,6-Tribromophenol	74.7	15-110		12/30/10 21:56
Terphenyl-d14	79.3	30-130		12/30/10 21:56

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 76-01 77th Avenue, Glendale NY Sample Description: Work Order: 10L0668

Date Received: 12/21/2010

Field Sample #: GWTT Knock Out Sampled: 12/17/2010 10:35

Sample ID: 10L0668-02

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aluminum	ND	0.050	mg/L	1		SW-846 6010B	12/28/10	12/30/10 17:06	OP
Antimony	ND	5.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Arsenic	ND	2.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Barium	ND	50	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Beryllium	ND	2.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Cadmium	ND	2.5	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Calcium	0.26	0.15	mg/L	1		SW-846 6010B	12/28/10	12/30/10 17:06	OP
Chromium	ND	5.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Cobalt	ND	5.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Copper	41	25	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Iron	1.3	0.050	mg/L	1		SW-846 6010B	1/3/11	1/3/11 16:18	OP
Lead	ND	5.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Magnesium	ND	0.15	mg/L	1		SW-846 6010B	12/28/10	12/30/10 17:06	OP
Manganese	24	5.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Mercury	0.00014	0.00010	mg/L	1		SW-846 7470A	12/27/10	12/27/10 16:21	CWB
Nickel	ND	25	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Potassium	ND	2.0	mg/L	1		SW-846 6010B	12/28/10	1/3/11 11:09	OP
Selenium	ND	25	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Silver	ND	2.5	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Sodium	ND	2.0	mg/L	1		SW-846 6010B	12/28/10	12/30/10 17:06	OP
Thallium	ND	1.0	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Vanadium	ND	25	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH
Zinc	56	50	µg/L	5		SW-846 6020A	12/28/10	12/29/10 11:07	KSH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method: SW-846 3005A-SW-846 6010B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
10L0668-01 [URS Knock Out]	B024282	50.0	50.0	12/28/10
10L0668-02 [GWTT Knock Out]	B024282	50.0	50.0	12/28/10

Prep Method: SW-846 3005A-SW-846 6010B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
10L0668-01RE1 [URS Knock Out]	B024431	50.0	50.0	01/03/11
10L0668-02RE1 [GWTT Knock Out]	B024431	50.0	50.0	01/03/11

Prep Method: SW-846 3005A-SW-846 6020A

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
10L0668-01 [URS Knock Out]	B024279	50.0	50.0	12/28/10
10L0668-02 [GWTT Knock Out]	B024279	50.0	50.0	12/28/10

Prep Method: SW-846 7470A Prep-SW-846 7470A

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
10L0668-01 [URS Knock Out]	B024239	6.00	6.00	12/27/10
10L0668-02 [GWTT Knock Out]	B024239	6.00	6.00	12/27/10

Prep Method: SW-846 5030B-SW-846 8260B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
10L0668-01 [URS Knock Out]	B024170	5	5.00	12/22/10
10L0668-02 [GWTT Knock Out]	B024170	5	5.00	12/22/10

Prep Method: SW-846 5030B-SW-846 8260B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
10L0668-01RE1 [URS Knock Out]	B024171	0.5	5.00	12/23/10
10L0668-02RE1 [GWTT Knock Out]	B024171	0.05	5.00	12/23/10

Prep Method: SW-846 3510C-SW-846 8270C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
10L0668-01 [URS Knock Out]	B024085	1000	1.00	12/22/10
10L0668-02 [GWTT Knock Out]	B024085	1000	1.00	12/22/10

con-test® ANALYTICAL LABORATORY
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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B024170 - SW-846 5030B										
Blank (B024170-BLK1)				Prepared & Analyzed: 12/22/10						
Acetone	ND	50	µg/L							
Acrylonitrile	ND	5.0	µg/L							
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L							
Benzene	ND	1.0	µg/L							
Bromobenzene	ND	1.0	µg/L							
Bromochloromethane	ND	1.0	µg/L							
Bromodichloromethane	ND	0.50	µg/L							
Bromoform	ND	1.0	µg/L							
Bromomethane	ND	2.0	µg/L							
2-Butanone (MEK)	ND	20	µg/L							
tert-Butyl Alcohol (TBA)	ND	20	µg/L							V-16
n-Butylbenzene	ND	1.0	µg/L							
sec-Butylbenzene	ND	1.0	µg/L							
tert-Butylbenzene	ND	1.0	µg/L							
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L							
Carbon Disulfide	ND	2.0	µg/L							
Carbon Tetrachloride	ND	1.0	µg/L							
Chlorobenzene	ND	1.0	µg/L							
Chlorodibromomethane	ND	0.50	µg/L							
Chloroethane	ND	2.0	µg/L							
Chloroform	ND	2.0	µg/L							
Chloromethane	ND	2.0	µg/L							
2-Chlorotoluene	ND	1.0	µg/L							
4-Chlorotoluene	ND	1.0	µg/L							
1,2-Dibromo-3-chloropropane (DBCP)	ND	5.0	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Dibromomethane	ND	1.0	µg/L							
1,2-Dichlorobenzene	ND	1.0	µg/L							
1,3-Dichlorobenzene	ND	1.0	µg/L							
1,4-Dichlorobenzene	ND	1.0	µg/L							
trans-1,4-Dichloro-2-butene	ND	2.0	µg/L							
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L							
1,1-Dichloroethane	ND	1.0	µg/L							
1,2-Dichloroethane	ND	1.0	µg/L							
1,1-Dichloroethylene	ND	1.0	µg/L							
cis-1,2-Dichloroethylene	ND	1.0	µg/L							
trans-1,2-Dichloroethylene	ND	1.0	µg/L							
1,2-Dichloropropane	ND	1.0	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
2,2-Dichloropropane	ND	2.0	µg/L							
1,1-Dichloropropene	ND	2.0	µg/L							
cis-1,3-Dichloropropene	ND	1.0	µg/L							
trans-1,3-Dichloropropene	ND	0.50	µg/L							
Diethyl Ether	ND	2.0	µg/L							
Diisopropyl Ether (DIPE)	ND	0.50	µg/L							
1,4-Dioxane	ND	50	µg/L							V-16
Ethylbenzene	ND	1.0	µg/L							
Hexachlorobutadiene	ND	1.0	µg/L							
2-Hexanone (MBK)	ND	10	µg/L							
Isopropylbenzene (Cumene)	ND	1.0	µg/L							
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L							
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L							

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B024170 - SW-846 5030B											
Blank (B024170-BLK1)				Prepared & Analyzed: 12/22/10							
Methylene Chloride	ND	5.0	µg/L								
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L								
Naphthalene	ND	2.0	µg/L								
n-Propylbenzene	ND	1.0	µg/L								
Styrene	ND	1.0	µg/L								
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L								
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L								
Tetrachloroethylene	ND	1.0	µg/L								
Tetrahydrofuran	ND	10	µg/L								
Toluene	ND	1.0	µg/L								
1,2,3-Trichlorobenzene	ND	5.0	µg/L								
1,2,4-Trichlorobenzene	ND	2.0	µg/L								
1,3,5-Trichlorobenzene	ND	1.0	µg/L								
1,1,1-Trichloroethane	ND	1.0	µg/L								
1,1,2-Trichloroethane	ND	1.0	µg/L								
Trichloroethylene	ND	1.0	µg/L								
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L								
1,2,3-Trichloropropane	ND	2.0	µg/L								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0	µg/L								
1,2,4-Trimethylbenzene	ND	1.0	µg/L								
1,3,5-Trimethylbenzene	ND	1.0	µg/L								
Vinyl Chloride	ND	2.0	µg/L								
m+p Xylene	ND	2.0	µg/L								
o-Xylene	ND	1.0	µg/L								
Surrogate: 1,2-Dichloroethane-d4	*25.1*		µg/L	25.0		100	70-130				
Surrogate: Toluene-d8	*25.5*		µg/L	25.0		102	70-130				
Surrogate: 4-Bromofluorobenzene	*25.6*		µg/L	25.0		102	70-130				
LCS (B024170-BS1)				Prepared & Analyzed: 12/22/10							
Acetone	107	50	µg/L	100		107	70-160				†
Acrylonitrile	10.1	5.0	µg/L	10.0		101	70-130				
tert-Amyl Methyl Ether (TAME)	11.1	0.50	µg/L	10.0		111	70-130				
Benzene	10.7	1.0	µg/L	10.0		107	70-130				
Bromobenzene	10.7	1.0	µg/L	10.0		107	70-130				
Bromochloromethane	9.42	1.0	µg/L	10.0		94.2	70-130				
Bromodichloromethane	11.7	0.50	µg/L	10.0		117	70-130				
Bromoform	10.5	1.0	µg/L	10.0		105	70-130				
Bromomethane	10.8	2.0	µg/L	10.0		108	40-160			V-20	†
2-Butanone (MEK)	111	20	µg/L	100		111	40-160				†
tert-Butyl Alcohol (TBA)	132	20	µg/L	100		132	40-160			V-16, V-20	†
n-Butylbenzene	10.4	1.0	µg/L	10.0		104	70-130				
sec-Butylbenzene	10.6	1.0	µg/L	10.0		106	70-130				
tert-Butylbenzene	10.3	1.0	µg/L	10.0		103	70-130				
tert-Butyl Ethyl Ether (TBEE)	10.7	0.50	µg/L	10.0		107	70-130				
Carbon Disulfide	105	2.0	µg/L	100		105	70-130				
Carbon Tetrachloride	11.9	1.0	µg/L	10.0		119	70-130			V-20	
Chlorobenzene	10.6	1.0	µg/L	10.0		106	70-130				
Chlorodibromomethane	10.5	0.50	µg/L	10.0		105	70-130				
Chloroethane	9.24	2.0	µg/L	10.0		92.4	70-130				
Chloroform	10.9	2.0	µg/L	10.0		109	70-130				
Chloromethane	8.98	2.0	µg/L	10.0		89.8	40-160				†
2-Chlorotoluene	10.9	1.0	µg/L	10.0		109	70-130				

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B024170 - SW-846 5030B											
LCS (B024170-BS1)				Prepared & Analyzed: 12/22/10							
4-Chlorotoluene	11.1	1.0	µg/L	10.0		111	70-130				
1,2-Dibromo-3-chloropropane (DBCP)	11.1	5.0	µg/L	10.0		111	70-130				
1,2-Dibromoethane (EDB)	12.1	0.50	µg/L	10.0		121	70-130				
Dibromomethane	11.0	1.0	µg/L	10.0		110	70-130				
1,2-Dichlorobenzene	10.4	1.0	µg/L	10.0		104	70-130				
1,3-Dichlorobenzene	10.6	1.0	µg/L	10.0		106	70-130				
1,4-Dichlorobenzene	10.3	1.0	µg/L	10.0		103	70-130				
trans-1,4-Dichloro-2-butene	9.47	2.0	µg/L	10.0		94.7	70-130				
Dichlorodifluoromethane (Freon 12)	9.81	2.0	µg/L	10.0		98.1	40-160				†
1,1-Dichloroethane	11.0	1.0	µg/L	10.0		110	70-130				
1,2-Dichloroethane	10.9	1.0	µg/L	10.0		109	70-130				
1,1-Dichloroethylene	10.2	1.0	µg/L	10.0		102	70-130				
cis-1,2-Dichloroethylene	10.6	1.0	µg/L	10.0		106	70-130				
trans-1,2-Dichloroethylene	10.6	1.0	µg/L	10.0		106	70-130				
1,2-Dichloropropane	10.6	1.0	µg/L	10.0		106	70-130				
1,3-Dichloropropane	11.2	0.50	µg/L	10.0		112	70-130				
2,2-Dichloropropane	11.5	2.0	µg/L	10.0		115	40-130				†
1,1-Dichloropropene	10.6	2.0	µg/L	10.0		106	70-130				
cis-1,3-Dichloropropene	11.5	1.0	µg/L	10.0		115	70-130				
trans-1,3-Dichloropropene	9.85	0.50	µg/L	10.0		98.5	70-130				
Diethyl Ether	10.3	2.0	µg/L	10.0		103	70-130				
Diisopropyl Ether (DIPE)	10.0	0.50	µg/L	10.0		100	70-130				
1,4-Dioxane	130	50	µg/L	100		130	40-130			V-16	†
Ethylbenzene	10.9	1.0	µg/L	10.0		109	70-130				
Hexachlorobutadiene	11.0	1.0	µg/L	10.0		110	70-130				
2-Hexanone (MBK)	110	10	µg/L	100		110	70-160				†
Isopropylbenzene (Cumene)	11.2	1.0	µg/L	10.0		112	70-130				
p-Isopropyltoluene (p-Cymene)	10.5	1.0	µg/L	10.0		105	70-130				
Methyl tert-Butyl Ether (MTBE)	11.5	1.0	µg/L	10.0		115	70-130				
Methylene Chloride	9.53	5.0	µg/L	10.0		95.3	70-130				
4-Methyl-2-pentanone (MIBK)	109	10	µg/L	100		109	70-160				†
Naphthalene	11.7	2.0	µg/L	10.0		117	40-130				†
n-Propylbenzene	10.9	1.0	µg/L	10.0		109	70-130				
Styrene	11.3	1.0	µg/L	10.0		113	70-130				
1,1,1,2-Tetrachloroethane	10.4	1.0	µg/L	10.0		104	70-130				
1,1,2,2-Tetrachloroethane	11.6	0.50	µg/L	10.0		116	70-130				
Tetrachloroethylene	10.6	1.0	µg/L	10.0		106	70-130				
Tetrahydrofuran	8.64	10	µg/L	10.0		86.4	70-130				
Toluene	10.8	1.0	µg/L	10.0		108	70-130				
1,2,3-Trichlorobenzene	11.2	5.0	µg/L	10.0		112	70-130				
1,2,4-Trichlorobenzene	10.8	2.0	µg/L	10.0		108	70-130				
1,3,5-Trichlorobenzene	10.9	1.0	µg/L	10.0		109	70-130				
1,1,1-Trichloroethane	11.5	1.0	µg/L	10.0		115	70-130			V-06	
1,1,2-Trichloroethane	11.2	1.0	µg/L	10.0		112	70-130				
Trichloroethylene	10.8	1.0	µg/L	10.0		108	70-130				
Trichlorofluoromethane (Freon 11)	11.2	2.0	µg/L	10.0		112	70-130				
1,2,3-Trichloropropane	11.2	2.0	µg/L	10.0		112	70-130				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.6	1.0	µg/L	10.0		106	70-130				
1,2,4-Trimethylbenzene	10.8	1.0	µg/L	10.0		108	70-130				
1,3,5-Trimethylbenzene	11.4	1.0	µg/L	10.0		114	70-130				
Vinyl Chloride	10.0	2.0	µg/L	10.0		100	40-160				†

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B024170 - SW-846 5030B										
LCS (B024170-BS1)				Prepared & Analyzed: 12/22/10						
m+p Xylene	21.8	2.0	µg/L	20.0		109	70-130			
o-Xylene	10.8	1.0	µg/L	10.0		108	70-130			
Surrogate: 1,2-Dichloroethane-d4	*24.3*		µg/L	25.0		97.4	70-130			
Surrogate: Toluene-d8	*25.4*		µg/L	25.0		102	70-130			
Surrogate: 4-Bromofluorobenzene	*26.2*		µg/L	25.0		105	70-130			
Batch B024171 - SW-846 5030B										
Blank (B024171-BLK1)				Prepared & Analyzed: 12/23/10						
Tetrachloroethylene	ND	1.0	µg/L							
Surrogate: 1,2-Dichloroethane-d4	*24.4*		µg/L	25.0		97.8	70-130			
Surrogate: Toluene-d8	*24.0*		µg/L	25.0		96.0	70-130			
Surrogate: 4-Bromofluorobenzene	*25.8*		µg/L	25.0		103	70-130			
LCS (B024171-BS1)				Prepared & Analyzed: 12/23/10						
Tetrachloroethylene	9.37	1.0	µg/L	10.0		93.7	70-130			
Surrogate: 1,2-Dichloroethane-d4	*23.6*		µg/L	25.0		94.2	70-130			
Surrogate: Toluene-d8	*23.4*		µg/L	25.0		93.6	70-130			
Surrogate: 4-Bromofluorobenzene	*26.3*		µg/L	25.0		105	70-130			
LCS Dup (B024171-BSD1)				Prepared & Analyzed: 12/23/10						
Tetrachloroethylene	9.64	1.0	µg/L	10.0		96.4	70-130	2.84	25	
Surrogate: 1,2-Dichloroethane-d4	*23.2*		µg/L	25.0		92.7	70-130			
Surrogate: Toluene-d8	*23.5*		µg/L	25.0		93.8	70-130			
Surrogate: 4-Bromofluorobenzene	*25.9*		µg/L	25.0		104	70-130			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B024085 - SW-846 3510C										
Blank (B024085-BLK1)				Prepared: 12/22/10 Analyzed: 12/30/10						
Acenaphthene	ND	5.0	µg/L							
Acenaphthylene	ND	5.0	µg/L							
Acetophenone	ND	10	µg/L							
Aniline	ND	5.0	µg/L							
Anthracene	ND	5.0	µg/L							
Benzidine	ND	10	µg/L							R-05
Benzo(a)anthracene	ND	5.0	µg/L							
Benzo(a)pyrene	ND	5.0	µg/L							
Benzo(b)fluoranthene	ND	5.0	µg/L							
Benzo(g,h,i)perylene	ND	5.0	µg/L							
Benzo(k)fluoranthene	ND	5.0	µg/L							
Benzoic Acid	ND	10	µg/L							V-05
Bis(2-chloroethoxy)methane	ND	10	µg/L							
Bis(2-chloroethyl)ether	ND	10	µg/L							
Bis(2-chloroisopropyl)ether	ND	10	µg/L							V-05
Bis(2-Ethylhexyl)phthalate	ND	10	µg/L							
4-Bromophenylphenylether	ND	10	µg/L							
Butylbenzylphthalate	ND	10	µg/L							
Carbazole	ND	10	µg/L							
4-Chloroaniline	ND	10	µg/L							
4-Chloro-3-methylphenol	ND	10	µg/L							
2-Chloronaphthalene	ND	10	µg/L							V-05
2-Chlorophenol	ND	10	µg/L							
4-Chlorophenylphenylether	ND	10	µg/L							
Chrysene	ND	5.0	µg/L							
Dibenz(a,h)anthracene	ND	5.0	µg/L							
Dibenzofuran	ND	5.0	µg/L							
Di-n-butylphthalate	ND	10	µg/L							
1,2-Dichlorobenzene	ND	5.0	µg/L							
1,3-Dichlorobenzene	ND	5.0	µg/L							
1,4-Dichlorobenzene	ND	5.0	µg/L							
3,3-Dichlorobenzidine	ND	10	µg/L							
2,4-Dichlorophenol	ND	10	µg/L							
Diethylphthalate	ND	10	µg/L							
2,4-Dimethylphenol	ND	10	µg/L							
Dimethylphthalate	ND	10	µg/L							
4,6-Dinitro-2-methylphenol	ND	10	µg/L							
2,4-Dinitrophenol	ND	10	µg/L							
2,4-Dinitrotoluene	ND	10	µg/L							
2,6-Dinitrotoluene	ND	10	µg/L							
Di-n-octylphthalate	ND	10	µg/L							
1,2-Diphenylhydrazine (as Azobenzene)	ND	10	µg/L							
Fluoranthene	ND	5.0	µg/L							
Fluorene	ND	5.0	µg/L							
Hexachlorobenzene	ND	10	µg/L							
Hexachlorobutadiene	ND	10	µg/L							
Hexachlorocyclopentadiene	ND	10	µg/L							V-05
Hexachloroethane	ND	10	µg/L							
Indeno(1,2,3-cd)pyrene	ND	5.0	µg/L							
Isophorone	ND	10	µg/L							
1-Methylnaphthalene	ND	5.0	µg/L							
2-Methylnaphthalene	ND	5.0	µg/L							

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B024085 - SW-846 3510C												
Blank (B024085-BLK1)				Prepared: 12/22/10 Analyzed: 12/30/10								
2-Methylphenol	ND	10	µg/L									
3/4-Methylphenol	ND	10	µg/L									
Naphthalene	ND	5.0	µg/L									
2-Nitroaniline	ND	10	µg/L									
3-Nitroaniline	ND	10	µg/L								L-04	
4-Nitroaniline	ND	10	µg/L								V-05	
Nitrobenzene	ND	10	µg/L									
2-Nitrophenol	ND	10	µg/L									
4-Nitrophenol	ND	10	µg/L								V-05	
N-Nitrosodimethylamine	ND	5.0	µg/L								V-05	
N-Nitrosodiphenylamine	ND	10	µg/L									
N-Nitrosodi-n-propylamine	ND	10	µg/L									
Pentachloronitrobenzene	ND	10	µg/L									
Pentachlorophenol	ND	10	µg/L									
Phenanthrene	ND	5.0	µg/L									
Phenol	ND	10	µg/L									
Pyrene	ND	5.0	µg/L									
Pyridine	ND	5.0	µg/L								V-05	
1,2,4,5-Tetrachlorobenzene	ND	10	µg/L									
1,2,4-Trichlorobenzene	ND	5.0	µg/L									
2,4,5-Trichlorophenol	ND	10	µg/L									
2,4,6-Trichlorophenol	ND	10	µg/L									
Surrogate: 2-Fluorophenol	*167*		µg/L	200		83.6		15-110				
Surrogate: Phenol-d6	*199*		µg/L	200		99.7		15-110				
Surrogate: Nitrobenzene-d5	*76.6*		µg/L	100		76.6		30-130				
Surrogate: 2-Fluorobiphenyl	*91.7*		µg/L	100		91.7		30-130				
Surrogate: 2,4,6-Tribromophenol	*183*		µg/L	200		91.7		15-110				
Surrogate: Terphenyl-d14	*97.2*		µg/L	100		97.2		30-130				
LCS (B024085-BS1)				Prepared: 12/22/10 Analyzed: 12/30/10								
Acenaphthene	73.2	5.0	µg/L	100		73.2		40-140				
Acenaphthylene	69.1	5.0	µg/L	100		69.1		40-140				
Acetophenone	32.2	10	µg/L	50.0		64.5		40-140				
Aniline	49.5	5.0	µg/L	100		49.5		40-140				
Anthracene	73.1	5.0	µg/L	100		73.1		40-140				
Benzidine	30.0	10	µg/L	100		**30.0**	*	40-140			L-07A	
Benzo(a)anthracene	65.8	5.0	µg/L	100		65.8		40-140				
Benzo(a)pyrene	74.5	5.0	µg/L	100		74.5		40-140				
Benzo(b)fluoranthene	92.8	5.0	µg/L	100		92.8		40-140				
Benzo(g,h,i)perylene	96.6	5.0	µg/L	100		96.6		40-140				
Benzo(k)fluoranthene	58.8	5.0	µg/L	100		58.8		40-140				
Benzoic Acid	62.7	10	µg/L	100		62.7		10-130			V-05	†
Bis(2-chloroethoxy)methane	81.0	10	µg/L	100		81.0		40-140				
Bis(2-chloroethyl)ether	87.8	10	µg/L	100		87.8		40-140				
Bis(2-chloroisopropyl)ether	55.0	10	µg/L	100		55.0		40-140			V-05	
Bis(2-Ethylhexyl)phthalate	75.3	10	µg/L	100		75.3		40-140				
4-Bromophenylphenylether	94.0	10	µg/L	100		94.0		40-140				
Butylbenzylphthalate	70.2	10	µg/L	100		70.2		40-140				
Carbazole	65.4	10	µg/L	100		65.4		40-140				
4-Chloroaniline	39.2	10	µg/L	100		**39.2**	*	40-140			L-07	
4-Chloro-3-methylphenol	73.4	10	µg/L	100		73.4		30-130				
2-Chloronaphthalene	71.2	10	µg/L	100		71.2		40-140			V-05	

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B024085 - SW-846 3510C												
LCS (B024085-BS1)				Prepared: 12/22/10 Analyzed: 12/30/10								
2-Chlorophenol	73.9	10	µg/L	100		73.9		30-130				
4-Chlorophenylphenylether	82.0	10	µg/L	100		82.0		40-140				
Chrysene	67.1	5.0	µg/L	100		67.1		40-140				
Dibenz(a,h)anthracene	106	5.0	µg/L	100		106		40-140				
Dibenzofuran	84.5	5.0	µg/L	100		84.5		40-140				
Di-n-butylphthalate	83.9	10	µg/L	100		83.9		40-140				
1,2-Dichlorobenzene	71.1	5.0	µg/L	100		71.1		40-140				
1,3-Dichlorobenzene	68.2	5.0	µg/L	100		68.2		40-140				
1,4-Dichlorobenzene	73.6	5.0	µg/L	100		73.6		40-140				
3,3-Dichlorobenzidine	69.4	10	µg/L	100		69.4		40-140				
2,4-Dichlorophenol	85.9	10	µg/L	100		85.9		30-130				
Diethylphthalate	70.9	10	µg/L	100		70.9		40-140				
2,4-Dimethylphenol	65.2	10	µg/L	100		65.2		30-130				
Dimethylphthalate	74.2	10	µg/L	100		74.2		40-140				
4,6-Dinitro-2-methylphenol	81.2	10	µg/L	100		81.2		30-130				
2,4-Dinitrophenol	67.1	10	µg/L	100		67.1		30-130				
2,4-Dinitrotoluene	68.4	10	µg/L	100		68.4		40-140				
2,6-Dinitrotoluene	75.3	10	µg/L	100		75.3		40-140				
Di-n-octylphthalate	85.6	10	µg/L	100		85.6		40-140				
1,2-Diphenylhydrazine (as Azobenzene)	86.6	10	µg/L	100		86.6		40-140				
Fluoranthene	74.0	5.0	µg/L	100		74.0		40-140				
Fluorene	71.3	5.0	µg/L	100		71.3		40-140				
Hexachlorobenzene	96.4	10	µg/L	100		96.4		40-140				
Hexachlorobutadiene	92.6	10	µg/L	100		92.6		40-140				
Hexachlorocyclopentadiene	106	10	µg/L	100		106		30-140			V-05	†
Hexachloroethane	77.0	10	µg/L	100		77.0		40-140				
Indeno(1,2,3-cd)pyrene	113	5.0	µg/L	100		113		40-140				
Isophorone	72.8	10	µg/L	100		72.8		40-140				
1-Methylnaphthalene	82.2	5.0	µg/L	100		82.2		40-140				
2-Methylnaphthalene	74.6	5.0	µg/L	100		74.6		40-140				
2-Methylphenol	63.2	10	µg/L	100		63.2		30-130				
3/4-Methylphenol	70.5	10	µg/L	100		70.5		30-130				
Naphthalene	72.6	5.0	µg/L	100		72.6		40-140				
2-Nitroaniline	66.4	10	µg/L	100		66.4		40-140				
3-Nitroaniline	37.8	10	µg/L	100		**37.8**	*	40-140			L-04	
4-Nitroaniline	48.5	10	µg/L	100		48.5		40-140			V-05	
Nitrobenzene	73.1	10	µg/L	100		73.1		40-140				
2-Nitrophenol	81.4	10	µg/L	100		81.4		30-130				
4-Nitrophenol	52.7	10	µg/L	100		52.7		10-130			V-05	†
N-Nitrosodimethylamine	44.3	5.0	µg/L	100		44.3		40-140			V-05	
N-Nitrosodiphenylamine	99.0	10	µg/L	100		99.0		40-140				
N-Nitrosodi-n-propylamine	66.4	10	µg/L	100		66.4		40-140				
Pentachloronitrobenzene	51.2	10	µg/L	50.0		102		40-140				
Pentachlorophenol	65.2	10	µg/L	100		65.2		30-130				
Phenanthrene	74.4	5.0	µg/L	100		74.4		40-140				
Phenol	72.2	10	µg/L	100		72.2		20-130				†
Pyrene	62.2	5.0	µg/L	100		62.2		40-140				
Pyridine	35.1	5.0	µg/L	100		35.1		10-140			V-05	†
1,2,4,5-Tetrachlorobenzene	49.5	10	µg/L	50.0		99.0		40-140				
1,2,4-Trichlorobenzene	88.5	5.0	µg/L	100		88.5		40-140				
2,4,5-Trichlorophenol	88.9	10	µg/L	100		88.9		30-130				
2,4,6-Trichlorophenol	86.6	10	µg/L	100		86.6		30-130				

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD		RPD Limit	Notes	
Batch B024085 - SW-846 3510C												
LCS (B024085-BS1)				Prepared: 12/22/10 Analyzed: 12/30/10								
Surrogate: 2-Fluorophenol	*159*		µg/L	200		79.7	15-110					
Surrogate: Phenol-d6	*157*		µg/L	200		78.3	15-110					
Surrogate: Nitrobenzene-d5	*73.1*		µg/L	100		73.1	30-130					
Surrogate: 2-Fluorobiphenyl	*92.2*		µg/L	100		92.2	30-130					
Surrogate: 2,4,6-Tribromophenol	*201*		µg/L	200		101	15-110					
Surrogate: Terphenyl-d14	*80.7*		µg/L	100		80.7	30-130					
LCS Dup (B024085-BSD1)				Prepared: 12/22/10 Analyzed: 12/30/10								
Acenaphthene	74.1	5.0	µg/L	100		74.1	40-140	1.24		20		
Acenaphthylene	70.4	5.0	µg/L	100		70.4	40-140	1.82		20		
Acetophenone	33.4	10	µg/L	50.0		66.7	40-140	3.41		20		
Aniline	44.3	5.0	µg/L	100		44.3	40-140	11.1		50		‡
Anthracene	73.0	5.0	µg/L	100		73.0	40-140	0.137		20		
Benzidine	40.3	10	µg/L	100		40.3	40-140	**29.3**	*	20	R-05	
Benzo(a)anthracene	67.5	5.0	µg/L	100		67.5	40-140	2.51		20		
Benzo(a)pyrene	76.5	5.0	µg/L	100		76.5	40-140	2.70		20		
Benzo(b)fluoranthene	93.3	5.0	µg/L	100		93.3	40-140	0.527		20		
Benzo(g,h,i)perylene	105	5.0	µg/L	100		105	40-140	8.23		20		
Benzo(k)fluoranthene	58.8	5.0	µg/L	100		58.8	40-140	0.136		20		
Benzoic Acid	66.0	10	µg/L	100		66.0	10-130	5.13		50	V-05	† ‡
Bis(2-chloroethoxy)methane	80.9	10	µg/L	100		80.9	40-140	0.0741		20		
Bis(2-chloroethyl)ether	94.5	10	µg/L	100		94.5	40-140	7.33		20		
Bis(2-chloroisopropyl)ether	56.4	10	µg/L	100		56.4	40-140	2.41		20	V-05	
Bis(2-Ethylhexyl)phthalate	76.8	10	µg/L	100		76.8	40-140	2.03		20		
4-Bromophenylphenylether	97.7	10	µg/L	100		97.7	40-140	3.86		20		
Butylbenzylphthalate	70.6	10	µg/L	100		70.6	40-140	0.583		20		
Carbazole	64.1	10	µg/L	100		64.1	40-140	2.07		20		
4-Chloroaniline	40.5	10	µg/L	100		40.5	40-140	3.09		20		
4-Chloro-3-methylphenol	74.9	10	µg/L	100		74.9	30-130	2.04		20		
2-Chloronaphthalene	73.2	10	µg/L	100		73.2	40-140	2.74		20	V-05	
2-Chlorophenol	76.5	10	µg/L	100		76.5	30-130	3.46		20		
4-Chlorophenylphenylether	82.8	10	µg/L	100		82.8	40-140	0.935		20		
Chrysene	68.4	5.0	µg/L	100		68.4	40-140	1.99		20		
Dibenz(a,h)anthracene	114	5.0	µg/L	100		114	40-140	7.50		20		
Dibenzofuran	85.9	5.0	µg/L	100		85.9	40-140	1.62		20		
Di-n-butylphthalate	81.0	10	µg/L	100		81.0	40-140	3.47		20		
1,2-Dichlorobenzene	72.2	5.0	µg/L	100		72.2	40-140	1.65		20		
1,3-Dichlorobenzene	71.4	5.0	µg/L	100		71.4	40-140	4.58		20		
1,4-Dichlorobenzene	76.6	5.0	µg/L	100		76.6	40-140	3.95		20		
3,3-Dichlorobenzidine	71.3	10	µg/L	100		71.3	40-140	2.67		20		
2,4-Dichlorophenol	89.2	10	µg/L	100		89.2	30-130	3.73		20		
Diethylphthalate	72.0	10	µg/L	100		72.0	40-140	1.62		20		
2,4-Dimethylphenol	70.9	10	µg/L	100		70.9	30-130	8.35		20		
Dimethylphthalate	75.0	10	µg/L	100		75.0	40-140	1.06		50		‡
4,6-Dinitro-2-methylphenol	80.3	10	µg/L	100		80.3	30-130	1.14		50		‡
2,4-Dinitrophenol	70.4	10	µg/L	100		70.4	30-130	4.77		50		‡
2,4-Dinitrotoluene	65.9	10	µg/L	100		65.9	40-140	3.66		20		
2,6-Dinitrotoluene	76.3	10	µg/L	100		76.3	40-140	1.35		20		
Di-n-octylphthalate	82.8	10	µg/L	100		82.8	40-140	3.27		20		
1,2-Diphenylhydrazine (as Azobenzene)	89.7	10	µg/L	100		89.7	40-140	3.51		20		
Fluoranthene	72.0	5.0	µg/L	100		72.0	40-140	2.67		20		
Fluorene	72.4	5.0	µg/L	100		72.4	40-140	1.53		20		

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B024085 - SW-846 3510C												
LCS Dup (B024085-BSD1)				Prepared: 12/22/10 Analyzed: 12/30/10								
Hexachlorobenzene	98.5	10	µg/L	100		98.5		40-140	2.08	20		
Hexachlorobutadiene	94.7	10	µg/L	100		94.7		40-140	2.25	20		
Hexachlorocyclopentadiene	115	10	µg/L	100		115		30-140	8.77	50	V-05	† ‡
Hexachloroethane	79.7	10	µg/L	100		79.7		40-140	3.43	50		‡
Indeno(1,2,3-cd)pyrene	120	5.0	µg/L	100		120		40-140	6.12	50		‡
Isophorone	71.2	10	µg/L	100		71.2		40-140	2.17	20		
1-Methylnaphthalene	83.2	5.0	µg/L	100		83.2		40-140	1.10	20		
2-Methylnaphthalene	71.3	5.0	µg/L	100		71.3		40-140	4.63	20		
2-Methylphenol	65.7	10	µg/L	100		65.7		30-130	3.91	20		
3/4-Methylphenol	72.2	10	µg/L	100		72.2		30-130	2.40	20		
Naphthalene	75.4	5.0	µg/L	100		75.4		40-140	3.70	20		
2-Nitroaniline	68.8	10	µg/L	100		68.8		40-140	3.46	20		
3-Nitroaniline	38.0	10	µg/L	100		**38.0**	*	40-140	0.528	20	L-04	
4-Nitroaniline	48.5	10	µg/L	100		48.5		40-140	0.0412	20	V-05	
Nitrobenzene	75.3	10	µg/L	100		75.3		40-140	2.97	20		
2-Nitrophenol	83.4	10	µg/L	100		83.4		30-130	2.41	20		
4-Nitrophenol	52.2	10	µg/L	100		52.2		10-130	0.934	50	V-05	† ‡
N-Nitrosodimethylamine	49.7	5.0	µg/L	100		49.7		40-140	11.5	20	V-05	
N-Nitrosodiphenylamine	103	10	µg/L	100		103		40-140	3.85	20		
N-Nitrosodi-n-propylamine	67.0	10	µg/L	100		67.0		40-140	0.810	20		
Pentachloronitrobenzene	51.2	10	µg/L	50.0		102		40-140	0.137	20		
Pentachlorophenol	65.8	10	µg/L	100		65.8		30-130	0.885	50		‡
Phenanthrene	77.3	5.0	µg/L	100		77.3		40-140	3.92	20		
Phenol	76.2	10	µg/L	100		76.2		20-130	5.46	20		†
Pyrene	63.5	5.0	µg/L	100		63.5		40-140	2.21	20		
Pyridine	42.1	5.0	µg/L	100		42.1		10-140	18.1	50	V-05	† ‡
1,2,4,5-Tetrachlorobenzene	51.4	10	µg/L	50.0		103		40-140	3.71	20		
1,2,4-Trichlorobenzene	91.9	5.0	µg/L	100		91.9		40-140	3.74	20		
2,4,5-Trichlorophenol	90.0	10	µg/L	100		90.0		30-130	1.32	20		
2,4,6-Trichlorophenol	87.6	10	µg/L	100		87.6		30-130	1.08	50		‡
Surrogate: 2-Fluorophenol	*169*		µg/L	200		84.5		15-110				
Surrogate: Phenol-d6	*163*		µg/L	200		81.7		15-110				
Surrogate: Nitrobenzene-d5	*76.5*		µg/L	100		76.5		30-130				
Surrogate: 2-Fluorobiphenyl	*95.4*		µg/L	100		95.4		30-130				
Surrogate: 2,4,6-Tribromophenol	*204*		µg/L	200		102		15-110				
Surrogate: Terphenyl-d14	*83.0*		µg/L	100		83.0		30-130				

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B024239 - SW-846 7470A Prep										
Blank (B024239-BLK1)				Prepared & Analyzed: 12/27/10						
Mercury	ND	0.00010	mg/L							
LCS (B024239-BS1)				Prepared & Analyzed: 12/27/10						
Mercury	0.00194	0.00010	mg/L	0.00200		96.8	80-120			
Batch B024279 - SW-846 3005A										
Blank (B024279-BLK1)				Prepared: 12/28/10 Analyzed: 12/29/10						
Antimony	ND	5.0	µg/L							
Arsenic	ND	2.0	µg/L							
Barium	ND	50	µg/L							
Beryllium	ND	2.0	µg/L							
Cadmium	ND	2.5	µg/L							
Chromium	ND	5.0	µg/L							
Cobalt	ND	5.0	µg/L							
Copper	ND	25	µg/L							
Lead	ND	5.0	µg/L							
Manganese	ND	5.0	µg/L							
Nickel	ND	25	µg/L							
Selenium	ND	25	µg/L							
Silver	ND	2.5	µg/L							
Thallium	ND	1.0	µg/L							
Vanadium	ND	25	µg/L							
Zinc	ND	50	µg/L							
LCS (B024279-BS1)				Prepared: 12/28/10 Analyzed: 12/29/10						
Antimony	238	5.0	µg/L	250		95.1	80-120			
Arsenic	255	2.0	µg/L	250		102	80-120			
Barium	241	50	µg/L	250		96.3	80-120			
Beryllium	237	2.0	µg/L	250		94.9	80-120			
Cadmium	243	2.5	µg/L	250		97.2	80-120			
Chromium	246	5.0	µg/L	250		98.2	80-120			
Cobalt	242	5.0	µg/L	250		97.0	80-120			
Copper	237	25	µg/L	250		94.7	80-120			
Lead	248	5.0	µg/L	250		99.0	80-120			
Manganese	235	5.0	µg/L	250		93.8	80-120			
Nickel	236	25	µg/L	250		94.5	80-120			
Selenium	237	25	µg/L	250		94.8	80-120			
Silver	255	2.5	µg/L	250		102	80-120			
Thallium	233	1.0	µg/L	250		93.2	80-120			
Vanadium	231	25	µg/L	250		92.2	80-120			
Zinc	231	50	µg/L	250		92.3	80-120			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B024279 - SW-846 3005A										
LCS Dup (B024279-BSD1)					Prepared: 12/28/10 Analyzed: 12/29/10					
Antimony	251	5.0	µg/L	250		101	80-120	5.56	20	
Arsenic	269	2.0	µg/L	250		108	80-120	5.33	20	
Barium	253	50	µg/L	250		101	80-120	4.82	20	
Beryllium	239	2.0	µg/L	250		95.6	80-120	0.741	20	
Cadmium	254	2.5	µg/L	250		102	80-120	4.53	20	
Chromium	253	5.0	µg/L	250		101	80-120	3.06	20	
Cobalt	249	5.0	µg/L	250		99.7	80-120	2.78	20	
Copper	243	25	µg/L	250		97.1	80-120	2.49	20	
Lead	253	5.0	µg/L	250		101	80-120	2.25	20	
Manganese	242	5.0	µg/L	250		96.6	80-120	2.98	20	
Nickel	243	25	µg/L	250		97.4	80-120	2.97	20	
Selenium	248	25	µg/L	250		99.3	80-120	4.67	20	
Silver	264	2.5	µg/L	250		106	80-120	3.77	20	
Thallium	241	1.0	µg/L	250		96.6	80-120	3.55	20	
Vanadium	241	25	µg/L	250		96.4	80-120	4.39	20	
Zinc	239	50	µg/L	250		95.6	80-120	3.43	20	
Duplicate (B024279-DUP1)		**Source: 10L0668-02**			Prepared: 12/28/10 Analyzed: 12/29/10					
Antimony	ND	5.0	µg/L		ND			NC	20	
Arsenic	ND	2.0	µg/L		ND			NC	20	
Barium	ND	50	µg/L		ND			NC	20	
Beryllium	ND	2.0	µg/L		ND			NC	20	
Cadmium	ND	2.5	µg/L		ND			NC	20	
Chromium	ND	5.0	µg/L		ND			NC	20	
Cobalt	ND	5.0	µg/L		ND			NC	20	
Copper	42.1	25	µg/L		41.0			2.46	20	
Lead	ND	5.0	µg/L		ND			NC	20	
Manganese	25.7	5.0	µg/L		24.3			5.44	20	
Nickel	ND	25	µg/L		ND			NC	20	
Selenium	ND	25	µg/L		ND			NC	20	
Silver	ND	2.5	µg/L		ND			NC	20	
Thallium	ND	1.0	µg/L		ND			NC	20	
Vanadium	ND	25	µg/L		ND			NC	20	
Zinc	58.8	50	µg/L		55.9			5.03	20	
Matrix Spike (B024279-MS1)		**Source: 10L0668-02**			Prepared: 12/28/10 Analyzed: 12/29/10					
Antimony	249	5.0	µg/L	250	ND	99.4	75-125			
Arsenic	261	2.0	µg/L	250	ND	105	75-125			
Barium	265	50	µg/L	250	9.13	102	75-125			
Beryllium	243	2.0	µg/L	250	ND	97.1	75-125			
Cadmium	250	2.5	µg/L	250	0.138	99.8	75-125			
Chromium	254	5.0	µg/L	250	ND	102	75-125			
Cobalt	250	5.0	µg/L	250	ND	100	75-125			
Copper	286	25	µg/L	250	41.0	98.2	75-125			
Lead	253	5.0	µg/L	250	2.20	100	75-125			
Manganese	269	5.0	µg/L	250	24.3	97.8	75-125			
Nickel	251	25	µg/L	250	0.471	100	75-125			
Selenium	240	25	µg/L	250	ND	96.1	75-125			
Silver	259	2.5	µg/L	250	0.143	103	75-125			
Thallium	239	1.0	µg/L	250	0.161	95.5	75-125			
Vanadium	238	25	µg/L	250	ND	95.3	75-125			
Zinc	306	50	µg/L	250	55.9	100	75-125			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B024282 - SW-846 3005A										
Blank (B024282-BLK1)				Prepared: 12/28/10 Analyzed: 12/30/10						
Aluminum	ND	0.050	mg/L							
Calcium	ND	0.15	mg/L							
Magnesium	ND	0.15	mg/L							
Potassium	ND	2.0	mg/L							
Sodium	ND	2.0	mg/L							
LCS (B024282-BS1)				Prepared: 12/28/10 Analyzed: 12/30/10						
Aluminum	1.99	0.050	mg/L	2.00		99.5	80-120			
Calcium	1.94	0.15	mg/L	2.00		97.2	80-120			
Magnesium	1.98	0.15	mg/L	2.00		98.9	80-120			
Potassium	23.3	2.0	mg/L	20.0		116	80-120			
Sodium	1.99	2.0	mg/L	2.00		99.5	80-120			
LCS Dup (B024282-BSD1)				Prepared: 12/28/10 Analyzed: 12/30/10						
Aluminum	1.92	0.050	mg/L	2.00		95.8	80-120	3.76	20	
Calcium	1.93	0.15	mg/L	2.00		96.3	80-120	0.980	20	
Magnesium	1.96	0.15	mg/L	2.00		98.2	80-120	0.656	20	
Potassium	20.8	2.0	mg/L	20.0		104	80-120	11.2	20	
Sodium	1.94	2.0	mg/L	2.00		96.9	80-120	2.66	20	
Batch B024431 - SW-846 3005A										
Blank (B024431-BLK1)				Prepared & Analyzed: 01/03/11						
Iron	ND	0.050	mg/L							
LCS (B024431-BS1)				Prepared & Analyzed: 01/03/11						
Iron	0.499	0.050	mg/L	0.500		99.7	80-120			
LCS Dup (B024431-BSD1)				Prepared & Analyzed: 01/03/11						
Iron	0.521	0.050	mg/L	0.500		104	80-120	4.42	20	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
L-04	Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.
L-07	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.
L-07A	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD outside of control limits. Reduced precision anticipated for any reported result for this compound.
MS-19	Sample to spike ratio is greater than or equal to 4:1. Spiked amount is not representative of the native amount in the sample. Appropriate or meaningful recoveries cannot be calculated.
R-05	Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.
V-05	Continuing calibration did not meet method specifications and was biased on the low side for this compound. Significant uncertainty is associated with the reported value which is likely to be biased on the low side.
V-06	Continuing calibration did not meet method specifications and was biased on the high side for this compound. Significant uncertainty is associated with the reported value which is likely to be biased on the high side.
V-16	Response factor is less than method specified minimum acceptable value. Reduced precision and accuracy are associated with reported result.
V-20	Continuing calibration did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6010B in Water	
Aluminum	CT,NH,NY,RI
Calcium	CT,NH,NY,RI
Iron	CT,NH,NY,RI
Magnesium	CT,NH,NY,RI
Potassium	CT,NH,NY,RI
Sodium	CT,NH,RI,NY
SW-846 6020A in Water	
Antimony	CT,NH,NY,RI,NC
Arsenic	CT,NH,NY,RI,NC
Barium	CT,NH,NY,RI,NC
Beryllium	CT,NH,NY,RI,NC
Cadmium	CT,NH,NY,RI,NC
Chromium	CT,NH,NY,RI,NC
Cobalt	CT,NH,NY,RI,NC
Copper	CT,NH,NY,RI,NC
Lead	CT,NH,NY,RI,NC
Manganese	CT,NH,NY,RI,NC
Nickel	CT,NH,NY,RI,NC
Selenium	CT,NH,NY,RI,NC
Silver	CT,NH,NY,RI,NC
Thallium	CT,NH,NY,RI,NC
Vanadium	CT,NC,NH,NY,RI
Zinc	CT,NH,NY,RI,NC
SW-846 7470A in Water	
Mercury	CT,NH,NY,RI,NC
SW-846 8260B in Water	
Acetone	CT,NH,NY,NC
Acrylonitrile	CT,NY,NC,RI
tert-Amyl Methyl Ether (TAME)	NH,NY,NC
Benzene	CT,NH,NY,NC,RI
Bromobenzene	NC
Bromochloromethane	NH,NY,NC
Bromodichloromethane	CT,NH,NY,NC,RI
Bromoform	CT,NH,NY,NC,RI
Bromomethane	CT,NH,NY,NC,RI
2-Butanone (MEK)	CT,NH,NY,NC
tert-Butyl Alcohol (TBA)	NH,NY,NC
n-Butylbenzene	NY,NC
sec-Butylbenzene	NY,NC
tert-Butylbenzene	NY,NC
tert-Butyl Ethyl Ether (TBEE)	NH,NY,NC
Carbon Disulfide	CT,NH,NY,NC
Carbon Tetrachloride	CT,NH,NY,NC,RI
Chlorobenzene	CT,NH,NY,NC,RI
Chlorodibromomethane	CT,NH,NY,NC,RI
Chloroethane	CT,NH,NY,NC,RI

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8260B in Water	
Chloroform	CT,NH,NY,NC,RI
Chloromethane	CT,NH,NY,NC,RI
2-Chlorotoluene	NY,NC
4-Chlorotoluene	NY,NC
1,2-Dibromo-3-chloropropane (DBCP)	NC
1,2-Dibromoethane (EDB)	NC
Dibromomethane	NH,NY,NC
1,2-Dichlorobenzene	CT,NY,NC,RI
1,3-Dichlorobenzene	CT,NH,NY,NC,RI
1,4-Dichlorobenzene	CT,NH,NY,NC,RI
trans-1,4-Dichloro-2-butene	NH,NY,NC
Dichlorodifluoromethane (Freon 12)	NH,NY,NC,RI
1,1-Dichloroethane	CT,NH,NY,NC,RI
1,2-Dichloroethane	CT,NH,NY,NC,RI
1,1-Dichloroethylene	CT,NH,NY,NC,RI
cis-1,2-Dichloroethylene	NC
trans-1,2-Dichloroethylene	CT,NH,NY,NC,RI
1,2-Dichloropropane	CT,NH,NY,NC,RI
1,3-Dichloropropane	NY,NC
2,2-Dichloropropane	NH,NY,NC
1,1-Dichloropropene	NH,NY,NC
cis-1,3-Dichloropropene	CT,NH,NY,NC,RI
trans-1,3-Dichloropropene	CT,NH,NY,NC,RI
Diethyl Ether	NC
Diisopropyl Ether (DIPE)	NH,NY,NC
1,4-Dioxane	NC
Ethylbenzene	CT,NH,NY,NC,RI
Hexachlorobutadiene	CT,NH,NY,NC
2-Hexanone (MBK)	CT,NH,NY,NC
Isopropylbenzene (Cumene)	NY,NC
p-Isopropyltoluene (p-Cymene)	CT,NH,NY,NC
Methyl tert-Butyl Ether (MTBE)	CT,NH,NY,NC
Methylene Chloride	CT,NH,NY,NC,RI
4-Methyl-2-pentanone (MIBK)	CT,NH,NY,NC
Naphthalene	NH,NY,NC
n-Propylbenzene	CT,NH,NY,NC
Styrene	CT,NH,NY,NC
1,1,1,2-Tetrachloroethane	CT,NH,NY,NC
1,1,2,2-Tetrachloroethane	CT,NH,NY,NC,RI
Tetrachloroethylene	CT,NH,NY,NC,RI
Tetrahydrofuran	NC
Toluene	CT,NH,NY,NC,RI
1,2,3-Trichlorobenzene	NH,NY,NC
1,2,4-Trichlorobenzene	CT,NH,NY,NC
1,3,5-Trichlorobenzene	NC
1,1,1-Trichloroethane	CT,NH,NY,NC,RI
1,1,2-Trichloroethane	CT,NH,NY,NC,RI

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8260B in Water	
Trichloroethylene	CT,NH,NY,NC,RI
Trichlorofluoromethane (Freon 11)	CT,NH,NY,NC,RI
1,2,3-Trichloropropane	NH,NY,NC
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NC
1,2,4-Trimethylbenzene	NY,NC
1,3,5-Trimethylbenzene	NY,NC
Vinyl Chloride	CT,NH,NY,NC,RI
m+p Xylene	CT,NH,NY,NC,RI
o-Xylene	CT,NH,NY,NC,RI
SW-846 8270C in Water	
Acenaphthene	CT,NY,NH,RI
Acenaphthylene	CT,NY,NH,RI
Aniline	CT,NY
Anthracene	CT,NY,NH,RI
Benzidine	CT,NY,NH
Benzo(a)anthracene	CT,NY,NH,RI
Benzo(a)pyrene	CT,NY,NH,RI
Benzo(b)fluoranthene	CT,NY,NH,RI
Benzo(g,h,i)perylene	CT,NY,NH,RI
Benzo(k)fluoranthene	CT,NY,NH,RI
Benzoic Acid	NY,NH
Bis(2-chloroethoxy)methane	CT,NY,NH,RI
Bis(2-chloroethyl)ether	CT,NY,NH,RI
Bis(2-chloroisopropyl)ether	CT,NY,NH,RI
Bis(2-Ethylhexyl)phthalate	CT,NY,NH,RI
4-Bromophenylphenylether	CT,NY,NH,RI
Butylbenzylphthalate	CT,NY,NH,RI
4-Chloroaniline	CT,NY,NH
4-Chloro-3-methylphenol	CT,NY,NH,RI
2-Chloronaphthalene	CT,NY,NH,RI
2-Chlorophenol	CT,NY,NH,RI
4-Chlorophenylphenylether	CT,NY,NH,RI
Chrysene	CT,NY,NH,RI
Dibenz(a,h)anthracene	CT,NY,NH,RI
Dibenzofuran	CT,NY,NH
Di-n-butylphthalate	CT,NY,NH,RI
1,2-Dichlorobenzene	CT,NY,NH,RI
1,3-Dichlorobenzene	CT,NY,NH,RI
1,4-Dichlorobenzene	CT,NY,NH,RI
3,3-Dichlorobenzidine	CT,NY,NH,RI
2,4-Dichlorophenol	CT,NY,NH,RI
Diethylphthalate	CT,NY,NH,RI
2,4-Dimethylphenol	CT,NY,NH,RI
Dimethylphthalate	CT,NY,NH,RI
4,6-Dinitro-2-methylphenol	CT,NY,NH,RI
2,4-Dinitrophenol	CT,NY,NH,RI

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270C in Water	
2,4-Dinitrotoluene	CT,NY,NH,RI
2,6-Dinitrotoluene	CT,NY,NH,RI
Di-n-octylphthalate	CT,NY,NH,RI
Fluoranthene	CT,NY,NH,RI
Fluorene	NY,NH,RI
Hexachlorobenzene	CT,NY,NH,RI
Hexachlorobutadiene	CT,NY,NH,RI
Hexachlorocyclopentadiene	CT,NY,NH,RI
Hexachloroethane	CT,NY,NH,RI
Indeno(1,2,3-cd)pyrene	CT,NY,NH,RI
Isophorone	CT,NY,NH,RI
2-Methylnaphthalene	CT,NY,NH
2-Methylphenol	CT,NY,NH
3/4-Methylphenol	CT,NY,NH
Naphthalene	CT,NY,NH,RI
2-Nitroaniline	CT,NY,NH
3-Nitroaniline	CT,NY,NH
4-Nitroaniline	CT,NY,NH
Nitrobenzene	CT,NY,NH,RI
2-Nitrophenol	CT,NY,NH,RI
4-Nitrophenol	CT,NY,NH,RI
N-Nitrosodimethylamine	CT,NY,NH,RI
N-Nitrosodiphenylamine	CT,NY,NH,RI
N-Nitrosodi-n-propylamine	CT,NY,NH,RI
Pentachlorophenol	CT,NY,NH,RI
Phenanthrene	CT,NY,NH,RI
Phenol	CT,NY,NH,RI
Pyrene	CT,NY,NH,RI
Pyridine	CT,NY,NH
1,2,4-Trichlorobenzene	CT,NY,NH,RI
2,4,5-Trichlorophenol	CT,NY,NH
2,4,6-Trichlorophenol	CT,NY,NH,RI

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	American Industrial Hygiene Association	100033	01/1/2012
MA	Massachusetts DEP	M-MA100	06/30/2011
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2011
NY	New York State Department of Health	10899 NELAP	04/1/2011
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2011
RI	Rhode Island Department of Health	LAO00112	12/30/2011
NC	North Carolina Div. of Water Quality	652	12/31/2011
NJ	New Jersey DEP	MA007 NELAP	06/30/2011
FL	Florida Department of Health	E871027 NELAP	06/30/2011
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2011
WA	State of Washington Department of Ecology	C2065	02/23/2011

con-test® ANALYTICAL LABORATORY
Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com
www.contestlabs.com

CHAIN OF CUSTODY RECORD

1010668

39 Spruce Street
East longmeadow, MA 01028

Page 1 of 1

Company Name: CDM
Address: 1 Woodward Avenue, Suite 1500
Detroit, MI 48226
Attention: Phillip Dixon
Project Location: 76-01 77th Avenue, Glendale, NY
Sampled By: Marc Morgenstern (Preferred)

Telephone: 313-963-1313
Project # Kliegman OU #1
Client PO# D-006131-2

Project Proposal Provided? (for billing purposes)
○ yes _____ proposal date

DATA DELIVERY (check all that apply)
○ FAX ◉ EMAIL ○ WEBSITE
Fax #
Email: Dixonpj@cdm.com and hallettht@cdm.com
Format: ◉ PDF ◉ EXCEL ○ GIS
○ OTHER
○ "Enhanced Data Package"

Con-Test Lab ID (laboratory use only)	Client Sample ID / Description	Collection Beginning Date/Time	Collection Ending Date/Time	Composite	Grab	*Matrix Code	Conc Code	VOCs (Per Phillip Dixon - CDM)	SVOCs (Per Phillip Dixon - CDM)	Metals (Per Phillip Dixon - CDM)
01	URS Knock Out	12-17-10/10:13	12-17-10/10:13		X	GW	u	✓	✓	✓
02	GWTT Knock Out	12-17-10/10:35	12-17-10/10:35		X	GW	u	✓	✓	✓

	4	2	1
# of Containers			
** Preservation	HCL	None	HNO3
***Container Code	V	A	P

ANALYSIS REQUESTED

Dissolved Metals
○ Field Filtered
○ Lab to Filter

***Cont. Code:**
A=amber glass
G=glass
P=plastic
ST=sterile
V= vial
S=summa can
T=tedlar bag
O=Other

**Preservation
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium bisulfate
X = Na hydroxide
T = Na thiosulfate
O = Other_____

*Matrix Code:
GW= groundwater
WW= wastewater
DW= drinking water
A = air
S = soil/solid
SL = sludge
O = other_____

Comments:
PG= Pressure Gauge Identification
Data Enhancement/RCP = Category B

Please use the following codes to let Con-Test know if a specific sample may be high in concentration in Matrix/Conc. Code Box:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

	Date/Time:
Relinquished by: (signature)	12/20/10/1150
Received by: (signature) Ellen Pierkowski 3.4°C	12/21/10 10:55
Relinquished by: (signature)	
Received by: (signature)	

Turnaround ††
◉ 7-Day
☐ 10-Day
☐ Other ____
RUSH †
☐ †24-Hr ☐ †48-Hr
☐ †72-Hr ☐ †4-Day
† Require lab approval

Detection Limit Requirements
Massachusetts: _____
Connecticut: _____
Other: _____

Is your project MCP or RCP ?
○ MCP Form Required
◉ RCP Form Required
○ MA State DW Form Required PWSID # _____

nelac AIHA NELAC & AIHA Certified
WBE/DBE Certified

†† TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

PLEASE BE CAREFUL NOT TO CONTAMINATE THIS DOCUMENT

Detailed Results

Printer-Friendly Get Link

Enter tracking number

Detailed Results | Notifications

Tracking no.: 872990038512 Select time format: **12H** | 24H E-mail

Delivered

Initiated Picked up In transit Delivered

Delivered
Signed for by: C.COLLINS

Shipment Dates	Destination
Ship date Dec 20, 2010	Signature Proof of Delivery
Delivery date Dec 21, 2010 10:55 AM	

Shipment Options

Hold at FedEx Location
Hold at FedEx Location service is not available for this shipment.

Shipment Facts

Service type	Standard Overnight	Delivered to	Shipping/Receiving
Weight	43.0 lbs/19.5 kg	Reference	KLIEGNA OU 1

Shipment Travel History

Select time zone: Local Scan Time

All shipment travel activity is displayed in local time for the location

Date/Time	Activity	Location	Details
Dec 21, 2010 10:55 AM	**Delivered**		
Dec 21, 2010 8:21 AM	On FedEx vehicle for delivery	WINDSOR LOCKS, CT	
Dec 21, 2010 8:16 AM	At local FedEx facility	WINDSOR LOCKS, CT	
Dec 21, 2010 4:42 AM	Departed FedEx location	NEWARK, NJ	
Dec 20, 2010 11:45 PM	Arrived at FedEx location	NEWARK, NJ	
Dec 20, 2010 10:33 PM	Left FedEx origin facility	JAMAICA, NY	
Dec 20, 2010 12:58 PM	Picked up	JAMAICA, NY	

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con-test ANALYTICAL LABORATORY

39 Spruce St.
East Longmeadow, MA.
01028
P: 413-525-2332
F: 413-525-6405

Sample Receipt Checklist

CLIENT NAME: CDM RECEIVED BY: AP DATE: 12/21/10

1) Was the chain(s) of custody relinquished and signed? (Yes) No

2) Does the chain agree with the samples? (Yes) No

If not, explain:

3) Are all the samples in good condition? (Yes) No

If not, explain:

4) How were the samples received:

On Ice ☑ Direct from Sampling ☐ Ambient ☐ In Cooler(s) ☑

Were the samples received in Temperature Compliance of (2-6°C)? (Yes) No N/A

Temperature °C by Temp blank _____ Temperature °C by Temp gun 3.4°C

5) Are there Dissolved samples for the lab to filter? Yes (No)

Who was notified _____ Date _____ Time _____

6) Are there any samples "On Hold"? Yes (No) Stored where: _____

7) Are there any RUSH or SHORT HOLDING TIME samples? Yes (No)

Who was notified _____ Date _____ Time _____

8) Location where samples are stored: 19

Permission to subcontract samples? Yes No
(Walk-in clients only) if not already approved
Client Signature: _____

Containers received at Con-Test

	# of containers		# of containers
1 Liter Amber	4	8 oz amber/clear jar	
500 mL Amber		4 oz amber/clear jar	
250 mL Amber (8oz amber)		2 oz amber/clear jar	
1 Liter Plastic		Other glass jar	
500 mL Plastic		Plastic Bag / Ziploc	
250 mL plastic	2	Air Cassette	
40 mL Vial - type listed below	6	SOC Kit	
Colisure / bacteria bottle		Tubes	
Dissolved Oxygen bottle		Non-ConTest Container	
Flashpoint bottle		Other	
Encore		PM 2.5 / PM 10	
Perchlorate Kit		PUF Cartridge	

Laboratory Comments:

Time and Date Frozen:

40 mL vials: # HCl 6 # Methanol _____

Bisulfate _____ # DI Water _____

Thiosulfate _____ Unpreserved _____

Do all samples have the proper Acid pH: Yes No (N/A) AP _____

Do all samples have the proper Base pH: Yes No (N/A) _____

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

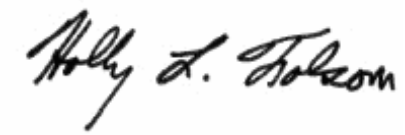
January 18, 2011

Phillip Dixon
Camp, Dresser & McKee - NY
11 British American Boulevard, Suite 200
Latham, NY 12110

Project Location: 76-01 77th Avenue, Glendale, NY
Client Job Number:
Project Number: Kliegman OU #1
Laboratory Work Order Number: 11A0149

Enclosed are results of analyses for samples received by the laboratory on January 7, 2011. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Holly L. Folsom
Project Manager

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Camp, Dresser & McKee - NY
11 British American Boulevard, Suite 200
Latham, NY 12110
ATTN: Phillip Dixon

REPORT DATE: 1/18/2011

PURCHASE ORDER NUMBER: D-006131-2

PROJECT NUMBER: Kliegman OU #1

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 11A0149

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: 76-01 77th Avenue, Glendale, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
GWTT Effluent	11A0149-01	Soil Gas		EPA TO-15	
URS Effluent	11A0149-02	Soil Gas		EPA TO-15	
GWTT Influent	11A0149-03	Soil Gas		EPA TO-15	
URS Influent	11A0149-04	Soil Gas		EPA TO-15	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

EPA TO-15

Qualifications:

Analyte is found in the associated blank as well as in the sample.

Analyte & Samples(s) Qualified:

2-Butanone (MEK), Acetone

11A0149-01[GWTT Effluent], B024814-BLK1, B024814-BS1, 11A0149-02[URS Effluent]

Laboratory fortified blank/laboratory control sample recovery is outside of control limits. Reported value for this compound is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

1,2,4-Trichlorobenzene, Ethanol, Vinyl Acetate

11A0149-01[GWTT Effluent], 11A0149-02[URS Effluent], B024814-BLK1, B024814-BS1, 11A0149-03[GWTT Influent], 11A0149-04[URS Influent], B024813-BLK1, B024813-BS1

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Michael A. Erickson
Laboratory Director

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

ANALYTICAL RESULTS

Project Location: 76-01 77th Avenue, Glendale, NY
Date Received: 1/7/2011
Field Sample #: GWTT Effluent
Sample ID: 11A0149-01
Sample Matrix: Soil Gas
Sampled: 1/5/2011 07:45

Sample Description/Location:
Sub Description/Location:
Canister ID: 1763
Canister Size: 6 liter
Flow Controller ID: 5038
Sample Type: Grab

Work Order: 11A0149
Initial Vacuum(in Hg): NA
Final Vacuum(in Hg): NA
Receipt Vacuum(in Hg): -4
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

	ppbv			ug/m3			Date/Time	
Analyte	Results	RL	Flag	Results	RL	Dilution	Analyzed	Analyst
Acetone	7.2	1.0	B	17	2.4	2	1/11/11 21:50	WSD
Benzene	ND	0.10		ND	0.32	2	1/11/11 21:50	WSD
Benzyl chloride	ND	0.10		ND	0.52	2	1/11/11 21:50	WSD
Bromodichloromethane	ND	0.10		ND	0.67	2	1/11/11 21:50	WSD
Bromoform	ND	0.10		ND	1.0	2	1/11/11 21:50	WSD
Bromomethane	ND	0.10		ND	0.39	2	1/11/11 21:50	WSD
1,3-Butadiene	ND	0.10		ND	0.22	2	1/11/11 21:50	WSD
2-Butanone (MEK)	1.2	0.10	B	3.5	0.29	2	1/11/11 21:50	WSD
Carbon Disulfide	1.2	0.10		3.6	0.31	2	1/11/11 21:50	WSD
Carbon Tetrachloride	ND	0.10		ND	0.63	2	1/11/11 21:50	WSD
Chlorobenzene	ND	0.10		ND	0.46	2	1/11/11 21:50	WSD
Chloroethane	3.5	0.10		9.2	0.26	2	1/11/11 21:50	WSD
Chloroform	ND	0.10		ND	0.49	2	1/11/11 21:50	WSD
Chloromethane	ND	0.10		ND	0.21	2	1/11/11 21:50	WSD
Cyclohexane	ND	0.10		ND	0.34	2	1/11/11 21:50	WSD
Dibromochloromethane	ND	0.10		ND	0.85	2	1/11/11 21:50	WSD
1,2-Dibromoethane (EDB)	ND	0.10		ND	0.77	2	1/11/11 21:50	WSD
1,2-Dichlorobenzene	ND	0.10		ND	0.60	2	1/11/11 21:50	WSD
1,3-Dichlorobenzene	ND	0.10		ND	0.60	2	1/11/11 21:50	WSD
1,4-Dichlorobenzene	ND	0.10		ND	0.60	2	1/11/11 21:50	WSD
Dichlorodifluoromethane (Freon 12)	5.2	0.10		26	0.49	2	1/11/11 21:50	WSD
1,1-Dichloroethane	ND	0.10		ND	0.40	2	1/11/11 21:50	WSD
1,2-Dichloroethane	ND	0.10		ND	0.40	2	1/11/11 21:50	WSD
1,1-Dichloroethylene	ND	0.10		ND	0.40	2	1/11/11 21:50	WSD
cis-1,2-Dichloroethylene	0.20	0.10		0.78	0.40	2	1/11/11 21:50	WSD
trans-1,2-Dichloroethylene	ND	0.10		ND	0.40	2	1/11/11 21:50	WSD
1,2-Dichloropropane	ND	0.10		ND	0.46	2	1/11/11 21:50	WSD
cis-1,3-Dichloropropene	ND	0.10		ND	0.45	2	1/11/11 21:50	WSD
trans-1,3-Dichloropropene	ND	0.10		ND	0.45	2	1/11/11 21:50	WSD
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	ND	0.10		ND	0.70	2	1/11/11 21:50	WSD
Ethanol	13	1.0	L-03	24	1.9	2	1/11/11 21:50	WSD
Ethyl Acetate	ND	0.10		ND	0.36	2	1/11/11 21:50	WSD
Ethylbenzene	ND	0.10		ND	0.43	2	1/11/11 21:50	WSD
4-Ethyltoluene	ND	0.10		ND	0.49	2	1/11/11 21:50	WSD
Heptane	ND	0.10		ND	0.41	2	1/11/11 21:50	WSD
Hexachlorobutadiene	ND	0.10		ND	1.1	2	1/11/11 21:50	WSD
Hexane	ND	0.10		ND	0.35	2	1/11/11 21:50	WSD
2-Hexanone (MBK)	ND	0.10		ND	0.41	2	1/11/11 21:50	WSD

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ANALYTICAL RESULTS

Project Location: 76-01 77th Avenue, Glendale, NY
Date Received: 1/7/2011
Field Sample #: GWTT Effluent
Sample ID: 11A0149-01
Sample Matrix: Soil Gas
Sampled: 1/5/2011 07:45

Sample Description/Location:
Sub Description/Location:
Canister ID: 1763
Canister Size: 6 liter
Flow Controller ID: 5038
Sample Type: Grab

Work Order: 11A0149
Initial Vacuum(in Hg): NA
Final Vacuum(in Hg): NA
Receipt Vacuum(in Hg): -4
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

Analyte	ppbv Results	ppbv RL	Flag	ug/m3 Results	ug/m3 RL	Dilution	Date/Time Analyzed	Analyst
Isopropanol	1.1	0.10		2.8	0.25	2	1/11/11 21:50	WSD
Methyl tert-Butyl Ether (MTBE)	ND	0.10		ND	0.36	2	1/11/11 21:50	WSD
Methylene Chloride	0.49	0.20		1.7	0.69	2	1/11/11 21:50	WSD
4-Methyl-2-pentanone (MIBK)	ND	0.10		ND	0.41	2	1/11/11 21:50	WSD
Propene	ND	1.0		ND	1.7	2	1/11/11 21:50	WSD
Styrene	ND	0.10		ND	0.43	2	1/11/11 21:50	WSD
1,1,2,2-Tetrachloroethane	ND	0.10		ND	0.69	2	1/11/11 21:50	WSD
Tetrachloroethylene	19	0.10		130	0.68	2	1/11/11 21:50	WSD
Tetrahydrofuran	ND	0.10		ND	0.29	2	1/11/11 21:50	WSD
Toluene	ND	0.10		ND	0.38	2	1/11/11 21:50	WSD
1,2,4-Trichlorobenzene	ND	0.10	L-03	ND	0.74	2	1/11/11 21:50	WSD
1,1,1-Trichloroethane	ND	0.10		ND	0.55	2	1/11/11 21:50	WSD
1,1,2-Trichloroethane	ND	0.10		ND	0.55	2	1/11/11 21:50	WSD
Trichloroethylene	6.1	0.10		33	0.54	2	1/11/11 21:50	WSD
Trichlorofluoromethane (Freon 11)	ND	0.10		ND	0.56	2	1/11/11 21:50	WSD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.10		ND	0.77	2	1/11/11 21:50	WSD
1,2,4-Trimethylbenzene	ND	0.10		ND	0.49	2	1/11/11 21:50	WSD
1,3,5-Trimethylbenzene	ND	0.10		ND	0.49	2	1/11/11 21:50	WSD
Vinyl Acetate	ND	0.10	L-03	ND	0.35	2	1/11/11 21:50	WSD
Vinyl Chloride	1.0	0.10		2.5	0.26	2	1/11/11 21:50	WSD
m&p-Xylene	ND	0.20		ND	0.87	2	1/11/11 21:50	WSD
o-Xylene	ND	0.10		ND	0.43	2	1/11/11 21:50	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	102	70-130	1/11/11 21:50

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ANALYTICAL RESULTS

Project Location: 76-01 77th Avenue, Glendale, NY
Date Received: 1/7/2011
Field Sample #: URS Effluent
Sample ID: 11A0149-02
Sample Matrix: Soil Gas
Sampled: 1/5/2011 07:38

Sample Description/Location:
Sub Description/Location:
Canister ID: 1253
Canister Size: 6 liter
Flow Controller ID: 5029
Sample Type: Grab

Work Order: 11A0149
Initial Vacuum(in Hg): NA
Final Vacuum(in Hg): NA
Receipt Vacuum(in Hg): -5
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

	ppbv			ug/m3			Date/Time	
Analyte	Results	RL	Flag	Results	RL	Dilution	Analyzed	Analyst
Acetone	1.2	1.0	B	2.8	2.4	2	1/11/11 22:28	WSD
Benzene	ND	0.10		ND	0.32	2	1/11/11 22:28	WSD
Benzyl chloride	ND	0.10		ND	0.52	2	1/11/11 22:28	WSD
Bromodichloromethane	ND	0.10		ND	0.67	2	1/11/11 22:28	WSD
Bromoform	ND	0.10		ND	1.0	2	1/11/11 22:28	WSD
Bromomethane	ND	0.10		ND	0.39	2	1/11/11 22:28	WSD
1,3-Butadiene	ND	0.10		ND	0.22	2	1/11/11 22:28	WSD
2-Butanone (MEK)	ND	0.10		ND	0.29	2	1/11/11 22:28	WSD
Carbon Disulfide	ND	0.10		ND	0.31	2	1/11/11 22:28	WSD
Carbon Tetrachloride	ND	0.10		ND	0.63	2	1/11/11 22:28	WSD
Chlorobenzene	ND	0.10		ND	0.46	2	1/11/11 22:28	WSD
Chloroethane	ND	0.10		ND	0.26	2	1/11/11 22:28	WSD
Chloroform	0.37	0.10		1.8	0.49	2	1/11/11 22:28	WSD
Chloromethane	ND	0.10		ND	0.21	2	1/11/11 22:28	WSD
Cyclohexane	ND	0.10		ND	0.34	2	1/11/11 22:28	WSD
Dibromochloromethane	ND	0.10		ND	0.85	2	1/11/11 22:28	WSD
1,2-Dibromoethane (EDB)	ND	0.10		ND	0.77	2	1/11/11 22:28	WSD
1,2-Dichlorobenzene	ND	0.10		ND	0.60	2	1/11/11 22:28	WSD
1,3-Dichlorobenzene	ND	0.10		ND	0.60	2	1/11/11 22:28	WSD
1,4-Dichlorobenzene	ND	0.10		ND	0.60	2	1/11/11 22:28	WSD
Dichlorodifluoromethane (Freon 12)	1.1	0.10		5.5	0.49	2	1/11/11 22:28	WSD
1,1-Dichloroethane	0.12	0.10		0.47	0.40	2	1/11/11 22:28	WSD
1,2-Dichloroethane	ND	0.10		ND	0.40	2	1/11/11 22:28	WSD
1,1-Dichloroethylene	0.11	0.10		0.44	0.40	2	1/11/11 22:28	WSD
cis-1,2-Dichloroethylene	0.22	0.10		0.87	0.40	2	1/11/11 22:28	WSD
trans-1,2-Dichloroethylene	ND	0.10		ND	0.40	2	1/11/11 22:28	WSD
1,2-Dichloropropane	ND	0.10		ND	0.46	2	1/11/11 22:28	WSD
cis-1,3-Dichloropropene	ND	0.10		ND	0.45	2	1/11/11 22:28	WSD
trans-1,3-Dichloropropene	ND	0.10		ND	0.45	2	1/11/11 22:28	WSD
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	ND	0.10		ND	0.70	2	1/11/11 22:28	WSD
Ethanol	ND	1.0	L-03	ND	1.9	2	1/11/11 22:28	WSD
Ethyl Acetate	ND	0.10		ND	0.36	2	1/11/11 22:28	WSD
Ethylbenzene	ND	0.10		ND	0.43	2	1/11/11 22:28	WSD
4-Ethyltoluene	ND	0.10		ND	0.49	2	1/11/11 22:28	WSD
Heptane	ND	0.10		ND	0.41	2	1/11/11 22:28	WSD
Hexachlorobutadiene	ND	0.10		ND	1.1	2	1/11/11 22:28	WSD
Hexane	ND	0.10		ND	0.35	2	1/11/11 22:28	WSD
2-Hexanone (MBK)	ND	0.10		ND	0.41	2	1/11/11 22:28	WSD

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ANALYTICAL RESULTS

Project Location: 76-01 77th Avenue, Glendale, NY
Date Received: 1/7/2011
Field Sample #: URS Effluent
Sample ID: 11A0149-02
Sample Matrix: Soil Gas
Sampled: 1/5/2011 07:38

Sample Description/Location:
Sub Description/Location:
Canister ID: 1253
Canister Size: 6 liter
Flow Controller ID: 5029
Sample Type: Grab

Work Order: 11A0149
Initial Vacuum(in Hg): NA
Final Vacuum(in Hg): NA
Receipt Vacuum(in Hg): -5
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

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	ppbv			ug/m3			Date/Time	
Analyte	**Results**	**RL**	**Flag**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
Isopropanol	ND	0.10		ND	0.25	2	1/11/11 22:28	WSD
Methyl tert-Butyl Ether (MTBE)	ND	0.10		ND	0.36	2	1/11/11 22:28	WSD
Methylene Chloride	2.3	0.20		7.9	0.69	2	1/11/11 22:28	WSD
4-Methyl-2-pentanone (MIBK)	ND	0.10		ND	0.41	2	1/11/11 22:28	WSD
Propene	ND	1.0		ND	1.7	2	1/11/11 22:28	WSD
Styrene	ND	0.10		ND	0.43	2	1/11/11 22:28	WSD
1,1,2,2-Tetrachloroethane	ND	0.10		ND	0.69	2	1/11/11 22:28	WSD
Tetrachloroethylene	65	0.10		440	0.68	2	1/11/11 22:28	WSD
Tetrahydrofuran	ND	0.10		ND	0.29	2	1/11/11 22:28	WSD
Toluene	ND	0.10		ND	0.38	2	1/11/11 22:28	WSD
1,2,4-Trichlorobenzene	ND	0.10	L-03	ND	0.74	2	1/11/11 22:28	WSD
1,1,1-Trichloroethane	0.53	0.10		2.9	0.55	2	1/11/11 22:28	WSD
1,1,2-Trichloroethane	ND	0.10		ND	0.55	2	1/11/11 22:28	WSD
Trichloroethylene	0.17	0.10		0.89	0.54	2	1/11/11 22:28	WSD
Trichlorofluoromethane (Freon 11)	1.1	0.10		6.0	0.56	2	1/11/11 22:28	WSD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.10		ND	0.77	2	1/11/11 22:28	WSD
1,2,4-Trimethylbenzene	ND	0.10		ND	0.49	2	1/11/11 22:28	WSD
1,3,5-Trimethylbenzene	ND	0.10		ND	0.49	2	1/11/11 22:28	WSD
Vinyl Acetate	ND	0.10	L-03	ND	0.35	2	1/11/11 22:28	WSD
Vinyl Chloride	ND	0.10		ND	0.26	2	1/11/11 22:28	WSD
m&p-Xylene	ND	0.20		ND	0.87	2	1/11/11 22:28	WSD
o-Xylene	ND	0.10		ND	0.43	2	1/11/11 22:28	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	101	70-130	1/11/11 22:28

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ANALYTICAL RESULTS

Project Location: 76-01 77th Avenue, Glendale, NY
Date Received: 1/7/2011
Field Sample #: GWTT Influent
Sample ID: 11A0149-03
Sample Matrix: Soil Gas
Sampled: 1/5/2011 07:47

Sample Description/Location:
Sub Description/Location:
Canister ID: 1480
Canister Size: 3 liter
Flow Controller ID: 5030
Sample Type: Grab

Work Order: 11A0149
Initial Vacuum(in Hg): NA
Final Vacuum(in Hg): NA
Receipt Vacuum(in Hg): -5
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

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	ppbv			ug/m3			Date/Time	
Analyte	Results	RL	Flag	Results	RL	Dilution	Analyzed	Analyst
Acetone	ND	10		ND	24	20	1/11/11 4:35	WSD
Benzene	ND	1.0		ND	3.2	20	1/11/11 4:35	WSD
Benzyl chloride	ND	1.0		ND	5.2	20	1/11/11 4:35	WSD
Bromodichloromethane	ND	1.0		ND	6.7	20	1/11/11 4:35	WSD
Bromoform	ND	1.0		ND	10	20	1/11/11 4:35	WSD
Bromomethane	ND	1.0		ND	3.9	20	1/11/11 4:35	WSD
1,3-Butadiene	ND	1.0		ND	2.2	20	1/11/11 4:35	WSD
2-Butanone (MEK)	ND	1.0		ND	2.9	20	1/11/11 4:35	WSD
Carbon Disulfide	ND	1.0		ND	3.1	20	1/11/11 4:35	WSD
Carbon Tetrachloride	11	1.0		70	6.3	20	1/11/11 4:35	WSD
Chlorobenzene	ND	1.0		ND	4.6	20	1/11/11 4:35	WSD
Chloroethane	ND	1.0		ND	2.6	20	1/11/11 4:35	WSD
Chloroform	5.4	1.0		26	4.9	20	1/11/11 4:35	WSD
Chloromethane	ND	1.0		ND	2.1	20	1/11/11 4:35	WSD
Cyclohexane	ND	1.0		ND	3.4	20	1/11/11 4:35	WSD
Dibromochloromethane	ND	1.0		ND	8.5	20	1/11/11 4:35	WSD
1,2-Dibromoethane (EDB)	ND	1.0		ND	7.7	20	1/11/11 4:35	WSD
1,2-Dichlorobenzene	ND	1.0		ND	6.0	20	1/11/11 4:35	WSD
1,3-Dichlorobenzene	ND	1.0		ND	6.0	20	1/11/11 4:35	WSD
1,4-Dichlorobenzene	ND	1.0		ND	6.0	20	1/11/11 4:35	WSD
Dichlorodifluoromethane (Freon 12)	2.8	1.0		14	4.9	20	1/11/11 4:35	WSD
1,1-Dichloroethane	9.6	1.0		39	4.0	20	1/11/11 4:35	WSD
1,2-Dichloroethane	ND	1.0		ND	4.0	20	1/11/11 4:35	WSD
1,1-Dichloroethylene	58	1.0		230	4.0	20	1/11/11 4:35	WSD
cis-1,2-Dichloroethylene	44	1.0		180	4.0	20	1/11/11 4:35	WSD
trans-1,2-Dichloroethylene	ND	1.0		ND	4.0	20	1/11/11 4:35	WSD
1,2-Dichloropropane	ND	1.0		ND	4.6	20	1/11/11 4:35	WSD
cis-1,3-Dichloropropene	ND	1.0		ND	4.5	20	1/11/11 4:35	WSD
trans-1,3-Dichloropropene	ND	1.0		ND	4.5	20	1/11/11 4:35	WSD
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	ND	1.0		ND	7.0	20	1/11/11 4:35	WSD
Ethanol	ND	10	L-03	ND	19	20	1/11/11 4:35	WSD
Ethyl Acetate	ND	1.0		ND	3.6	20	1/11/11 4:35	WSD
Ethylbenzene	ND	1.0		ND	4.3	20	1/11/11 4:35	WSD
4-Ethyltoluene	ND	1.0		ND	4.9	20	1/11/11 4:35	WSD
Heptane	ND	1.0		ND	4.1	20	1/11/11 4:35	WSD
Hexachlorobutadiene	ND	1.0		ND	11	20	1/11/11 4:35	WSD
Hexane	ND	1.0		ND	3.5	20	1/11/11 4:35	WSD
2-Hexanone (MBK)	ND	1.0		ND	4.1	20	1/11/11 4:35	WSD

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ANALYTICAL RESULTS

Project Location: 76-01 77th Avenue, Glendale, NY
Date Received: 1/7/2011
Field Sample #: GWTT Influent
Sample ID: 11A0149-03
Sample Matrix: Soil Gas
Sampled: 1/5/2011 07:47

Sample Description/Location:
Sub Description/Location:
Canister ID: 1480
Canister Size: 3 liter
Flow Controller ID: 5030
Sample Type: Grab

Work Order: 11A0149
Initial Vacuum(in Hg): NA
Final Vacuum(in Hg): NA
Receipt Vacuum(in Hg): -5
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

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Analyte	ppbv Results	RL	Flag	ug/m3 Results	RL	Dilution	Date/Time Analyzed	Analyst
Isopropanol	ND	1.0		ND	2.5	20	1/11/11 4:35	WSD
Methyl tert-Butyl Ether (MTBE)	ND	1.0		ND	3.6	20	1/11/11 4:35	WSD
Methylene Chloride	ND	2.0		ND	6.9	20	1/11/11 4:35	WSD
4-Methyl-2-pentanone (MIBK)	ND	1.0		ND	4.1	20	1/11/11 4:35	WSD
Propene	ND	10		ND	17	20	1/11/11 4:35	WSD
Styrene	ND	1.0		ND	4.3	20	1/11/11 4:35	WSD
1,1,2,2-Tetrachloroethane	ND	1.0		ND	6.9	20	1/11/11 4:35	WSD
Tetrachloroethylene	15000	40		100000	270	800	1/11/11 23:04	WSD
Tetrahydrofuran	ND	1.0		ND	2.9	20	1/11/11 4:35	WSD
Toluene	ND	1.0		ND	3.8	20	1/11/11 4:35	WSD
1,2,4-Trichlorobenzene	ND	1.0		ND	7.4	20	1/11/11 4:35	WSD
1,1,1-Trichloroethane	140	1.0		760	5.5	20	1/11/11 4:35	WSD
1,1,2-Trichloroethane	ND	1.0		ND	5.5	20	1/11/11 4:35	WSD
Trichloroethylene	150	1.0		810	5.4	20	1/11/11 4:35	WSD
Trichlorofluoromethane (Freon 11)	5.5	1.0		31	5.6	20	1/11/11 4:35	WSD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0		ND	7.7	20	1/11/11 4:35	WSD
1,2,4-Trimethylbenzene	ND	1.0		ND	4.9	20	1/11/11 4:35	WSD
1,3,5-Trimethylbenzene	ND	1.0		ND	4.9	20	1/11/11 4:35	WSD
Vinyl Acetate	ND	1.0		ND	3.5	20	1/11/11 4:35	WSD
Vinyl Chloride	ND	1.0		ND	2.6	20	1/11/11 4:35	WSD
m&p-Xylene	ND	2.0		ND	8.7	20	1/11/11 4:35	WSD
o-Xylene	ND	1.0		ND	4.3	20	1/11/11 4:35	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	102	70-130	1/11/11 23:04
4-Bromofluorobenzene (1)	97.6	70-130	1/11/11 4:35

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ANALYTICAL RESULTS

Project Location: 76-01 77th Avenue, Glendale, NY
Date Received: 1/7/2011
Field Sample #: URS Influent
Sample ID: 11A0149-04
Sample Matrix: Soil Gas
Sampled: 1/5/2011 07:35

Sample Description/Location:
Sub Description/Location:
Canister ID: 1523
Canister Size: 3 liter
Flow Controller ID: 5036
Sample Type: Grab

Work Order: 11A0149
Initial Vacuum(in Hg): NA
Final Vacuum(in Hg): NA
Receipt Vacuum(in Hg): -2
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

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Analyte	ppbv Results	ppbv RL	Flag	ug/m3 Results	ug/m3 RL	Dilution	Date/Time Analyzed	Analyst
Acetone	ND	10		ND	24	20	1/11/11 5:10	WSD
Benzene	ND	1.0		ND	3.2	20	1/11/11 5:10	WSD
Benzyl chloride	ND	1.0		ND	5.2	20	1/11/11 5:10	WSD
Bromodichloromethane	ND	1.0		ND	6.7	20	1/11/11 5:10	WSD
Bromoform	ND	1.0		ND	10	20	1/11/11 5:10	WSD
Bromomethane	ND	1.0		ND	3.9	20	1/11/11 5:10	WSD
1,3-Butadiene	ND	1.0		ND	2.2	20	1/11/11 5:10	WSD
2-Butanone (MEK)	ND	1.0		ND	2.9	20	1/11/11 5:10	WSD
Carbon Disulfide	ND	1.0		ND	3.1	20	1/11/11 5:10	WSD
Carbon Tetrachloride	ND	1.0		ND	6.3	20	1/11/11 5:10	WSD
Chlorobenzene	ND	1.0		ND	4.6	20	1/11/11 5:10	WSD
Chloroethane	ND	1.0		ND	2.6	20	1/11/11 5:10	WSD
Chloroform	ND	1.0		ND	4.9	20	1/11/11 5:10	WSD
Chloromethane	ND	1.0		ND	2.1	20	1/11/11 5:10	WSD
Cyclohexane	ND	1.0		ND	3.4	20	1/11/11 5:10	WSD
Dibromochloromethane	ND	1.0		ND	8.5	20	1/11/11 5:10	WSD
1,2-Dibromoethane (EDB)	ND	1.0		ND	7.7	20	1/11/11 5:10	WSD
1,2-Dichlorobenzene	ND	1.0		ND	6.0	20	1/11/11 5:10	WSD
1,3-Dichlorobenzene	ND	1.0		ND	6.0	20	1/11/11 5:10	WSD
1,4-Dichlorobenzene	ND	1.0		ND	6.0	20	1/11/11 5:10	WSD
Dichlorodifluoromethane (Freon 12)	ND	1.0		ND	4.9	20	1/11/11 5:10	WSD
1,1-Dichloroethane	ND	1.0		ND	4.0	20	1/11/11 5:10	WSD
1,2-Dichloroethane	ND	1.0		ND	4.0	20	1/11/11 5:10	WSD
1,1-Dichloroethylene	ND	1.0		ND	4.0	20	1/11/11 5:10	WSD
cis-1,2-Dichloroethylene	ND	1.0		ND	4.0	20	1/11/11 5:10	WSD
trans-1,2-Dichloroethylene	ND	1.0		ND	4.0	20	1/11/11 5:10	WSD
1,2-Dichloropropane	ND	1.0		ND	4.6	20	1/11/11 5:10	WSD
cis-1,3-Dichloropropene	ND	1.0		ND	4.5	20	1/11/11 5:10	WSD
trans-1,3-Dichloropropene	ND	1.0		ND	4.5	20	1/11/11 5:10	WSD
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	ND	1.0		ND	7.0	20	1/11/11 5:10	WSD
Ethanol	15	10	L-03	29	19	20	1/11/11 5:10	WSD
Ethyl Acetate	ND	1.0		ND	3.6	20	1/11/11 5:10	WSD
Ethylbenzene	ND	1.0		ND	4.3	20	1/11/11 5:10	WSD
4-Ethyltoluene	ND	1.0		ND	4.9	20	1/11/11 5:10	WSD
Heptane	ND	1.0		ND	4.1	20	1/11/11 5:10	WSD
Hexachlorobutadiene	ND	1.0		ND	11	20	1/11/11 5:10	WSD
Hexane	ND	1.0		ND	3.5	20	1/11/11 5:10	WSD
2-Hexanone (MBK)	ND	1.0		ND	4.1	20	1/11/11 5:10	WSD

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ANALYTICAL RESULTS

Project Location: 76-01 77th Avenue, Glendale, NY
Date Received: 1/7/2011
Field Sample #: URS Influent
Sample ID: 11A0149-04
Sample Matrix: Soil Gas
Sampled: 1/5/2011 07:35

Sample Description/Location:
Sub Description/Location:
Canister ID: 1523
Canister Size: 3 liter
Flow Controller ID: 5036
Sample Type: Grab

Work Order: 11A0149
Initial Vacuum(in Hg): NA
Final Vacuum(in Hg): NA
Receipt Vacuum(in Hg): -2
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

Analyte	ppbv Results	ppbv RL	Flag	ug/m3 Results	ug/m3 RL	Dilution	Date/Time Analyzed	Analyst
Isopropanol	ND	1.0		ND	2.5	20	1/11/11 5:10	WSD
Methyl tert-Butyl Ether (MTBE)	ND	1.0		ND	3.6	20	1/11/11 5:10	WSD
Methylene Chloride	ND	2.0		ND	6.9	20	1/11/11 5:10	WSD
4-Methyl-2-pentanone (MIBK)	ND	1.0		ND	4.1	20	1/11/11 5:10	WSD
Propene	ND	10		ND	17	20	1/11/11 5:10	WSD
Styrene	ND	1.0		ND	4.3	20	1/11/11 5:10	WSD
1,1,2,2-Tetrachloroethane	ND	1.0		ND	6.9	20	1/11/11 5:10	WSD
Tetrachloroethylene	790	10		5300	68	200	1/11/11 23:43	WSD
Tetrahydrofuran	ND	1.0		ND	2.9	20	1/11/11 5:10	WSD
Toluene	ND	1.0		ND	3.8	20	1/11/11 5:10	WSD
1,2,4-Trichlorobenzene	ND	1.0		ND	7.4	20	1/11/11 5:10	WSD
1,1,1-Trichloroethane	ND	1.0		ND	5.5	20	1/11/11 5:10	WSD
1,1,2-Trichloroethane	ND	1.0		ND	5.5	20	1/11/11 5:10	WSD
Trichloroethylene	1.3	1.0		7.1	5.4	20	1/11/11 5:10	WSD
Trichlorofluoromethane (Freon 11)	ND	1.0		ND	5.6	20	1/11/11 5:10	WSD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	1.0		ND	7.7	20	1/11/11 5:10	WSD
1,2,4-Trimethylbenzene	ND	1.0		ND	4.9	20	1/11/11 5:10	WSD
1,3,5-Trimethylbenzene	ND	1.0		ND	4.9	20	1/11/11 5:10	WSD
Vinyl Acetate	ND	1.0		ND	3.5	20	1/11/11 5:10	WSD
Vinyl Chloride	ND	1.0		ND	2.6	20	1/11/11 5:10	WSD
m&p-Xylene	ND	2.0		ND	8.7	20	1/11/11 5:10	WSD
o-Xylene	ND	1.0		ND	4.3	20	1/11/11 5:10	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	104	70-130	1/11/11 23:43
4-Bromofluorobenzene (1)	100	70-130	1/11/11 5:10

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Sample Extraction Data

Prep Method: TO-15 Prep-EPA TO-15

Lab Number [Field ID]	Batch	Pressure Dilution	Pre Dilution	Pre-Dil Initial mL	Pre-Dil Final mL	Default Injection mL	Actual Injection mL	Date
11A0149-03 [GWTT Influent]	B024813	1	1	N/A	1000	400	20	01/10/11
11A0149-04 [URS Influent]	B024813	1	1	N/A	1000	400	20	01/10/11

Prep Method: TO-15 Prep-EPA TO-15

Lab Number [Field ID]	Batch	Pressure Dilution	Pre Dilution	Pre-Dil Initial mL	Pre-Dil Final mL	Default Injection mL	Actual Injection mL	Date
11A0149-01 [GWTT Effluent]	B024814	1	1	N/A	1000	400	200	01/11/11
11A0149-02 [URS Effluent]	B024814	1	1	N/A	1000	400	200	01/11/11
11A0149-03RE1 [GWTT Influent]	B024814	2	100	10	1000	400	100	01/11/11
11A0149-04RE1 [URS Influent]	B024814	2	100	10	1000	400	400	01/11/11

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QUALITY CONTROL

Air Toxics by EPA Compendium Methods - Quality Control

Analyte	ppbv Results	ppbv RL	ug/m3 Results	ug/m3 RL	Spike Level ppbv	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch B024813 - TO-15 Prep											
Blank (B024813-BLK1)					Prepared & Analyzed: 01/10/11						
Acetone	ND	0.20									
Benzene	ND	0.020									
Benzyl chloride	ND	0.020									
Bromodichloromethane	ND	0.020									
Bromoform	ND	0.020									
Bromomethane	ND	0.020									
1,3-Butadiene	ND	0.020									
2-Butanone (MEK)	ND	0.020									
Carbon Disulfide	ND	0.020									
Carbon Tetrachloride	ND	0.020									
Chlorobenzene	ND	0.020									
Chloroethane	ND	0.020									
Chloroform	ND	0.020									
Chloromethane	ND	0.020									
Cyclohexane	ND	0.020									
Dibromochloromethane	ND	0.020									
1,2-Dibromoethane (EDB)	ND	0.020									
1,2-Dichlorobenzene	ND	0.020									
1,3-Dichlorobenzene	ND	0.020									
1,4-Dichlorobenzene	ND	0.020									
Dichlorodifluoromethane (Freon 12)	ND	0.020									
1,1-Dichloroethane	ND	0.020									
1,2-Dichloroethane	ND	0.020									
1,1-Dichloroethylene	ND	0.020									
cis-1,2-Dichloroethylene	ND	0.020									
trans-1,2-Dichloroethylene	ND	0.020									
1,2-Dichloropropane	ND	0.020									
cis-1,3-Dichloropropene	ND	0.020									
trans-1,3-Dichloropropene	ND	0.020									
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	ND	0.020									
Ethanol	ND	0.20									L-03
Ethyl Acetate	ND	0.020									
Ethylbenzene	ND	0.020									
4-Ethyltoluene	ND	0.020									
Heptane	ND	0.020									
Hexachlorobutadiene	ND	0.020									
Hexane	ND	0.020									
2-Hexanone (MBK)	ND	0.020									
Isopropanol	ND	0.020									
Methyl tert-Butyl Ether (MTBE)	ND	0.020									
Methylene Chloride	ND	0.040									
4-Methyl-2-pentanone (MIBK)	ND	0.020									
Propene	ND	0.20									
Styrene	ND	0.020									
1,1,2,2-Tetrachloroethane	ND	0.020									
Tetrachloroethylene	ND	0.020									

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QUALITY CONTROL

Air Toxics by EPA Compendium Methods - Quality Control

Analyte	ppbv Results	ppbv RL	ug/m3 Results	ug/m3 RL	Spike Level ppbv	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch B024813 - TO-15 Prep											
Blank (B024813-BLK1)					Prepared & Analyzed: 01/10/11						
Tetrahydrofuran	ND	0.020									
Toluene	ND	0.020									
1,2,4-Trichlorobenzene	ND	0.020									
1,1,1-Trichloroethane	ND	0.020									
1,1,2-Trichloroethane	ND	0.020									
Trichloroethylene	ND	0.020									
Trichlorofluoromethane (Freon 11)	ND	0.020									
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.020									
1,2,4-Trimethylbenzene	ND	0.020									
1,3,5-Trimethylbenzene	ND	0.020									
Vinyl Acetate	ND	0.020									
Vinyl Chloride	ND	0.020									
m&p-Xylene	ND	0.040									
o-Xylene	ND	0.020									
Surrogate: 4-Bromofluorobenzene (1)	*8.18*				*8.00*		*102*	*70-130*			
LCS (B024813-BS1)					Prepared & Analyzed: 01/10/11						
Acetone	5.15				5.00		103	50-150			
Benzene	4.62				5.00		92.5	70-130			
Benzyl chloride	4.16				5.00		83.2	70-130			
Bromodichloromethane	5.02				5.00		100	70-130			
Bromoform	5.09				5.00		102	70-130			
Bromomethane	4.47				5.00		89.5	70-130			
1,3-Butadiene	4.53				5.00		90.7	70-130			
2-Butanone (MEK)	4.31				5.00		86.2	70-130			
Carbon Disulfide	4.66				5.00		93.3	70-130			
Carbon Tetrachloride	5.26				5.00		105	70-130			
Chlorobenzene	4.65				5.00		92.9	70-130			
Chloroethane	4.58				5.00		91.7	70-130			
Chloroform	4.62				5.00		92.3	70-130			
Chloromethane	4.76				5.00		95.3	70-130			
Cyclohexane	4.42				5.00		88.3	50-150			
Dibromochloromethane	4.97				5.00		99.4	70-130			
1,2-Dibromoethane (EDB)	4.81				5.00		96.3	70-130			
1,2-Dichlorobenzene	4.37				5.00		87.5	70-130			
1,3-Dichlorobenzene	4.59				5.00		91.7	70-130			
1,4-Dichlorobenzene	4.53				5.00		90.6	70-130			
Dichlorodifluoromethane (Freon 12)	4.58				5.00		91.6	70-130			
1,1-Dichloroethane	4.67				5.00		93.4	70-130			
1,2-Dichloroethane	4.77				5.00		95.4	70-130			
1,1-Dichloroethylene	4.95				5.00		99.0	70-130			
cis-1,2-Dichloroethylene	4.69				5.00		93.8	70-130			
trans-1,2-Dichloroethylene	4.81				5.00		96.2	70-130			
1,2-Dichloropropane	4.76				5.00		95.1	70-130			
cis-1,3-Dichloropropene	5.20				5.00		104	70-130			
trans-1,3-Dichloropropene	4.50				5.00		89.9	70-130			

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QUALITY CONTROL

Air Toxics by EPA Compendium Methods - Quality Control

Analyte	ppbv Results	ppbv RL	ug/m3 Results	ug/m3 RL	Spike Level ppbv	Source Result	%REC		%REC Limits	RPD	RPD Limit	Flag
Batch B024813 - TO-15 Prep												
LCS (B024813-BS1)					Prepared & Analyzed: 01/10/11							
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	4.07				5.00		81.5		70-130			
Ethanol	2.23				5.00		**44.6**	*	50-150			L-03
Ethyl Acetate	4.67				5.00		93.5		50-150			
Ethylbenzene	4.63				5.00		92.5		70-130			
4-Ethyltoluene	4.52				5.00		90.4		50-150			
Heptane	4.84				5.00		96.8		50-150			
Hexachlorobutadiene	4.30				5.00		86.1		70-130			
Hexane	4.70				5.00		94.0		70-130			
2-Hexanone (MBK)	3.84				5.00		76.9		50-150			
Isopropanol	2.92				5.00		58.5		50-150			
Methyl tert-Butyl Ether (MTBE)	4.35				5.00		87.0		70-130			
Methylene Chloride	4.76				5.00		95.1		70-130			
4-Methyl-2-pentanone (MIBK)	4.20				5.00		83.9		70-130			
Propene	5.30				5.00		106		50-150			
Styrene	4.55				5.00		91.0		70-130			
1,1,2,2-Tetrachloroethane	4.50				5.00		89.9		70-130			
Tetrachloroethylene	4.81				5.00		96.1		70-130			
Tetrahydrofuran	4.48				5.00		89.6		50-150			
Toluene	4.57				5.00		91.4		70-130			
1,2,4-Trichlorobenzene	3.66				5.00		73.3		70-130			
1,1,1-Trichloroethane	5.12				5.00		102		70-130			
1,1,2-Trichloroethane	4.65				5.00		93.0		70-130			
Trichloroethylene	4.86				5.00		97.2		70-130			
Trichlorofluoromethane (Freon 11)	4.79				5.00		95.8		70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	5.00				5.00		100		70-130			
1,2,4-Trimethylbenzene	4.50				5.00		89.9		70-130			
1,3,5-Trimethylbenzene	4.51				5.00		90.2		70-130			
Vinyl Acetate	3.61				5.00		72.3		70-130			
Vinyl Chloride	4.66				5.00		93.2		70-130			
m&p-Xylene	9.44				10.0		94.4		70-130			
o-Xylene	4.62				5.00		92.3		70-130			
Surrogate: 4-Bromofluorobenzene (1)	*8.45*				*8.00*		*106*		*70-130*			

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QUALITY CONTROL

Air Toxics by EPA Compendium Methods - Quality Control

Analyte	ppbv Results	ppbv RL	ug/m3 Results	ug/m3 RL	Spike Level ppbv	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch B024814 - TO-15 Prep											
Blank (B024814-BLK1)					Prepared & Analyzed: 01/11/11						
Acetone	2.7	0.50									B
Benzene	ND	0.050									
Benzyl chloride	ND	0.050									
Bromodichloromethane	ND	0.050									
Bromoform	ND	0.050									
Bromomethane	ND	0.050									
1,3-Butadiene	ND	0.050									
2-Butanone (MEK)	0.13	0.050									B
Carbon Disulfide	ND	0.050									
Carbon Tetrachloride	ND	0.050									
Chlorobenzene	ND	0.050									
Chloroethane	ND	0.050									
Chloroform	ND	0.050									
Chloromethane	ND	0.050									
Cyclohexane	ND	0.050									
Dibromochloromethane	ND	0.050									
1,2-Dibromoethane (EDB)	ND	0.050									
1,2-Dichlorobenzene	ND	0.050									
1,3-Dichlorobenzene	ND	0.050									
1,4-Dichlorobenzene	ND	0.050									
Dichlorodifluoromethane (Freon 12)	ND	0.050									
1,1-Dichloroethane	ND	0.050									
1,2-Dichloroethane	ND	0.050									
1,1-Dichloroethylene	ND	0.050									
cis-1,2-Dichloroethylene	ND	0.050									
trans-1,2-Dichloroethylene	ND	0.050									
1,2-Dichloropropane	ND	0.050									
cis-1,3-Dichloropropene	ND	0.050									
trans-1,3-Dichloropropene	ND	0.050									
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	ND	0.050									
Ethanol	ND	0.50									L-03
Ethyl Acetate	ND	0.050									
Ethylbenzene	ND	0.050									
4-Ethyltoluene	ND	0.050									
Heptane	ND	0.050									
Hexachlorobutadiene	ND	0.050									
Hexane	ND	0.050									
2-Hexanone (MBK)	ND	0.050									
Isopropanol	ND	0.050									
Methyl tert-Butyl Ether (MTBE)	ND	0.050									
Methylene Chloride	ND	0.10									
4-Methyl-2-pentanone (MIBK)	ND	0.050									
Propene	ND	0.50									
Styrene	ND	0.050									
1,1,2,2-Tetrachloroethane	ND	0.050									
Tetrachloroethylene	ND	0.050									

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QUALITY CONTROL

Air Toxics by EPA Compendium Methods - Quality Control

Analyte	ppbv Results	ppbv RL	ug/m3 Results	ug/m3 RL	Spike Level ppbv	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch B024814 - TO-15 Prep											
Blank (B024814-BLK1)					Prepared & Analyzed: 01/11/11						
Tetrahydrofuran	ND	0.050									
Toluene	ND	0.050									
1,2,4-Trichlorobenzene	ND	0.050									L-03
1,1,1-Trichloroethane	ND	0.050									
1,1,2-Trichloroethane	ND	0.050									
Trichloroethylene	ND	0.050									
Trichlorofluoromethane (Freon 11)	ND	0.050									
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.050									
1,2,4-Trimethylbenzene	ND	0.050									
1,3,5-Trimethylbenzene	ND	0.050									
Vinyl Acetate	ND	0.050									L-03
Vinyl Chloride	ND	0.050									
m&p-Xylene	ND	0.10									
o-Xylene	ND	0.050									
Surrogate: 4-Bromofluorobenzene (1)	*8.27*				*8.00*		*103*	*70-130*			
LCS (B024814-BS1)					Prepared & Analyzed: 01/11/11						
Acetone	5.17				5.00		103	50-150			B
Benzene	4.43				5.00		88.6	70-130			
Benzyl chloride	4.28				5.00		85.6	70-130			
Bromodichloromethane	5.67				5.00		113	70-130			
Bromoform	4.91				5.00		98.1	70-130			
Bromomethane	4.03				5.00		80.6	70-130			
1,3-Butadiene	4.40				5.00		87.9	70-130			
2-Butanone (MEK)	3.82				5.00		76.3	70-130			B
Carbon Disulfide	4.11				5.00		82.2	70-130			
Carbon Tetrachloride	6.03				5.00		121	70-130			
Chlorobenzene	4.20				5.00		83.9	70-130			
Chloroethane	4.32				5.00		86.3	70-130			
Chloroform	4.28				5.00		85.6	70-130			
Chloromethane	4.60				5.00		92.0	70-130			
Cyclohexane	4.10				5.00		81.9	50-150			
Dibromochloromethane	4.92				5.00		98.5	70-130			
1,2-Dibromoethane (EDB)	4.48				5.00		89.6	70-130			
1,2-Dichlorobenzene	4.20				5.00		84.0	70-130			
1,3-Dichlorobenzene	4.42				5.00		88.4	70-130			
1,4-Dichlorobenzene	4.40				5.00		87.9	70-130			
Dichlorodifluoromethane (Freon 12)	4.72				5.00		94.4	70-130			
1,1-Dichloroethane	4.13				5.00		82.5	70-130			
1,2-Dichloroethane	4.98				5.00		99.7	70-130			
1,1-Dichloroethylene	4.90				5.00		98.0	70-130			
cis-1,2-Dichloroethylene	4.24				5.00		84.9	70-130			
trans-1,2-Dichloroethylene	4.28				5.00		85.5	70-130			
1,2-Dichloropropane	4.77				5.00		95.4	70-130			
cis-1,3-Dichloropropene	5.21				5.00		104	70-130			
trans-1,3-Dichloropropene	4.82				5.00		96.4	70-130			

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Air Toxics by EPA Compendium Methods - Quality Control

Analyte	ppbv Results	ppbv RL	ug/m3 Results	ug/m3 RL	Spike Level ppbv	Source Result	%REC		%REC Limits	RPD	RPD Limit	Flag
Batch B024814 - TO-15 Prep												
LCS (B024814-BS1)					Prepared & Analyzed: 01/11/11							
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	3.93				5.00		78.7		70-130			
Ethanol	1.84				5.00		**36.8**	*	50-150			L-03
Ethyl Acetate	4.17				5.00		83.3		50-150			
Ethylbenzene	4.50				5.00		90.0		70-130			
4-Ethyltoluene	4.47				5.00		89.3		50-150			
Heptane	4.99				5.00		99.8		50-150			
Hexachlorobutadiene	4.22				5.00		84.5		70-130			
Hexane	4.74				5.00		94.9		70-130			
2-Hexanone (MBK)	3.99				5.00		79.7		50-150			
Isopropanol	2.67				5.00		53.4		50-150			
Methyl tert-Butyl Ether (MTBE)	3.73				5.00		74.6		70-130			
Methylene Chloride	4.67				5.00		93.3		70-130			
4-Methyl-2-pentanone (MIBK)	4.05				5.00		80.9		70-130			
Propene	5.30				5.00		106		50-150			
Styrene	4.28				5.00		85.5		70-130			
1,1,2,2-Tetrachloroethane	4.42				5.00		88.4		70-130			
Tetrachloroethylene	4.20				5.00		84.1		70-130			
Tetrahydrofuran	3.76				5.00		75.2		50-150			
Toluene	4.22				5.00		84.3		70-130			
1,2,4-Trichlorobenzene	3.37				5.00		**67.4**	*	70-130			L-03
1,1,1-Trichloroethane	5.89				5.00		118		70-130			
1,1,2-Trichloroethane	4.32				5.00		86.3		70-130			
Trichloroethylene	4.88				5.00		97.6		70-130			
Trichlorofluoromethane (Freon 11)	4.92				5.00		98.5		70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	4.42				5.00		88.4		70-130			
1,2,4-Trimethylbenzene	4.56				5.00		91.2		70-130			
1,3,5-Trimethylbenzene	4.55				5.00		91.0		70-130			
Vinyl Acetate	3.38				5.00		**67.7**	*	70-130			L-03
Vinyl Chloride	4.41				5.00		88.2		70-130			
m&p-Xylene	9.10				10.0		91.0		70-130			
o-Xylene	4.80				5.00		96.0		70-130			
Surrogate: 4-Bromofluorobenzene (1)	*8.90*				*8.00*		*111*		*70-130*			

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
B	Analyte is found in the associated blank as well as in the sample.
L-03	Laboratory fortified blank/laboratory control sample recovery is outside of control limits. Reported value for this compound is likely to be biased on the low side.

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INTERNAL STANDARD AREA AND RT SUMMARY

EPA TO-15

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (S000585-CCV1)			Lab File ID: F011102.D			Analyzed: 01/11/11 13:38			
Bromochloromethane (1)	154987	8.6	226737	8.6	68	60 - 140	0.0000	+/-0.50	
1,4-Difluorobenzene (1)	354017	10.353	687722	10.353	51	60 - 140	0.0000	+/-0.50	
Chlorobenzene-d5 (1)	345561	14.697	611387	14.697	57	60 - 140	0.0000	+/-0.50	
LCS (B024814-BS1)			Lab File ID: F011103.D			Analyzed: 01/11/11 14:14			
Bromochloromethane (1)	163033	8.585	154987	8.6	105	60 - 140	-0.0150	+/-0.50	
1,4-Difluorobenzene (1)	374956	10.338	354017	10.353	106	60 - 140	-0.0150	+/-0.50	
Chlorobenzene-d5 (1)	358812	14.689	345561	14.697	104	60 - 140	-0.0080	+/-0.50	
Blank (B024814-BLK1)			Lab File ID: F011105.D			Analyzed: 01/11/11 15:29			
Bromochloromethane (1)	155538	8.585	154987	8.6	100	60 - 140	-0.0150	+/-0.50	
1,4-Difluorobenzene (1)	351764	10.338	354017	10.353	99	60 - 140	-0.0150	+/-0.50	
Chlorobenzene-d5 (1)	323450	14.689	345561	14.697	94	60 - 140	-0.0080	+/-0.50	
GWTT Effluent (11A0149-01)			Lab File ID: F011115.D			Analyzed: 01/11/11 21:50			
Bromochloromethane (1)	150535	8.6	154987	8.6	97	60 - 140	0.0000	+/-0.50	
1,4-Difluorobenzene (1)	337386	10.338	354017	10.353	95	60 - 140	-0.0150	+/-0.50	
Chlorobenzene-d5 (1)	310556	14.69	345561	14.697	90	60 - 140	-0.0070	+/-0.50	
URS Effluent (11A0149-02)			Lab File ID: F011116.D			Analyzed: 01/11/11 22:28			
Bromochloromethane (1)	144784	8.615	154987	8.6	93	60 - 140	0.0150	+/-0.50	
1,4-Difluorobenzene (1)	320340	10.353	354017	10.353	90	60 - 140	0.0000	+/-0.50	
Chlorobenzene-d5 (1)	296124	14.69	345561	14.697	86	60 - 140	-0.0070	+/-0.50	
GWTT Influent (11A0149-03RE1)			Lab File ID: F011117.D			Analyzed: 01/11/11 23:04			
Bromochloromethane (1)	143702	8.585	154987	8.6	93	60 - 140	-0.0150	+/-0.50	
1,4-Difluorobenzene (1)	316095	10.338	354017	10.353	89	60 - 140	-0.0150	+/-0.50	
Chlorobenzene-d5 (1)	293373	14.69	345561	14.697	85	60 - 140	-0.0070	+/-0.50	
URS Influent (11A0149-04RE1)			Lab File ID: F011118.D			Analyzed: 01/11/11 23:43			
Bromochloromethane (1)	142665	8.585	154987	8.6	92	60 - 140	-0.0150	+/-0.50	
1,4-Difluorobenzene (1)	314264	10.338	354017	10.353	89	60 - 140	-0.0150	+/-0.50	
Chlorobenzene-d5 (1)	291634	14.682	345561	14.697	84	60 - 140	-0.0150	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

EPA TO-15

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (S000586-CCV1)			Lab File ID: F011002.D			Analyzed: 01/10/11 15:06			
Bromochloromethane (1)	194402	8.585	226737	8.6	86	60 - 140	-0.0150	+/-0.50	
1,4-Difluorobenzene (1)	543940	10.338	687722	10.353	79	60 - 140	-0.0150	+/-0.50	
Chlorobenzene-d5 (1)	499476	14.689	611387	14.697	82	60 - 140	-0.0080	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

EPA TO-15

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B024813-BS1)			Lab File ID: F011003.D			Analyzed: 01/10/11 15:43			
Bromochloromethane (1)	191503	8.585	194402	8.585	99	60 - 140	0.0000	+/-0.50	
1,4-Difluorobenzene (1)	528237	10.338	543940	10.338	97	60 - 140	0.0000	+/-0.50	
Chlorobenzene-d5 (1)	487648	14.689	499476	14.689	98	60 - 140	0.0000	+/-0.50	
Blank (B024813-BLK1)			Lab File ID: F011006.D			Analyzed: 01/10/11 17:50			
Bromochloromethane (1)	203323	8.585	194402	8.585	105	60 - 140	0.0000	+/-0.50	
1,4-Difluorobenzene (1)	524939	10.338	543940	10.338	97	60 - 140	0.0000	+/-0.50	
Chlorobenzene-d5 (1)	462809	14.682	499476	14.689	93	60 - 140	-0.0070	+/-0.50	
GWTT Influent (11A0149-03)			Lab File ID: F011023.D			Analyzed: 01/11/11 04:35			
Bromochloromethane (1)	153182	8.6	194402	8.585	79	60 - 140	0.0150	+/-0.50	
1,4-Difluorobenzene (1)	338411	10.338	543940	10.338	62	60 - 140	0.0000	+/-0.50	
Chlorobenzene-d5 (1)	322597	14.697	499476	14.689	65	60 - 140	0.0080	+/-0.50	
URS Influent (11A0149-04)			Lab File ID: F011024.D			Analyzed: 01/11/11 05:10			
Bromochloromethane (1)	155447	8.592	194402	8.585	80	60 - 140	0.0070	+/-0.50	
1,4-Difluorobenzene (1)	342828	10.338	543940	10.338	63	60 - 140	0.0000	+/-0.50	
Chlorobenzene-d5 (1)	315296	14.689	499476	14.689	63	60 - 140	0.0000	+/-0.50	

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CONTINUING CALIBRATION CHECK

EPA TO-15

S000585-CCV1

COMPOUND	TYPE	CONC. (ppbv)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	A	5.00	5.60	0.9572932	1.071708	0.05	12.0	50
Benzene	A	5.00	4.61	0.7445976	0.6864665	0.05	-7.8	30
Benzyl chloride	A	5.00	5.90	1.039369	1.22712	0.05	18.1	30
Bromodichloromethane	A	5.00	6.09	0.5037588	0.6134756	0.05	21.8	30
Bromoform	A	5.00	5.56	0.5202506	0.5786255	0.05	11.2	30
Bromomethane	A	5.00	3.64	0.6800857	0.4948957	0.05	-27.2	30
1,3-Butadiene	A	5.00	3.96	0.5168669	0.4091801	0.05	-20.8	30
2-Butanone (MEK)	A	5.00	4.43	1.442287	1.277919	0.05	-11.4	30
Carbon Disulfide	A	5.00	3.92	1.990114	1.558717	0.05	-21.7	30
Carbon Tetrachloride	A	5.00	6.16	0.4616211	0.5682981	0.05	23.1	30
Chlorobenzene	A	5.00	4.46	0.7711919	0.6878739	0.05	-10.8	30
Chloroethane	A	5.00	3.86	0.3673746	0.2834922	0.05	-22.8	30
Chloroform	A	5.00	4.35	1.424879	1.240796	0.05	-12.9	30
Chloromethane	A	5.00	4.23	0.6045946	0.5119707	0.05	-15.3	30
Cyclohexane	A	5.00	4.32	0.3404812	0.2941057	0.05	-13.6	30
Dibromochloromethane	A	5.00	5.39	0.5565529	0.5998732	0.05	7.8	30
1,2-Dibromoethane (EDB)	A	5.00	4.84	0.5224367	0.505608	0.05	-3.2	30
1,2-Dichlorobenzene	A	5.00	5.22	0.7350193	0.7681145	0.05	4.5	30
1,3-Dichlorobenzene	A	5.00	5.36	0.774909	0.8307604	0.05	7.2	30
1,4-Dichlorobenzene	A	5.00	5.29	0.7899202	0.8353952	0.05	5.8	30
Dichlorodifluoromethane (Freon 12)	A	5.00	4.64	1.676061	1.555857	0.05	-7.2	30
1,1-Dichloroethane	A	5.00	4.14	1.265918	1.049502	0.05	-17.1	30
1,2-Dichloroethane	A	5.00	5.22	0.9102673	0.9500668	0.05	4.4	30
1,1-Dichloroethylene	A	5.00	4.70	1.036199	0.9732429	0.05	-6.1	30
cis-1,2-Dichloroethylene	A	5.00	4.29	0.9291754	0.7979611	0.05	-14.1	30
trans-1,2-Dichloroethylene	A	5.00	4.27	0.994264	0.8497539	0.05	-14.5	30
1,2-Dichloropropane	A	5.00	4.96	0.2704444	0.2681318	0.05	-0.9	30
cis-1,3-Dichloropropene	A	5.00	5.34	0.4016621	0.429367	0.05	6.9	30
trans-1,3-Dichloropropene	A	5.00	5.78	0.4003214	0.4625857	0.05	15.6	30
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 1	A	5.00	3.99	1.873473	1.495671	0.05	-20.2	30
Ethanol	A	5.00	4.11	0.2417121	0.1988502	0.05	-17.7	50
Ethyl Acetate	A	5.00	4.51	0.2166176	0.2047449	0.05	-5.5	50
Ethylbenzene	A	5.00	4.82	1.276998	1.230917	0.05	-3.6	30
4-Ethyltoluene	A	5.00	5.13	1.413115	1.449113	0.05	2.5	50
Heptane	A	5.00	5.26	0.2255311	0.2372225	0.05	5.2	50
Hexachlorobutadiene	A	5.00	5.86	0.4997336	0.5860059	0.05	17.3	30
Hexane	A	5.00	4.80	0.8010376	0.7687148	0.05	-4.0	30
2-Hexanone (MBK)	A	5.00	5.77	0.6180448	0.71365	0.05	15.5	50

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CONTINUING CALIBRATION CHECK

EPA TO-15

S000585-CCV1

COMPOUND	TYPE	CONC. (ppbv)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Isopropanol	A	5.00	4.40	1.218791	1.125462	0.05	-7.7	50
Methyl tert-Butyl Ether (MTBE)	A	5.00	3.90	1.981639	1.54384	0.05	-22.1	30
Methylene Chloride	A	5.00	4.60	0.764772	0.7032745	0.05	-8.0	30
4-Methyl-2-pentanone (MIBK)	A	5.00	5.33	0.2259675	0.2409014	0.05	6.6	30
Propene	A	5.00	4.63	0.4763985	0.4410073	0.05	-7.4	50
Styrene	A	5.00	4.73	0.7668346	0.724804	0.05	-5.5	30
1,1,2,2-Tetrachloroethane	A	5.00	5.32	0.697533	0.741843	0.05	6.4	30
Tetrachloroethylene	A	5.00	4.48	0.4642605	0.4158664	0.05	-10.4	30
Tetrahydrofuran	A	5.00	4.36	0.7981852	0.6966262	0.05	-12.7	50
Toluene	A	5.00	4.43	0.9857128	0.8737051	0.05	-11.4	30
1,2,4-Trichlorobenzene	A	5.00	5.91	0.5310595	0.6275754	0.05	18.2	30
1,1,1-Trichloroethane	A	5.00	5.98	0.4743502	0.5669829	0.05	19.5	30
1,1,2-Trichloroethane	A	5.00	4.52	0.3284759	0.2966631	0.05	-9.7	30
Trichloroethylene	A	5.00	5.10	0.3129761	0.3194604	0.05	2.1	30
Trichlorofluoromethane (Freon 11)	A	5.00	4.84	1.706165	1.650347	0.05	-3.3	30
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	A	5.00	4.06	1.350825	1.098188	0.05	-18.7	30
1,2,4-Trimethylbenzene	A	5.00	5.35	1.153349	1.233644	0.05	7.0	30
1,3,5-Trimethylbenzene	A	5.00	5.19	1.16111	1.205775	0.05	3.8	30
Vinyl Acetate	A	5.00	3.94	1.98752	1.632715	0.05	-17.9	30
Vinyl Chloride	A	5.00	3.90	0.6972394	0.5445412	0.05	-21.9	30
m&p-Xylene	A	10.0	9.66	1.024508	0.9902113	0.05	-3.3	30
o-Xylene	A	5.00	5.21	1.014615	1.05767	0.05	4.2	30

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

con-test® ANALYTICAL LABORATORY

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CONTINUING CALIBRATION CHECK

EPA TO-15

S000586-CCV1

COMPOUND	TYPE	CONC. (ppbv)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	A	5.00	5.29	0.9572932	1.013669	0.05	5.9	50
Benzene	A	5.00	4.68	0.7445976	0.6965151	0.05	-6.5	30
Benzyl chloride	A	5.00	5.29	1.039369	1.100363	0.05	5.9	30
Bromodichloromethane	A	5.00	5.06	0.5037588	0.509515	0.05	1.1	30
Bromoform	A	5.00	5.60	0.5202506	0.582822	0.05	12.0	30
Bromomethane	A	5.00	4.71	0.6800857	0.6403473	0.05	-5.8	30
1,3-Butadiene	A	5.00	4.64	0.5168669	0.4793531	0.05	-7.3	30
2-Butanone (MEK)	A	5.00	4.62	1.442287	1.334044	0.05	-7.5	30
Carbon Disulfide	A	5.00	4.62	1.990114	1.839224	0.05	-7.6	30
Carbon Tetrachloride	A	5.00	5.14	0.4616211	0.4743847	0.05	2.8	30
Chlorobenzene	A	5.00	4.81	0.7711919	0.7417726	0.05	-3.8	30
Chloroethane	A	5.00	4.70	0.3673746	0.3453298	0.05	-6.0	30
Chloroform	A	5.00	4.61	1.424879	1.313879	0.05	-7.8	30
Chloromethane	A	5.00	4.73	0.6045946	0.5718624	0.05	-5.4	30
Cyclohexane	A	5.00	4.47	0.3404812	0.3045865	0.05	-10.5	30
Dibromochloromethane	A	5.00	5.14	0.5565529	0.5724239	0.05	2.9	30
1,2-Dibromoethane (EDB)	A	5.00	4.99	0.5224367	0.5217404	0.05	-0.1	30
1,2-Dichlorobenzene	A	5.00	5.16	0.7350193	0.7585774	0.05	3.2	30
1,3-Dichlorobenzene	A	5.00	5.24	0.774909	0.811404	0.05	4.7	30
1,4-Dichlorobenzene	A	5.00	5.18	0.7899202	0.8174583	0.05	3.5	30
Dichlorodifluoromethane (Freon 12)	A	5.00	4.66	1.676061	1.562782	0.05	-6.8	30
1,1-Dichloroethane	A	5.00	4.56	1.265918	1.154762	0.05	-8.8	30
1,2-Dichloroethane	A	5.00	4.80	0.9102673	0.8738511	0.05	-4.0	30
1,1-Dichloroethylene	A	5.00	4.79	1.036199	0.9932573	0.05	-4.1	30
cis-1,2-Dichloroethylene	A	5.00	4.74	0.9291754	0.8802214	0.05	-5.3	30
trans-1,2-Dichloroethylene	A	5.00	4.72	0.994264	0.9391508	0.05	-5.5	30
1,2-Dichloropropane	A	5.00	4.76	0.2704444	0.2572784	0.05	-4.9	30
cis-1,3-Dichloropropene	A	5.00	5.00	0.4016621	0.4016619	0.05	-4.98E-5	30
trans-1,3-Dichloropropene	A	5.00	5.02	0.4003214	0.4018767	0.05	0.4	30
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 1	A	5.00	4.58	1.873473	1.715579	0.05	-8.4	30
Ethanol	A	5.00	4.81	0.2417121	0.2326231	0.05	-3.8	50
Ethyl Acetate	A	5.00	4.72	0.2166176	0.2144999	0.05	-1.0	50
Ethylbenzene	A	5.00	4.77	1.276998	1.217833	0.05	-4.6	30
4-Ethyltoluene	A	5.00	4.94	1.413115	1.394678	0.05	-1.3	50
Heptane	A	5.00	4.83	0.2255311	0.2179829	0.05	-3.3	50
Hexachlorobutadiene	A	5.00	6.05	0.4997336	0.604371	0.05	20.9	30
Hexane	A	5.00	4.63	0.8010376	0.7412763	0.05	-7.5	30
2-Hexanone (MBK)	A	5.00	5.11	0.6180448	0.6317565	0.05	2.2	50

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CONTINUING CALIBRATION CHECK

EPA TO-15

S000586-CCV1

COMPOUND	TYPE	CONC. (ppbv)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Isopropanol	A	5.00	4.78	1.218791	1.223378	0.05	0.4	50
Methyl tert-Butyl Ether (MTBE)	A	5.00	4.36	1.981639	1.728855	0.05	-12.8	30
Methylene Chloride	A	5.00	4.65	0.764772	0.7113013	0.05	-7.0	30
4-Methyl-2-pentanone (MIBK)	A	5.00	4.91	0.2259675	0.2219157	0.05	-1.8	30
Propene	A	5.00	5.10	0.4763985	0.48546	0.05	1.9	50
Styrene	A	5.00	4.88	0.7668346	0.7483843	0.05	-2.4	30
1,1,2,2-Tetrachloroethane	A	5.00	5.01	0.697533	0.6992993	0.05	0.3	30
Tetrachloroethylene	A	5.00	4.96	0.4642605	0.4609631	0.05	-0.7	30
Tetrahydrofuran	A	5.00	4.78	0.7981852	0.763416	0.05	-4.4	50
Toluene	A	5.00	4.69	0.9857128	0.9237457	0.05	-6.3	30
1,2,4-Trichlorobenzene	A	5.00	6.13	0.5310595	0.6508677	0.05	22.6	30
1,1,1-Trichloroethane	A	5.00	5.00	0.4743502	0.4747024	0.05	0.07	30
1,1,2-Trichloroethane	A	5.00	4.76	0.3284759	0.3125451	0.05	-4.8	30
Trichloroethylene	A	5.00	4.88	0.3129761	0.3052248	0.05	-2.5	30
Trichlorofluoromethane (Freon 11)	A	5.00	4.88	1.706165	1.664641	0.05	-2.4	30
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	A	5.00	4.78	1.350825	1.291608	0.05	-4.4	30
1,2,4-Trimethylbenzene	A	5.00	4.99	1.153349	1.150056	0.05	-0.3	30
1,3,5-Trimethylbenzene	A	5.00	4.84	1.16111	1.123683	0.05	-3.2	30
Vinyl Acetate	A	5.00	4.16	1.98752	1.721019	0.05	-13.4	30
Vinyl Chloride	A	5.00	4.70	0.6972394	0.6559356	0.05	-5.9	30
m&p-Xylene	A	10.0	9.82	1.024508	1.006144	0.05	-1.8	30
o-Xylene	A	5.00	4.83	1.014615	0.9800927	0.05	-3.4	30

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA TO-15 in Air	
Acetone	AIHA
Benzene	AIHA,FL,NJ,NY
Benzyl chloride	AIHA,FL,NJ,NY
Bromodichloromethane	AIHA,NJ
Bromoform	AIHA,NJ
Bromomethane	AIHA,FL,NJ,NY
1,3-Butadiene	AIHA,NJ
2-Butanone (MEK)	AIHA,FL,NJ,NY
Carbon Disulfide	AIHA,NJ
Carbon Tetrachloride	AIHA,FL,NJ,NY
Chlorobenzene	AIHA,FL,NJ,NY
Chloroethane	AIHA,FL,NJ,NY
Chloroform	AIHA,FL,NJ,NY
Chloromethane	AIHA,FL,NJ,NY
Cyclohexane	AIHA,NJ
Dibromochloromethane	AIHA
1,2-Dibromoethane (EDB)	AIHA,NJ
1,2-Dichlorobenzene	AIHA,FL,NJ,NY
1,3-Dichlorobenzene	AIHA,NJ
1,4-Dichlorobenzene	AIHA,FL,NJ,NY
Dichlorodifluoromethane (Freon 12)	AIHA
1,1-Dichloroethane	AIHA,FL,NJ,NY
1,2-Dichloroethane	AIHA,FL,NJ,NY
1,1-Dichloroethylene	AIHA,FL,NJ,NY
cis-1,2-Dichloroethylene	AIHA,FL,NY
trans-1,2-Dichloroethylene	AIHA,NJ,NY
1,2-Dichloropropane	AIHA,FL,NJ,NY
cis-1,3-Dichloropropene	AIHA,FL,NJ,NY
trans-1,3-Dichloropropene	AIHA
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	AIHA,NJ
Ethanol	AIHA
Ethyl Acetate	AIHA
Ethylbenzene	AIHA,FL,NJ,NY
4-Ethyltoluene	AIHA,NJ
Heptane	AIHA,NJ,NY
Hexachlorobutadiene	AIHA,NJ,NY
Hexane	AIHA,FL,NJ,NY
2-Hexanone (MBK)	AIHA
Isopropanol	AIHA,NY
Methyl tert-Butyl Ether (MTBE)	AIHA,FL,NJ,NY
Methylene Chloride	AIHA,FL,NJ,NY
4-Methyl-2-pentanone (MIBK)	AIHA,FL,NJ,NY
Propene	AIHA
Styrene	AIHA,FL,NJ,NY
1,1,2,2-Tetrachloroethane	AIHA,FL,NJ,NY
Tetrachloroethylene	AIHA,FL,NJ,NY
Tetrahydrofuran	AIHA

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA TO-15 in Air	
Toluene	AIHA,FL,NJ,NY
1,2,4-Trichlorobenzene	AIHA,NJ,NY
1,1,1-Trichloroethane	AIHA,FL,NJ,NY
1,1,2-Trichloroethane	AIHA,FL,NJ,NY
Trichloroethylene	AIHA,FL,NJ,NY
Trichlorofluoromethane (Freon 11)	AIHA
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	AIHA,NJ,NY
1,2,4-Trimethylbenzene	AIHA,NJ
1,3,5-Trimethylbenzene	AIHA,NJ
Vinyl Acetate	AIHA,FL,NJ,NY
Vinyl Chloride	AIHA,FL,NJ,NY
m&p-Xylene	AIHA,FL,NJ,NY
o-Xylene	AIHA,FL,NJ,NY

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	American Industrial Hygiene Association	100033	01/1/2012
MA	Massachusetts DEP	M-MA100	06/30/2011
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2011
NY	New York State Department of Health	10899 NELAP	04/1/2011
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2011
RI	Rhode Island Department of Health	LAO00112	12/30/2011
NC	North Carolina Div. of Water Quality	652	12/31/2011
NJ	New Jersey DEP	MA007 NELAP	06/30/2011
FL	Florida Department of Health	E871027 NELAP	06/30/2011
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2011
WA	State of Washington Department of Ecology	C2065	02/23/2011

con-test ANALYTICAL LABORATORY
Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com
www.contestlabs.com

CHAIN OF CUSTODY RECORD

11A0149

39 Spruce Street
East longmeadow, MA 01028

Company Name: CDM
Telephone: 313-963-1313
Address: 1 Woodward Avenue, Suite 1500
Detroit, MI 48226
Project # Kliegman OU #1
Client PO# D-006131-2
Attention: Phillip Dixon
Project Location: 76-01 77th Avenue, Glendale, NY
Sampled By: Marc Morgenstern (Preferred)

Project Proposal Provided? (for billing purposes)
○ yes _____ proposal date

DATA DELIVERY (check all that apply)
○ FAX ◉ EMAIL ○ WEBSITE
Fax #
Email: Dixonpj@cdm.com and halletthl@cdm.com
Format: ◉ PDF ◉ EXCEL ○ GIS
○ OTHER _____
○ "Enhanced Data Package"

Con-Test Lab ID (laboratory use only)	Client Sample ID / Description	Collection Beginning Date/Time	Collection Ending Date/Time	Composite	Grab	*Matrix Code	Conc Code	TO-15	# of Containers: 4	** Preservation: None	***Container Code: S	lab receipt pressure *	ANALYSIS REQUESTED
01	GWTT EFFLUENT / (Canister ID=1763 PG=5038)	1-5-11 / 7:45	1-5-11 / 7:45			O	u	✓				4	1763
02	URS EFFLUENT / (Canister= 1253 PG=5029)	1-5-11 / 7:38	1-5-11 / 7:38			O	u	✓				5	
03	GWTT INFLUENT / (Canister ID=1480 PG=5030)	1-5-11 / 7:47	1-5-11 / 7:47			O	u	✓				5	
04	URS INFLUENT / (Canister ID=1523 PG=5036	1-5-11 / 7:35	1-5-11 / 7:35			O	u	✓				2	

Dissolved Metals
○ Field Filtered
○ Lab to Filter

***Cont. Code:**
A=amber glass
G=glass
P=plastic
ST=sterile
V= vial
S=summa can
T=tedlar bag
O=Other

**Preservation
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium bisulfate
X = Na hydroxide
T = Na thiosulfate
O = Other _____

*Matrix Code:
GW= groundwater
WW= wastewater
DW= drinking water
A = air
S = soil/solid
SL = sludge
O = other SOIL GAS

Comments:
PG= Pressure Gauge Identification
Data Enhancement/RCP = Category B

Please use the following codes to let Con-Test know if a specific sample may be high in concentration in Matrix/Conc. Code Box:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature)	Date/Time:
	1/6/11 10:00
Received by: (signature)	Date/Time:
	1/7/11 13:02
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Turnaround ††
◉ 7-Day
☐ 10-Day
☐ Other ____
RUSH †
☐ †24-Hr ☐ †48-Hr
☐ †72-Hr ☐ †4-Day
† Require lab approval

Detection Limit Requirements
Massachusetts:
Connecticut:
Other:

Is your project MCP or RCP ?
○ MCP Form Required
◉ RCP Form Required
○ MA State DW Form Required PWSID # _____

NELAC & AIHA Certified
WBE/DBE Certified

†† TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

PLEASE BE CAREFUL NOT TO CONTAMINATE THIS DOCUMENT

Print page | C

FedEx

Detailed Results

Tracking no.: 872990038534 Select time format: **24H**

Delivered

Delivered
Signed for by: A.PIENKOWSKI

Shipment Dates

Ship date Jan 6, 2011
Delivery date Jan 7, 2011 13:02

Destination

Signature Proof of Delivery

Shipment Options

Hold at FedEx Location
Hold at FedEx Location service is not available for this shipment.

Shipment Facts

Service type	Standard Overnight	Delivered to	Shipping/Receiving
Weight	22.0 lbs/10.0 kg		

Shipment Travel History

Select time zone: Local Scan Time

All shipment travel activity is displayed in local time for the location

Date/Time	Activity	Location	Details
Jan 7, 2011 13:02	**Delivered**		
Jan 7, 2011 07:32	On FedEx vehicle for delivery	WINDSOR LOCKS, CT	
Jan 7, 2011 07:25	At local FedEx facility	WINDSOR LOCKS, CT	
Jan 7, 2011 03:27	Departed FedEx location	NEWARK, NJ	
Jan 6, 2011 23:45	Arrived at FedEx location	NEWARK, NJ	
Jan 6, 2011 21:11	Left FedEx origin facility	RONKONKOMA, NY	
Jan 6, 2011 16:54	Picked up	BOHEMIA, NY	Tendered at FedEx Kinko FedEx Office

con-test ANALYTICAL LABORATORY

www.contestlabs.com

39 Spruce Street
East Longmeadow, MA
Phone: 1-413-525-2332
Fax: 1-413-525-6405

AIR ONLY RECEIPT CHECKLIST

CLIENT NAME: CDM

RECEIVED BY: CB DATE: 1/2/11

1. Was chain of custody relinquished and signed? (YES) NO
2. Does Chain agree with samples? (YES) NO

If not, explain:

3. All Samples in good condition? (YES) NO

If not, explain:

4. Are there any on hold samples? YES (NO) STORED WHERE:

5. ARE THERE ANY RUSH OR SHORT HOLDING TIME SAMPLES? WHO WAS NOTIFIED?_____ DATE_____ TIME_____

Location where samples are stored: Air Lab

Permission to sub-contract samples? Yes No (circle)
(Walk in clients only) if not already approved.
Client Signature_____

CONTAINERS SENT TO CON-TEST	# of containers
Summa cans	4
Tedlar Bags	
Regulators Grab	4
Restrictors	
Tubes	
Other filters	4

6L - 1763, 1253 3L - 1480, 1523

1. Was all media (used & unused) checked into the WASP asset management program?
2. Were all returned summa cans, restrictors, & regulators documented as returned in the AIR Lab Outbound excel sheet?
3. Were the Lab ID's documented in the Air Lab Outbound excel sheet?
4. Was the job documented in the Air Lab Log-In Access Database?

Laboratory comments:

APPPENDIX G
SVE and VMP Well Logs

Kliegman Brothers OU1 Site
Remedial Construction Contract No. D006547

SVE and VMP Well Instalation Summary Table

Well No.	Well Diameter (inches)	Depth of Well (feet)	Screen Length (feet)	Screen Interval (feet)
SVE-7S	4	25	20	5-25
SVE-7D	4	65	35	30-65
SVE-8S	4	25	20	5-25
SVE-8D	4	63	33	30-63
SVE-9S	4	11	6	5-11
SVE-10S	4	11	6	5-11
VMP-1	1	27	19	8-27
VMP-2	1	30	25	5-30
VMP-3	1	30	22	8-30
VMP-4	1	11	6	6-11
VMP-5	1	24	16	8-24
VMP-6	0.75	5	4	1-5
VMP-7	0.75	5	4	1-5

GROUND/WATER TREATMENT
& TECHNOLOGY, INC.

P.O. BOX 1174 DENVILLE, NEW JERSEY 07834
Phone (973)-983-0901 • Fax (973) 983-0903

SUBMITTAL COVER SHEET FROM CONTRACTOR

DATE: January 28, 2008

To: Camp, Dresser, McKee, Inc.
15 Cornell Rd
Latham, NY 12110
Attn: Mr. John Blaum, P.E.

RE: KLIEGMAN BROTHERS OU#1
CONTRACT D006547

Please find enclosed for your review three (3) copies of the following item:

ITEM: Final Type Well Completion Logs SVE-7D/7S/8S/8D/9S/10S; VMP-1 through -5

SPEC SECTION: 01010

ARTICLE: 1.12.3.B.4

PAGE No. 01010-13

PARA. No. B.4

DRAWING No. N/A

LOCATION: N/A

SUBMITTAL No. 38

APPROVED BY: _____

Remarks:

These are transmitted as checked below:

X For approval	_____ Resubmit	_____ Approved as noted
_____ For your use	_____ Submit	_____ Approved as submitted
_____ As requested	_____ Return	_____ Returned for corrections
_____ For review	_____ Returned for corrections	

Sincerely,

Ground/Water Treatment & Technology, Inc.

Patrick T. Hunnewell

Dist:

PREFERRED ENVIRONMENTAL SERVICES
121 Metcalf Avenue - North Merrick, New York 11566
Tel: (516) 536-1100 Fax: (516) 203-1155

PROJECT: The Gourmet Factory
Location: 76-01 77th Avenue
Glendale, New York
DATE: 11/1/07
PROJECT NO.: 11-1404

SOIL BORING/MONITORING WELL CONSTRUCTION LOG
BORING NO.: SVE- 7S
MON WELL ID:
SHEET 1 OF 1

BORING LOCATION:
GROUND SURFACE ELEVATION:
START TIME: 8:00 AM DATE: 11/1/07
FINISH TIME: 12:45 PM DATE: 11/5/07
SAMPLING METHOD: 140 lb Hammer with 24 " Split Spoon. Samples Collected Every Five Feet
DRILLING METHOD AND RIG TYPE: Mobile B-61 Drill Rig with 6 5/8 Inner Diameter Hollow Stem Augers

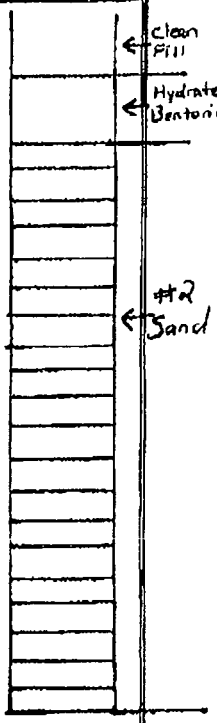
LOGGED BY: David Kalin (Preferred Environmental Services)
MEASURING POINT ELEVATION:
DRILLING CO.: LAWES
DRILLERS NAME: Kevin Mcgourty; Tony Smith

GROUNDWATER OBSERVATIONS

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1-5	0-5	Grab	NA	2.8		Hand cleared to 5 feet below grade; 7 inches of asphalt base; fill material consisting of concrete, brick, brown to black soil and rock fragments. No odors; Dry
6-7	5-7	16	4,4,5,7	14.3	CL	Dark brown to black clay; slight staining; no odor; dry
8-9					CL	
10-11	9-11	13	19,26,29, 31	8.4	SW	fine to medium brown sand with some fine angular gravel; no odor; no staining; dry
12-14					SW	
15-16	14-16	15	8,14,20,23	3.6	SM	light brown fine to medium silty sand with clay banding and little medium gravel; no odor; no staining; dry
17-19					SM	
20-21	19-21	8	15,23,25,3	11.8	SM	dark brown fine to medium silty sand with some rock fragments; no odor; no staining; dry
22-24					SM	
25-26	24-26	NA	50/3, refusal	NA	SM	No recovery, competent rock encountered
27-30						

WELL DIAGRAM



MONITORING WELL CONSTRUCTION DETAILS

DEPTH (FT): 25	RISER INTERVAL: 5 ft - 5 in. below grade	MANHOLE: 3ft X 3ft X 3ft Vault
DIA. (IN.): 4	DEPTH/TYPE PACK: #2 sand 25 ft - 5 ft	WELL ENDCAP: 4 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 5 ft - 2.5 ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Soil	
SCREEN INTERVAL: 25 ft - 5 ft	SURFACE SEAL: Concrete	

Notes: * SVE well set at a final depth of 25 feet below grade due to presence of competent rock layer.
* Summitt Drilling Company finished SVE well on 11/5/07 from a depth of 18 feet below grade.
- Drillers Names: Jon Murtha; Mike Wilson
- Rig: CME 75 with 6 5/8 Inner Diameter Hollow Stem Augers

PREFERRED ENVIRONMENTAL SERVICES

PROJECT: The Gourmet Factory
Location: 78-01 77th Avenue
Glendale, New York
DATE: 11/5/07
PROJECT NO.: 11-1404

SOIL BORING/MONITORING WELL CONSTRUCTION LOG
BORING NO.: SVE-7D
MON WELL ID:
SHEET 1 OF 3

BORING LOCATION:
GROUND SURFACE ELEVATION:
START TIME: 12:30 PM DATE: 12/6/07
FINISH TIME: 6:00 PM DATE: 12/8/07
SAMPLING METHOD: 140 lb Hammer with 24 " Split Spoon. Samples Collected Every Five Feet
DRILLING METHOD AND RIG TYPE: 8 5/8 Inner Diameter Hollow Stem Augers

LOGGED BY: William Schlageter
MEASURING POINT ELEVATION:
DRILLING CO.: HRS (B & B)
DRILLERS NAME: Mike Kinney; Peter Lite

GROUNDWATER OBSERVATIONS

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
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28							
29							
30							
31							
32							
33							
34							
35							

Cement-Bentonite Grout
Hydrated Bentonite
#00 sand
#2 Sand

MONITORING WELL CONSTRUCTION DETAILS

DEPTH (FT): 65	RISER INTERVAL: 30ft - 12 in. below grade	MANHOLE: 3ft X 3ft X 3ft Vault
DIA. (IN.): 4	DEPTH/TYPE PACK: #2 sand 65 ft - 28 ft (#00 28ft-27ft)	WELL ENDCAP: 4 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 27ft - 25ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Cement-Bentonite Grout 25 ft - 1 ft	
SCREEN INTERVAL: 65ft - 30ft	SURFACE SEAL: Concrete	

Notes: * Previous drilling took place to a depth of 43 feet below grade
* On 12/8/07 resumed drilling at a depth of 43 feet below grade

PREFERRED ENVIRONMENTAL SERVICES 333 Merrick Avenue · North Merrick, New York 11566 Tel (516) 576-1600 Fax (516) 213-0626	PROJECT: The Gourmet Factory Location: 76-01 77th Avenue Glendale, New York DATE: 12/8/07 PROJECT NO.: 11-1404	SOIL BORING/MONITORING WELL CONSTRUCTION LOG BORING NO.: SVE-7D MON WELL ID: SHEET 2 OF 3

BORING LOCATION:	LOGGED BY: William Schlageter (Preferred Environmental Services)
GROUND SURFACE ELEVATION:	MEASURING POINT ELEVATION:
START TIME: 12:30 PM DATE: 12/8/07	DRILLING CO.: HRS (B & B)
FINISH TIME: 6:00 PM DATE: 12/8/07	DRILLERS NAME: Mike Kinney; Peter Lite
SAMPLING METHOD: 140 lb Hammer with 24 " Split Spoon. Samples Collected Every Five Feet	GROUNDWATER OBSERVATIONS
DRILLING METHOD AND RIG TYPE: 8 3/8 Inner Diameter Hollow Stem Augers	

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36 37 38 39 40 41 42 43							
44 45	43-45	16	4,21,30,36	0.0	SW	Grey-black to brown medium to coarse sand; no odor;no staining	
46 47	45-47	17	9,21,31,30	0.0	SW	grey-black to brown medium to coarse sand with gravel; no staining;no odor	← #2 Sand
48 49 50					SW		
51 52	50-52	16	10,25,32, 35	0.0	SW	grey-brown to black medium to coarse sand and gravel; no odor; no staining	
53 54 55					SW		
56 57	55-57	14	13,27,30, 36	0.0	SW	Brown-grey fine to medium sand and gravel; no staining; no odor	
58 59 60					SW		
61 62	60-62	13.5	10,28,34, 36	0.0	SW	Brown-grey fine to medium sand with little gravel; no staining; no odor	
63 64 65					SW		

MONITORING WELL CONSTRUCTION DETAILS

DEPTH (FT): 65	RISER INTERVAL: 30ft - 12 in. below grade	MANHOLE: 3ft X 3ft X 3ft Vault
DIA. (IN.): 4	DEPTH/TYPE PACK: #2 sand 65 ft - 28 ft (#00 28ft-27ft)	WELL ENDCAP: 4 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 27ft - 25 ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Cement-Bentonite Grout 25 ft - 1 ft	
SCREEN INTERVAL: 65ft - 30ft	SURFACE SEAL: Concrete	

Notes: * Previous drilling took place to a depth of 43 feet below grade
* On 12/8/07 resumed drilling at a depth of 43 feet below grade

PREFERRED ENVIRONMENTAL SERVICES [illegible] Merrick Avenue · North Merrick, New York 11566 Tel (516) 546-1100 Fax (516) 223-0156	PROJECT: The Gourmet Factory Location: 78-01 77th Avenue Glendale, New York DATE: 11/5/07 PROJECT NO.: 11-1404	SOIL BORING/MONITORING WELL CONSTRUCTION LOG BORING NO.: SVE - 7D MON WELL ID: SHEET 3 OF 3

BORING LOCATION:	LOGGED BY: William Schlageter
GROUND SURFACE ELEVATION:	MEASURING POINT ELEVATION:
START TIME: 12:30 PM DATE: 12/8/07	DRILLING CO.: HRS (B & B)
FINISH TIME: 6:00 PM DATE: 12/8/07	DRILLERS NAME: Mike Kinney; Peter Lile
SAMPLING METHOD: 140 lb Hammer with 24 " Split Spoon. Samples Collected Every Five Foot	GROUNDWATER OBSERVATIONS
DRILLING METHOD AND RIG TYPE: 6 5/8 Inner Diameter Hollow Stem Augers	

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
66 67	66-67	24	8,18,33,41	0.0	SW	Grey-brown fine to medium sand with little gravel; no odor;no staining;wet	
68 69 70							

MONITORING WELL CONSTRUCTION DETAILS		
DEPTH (FT): 65	RISER INTERVAL: 30ft - 12 in. below grade	MANHOLE: 3ft X 3ft X 3ft Vault
DIA. (IN.): 4	DEPTH/TYPE PACK: #2 sand 65 ft - 28 ft (#00 28ft-27ft)	WELL ENDCAP: 4 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 27ft - 25ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Cement-Bentonite Grout 25 ft - 1 ft	
SCREEN INTERVAL: 65ft - 30ft	SURFACE SEAL: Concrete	

Notes: * Previous drilling took place to a depth of 43 feet below grade
* On 12/8/07 resumed drilling at a depth of 43 feet below grade

PREFERRED ENVIRONMENTAL SERVICES
[redacted]

PROJECT: The Gourmet Factory
LOCATION: 76-01 77th Avenue, Glendale, NY
DATE: 10/30/07
PROJECT NO.: 11-1404

SOIL BORING/MONITORING WELL CONSTRUCTION LOG

BORING NO.: SVE-8S
MON WELL ID:
SHEET 1 OF 1

BORING LOCATION:
LOGGED BY: David Kahn (Preferred Environmental Services)
GROUND SURFACE ELEVATION:
MEASURING POINT ELEVATION:
START TIME: 10:30 AM DATE: 10/30/07
DRILLING CO.: LAWES
FINISH TIME: 2:20 PM DATE: 10/30/07
DRILLERS NAME: Kevin Mcgourty; Ernesto Santiago
SAMPLING METHOD: 140 lb Hammer with 24 " Split Spoon. Samples Collected Continuously
DRILLING METHOD AND RIG TYPE: Mobile B-61 Drill Rig with 6$^{5/8}$ Inner Diameter Hollow Stem Augers

GROUNDWATER OBSERVATIONS

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/ 6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1-5	0-5	Grab	NA	74.1		Hand cleared to five feet below grade; 8 inches asphalt base; concrete from 8 inches to 2 feet below grade; fill material of fine to medium dark brown sand; no odor; no staining; dry	clean Fill. / Hydrated Bentonite
6-7	5-7	23	7,9,11, 15	2,880	SM	9 inches very fine silty sand; 14 inches medium to coarse brown silty sand; no odor; no staining; dry	
7-8	7-9	15	9,11,13, 14	346	SM	12 inches brown-grey fine to medium silty sand; 3 inches brown silty sand; no odor; no staining;dry	
9-11	9-11	23	9,10,13, 14	323	SP	5 inches brown fine to medium silty sand; 18 inches orange-brown coarse sand with little medium gravel; no odor;no staining;dry	#2 Sand
11-13	11-13	21	6,7,9,10	8 7	SC	2 inches orange-brown fine to medium sand; 19 inches brown-grey veryfine to fine clayey sand; no odor; no staining; moist	
13-15	13-15	18	7,9,11, 18	22.9	SC	Brown fine to medium clayey sand; no odor; no staining; moist	
15-17	15-17	20	9,12,15, 17	16.2	SC	Brown veryfine to fine clayey sand; no odor; no staining; moist	
17-19	17-19	15	16,24,33, 44	311	SM	Brown fine to medium silty sand with trace medium gravel; no odor; no staining; dry	
19-21	19-21	8	28,50, refusal	44	SM	Brown fine to medium sand with little fine gravel,Competant rock hit at 20 feet below grade;no odor;no staining;dry	
21-23	21-23	9	19,22,27,2 0	57.3	SW	fine to medium brown sand with little fine gravel and rock fragments;no odor;no staining;dry	
23-25	23-25	18	10,12,14, 20	260	SW	Brown fine to medium sand with trace fine gravel;no odor;no staining;dry	
25-30							

MONITORING WELL CONSTRUCTION DETAILS

DEPTH (FT): 25	RISER INTERVAL: 5 ft - 5 in.	MANHOLE: 3ft X 3ft X 3ft Vault
DIA. (IN.): 4	DEPTH/TYPE PACK: #2 Sand 25 ft- 5 ft	WELL ENDCAP: 4 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 5 ft - 2.5 ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Soil	
SCREEN INTERVAL: 25 ft - 5 ft	SURFACE SEAL: Concrete	

Notes:

PREFERRED ENVIRONMENTAL SERVICES
123 Merrick Avenue - North Merrick, New York 11566
Tel (516) 378-1169 Fax (516) 213-0115

PROJECT: The Gourmet Factory
Location: 76-01 77th Avenue
Glendale, New York
DATE: 11/1/07
PROJECT NO.: 11-1404

SOIL BORING/MONITORING WELL CONSTRUCTION LOG
BORING NO.: SVE-3O
MON WELL ID:
SHEET 1 OF 3

BORING LOCATION:
LOGGED BY: David Kahn (Preferred Environmental Services)
GROUND SURFACE ELEVATION:
MEASURING POINT ELEVATION:
START TIME: 7:40 AM DATE: 10/31/07
DRILLING CO.: LAWES
FINISH TIME: 3:00 PM DATE: 10/31/07
DRILLERS NAME: Kevin Mcgourty; Ernesto Santiago
SAMPLING METHOD: 140 lb Hammer with 24 " Split Spoon. Samples Collected Every Five Feet
DRILLING METHOD AND RIG TYPE: Mobile B-61 Drill Rig with 8 5/8 Inner Diameter Hollow Stem Augers

GROUNDWATER OBSERVATIONS

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1-6	0-5	Grab	NA	79.5		Hand cleared to 5 feet below grade; 6 inches of asphalt; dark brown fill material inclusive of concrete and brick fragments; No staining; Slight odor; Dry	
6-7	6-7	18	4, 5, 7, 8	777	SW	8 inches brown to black clayey sand; Minor Staining 10 inches medium to coarse brown sand; slight odor; dry	
8-9					SW		Cement-Bentonite Grout
10-11	9-11	15	18, 18, 19, 22	79.6	SW	fine to coarse brown sand with some fine to medium gravel and little rock fragments; no odor; no staining; dry	
12-14					SW		
15-16	14-16	11	8, 9, 10, 12	27.9	SM	Brown very fine silty sand; no odor; no staining; moist	
17-19					SM		
20-21	19-21	20	6, 7, 8, 10	18.8	CL	8 inches brown fine to medium silty sand 12 inches brown clay; no odor;no staining; moist	
22-24					CL		Hydrated Bentonite
25-26	24-26	19	12, 15, 15, 17	71.5	SM	3 inches brown clay 16 inches brown fine to medium silty sandwith little fine gravel; no staining; no odor; moist	
27-29					SM		#2 Sand
30	29-31	10	12,15, 50/2	44.6	SW	brown fine to medium sand with little fine to medium	

MONITORING WELL CONSTRUCTION DETAILS

DEPTH (FT): 63	RISER INTERVAL: 30ft - 5 in. below grade	MANHOLE: 3ft X 3ft X 3ft Vault
DIA. (IN.): 4	DEPTH/TYPE PACK: #2 sand 63 ft - 25 ft	WELL ENDCAP: 4 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 25ft - 22.5ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Cement-Bentonite Grout 22.5 ft - 2.5 ft	
SCREEN INTERVAL: 63ft - 30ft	SURFACE SEAL: Concrete	

Notes:

PREFERRED ENVIRONMENTAL SERVICES	PROJECT: The Gourmet Factory	SOIL BORING/MONITORING WELL CONSTRUCTION LOG
333 Merrick Avenue - North Merrick, New York 11566 Tel: (516) 546-1000 Fax: (516) 378-8125	Location: 76-01 77th Avenue Glendale, New York	BORING NO.: SVE - 8D
	DATE: 11/1/07	MON WELL ID:
	PROJECT NO.: 11-1404	SHEET 2 OF 3

BORING LOCATION:	LOGGED BY: David Kahn (Preferred Environmental Services)
GROUND SURFACE ELEVATION:	MEASURING POINT ELEVATION:
START TIME: 7:40 AM DATE: 10/31/07	DRILLING CO.: LAWES
FINISH TIME: 3:00 PM DATE: 10/31/07	DRILLERS NAME: Kevin Mcgourty; Ernesto Santiago
SAMPLING METHOD: 140 lb Hammer with 24 " Split Spoon. Samples Collected Every Five Feet	GROUNDWATER OBSERVATIONS
DRILLING METHOD AND RIG TYPE: Mobile B-61 Drill Rig with 6 5/8 Inner Diameter Hollow Stem Augers	

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
31	29-31	10	12,15,50/2	44.5	SW	gravel; no staining; no odor;dry	
32					SW	Competent rock hit at 30 ft below grade; breakthrough at 33 feet below grade	
33							
34							
35	34-36	23	20,24,19, 20	358	SM	Brown Very fine to fine silty sand with little fine gravel; no odor; no staining; dry	
36							
37					SM		
38							
39							
40	39-41	14	7,9,13,16	0.0	SW	brown fine to coarse sand with some fine to medium gravel; no staining; no odor; dry	#2 Sand
41							
42					SW		
43							
44							
45	44-46	19	10,13, 17, 19	0.0	SW	Same as 39-41 Sample	
46							
47					SW		
48							
49							
50	49-51	22	12,13,21, 24	0.0	SW	Same as 39-41 Sample	
51							
52					SW		
53							
54							
55	54-56	14	14,21,29, 34	0.0	SW	Same as 39-41 Sample	
56							
57					SW		
58							
59							
60	59-61	18	9,13,13,14	0.0	SW	Same as 39-41 Sample	

MONITORING WELL CONSTRUCTION DETAILS

DEPTH (FT): 63	RISER INTERVAL: 30ft - 6 in. below grade	MANHOLE: 3ft X 3ft X 3ft Vault
DIA. (IN.): 4	DEPTH/TYPE PACK: #2 sand 63 ft - 25 ft	WELL ENDCAP: 4 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 25ft - 22.5ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Cement-Bentonite Grout 22.5 ft - 2.5 ft	
SCREEN INTERVAL: 63ft - 30ft	SURFACE SEAL: Concrete	

Notes:

PREFERRED ENVIRONMENTAL SERVICES
123 Merrick Avenue - North Merrick, New York 11566
Tel (516) 546-1001 Fax (516) 203-8156

PROJECT: The Gourmet Factory
Location: 78-01 77th Avenue
Glendale, New York
DATE: 11/1/07
PROJECT NO.: 11-1404

SOIL BORING/MONITORING WELL CONSTRUCTION LOG
BORING NO.: SVE-8D
MON WELL ID:
SHEET 3 OF 3

BORING LOCATION:
LOGGED BY: David Kahn (Preferred Environmental Services)
GROUND SURFACE ELEVATION:
MEASURING POINT ELEVATION:
START TIME: 7:40 AM DATE: 10/31/07
DRILLING CO.: LAWES
FINISH TIME: 3:00 PM DATE: 10/31/07
DRILLERS NAME: Kevin Mcgourty; Ernesto Santiago
SAMPLING METHOD: 140 lb Hammer with 24 " Split Spoon. Samples Collected Every Five Feet
DRILLING METHOD AND RIG TYPE: Mobile B-61 Drill Rig with 6 3/4 Inner Diameter Hollow Stem Augers

GROUNDWATER OBSERVATIONS

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
61	59-61	18	9,13,13,14	0.0	SW	Same as 39-41 Sample	#2 Sand
62					SW		
63							
64							
65	64-66	20	7,9,9,13	0.5	SW	Brown fine to coarse sand with fine to medium gravel; no odor, no staining; wet at 64 feet below grade	
66							
67							
68							
69							
70							
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							
81							
82							
83							
84							
85							
86							
87							
88							
89							
90							

MONITORING WELL CONSTRUCTION DETAILS

DEPTH (FT): 83	RISER INTERVAL: 30ft - 5 in. below grade	MANHOLE: 3ft X 3ft X 3ft Vault
DIA. (IN.): 4	DEPTH/TYPE PACK: #2 sand 83 ft - 25 ft	WELL ENDCAP: 4 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 25ft - 22.5ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Cement-Bentonite Grout 22.5 ft - 2.5 ft	
SCREEN INTERVAL: 83ft - 30ft	SURFACE SEAL: Concrete	

Notes:

PREFERRED ENVIRONMENTAL SERVICES

PROJECT: The Gourmet Factory
LOCATION: 76-01 77th Avenue, Glendale, NY
DATE: 10/30/07
PROJECT NO.: 11-1404

SOIL BORING/MONITORING WELL CONSTRUCTION LOG
BORING NO.: SVE- 9S
MON WELL ID:
SHEET 1 OF 1

BORING LOCATION:
GROUND SURFACE ELEVATION:
START TIME: 9:00 AM DATE: 10/30/07
FINISH TIME: 10:00 AM DATE: 10/30/07
SAMPLING METHOD: 140 lb Hammer with 24 " Split Spoon. Samples Collected Continuously
DRILLING METHOD AND RIG TYPE: Mobile B-61 Drill Rig with 8 3/8 Inner Diameter Hollow Stem Augers

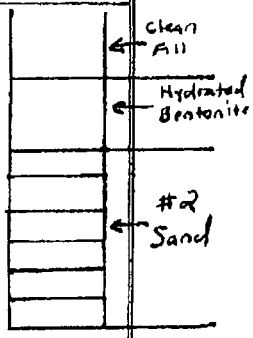
LOGGED BY: David Kahn (Preferred Environmental Services)
MEASURING POINT ELEVATION:
DRILLING CO.: LAWES
DRILLERS NAME: Kevin Mcgourty; Ernesto Santiago

GROUNDWATER OBSERVATIONS

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/ 6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1-5	0-5	Grab	NA	67.3		Hand cleared to 5 feet below grade; 6 inches asphalt base; light brown medium sand and light brown medium silty sand, no odor;no staining;dry
6-7	5-7	17	3,4,4,6	160	SP	Brown coarse sand with little very fine gravel; no odor;no staining;dry
7-9	7-9	13	6,7,7,9	950	SP	7 inches brown coarse sand; 6 inches brown medium silty sand; no odor;no staining;dry
9-11	9-11	17.5	7,8,8,9	1,746	SP	12 inches brown-orange coarse sand; 5 inches silty sand ; no staining;slight solvent odor; dry
11-13	11-13	22	5,6,9,13	27.8	CL	7 inches brown silty sand; 15 inches brown clay; no odor; no staining; moist

WELL DIAGRAM



MONITORING WELL CONSTRUCTION DETAILS

DEPTH (FT): 11	RISER INTERVAL: 5 ft - 6 in.	MANHOLE: 3ft X 3ft X 3ft Vault
DIA. (IN.): 4	DEPTH/TYPE PACK: #2 Sand 11 ft - 5 ft	WELL ENDCAP: 4 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 5 ft - 2.5 ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Soil	
SCREEN INTERVAL: 11 ft-5 ft	SURFACE SEAL: Concrete	

Notes: * Boring stopped after 11-13 foot sample due to presence of clay layer. Well set at 11 feet below grade

~~APPENDIX I~~ = Vapor Monitoring Points Logs

[redacted]

PREFERRED ENVIRONMENTAL SERVICES
323 Mamaroneck Avenue · North Mamaroneck, New York 10544
Tel (914) 345-1101 Fax (914) 835-0158

PROJECT: The Gourmet Factory
Location: 70-01 77th Avenue
Glendale, New York
DATE: 11/2/07
PROJECT NO.: 11-1404

SOIL BORING/MONITORING WELL CONSTRUCTION LOG
BORING NO.: VMP-1
MON WELL ID:
SHEET 1 OF 1

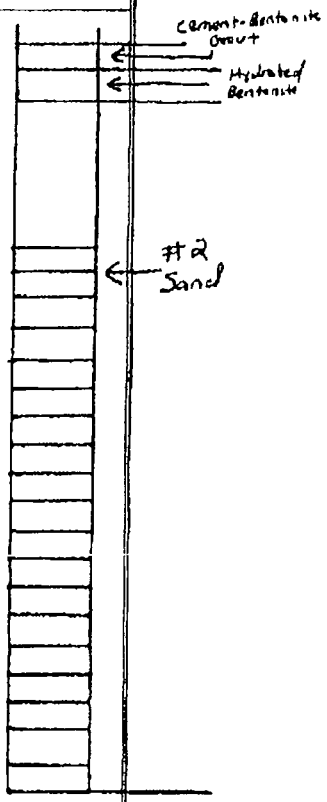
BORING LOCATION:
LOGGED BY: David Kahn (Preferred Environmental Services)
GROUND SURFACE ELEVATION:
MEASURING POINT ELEVATION:
START TIME: 1:15 PM DATE: 11/2/07
DRILLING CO.: LAWES
FINISH TIME: 3:30 PM DATE: 11/29/07
DRILLERS NAME: Ernesto Santiago; Tony Smith
SAMPLING METHOD: DH-100 Automatic Drop Hammer with 24" split spoon. Samples Collected Every Five Feet
DRILLING METHOD AND RIG TYPE: Geoprobe 7720DT; Dual Tube System-3" Outer Rods and 1.5" Inner Rods

GROUNDWATER OBSERVATIONS

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1-5	0-5	NA	NA	NA	NA	NA
6-7	5-7	22	2,3,6,7	0.0	SM	Brown fine to medium silty sand; no odor;no staining;dry
8-10					SM	
11-15	10-12	19	9,8,11,12	0.1	SW	5 inches brown fine to medium silty sand; 14 inches brown-orange fine to coarse sand with some fine to medium gravel;no odor;no staining;dry
16-20	15-17	19	11,12,14, 11	0.0	SW	brown fine to medium sand with little fine gravel;brick fragments at 18-18.4 ft; no odor;no staining;dry
21-25	20-22	18	6,9,11, 11	1.9	SW	Brown fine to medium sand and silt with some medium gravel;no odor;no staining;dry
26-27	25-27	19	13,11,12, 14	1.1	SW	Brown-orange fine to medium sand and silt with little fine to medium gravel; no odor; no staining; dry
28-31	28-31	10	50,31,45, 30	0.0	SW	brown fine to medium sand and silt with some fine to medium gravel; competent rock hit at 29 ft; no odor;no staining;dry

WELL DIAGRAM



MONITORING WELL CONSTRUCTION DETAILS

DEPTH (FT): 27	RISER INTERVAL: 8 ft - 4"	MANHOLE: 12" Round Bolldown
DIA. (IN.): 1	DEPTH/TYPE PACK: #2 sand 27 ft - 3 ft	WELL ENDCAP: 1 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 3 ft - 2 ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Cement-Bentonite Grout 2 ft - 16 "	
SCREEN INTERVAL: 27 ft - 8 ft	SURFACE SEAL: Concrete	

Notes: * VMP well not set on 11/2/07
* Upon re-drill on 11/29/07, could not drill past 27 ft. Set well at 27 ft on 11/29/07

PREFERRED ENVIRONMENTAL SERVICES 323 Merrick Avenue - North Merrick, New York 11566 Tel (516)546-1100 Fax (516)212-6195	PROJECT: The Gourmet Factory Location: 78-01 77th Avenue Glendale, New York DATE: 12/4/07 PROJECT NO.: 11-1404	SOIL BORING/MONITORING WELL CONSTRUCTION LOG BORING NO.: VMP-2 MON WELL ID: SHEET 1 OF 1

BORING LOCATION:	LOGGED BY: David Kahn (Preferred Environmental Services)
GROUND SURFACE ELEVATION:	MEASURING POINT ELEVATION:
START TIME: 12:30 PM DATE: 12/4/07	DRILLING CO.: LAWES
FINISH TIME: 4:00 PM DATE: 12/4/07	DRILLERS NAME: Ernesto Santiago; Tony Smith
SAMPLING METHOD: DH-100 Automatic Drop Hammer with 24" split spoon. Samples Collected Every Five Feet	GROUNDWATER OBSERVATIONS
DRILLING METHOD AND RIG TYPE: Geoprobe 7720DT; Dual Tube System-3" Outer Rods and 1.5" Inner Rods	

GROUNDWATER OBSERVATIONS				
DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1-5	0-5	Grab	NA	0.0		Brown veryfine to fine sand; 6 inches concrete; no odor;no staining;dry	cement-Bentonite Grout; Hydrated Bentonite
6-7	5-7	18	4,1,4,2	0.0	SW	Brown veryfine to fine silty sand; no odor;no staining;dry	
8-10					SW		#2 Sand
11-12	10-12	16	16,9,11,12	0.0	SW	Brown fine to medium sand;no odor;no staining;dry	
13-15					SW		
16-17	16-17	16	16,19,20, 22	0.0	SW	Brown fine to medium silty sand with rock fragments; no odor;no staining;dry	
18-20					SM		
21-22	20-22	12	25,20,16, 21	0.0	SM	Brown fine to medium silty sand with little fine gravel and rock fragments;no odor; no staining; dry	
23-25					SM		
26-27	26-27	11	17,14,20, 22	0.0	SM	Same as 20-22 Sample	
28					SM		
29-30	28-30	23	57,25,20, 23	0.0	SM	Brown fine to medium silty sand with little fine gravel and rock fragments; no odor; no staining; dry	
31							

MONITORING WELL CONSTRUCTION DETAILS		
DEPTH (FT): 30	RISER INTERVAL: 8 ft - 5 in.	MANHOLE: 12" Round Bolldown
DIA. (IN.): 1	DEPTH/TYPE PACK: #2 sand 30 ft - 3 ft	WELL ENDCAP: 1 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 3 ft - 2 ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Cement-Bentonite Grout 2 ft - 18"	
SCREEN INTERVAL: 30 ft - 8 ft	SURFACE SEAL: Concrete	

Notes:

PREFERRED ENVIRONMENTAL SERVICES 123 Merrick Avenue • North Merrick, New York 11566 Tel. (516) 546-0100 Fax (516) 223-4136	PROJECT: The Gourmet Factory Location: 76-01 77th Avenue Glendale, New York DATE: 11/29/07 PROJECT NO.: 11-1404	SOIL BORING/MONITORING WELL CONSTRUCTION LOG BORING NO.: VMP-3 MON WELL ID: SHEET 1 OF 1

BORING LOCATION:	LOGGED BY: David Kahn (Preferred Environmental Services)
GROUND SURFACE ELEVATION:	MEASURING POINT ELEVATION:
START TIME: 8:00 AM DATE: 11/29/07	DRILLING CO.: LAWES
FINISH TIME: 11:00 AM DATE: 11/29/07	DRILLERS NAME: Kevin Mcgourty; Tony Smith
SAMPLING METHOD: CH-100 Automatic Drop Hammer with 24" split spoon. Samples Collected Every Five Feet	GROUNDWATER OBSERVATIONS
ORILLING METHOD AND RIG TYPE: Geoprobe 7720DT; Dual Tube System-3" Outer Rods and 1.5" Inner Rods	

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1-5	0-5	Grab	NA	0.0		Hand cleared to five feet below grade; 9 inches of concrete; brown fine to medium silty sand with some gravel; no odors;no staining; dry	Cement-Bentonite Grout; Hydrated Bentonite
6-7	6-7	9	6,6,7,12	0.0	SW	Brown-orange fine to medium sand with some gravel; no odors; no staining;dry	
8-10					SW		
11-12	10-12	12	11,13,9,10	1.3	SW	Brown-orange medium to coarse sand with little fine to medium gravel; no odor; no staining; dry	#2 Sand
13-15					SW		
16-17	15-17	12	8,9,11,11	2.5	SM	Brown silty sand with some fine to medium gravel and rock fragments; no odor; no staining;dry	
18-20					SM		
21-22	20-22	18	16,18,18,32	7.4	SM	Brown veryfine to fine silty sand with some large rock fragments; no odor; no staining; dry	
23-25					SM		
26-27	25-27	18	25,20,20, 20	0.0	SM	Brown fine to medium silty sand with large rock fragments; no odor; no staining; dry	
28-29					SM		
30-31	29-31	17	30,25,50, 26	5.5	SM	Brown fine to medium silty sand with rock fragments; no odor; no staining; dry	

MONITORING WELL CONSTRUCTION DETAILS		
DEPTH (FT): 30	RISER INTERVAL: 8 ft - 6"	MANHOLE: 12" Round Bolldown
DIA. (IN.): 1	DEPTH/TYPE PACK: #2 sand 30 ft - 3 ft	WELL ENDCAP: 1 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 3 ft - 2 ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Cement-Bentonite Grout 2 ft - 16 "	
SCREEN INTERVAL: 30 ft - 8 ft	SURFACE SEAL: Concrete	

Notes:

PREFERRED ENVIRONMENTAL SERVICES 131 Merrick Avenue - North Merrick, New York 11566 Tel: (516) 378-1110 Fax: (516) 254-4136	PROJECT: The Gourmet Factory Location: 76-01 77th Avenue Glendale New York DATE: 11/29/07 PROJECT NO.: 11-1404	SOIL BORING/MONITORING WELL CONSTRUCTION LOG BORING NO.: VMP-4 MON WELL ID: SHEET 1 OF 1

BORING LOCATION:	LOGGED BY: David Kahn (Preferred Environmental Services)
GROUND SURFACE ELEVATION:	MEASURING POINT ELEVATION:
START TIME: 12:00 PM DATE: 11/29/07	DRILLING CO.: LAWES
FINISH TIME: 1:30 PM DATE: 11/29/07	DRILLERS NAME: Kevin Mcgourty; Tony Smith
SAMPLING METHOD: DH-100 Automatic Drop Hammer with 24" split spoon. Samples Collected Continuously	GROUNDWATER OBSERVATIONS
DRILLING METHOD AND RIG TYPE: Geoprobe 7720DT; Dual Tube System-3" Outer Rods and 1.5" Inner Rods	

GROUNDWATER OBSERVATIONS				
DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1-5	0-5	Grab	NA	0.0	SM	Hand cleared to five feet below grade; 8 inches concrete; brown veryfine to fine silty sand; no odor; no staining; dry	cement-bentonite Grout; Hydrated Bentonite
6-7	5-7	18	4,4,7,8	0.0	SM	6 inches orange fine to medium sand; 12 inches grey veryfine to fine silty sand; no odor; no staining; dry	#2 Sand
8-9	7-9	19	5,5,4,4	0.0	SW	14 inches fine to medium orange sand with little gravel; 5 inches veryfine to fine grey silty sand; no odor; no staining; dry	
10-11	9-11	17	3,2,1,1	0.0	SM	10 inches veryfine to fine grey silty sand; 7 inches grey clay; no odor; no staining; moist	
12-13	11-13	NA	NA	NA	CL	NA	
14-31							

MONITORING WELL CONSTRUCTION DETAILS		
DEPTH (FT): 11	RISER INTERVAL: 5 ft - 6"	MANHOLE: 12" Round Boltdown
DIA. (IN.): 1	DEPTH/TYPE PACK: #2 sand 11 ft - 2.5 ft	WELL ENDCAP: 1 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 2.5 ft - 2 ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Cement-Bentonite Grout 2 ft - 18"	
SCREEN INTERVAL: 11 ft - 6 ft	SURFACE SEAL: Concrete	

Notes: * Boring ceased at 11 feet below grade due to presence of clay layer

PREFERRED ENVIRONMENTAL SERVICES 711 Merrick Avenue · North Merrick, New York 11566 Tel. (516) 378-1100 Fax (516) 378-4176	PROJECT: The Gourmet Factory Location: 78-01 77th Avenue Glendale, New York DATE: 12/4/07 PROJECT NO.: 11-1404	SOIL BORING/MONITORING WELL CONSTRUCTION LOG BORING NO.: VMP-5 MON WELL ID: SHEET 1 OF 1

BORING LOCATION:	LOGGED BY: David Kahn (Preferred Environmental Services)
GROUND SURFACE ELEVATION:	MEASURING POINT ELEVATION:
START TIME: 8:00 AM DATE: 12/4/07	DRILLING CO.: LAWES
FINISH TIME: 11:30 AM DATE: 12/4/07	DRILLERS NAME: Ernesto Santiago; Tony Smith
SAMPLING METHOD: DH-100 Automatic Drop Hammer with 24" split spoon. Samples Collected Every Five Feet	GROUNDWATER OBSERVATIONS
DRILLING METHOD AND RIG TYPE: Geoprobe 7720DT; Dual Tube System-3" Outer Rods and 1.5" Inner Rods	

DATE	TIME	DEPTH	CASING	NOTES
NA	NA	NA	NA	NA

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (IN.)	SAMPLE BLOWS/6 IN.	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1-5	0-5	Grab	NA	3.5	SM	Hand cleared to five feet below grade; 6 inches concrete; fill material to 1.5 ft. Cobblestone fill at 1.5 feet. Brown silt; No odor; no staining; dry	Cement-Bentonite Grout; Hydrated Bentonite
6-7	6-7	23	1,2,4,8	0.0	SM	Light brown silt with fine sand; no odor; no staining; dry	
8-10					SM		
11-12	10-12	2	31,46,33, 31	0.0	SM	Brown silty sand and rock fragments; no odor; no staining; dry	#2 Sand
13-15					SM		
16-17	15-17	13	36,31,23, 13	0.0	SW	Brown medium to coarse sand with medium to coarse gravel and rock fragments; no odor; no staining; dry	
18-20					SW		
21-22	20-22	11	22,21,29, 51	0.0	SW	Brown fine to medium sand with some medium to coarse gravel and some brick fragments; no odor; no staining; dry	
23-24					SW		
25-26	24-26	NA	50, refusal	NA	NA	Very competent rock fill at 22 ft. ; Unable to penetrate	
27-31							

MONITORING WELL CONSTRUCTION DETAILS		
DEPTH (FT): 24	RISER INTERVAL: 6 ft - 4 in.	MANHOLE: 12" Round Boltdown
DIA. (IN.): 1	DEPTH/TYPE PACK: #2 sand 24 ft - 3 ft	WELL ENDCAP: 1 in. Domecap
WELL MATERIAL: Sch. 40 PVC FJ	DEPTH/TYPE SEAL: Hydrated Bentonite 3 ft - 2 ft	WELL CAP: NA
SCREEN SLOT SIZE: .020	BACKFILL OVER SEAL: Cement-Bentonite Grout 2 ft - 16 *	
SCREEN INTERVAL: 24 ft - 6 ft	SURFACE SEAL: Concrete	

Notes: * Unable to penetrate competent rock at 24 feet below grade.

APPPENDIX H
Quality Assurance Project Plan
(on CD)

CDM GENERIC QUALITY ASSURANCE PROJECT PLAN (QAPP) FOR NYSDEC STANDBY CONTRACT NO. D-004437

Prepared for

New York State Department of Environmental Conservation
Investigation and Design Engineering Services

Prepared by

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Raritan Plaza I, Raritan Center
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CDM

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Section 1
Introduction

This Generic Quality Assurance Project Plan (QAPP) is the documentation of the quality assurance/quality control (QA/QC) procedures required to complete projects under New York State Department of Environmental Conservation (NYSDEC) under the Engineering Services for Investigation and Design, Standby Contract No. D004437. Site specific procedures will be included as an attachment to the site specific Work Plan for that site.

1.1 Purpose

The principal purpose of this document is to specify quality assurance/quality control (QA/QC) procedures for the collection, analysis, and evaluation of data that will be legally and scientifically defensible.

1.2 Objectives

The QAPP provides general information and procedures applicable to the activities and analytical program detailed in each site-specific Work Plan. This information includes definitions and generic goals for data quality and required types and quantities of QA/QC samples. The procedures address field documentation; sample handling, custody, and shipping; instrument calibration and maintenance; auditing; data reduction, validation, and reporting; corrective action requirements; and QA reporting specific to the analyses performed by the laboratories subcontracted by CDM.

Section 2
Project Organization and Responsibility

2.1 Overview

The project management organization for each project is to provide a clear delineation of functional responsibility and authority. The project manager for CDM is the primary point of contact with the regulatory agency. He/she is responsible for development and completion of the site-specific investigation, project team organization and supervision of all project tasks. In this role, he/she will communicate directly with NYSDEC staff.

For the fieldwork, field teams consisting of CDM personnel and subcontractors will be assembled and will be responsible for implementing all aspects of the fieldwork. Several key activities will be performed as part of the field and analytical work. These activities include:

- Ensuring that sample collection, testing and data collection procedures are performed according to DEP-10 requirements
- That health and safety procedures as outlined in the site-specific health and safety plan (HASP) are followed
- That the field QA/QC procedures are implemented
- That laboratory analysis, data validation, data processing, and data QC activities are performed in accordance with NYSDEC guidelines.
- That minority business enterprise/women business enterprise (MBE/WBE) goals are achieved.

2.2 Responsibility

The primary responsibilities for program management activities rest with the Program Manager (PRM). The Program Manager will have ultimate contract responsibility for the project, including responsibility for the technical content of all engineering work. The program manager will direct, review and approve all project deliverables, schedule staff and resources, resolve scheduling conflicts and identify and solve potential program problems. He will be directly accountable to NYSDEC's Division of Hazardous Waste Remediation for program execution. He has authority to assign staff, negotiate and execute contracts and amendments, as well as execute subcontracts. The PRM will communicate directly with CDM's Project Manager.

The Project Manager will have overall responsibility for the technical and financial aspects of this project. He/she will assign technical staff, maintain control of the project budget and schedule, prepare monthly progress reports, review and approve project invoices, evaluate the technical quality of the project deliverables as well as the

adherence to QA/QC procedures and manage subcontractors. He/she will serve as CDM's point of contact for this project.

The Program Quality Assurance Officer will monitor QC activities of program management and technical staff, as well as identify and report the needs for corrective action to the Program Manager. She will also conduct an internal review of all project deliverables prepared by CDM staff and sign off on the final investigation reports.

The Program Health and Safety Officer will review and make recommendations to the Subcontractors on health and safety plans for compliance with OSHA requirements. He will develop a Health and Safety plan for CDM and NYSDEC employees, handle over-sight activities, evaluate the performance of health and safety officers and maintain required health and safety records. He will report to the Program Manager.

The Health and Safety Site Supervisor/Coordinator will be responsible for ensuring that the Health and Safety Plan is implemented during field activities and that a copy of the site-specific Health and Safety Plan are maintained at the site at all times. He/she is also responsible for upgrading or downgrading personnel protection based on actual conditions at the time of the investigation. The Coordinator must also present an overview of the Health and Safety Plan to field personnel prior to initiating any field activities and is responsible for insuring that field personnel sign off on this plan. He/she will contact the Program Health and Safety Officer if any questions or issues arise during the field activities that he/she cannot answer.

2.3 Subcontractors

The following subcontractor services may be required as part of the site investigations and performed by subcontractors under CDM's supervision:

- Geophysical Survey
- Geoprobe Installation
- Drilling
- Well Installation
- Groundwater Sampling
- Chemical Analytical Services
- Site Survey
- Investigation Derived Waste Removal

Section 3
Field Procedures

CDM's points of contact for the field investigation are the Site Manager and the onsite NYSDEC representative. Any minor changes in sampling activities that are within the proposed scope of the project will be documented each day in the field logbook and signed by both representatives. Any modifications that are inconsistent with the approved work plan are to be approved by NYSDEC prior to implementation.

3.1 Documentation (Field Log Book)

Information recorded in field log books include observations, data, calculations, time, weather, description of the data collection activity, methods, instruments, and results. Additionally, the logbook may contain descriptions of wastes, biota, geologic material, and site features including sketches maps, or drawings as appropriate.

3.1.1 Preparation

In addition to this QAPP, site personnel responsible for maintaining logbooks must be familiar with other site specific standard operating procedure (SOPs). These should be consulted as necessary to obtain specific information about equipment and supplies, health and safety, sample collection, packaging, decontamination, and documentation.

Prior to use in the field, each logbook should be marked with a specific control number. The field notebook will then be assigned to an individual responsible for its care and maintenance.

Field logbooks will be bound with lined, consecutively numbered pages. All pages must be numbered prior to initial use of the logbook. The following information will be recorded inside the front cover of the logbook:

- Field logbook document number
- Activity (if the log book is to be activity-specific)
- Person and organization to whom the book is assigned, and phone number(s)
- Start date

3.1.2 Operation

The following is a list of requirements that must be followed when using a logbook:

- Record work, observations, quantities of materials, calculations, drawings, and related information directly in the log book. If data collection forms are specified by an activity-specific plan, this information need not be duplicated in the logbook. However, any forms used to record site information must be referenced in the logbook.

- Do not start a new page until the previous one is full or has been marked with a single diagonal line so that additional entries cannot be made. Use both sides of each page.

- Do not erase or blot out any entry at any time. Before an entry has been signed and dated, any changes may be made but care must be taken not to obliterate what was written originally. Indicate any deletion by a single line through the material to be deleted.

- Do not remove any pages from the book.

- Record as much information as possible.

- Specific requirements for field logbook entries include:

    - Initial and date each page.
    - Initial and date all changes.
    - Multiple authors must sign out the logbook by inserting the following:

- Above notes authored by:

    - (Sign name)
    - (Print name)
    - (Date)

- A new author must sign and print his/her name before additional entries are made.

- Draw a diagonal line through the remainder of the final page at the end of the day.

- Record the following information on a daily basis:

    - Date and time
    - Description of activity being conducted including station (i.e., well, boring, sampling location number) if appropriate
    - Weather conditions (i.e., temperature, cloud cover, precipitation, wind direction, and speed) and other pertinent data
    - Level of personnel protection to be used

Entries into the field logbook will be preceded with the time (written in military units) of the observation. The time should be recorded at the point of events or measurements that are critical to the activity being logged. All measurements made and samples collected must be recorded unless they are documented by automatic methods (e.g., data logger) or on a separate form. In these cases, the logbook must reference the automatic data record or form.

Other events and observations that should be recorded include:

- Changes in weather that impact field activities.
- Deviations from procedures outlined in any governing documents. Also record the reason for any noted deviation.
- Problems, downtime, or delays.
- Upgrade or downgrade of personnel protection equipment.

3.1.3 Post-Operation

To guard against loss of data due to damage or disappearance of logbooks, copies of completed pages will be made periodically (weekly, at a minimum) and submitted to the project manager. Documents that are separate from the logbook will be copied and submitted regularly and as promptly as possible to the project manager. This includes all automatic data recording media (printouts, logs, disks or tapes) and activity-specific data collection forms required by other SOPs.

At the conclusion of each activity or phase of site work, the individual responsible for the log book will ensure all entries have been appropriately signed and dated, and that corrections were made properly (single lines drawn through incorrect information, then initialed and dated). The completed logbook will be submitted to the records file.

3.2 Sample Collection, Documentation and Identification

The following procedures describe proper sample collection, and documentation to be included in field notebooks. Documentation includes describing data collection activities, logging sample locations, sample IDs, container labeling and chain-of-custody forms. Procedures for sample classification to insure proper labeling of samples are also included.

3.2.1 Responsibilities

The field manager and/or field technician is required to oversee drilling of the boreholes, collection of vapor, groundwater, and air samples, fill out field book logs, submit samples for analysis, COC forms and labeling of any waste-containing drums, if required. Also, the field manager and/or field engineer is required to adhere to the Site-Specific Health & Safety Plan. Field book entries should state starting time of monitoring, equipment used and results.

3.2.2 Sample Collection

3.2.2.1 Water Samples

- VOCs, if analyzed, are to be sampled first. Pour water slowly into the 40-ml vial, tipping the vial and allowing water to run down the side to prevent aeration. Fill until a meniscus forms and tightly seal the vial. Invert the vial and check for bubbles. If bubbles are present, add water and repeat. It may be necessary to discard the vial and use another if bubbles continue to appear.

- Remaining bottles should then be filled, again preventing aeration.

- If filtering is required (filtering is sometimes requested when samples are to be analyzed for metals and turbidity is high), use a dedicated 0.45 micron filter for each sample and filter prior to preservation.

- Label bottles with sample designation, project, date, time, preservative and required analysis. Clear tape may be used to cover the completed label.

- Place sample in a cooler with ice to maintain temperature at 4°C +/- 2°C. Samples will be maintained at this temperature throughout the sampling and transportation period. Chain of Custody and shipping procedures are discussed in See Section 3.3.

3.2.2.2 Soil/Sediment/Sludge Samples

- VOCs, if analyzed, are to be sampled first. Fill the jar completely such that there is no air space. VOCs must not be homogenized.

- For the remaining parameters, homogenize the samples with a decontaminated stainless bowl (Section 3.12) and trowel prior to filling the remaining bottles. Use of dedicated disposable trowels is permitted.

- Label bottles with sample designation, project, date, time, preservative and required analysis. Clear tape may be used to cover the completed label.

- Place sample in a cooler with ice to maintain temperature at 4°C +/- 2°C. Samples will be maintained at this temperature throughout the sampling and transportation period. Chain of Custody and shipping procedures are discussed in Section 3.3.

3.2.2.3 Soil Vapor/Ambient Air Samples

- Soil Vapor samples will be collected with 1.4-liter summa canisters, with 2-hour flow controllers (regulators) and particulate filters (if required). Flow rate shall not exceed 200 ml/min.

- Sub slab soil vapor samples will be collected with 6-liter summa canisters, with 24-hour flow controllers (regulators) and particulate filters (if required). Sample flow rate shall not exceed 200 ml/minute.

- Soil Vapor samples will be collected with 6-liter summa canisters, with flow controllers (regulators) and particulate filters (if required). Sample flow rate shall not exceed 200 ml/minute.

- Indoor and outdoor ambient air samples will be collected with 6-liter summa canisters, with flow controllers (regulators) and particulate filters (if required). Sample flow rate shall not exceed 200 ml/minute.

- Instantaneous grab samples may also be collected, as permitted by NYSDEC.
- Record vacuum prior to and at conclusion of sampling. Prior to sampling, vacuum should be 28-30 inches.
- At conclusion of sampling, vacuum should be 5 inches Hg +/- 1 inch Hg.
- Label summa canister and prepare for shipping. Summa canisters are not chilled or otherwise preserved.

3.2.3 Field Notebooks

Complete thorough notes of all field events are essential to a timely and accurate completion of this project. The field manager and/or field engineer is responsible for accounting for particular actions and times for these actions of the subcontractor while in the field. Also, identification (numbers and description) of field samples duplicates samples, and blank samples should also be noted in the field book. For a particular workday, the field book should contain the following:

- Field personnel name, contractors name, number of persons in crew, equipment used, weather, date, time, and location at start of day (boring number).
- Sample identification number, depth, amount of sample recovery, PID readings and soil descriptions.
- Description of any unusual surface or subsurface soil conditions
- Record of Health and Safety monitoring; time, equipment and results
- Record of site accidents or incidents
- Record of any visitors
- Potential of delays
- Materials and equipment used during borehole installation
- Final daily summary of work completed including list of samples obtained
- Completion of daily QA/QC log sheet
- Contractor downtime, decontamination time, equipment breakdowns, movement tracking throughout the day, etc.
- Any other data that may be construed as relevant information at a later date.

The field logs should confirm the subcontractor's data. Field notes should be photocopied weekly and returned to the project manager.

If a borehole is completed as a monitoring well, simply note this on the form, and complete the monitoring well log. Examples of completed boring logs should be reviewed and adequate blank log forms obtained.

Monitoring well logs are required in addition to the boring log form if the borehole is completed as a monitoring well. These are to be completed in the field after a monitoring well is installed. They should include data such as screen length, riser length, materials used, etc. Examples of monitoring well logs should be reviewed and adequate blank log forms obtained.

3.2.4 Drum Labeling

Labeling of drums is essential for tracking hazardous materials. The responsibility of the contractor is to collect, handle, and store the drums, but the responsibility of field personnel is to label these drums appropriately. There is a significant cost implication if drums are not property labeled. Unknown material must be disposed of as hazardous waste if any hazardous waste is found on-site.

The following drum labeling procedures are to be adhered to:

- Field staff shall secure packing list envelopes to the side of the drum(s) at the completion of a boring.

- Field staff shall print with an indelible marker on information cards all information pertaining to the contents of the drum(s). If more than one drum is collected from the same borehole, each information card shall be numbered sequentially in parenthesis starting with the number one after the boring number. The information shall include:

    - Program Area
    - Boring No.(s)
    - Date collected
    - Description of contents (i.e., soil cuttings, well water, etc.)
    - Amount of water (specify in inches)
    - Fullness of drum (not including free liquid, specify in fractional form)

- Field staff shall insert information card into packing list envelope. The packing list envelope shall be sealed at this time.

- Field staff shall record in field book all information pertaining to the contents of the drum that was printed on the information card.

- Program manager, upon receipt of the analytical data for the drums, shall prepare a summary table of the analytical results on a weekly basis, and provide the designated coordinator.

- Based on the tabulated information the designated coordinator will determine and prepare the appropriate storage labels required:
  - Hazardous Waste label
  - Non-hazardous label
- The designated coordinator will fill out these labels.
- Field staff shall attach these labels to the appropriate drums. If the information cards inside the packing list envelopes are damaged, they shall be reprinted at this time.

It is noted that waste material is expected to be transported off-site during excavation. No investigation derived wastes are expected to be drummed.

3.2.5 Sample Identification

Each sample collected will be designated by an alphanumeric code that will identify the type of sampling location, matrix sampled, and the specific sample designation (identifier). The sample identification for all samples will begin with the Site ID for the site.

The following terminology shall be used for the **soil** sample identification:

SITE ID - BORING/SAMPLE LOCATION ID – DEPTH

The sample ID for the soil vapor and groundwater samples will then include the sample type designation, followed by the sample number. The following terminology shall be used for the **soil vapor** sample identification:

SITE ID - SV- #
SITE ID – SV - #

Where there are shallow and deep samples at a location, the shallow samples will be designated "S" and the deep samples designated "D".

The following terminology shall be used for the **groundwater** sample identification:

SITE ID - MONITORING WELL ID - DEPTH (for monitoring well samples)
SITE ID – GW - BORING ID - DEPTH (for temporary well point or hydro-punch samples)

For sub-slab and indoor air samples, the site ID will be followed by the sample type designation, the sample number and then the date. The following terminology shall be used for the **structure** sample identification:

SITE ID-SS-xx-DATE (for sub-slab locations)

SITE ID-IA-xx-DATE (for indoor ambient air)
SITE ID-A-xx-DATE (for outdoor ambient air)

Field blank and **trip blank** samples will be designated as follows:

SITE ID-FB-DATE (for field blanks)
SITE ID-TB-DATE (for trip blanks)

Field **duplicates** will be designated by using the next consecutive sample number for the site.

3.3 Chain-of-Custody Procedures

This section describes the procedures used to ensure that sample integrity and chain-of-custody are maintained throughout the sampling and analysis program. Chain-of-custody (COC) procedures provide documentation of sample handling from the time of collection until its disposal by a licensed waste hauler. This documentation is essential in assuring that each sample collected is of known and ascertainable quality.

The COC begins at the time of sample collection. Sample collection is documented in the field notebooks in accordance with the specified SOP. At the same time, the sampler fills out the label on the sample container with the following information:

- Sample ID code
- Required analyses
- Sampler initials
- Date and time of sample collection

3.3.1 Chain-of-Custody Forms

The COC forms are a paper trail system that follows the samples collected and indicates which laboratory analyses are to be performed on which samples. Each sample should be clearly labeled and listed on the COC. The laboratory will only perform analyses on samples indicated and all other samples should be indicated with a "HOLD" designation. By labeling a sample "HOLD", the laboratory will store the sample until further instruction is given. Do not check the request for analysis blocks on the COC for samples designated with "HOLD" Status. Never indicate duplicate or blank samples on a COC.

It is the responsibility of the field manager to coordinate COC forms and supply copies of all COC to the project manager for data management use.

A COC form is filled out for each sample type at each sampling location. Each time the samples are transferred to another custodian or to the laboratory, the signatures of the people relinquishing the sample and receiving the sample, as well as the time and date, are documented. Labels will be filled out with an indelible, waterproof, marking pen.

3.3.2 Chain-of-Custody Records

The COC record is a three-part form. The laboratory retains the original form and the person relinquishing the samples keeps a copy of the form at the time of sample submittal. This form is then returned to the project manager or person in charge of data coordination.

The COC Record will be placed in a Ziplock bag and placed inside of all shipping and transport containers. All samples will be hand delivered or shipped by Federal Express to the laboratory specified by the field manager. Samples should be packed so that no breakage will occur (e.g. placed upright in the cooler surrounded by packing materials). Sample vials may be placed on their sides if frozen. Custody seals will be placed on all coolers/packages containing laboratory samples during shipment.

3.4 Field Quality Control Samples

In order to maintain QA/QC in both the field and the laboratory, additional samples such as trip blanks, duplicates, field blanks, performance evaluation samples and background samples will be collected. Each type of QA/QC sample is described below. Details of the QA/QC samples collected will be provided to the project data validator for use in their evaluation.

3.4.1 Quality Control for Soil Sampling

Approximately twenty percent of all soil samples analyzed should be QA/QC samples. These samples act as a verification of appropriate field and laboratory procedures. These samples should be recorded in the field book but should not be identified on the Chain-of-Custody (COC) form other than with an MD (Miscellaneous Discrete). All QA/QC samples should be numbered sequentially with other field samples on the soil log form. The following is a breakdown of types of QA/QC samples that are to be taken:

3.4.1.1 Duplicate Samples

Approximately ten percent of all soil samples analyzed should be duplicate samples. Soil duplicates shall be field-homogenized samples. To ensure laboratory "blind" analyses, duplicate samples will be identified with the next sequential sample number on sample containers and the COC forms. The actual identification of the duplicate samples shall be recorded in the field book. Duplicate samples are collected from the same split spoon sampler, homogenized in the field and analyzed for the same compounds.

3.4.1.2 Field Blanks

Approximately two percent of all soil samples analyzed should be field blanks. Rinsate blanks are collected after a sample is taken and the equipment used (i.e., split spoon sampler) has been decontaminated. Distilled water is then poured over the decontaminated sampling equipment and collected in sample jars for analysis. It

should be documented in the field book which soil sample preceded the field blank and which soil sample followed the field blank for the equipment used.

3.4.2 Quality Control for Soil Vapor and Air Sampling

Approximately five percent of all soil vapor (including sub-slab soil vapor) samples analyzed should be duplicate samples. Soil vapor duplicates will be collected in a manner so that the sample and duplicate are being collected simultaneously from the same sample location. One duplicate indoor air sample will be collected per site where indoor air sampling is being conducted. Duplicate outdoor air samples will be collected only at the sites where indoor air sampling is also being conducted. Duplicate samples are analyzed for the same compounds. All summa canisters must be certified to be free of contaminants in accordance with QA/QC protocol.

3.4.3 Quality Control for Groundwater Sampling

Approximately twenty percent of all groundwater samples analyzed should be QA/QC samples. These samples act as a verification of appropriate field and laboratory procedures. These samples should be recorded in the field book but should not be identified on the COC form as a QA/QC sample. All QA/QC samples should be numbered sequentially with other field samples. The following is a breakdown of types of QA/QC samples that are to be taken:

3.4.3.1 Duplicate Samples

Approximately five percent of all groundwater samples analyzed should be duplicate samples. To ensure laboratory "blind" analysis, duplicate samples will be recorded with the well I.D. number and the next sequential sample number on sample containers and the COC forms. Duplicate samples are collected from the same bailer and analyzed for the same compounds.

3.4.3.2 Trip Blanks

Each cooler packed and shipped for aqueous VOC analysis should also contain a trip blank. Trip blanks are VOA vials filled with distilled water. These pre-filled vials are to be carried with the sample bottles and samples and should remain sealed the entire time. It should be documented in the field book which aqueous samples were collected and transported with the trip blank.

3.4.3.3 Field Blanks

One field blank sample will be collected per day of sampling. Field blanks are collected after a sample is taken and the equipment used (i.e., bailer) has been decontaminated. Distilled water is then poured over the decontaminated sampling equipment and collected in sample jars for analysis. It should be documented in the field book which groundwater sample preceded the field blank and which sample followed the field blank for the equipment used.

3.5 Premobilization

Prior to initiating fieldwork, the following preparatory activities will be completed:

- Project mobilization.
- Utility clearance and permitting. The drilling subcontractor is responsible for contacting the appropriate local utility or "one-call" service to locate subsurface and aboveground utilities in the vicinity of the soil gas survey area.
- Site specific issues resolved.
- Sample analysis will be scheduled with the laboratory.
- Appropriate sample containers and preservatives for the various sample parameters will be obtained. Extra containers will be obtained to account for possible breakage.
- Field blank water will be obtained from the laboratory performing the analysis.
- Necessary field sampling and monitoring equipment will be obtained. Prior to use, the equipment will be checked to confirm that it is in good working condition, properly calibrated, and decontaminated. **The field equipment for the procedures detailed in Sections 3.6 through 3.27 is listed in Table 3-1.**
- Materials necessary for personal protection and decontamination will be obtained.
- Coordinate with subcontractors.

3.6 Direct Push Groundwater Sampling

3.6.1 Macro Core Sampling

Direct push methods will be used to collect 48 or 60-inch macro-core samples continuously at each of the groundwater sample locations. The samples will be used by the CDM engineer to determine the depth to groundwater at each location. Once saturated soil is verified, a screen point groundwater sampler will be set approximately 5 feet into the water table. The depth to water will be used to determine the depth of the soil vapor probes.

Table 3-1
Equipment List

Equipment List \ Field Procedure	Soil Vapor Sampling	Temporary Port Sub-Slab Soil Vapor Sampling	Permanent Port Sub-Slab Soil Vapor Sampling	Indoor (Ambient) Air Sampling	Outdoor (Ambient) Air Sampling	Direct Push Groundwater Sampling	Low Flow Groundwater Sampling	Monitoring Well Purging	Groundwater Sampling by Bailer	Tap Water Sampling	Surface Water Sampling	Sediment/Sludge Sampling	Subsurface Soil Sampling	Surface Soil Sampling	Investigative Derived Waste	Water Level/NAPL Measurement	Rock Coring	Packer Testing	Aquifer Performance Test	Membrane Interface Probe	Fish Sampling	Benthic Macroinvertibrate Sampling
¼-inch flush mount hex socket plug, Teflon coated			x																			
¼-inch OD Teflon tubing	x	x	x				x															
¼-inch outside diameter (OD) stainless steel tubing			x																			
¼-inch Swagelock™ female and male connector			x																			
½- to ¾-inch braided nylon line or Teflon-coated wire rope									x		x	x										
1.4 or 6 Liter summa canisters	x	x	x	x	x																	
1-gallon buckets with foam along the rim	x	x																				
5-gallon bucket							x	x	x	x											x	x
60 cm^3 syringe	x	x	x																			
6-ft Engineers Scale																	x					
Aluminum foil												x									x	
Anchoring cement			x																			
Auger, rotary, air hammer or other drilling method (provided by subcontractor)																	x	x				
Bailer (sampler) and rope or wire line								x	x		x											
Boat (as needed for deep water)												x										
Bricks (or equivalent)	x																					
Camera	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Cement (to patch floor)		x																				
Check valve																			x			
Clear waterproof tape												x										
Composite Liquid Waste Sampler (COLIWASA) or sample thief for liquid sampling in a container															x							
Coolers/Sample shipping containers with ice packs						x	x		x	x	x	x	x	x	x			x			x	x
Core Barrel (provided by subcontractor)																	x					
Data logger and laptop																x			x			
Decontamination supplies						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Direct-push drill rig or rotary drill rig (for split-spoon/split barrel or direct push sampling)													x									
Discharge Hosing/piping								x											x			
Electrical conduit putty or modeling clay		x	x																			
Field parameters meters (Temperature, conductivity, pH, dissolved oxygen, Redox, turbidity)							x		x	x	x							x				
Flow meter with totalizer																		x	x			
Generator/electric supply source							x	x											x			
Hammer Drill with 1.25-inch bit		x																				
Hammer Drill with 3/8,1-inch bit			x																			

Table 3-1
Equipment List

Equipment List / Field Procedure	Soil Vapor Sampling	Temporary Port Sub-Slab Soil Vapor Sampling	Permanent Port Sub-Slab Soil Vapor Sampling	Indoor (Ambient) Air Sampling	Outdoor (Ambient) Air Sampling	Direct Push Groundwater Sampling	Low Flow Groundwater Sampling	Monitoring Well Purging	Groundwater Sampling by Bailer	Tap Water Sampling	Surface Water Sampling	Sediment/Sludge Sampling	Subsurface Soil Sampling	Surface Soil Sampling	Investigative Derived Waste	Water Level/NAPL Measurement	Rock Coring	Packer Testing	Aquifer Performance Test	Membrane Interface Probe	Fish Sampling	Benthic Macroinvertibrate Sampling
Hand auger and extension rods (for manual sampling)												x	x									
Helium, regulator and detector	x	x																				
Indelible black ink pen or marker	x	x	x	x	x	x	x		x	x	x	x	x	x	x		x	x				
Inflatable Packers (provided by subcontractor)																		x				
Kimwipe or paper towels						x	x	x	x		x	x	x	x	x	x					x	x
Labels and shipping products	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x		x			x	x
Large, wide-mouth breakers for measuring field parameters							x		x	x	x							x				
Lift pipe (provided by subcontractor)																		x				
Logbook	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
low-flow air pump	x	x	x																			
low-flow groundwater pump							x															
Nitrogen																		x				
Personal protective equipment per Health and Safety Plan	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Photoionization detector (PID)	x	x	x			x	x		x	x		x	x	x	x			x				
Plastic Zip-top bag									x	x		x	x	x							x	x
Polyethylene or plastic sheeting						x	x	x	x		x	x	x	x	x			x		x	x	x
Ponar sampler/ Eckman grab												x										
Pond sampler											x											
Pressure Gauges																		x				
Sample containers and preservatives (supplied by laboratory)						x	x		x	x	x	x	x	x	x			x				
Sampling port/valve																		x	x			
Scale																					x	x
Slide Hammer with extension rods (for manual sampling)													x									
Stainless steel push tubes (as needed)												x										
Stainless steel trowels, spoons, pan, tray, or bowls												x	x	x	x							
Stop watch										x									x			
Submersible pump								x										x	x			
Surveyor's stand (or equivalent to place canister on)				x																		
Tap and deionized water						x			x		x	x	x	x	x	x	x	x				
Tape Measure (100+ ft)	x	x	x	x	x	x	x				x	x	x	x				x	x		x	x
Locating device (GPS)	x	x	x	x	x	x	x		x		x	x	x	x			x	x		x		
Tedlar™ sample bags	x	x	x																			
Teflon thread tape			x																			
T-handle (extension rod) and hand auger													x									
three-way valve	x	x	x																			
trowel or putty knife			x																			
Tubing cutter	x	x	x				x	x														
Water level indicator						x	x	x	x							x		x	x			

Table 3-1
Equipment List

Equipment List \ Field Procedure	Soil Vapor Sampling	Temporary Port Sub-Slab Soil Vapor Sampling	Permanent Port Sub-Slab Soil Vapor Sampling	Indoor (Ambient) Air Sampling	Outdoor (Ambient) Air Sampling	Direct Push Groundwater Sampling	Low Flow Groundwater Sampling	Monitoring Well Purging	Groundwater Sampling by Bailer	Tap Water Sampling	Surface Water Sampling	Sediment/Sludge Sampling	Subsurface Soil Sampling	Surface Soil Sampling	Investigative Derived Waste	Water Level/NAPL Measurement	Rock Coring	Packer Testing	Aquifer Performance Test	Membrane Interface Probe	Fish Sampling	Benthic Macroinvertibrate Sampling
Water spray bottle						x	x				x	x	x	x	x							
Water storage container (if necessary)					x	x	x											x	x			
Wrenches and pliers	x	x	x	x	x		x	x	x				x									

3.6.2 Purge and Sampling

Standard purge techniques will be utilized to purge and sample groundwater. Standard purge and sampling techniques consist of using a check valve and tubing to purge the well at a low flow rate. The check valve intake is set approximately in the middle of the screen. The well is purged at the low rate until the water flows clear or the turbidity is reduced to 50 nephelometric turbidity units (NTUs) or less or to a level deemed acceptable by NYSDEC. The sample is then collected directly from tubing or bailer.

3.6.3 Groundwater Sampling Procedure

Personal protective equipment will be donned in accordance with the requirements of the Site Health and Safety Plan (HASP).

- Assemble the screen point groundwater sampler.
- Attach the Mill-slotted screen point groundwater sampler, onto the leading probe rod.
- Thread the drive cap onto the top of the probe rod and advance the sampler using either the hydraulic hammer or hydraulic probe mechanism. Replace the 30-centimeter (cm) rod with the 90-cm rod as soon as the top of the sampler is driven to within 15 cm of the ground surface.
- Advance the sampler to the interval to be sampled using the hydraulic hammer. Add additional probe rods as necessary to reach the specified sampling depth.
- Move the probe unit back from the top of the probe rods and remove the drive cap.
- Attach the pull cap to the top probe rod, retract the probe rods, push the screen into the formation, remove extension rods from the probe rods, and measure and record the water level, allowing time for the water level to reach equilibrium.
- Purge the groundwater until the water flows clear or the turbidity has been reduced to 50 NTUs or less. If the well is purged dry, the sample may be collected after the well recharges.
- Collect the samples using a check valve and flexible tubing system or a dedicated bailer.
- Label and store samples. Samples will be preserved, labeled, and placed immediately into a cooler and maintained at 4°C throughout the sampling and transportation period. Samples should be labeled, recorded on the chain-of-custody and shipped according to the proper procedures. Custody seals will be placed on all coolers/packages containing laboratory samples during shipment.

3.7 Soil Vapor Sampling

Soil vapor sampling will be conducted in accordance with the NYSDOH "*Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006"* and the NYSDEC "*Draft Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation, dated December 2002".*

3.7.1 Soil Vapor Probe Installation

A Soil vapor probe installation at all locations will be performed according to the following procedures:

- At each location, a Geoprobe will be used to drive stainless steel rods equipped with detachable stainless steel drive points to the desired depth (approximately 8 feet bgs).
- Once the probe is in place, retract the drive rod slightly to expose a 6-inch sampling screen and sampling port. Insert Teflon-lined tubing through the rods and attach it to the soil gas probe just above the tip.
- Seal the probe at the surface using electrical conduit putty or non-shrink bentonite grout.
- The borehole will then be backfilled with sand to a minimum depth of 6 inches above the screen interval.
- Bentonite slurry will then be placed from approximately 6 inches above the screen to the ground surface and immediately hydrated. The bentonite will be allowed to set-up for a minimum of 24 hrs.
- Repeat steps 1 through 4 at a second co-located borehole to the second depth (~2 feet above the water table).

3.7.2 Tracer Testing

Tracer tests will be conducted at all soil vapor locations to verify the integrity of the soil vapor probe seal. Tracer tests will be conducted according to the following procedures:

- Set up the tracer test apparatus by first sealing the open area around the tubing with wax or bentonite.
- A bucket is then placed upside down over the borehole with the tubing coming out through a hole at the top.
- Helium will then be injected through a hole near the bottom of the bucket to enrich the atmosphere to at least 80 percent helium. The concentration of helium

inside the bucket will be monitored by a helium detector located at a second hole near the bottom of the bucket.

- Once the atmosphere is enriched to the appropriate concentration, the helium detector will then be used to check the concentration coming out of the tubing from the borehole located at the top of the bucket. If the reading is below 10 percent tracer gas, the probe seal is sufficient; proceed with sampling, as described in the following sections. If the reading is above 10 percent tracer gas, the probe seal is not sufficient; reseal the probe surface with bentonite and repeat the tracer test until the reading is below 10 percent tracer gas.

3.7.3 Soil Vapor Sampling Procedures for Offsite Analysis

Once the soil gas probe is installed and a tracer test is conducted, soil gas samples for off site analysis will be collected according to the following procedures:

- The soil vapor samples will be collected using a laboratory-certified clean summa canister with a two-hour regulator ensuring that the sample flow rate less than 200 milliliters per minute (ml/min) to minimize outdoor air infiltration during sampling. The summa canisters will have a vacuum of 28 inches mercury (in Hg) ± 2 inches prior to the collection of the soil vapor sample.

- Calculate the volume of the tubing including the screen interval as part of the volume. The tubing has an inside diameter of ¼ inch and a volume of 9.65 ml/foot.

- Attach the vacuum pump and purge at least 3 tube volumes from the tubing. Syringes will be utilized to purge the tubing if obtaining a flow rate of 200 ml/min is difficult with vacuum pump.

- A Tedlar™ bag will be filled toward the end of the purge volume to be screened using the PID meter. The PID readings will be observed and recorded on the appropriate field form.

- After purging is complete, the tubing will be connected to the summa canister.

- Record the initial pressure in the stainless steel summa canister to be used for the sample prior to connecting the tubing. The samples will be collected using laboratory-certified clean summa canisters with flow regulators and a vacuum of 28 inches Hg ± 2 inches. Vacuum readings in the canister should be approximately 28-30 inches Hg. If no vacuum reading is obtained, use a different canister as this indicates the canister was not properly evacuated.

- Connect the end of the tubing directly to the summa canister intake valve.

- Collect the sample into the summa canister, which will be provided by CDM's laboratory. An additional canister and regulator will be ordered as backup. Sample flow rate will not exceed 200 ml/min.

- When the vacuum gauge reads 5 inches Hg, close the valve. Sampling is complete. A vacuum of 5 inches Hg ± 1 inch must be present when sample collection is terminated to prevent contamination during transit. Record the final pressure reading in the summa canister.

- CDM personnel will label, pack and ship the samples to an NYSDOH ELAP-approved laboratory. The serial numbers for the summa canisters and the regulators will be recorded on the chain of custody. Custody seals will be placed on all coolers/packages containing laboratory samples during shipment.

- The field sampling team will maintain a sample log sheet summarizing the following:

    - sample identification.
    - date and time of sample collection
    - sampling height
    - serial numbers for summa canisters and regulators
    - sampling methods and devices
    - purge volumes
    - volume of soil vapor extracted
    - vacuum of summa canisters before and after sample collection
    - apparent moisture content (dry, moist, saturated, etc.) of the sampling zone
    - chain of custody protocols and records used to track samples from sampling point to analysis.

It is critical to ensure that moisture does not enter the summa canister which can compromise the analytical results.

3.8 Temporary Port Sub-Slab Soil Vapor Sampling Procedures for Offsite Analysis

Sub-slab soil gas samples for off site analysis will be collected according to the following procedures:

- Prior to installation of the sub-slab vapor probe, the building floor should be inspected and any penetrations (cracks, floor drains, utility perforations, sumps, etc.) should be noted and recorded. Probes should be installed at locations where the potential for ambient air infiltration via floor penetrations is minimal.

- After the slab has been inspected and the location of any subsurface utilities determined, the ambient air surrounding the proposed sampling location will be screened with a PID.

- A hammer drill with a 1.25-inch diameter drill bit will be used to advance a boring to a depth of approximately three to six inches beneath the slab. When drilling is complete, clean around drilled area.

- Insert probe constructed with 3/8-inch outer diameter, ¼-inch inner diameter Teflon® tubing. The tubing should not extend further than 2 inches into the sub-slab material

- The annular space between the borehole and the sample tubing will be filled and sealed with electrical conduit putty (or equivalent) at the surface.

- Conduct tracer testing in accordance with the procedures detailed in Section 3.7.2 above.

- The tubing will be connected to a low-flow sample pump. A three-way valve will be used to allow purging of all the lines. Flow rates for both purging and collection must not exceed 200 milliliters per minute to minimize the ambient air infiltration during sampling.

- Approximately 1 liter of gas will be purged from the subsurface probe and captured in a Tedlar™ bag using the low-flow pump. PID readings will be observed from this sample and the highest reading shall be recorded on the appropriate field form.

- Record the initial pressure in the stainless steel SUMMA canister to be used for the sample prior to connecting the tubing. The samples will be collected using laboratory-certified clean summa canisters with flow regulators and a vacuum of 28 inches Hg ± 2 inches. Vacuum readings in the canister should be approximately 28-30 inches Hg. If no vacuum reading is obtained, use a different canister as this indicates the canister was not properly evacuated.

- The end of the tubing will be connected directly to the summa canister's regulator intake valve via the three-way valve. Flexible silicone tubing will be used at a minimum and as a tubing adapter only. The sample shall be collected with a 6 Liter laboratory-certified summa canister with dedicated regulator set for a 24-hour sample collection.

- Collect the sample into the Summa canister, which will be provided by CDM's laboratory. An additional canister and regulator will be ordered as backup. Sample flow rate will not exceed 200 ml/min.

- When the vacuum gauge reads 5 inches Hg, close the valve. Sampling is complete. A vacuum of 5 inches Hg ± 1 inch must be present when sample collection is terminated to prevent contamination during transit. Record the final pressure reading in the summa canister.

- CDM personnel will label, pack and ship the samples to an NYSDOH ELAP-approved laboratory. The serial numbers for the SUMMA canisters and the regulators will be recorded on the chain of custody. Custody seals will be placed on all coolers/packages containing laboratory samples during shipment.

- Remove the sample port and patch the floor with concrete.

When sub-slab vapor samples are collected, the following actions should be taken to document conditions during sampling and ultimately to aid in the interpretation of the sampling results:

- historic and current storage and uses of volatile chemicals should be identified, especially if sampling within a commercial or industrial building (e.g., use of volatile chemicals in commercial or industrial processes and/or during building maintenance);

- the use of heating or air conditioning systems during sampling should be noted;

- floor plan sketches should be drawn that include the floor layout with sampling locations, chemical storage areas, garages, doorways, stairways, location of basement sumps or subsurface drains and utility perforations through building foundations, HVAC system air supply and return registers, compass orientation (north), footings that create separate foundation sections, and any other pertinent information should be completed;

- outdoor plot sketches should be drawn that include the building site, area streets, outdoor air sampling locations (if applicable), compass orientation (north), and paved areas;

- weather conditions (e.g., precipitation and indoor and outdoor temperature) and ventilation conditions (e.g., heating system active and windows closed) should be reported; and

- any pertinent observations, such as spills, floor stains, smoke tube results, odors and readings from field instrumentation (e.g., vapors via PID, Jerome Mercury Vapor Analyzer, etc.), should be recorded.

Additional documentation that could be gathered to assist in the interpretation of the results includes information about air flow patterns and pressure relationships obtained by using smoke tubes or other devices (especially between floor levels and

between suspected contaminant sources and other areas), the barometric pressure and photographs to accompany floor plan sketches.

The field sampling team should maintain a sample log sheet summarizing the following:

- sample identification,
- date and time of sample collection,
- sampling depth,
- identity of samplers,
- sampling methods and devices,
- soil vapor purge volumes,
- volume of soil vapor extracted,
- if canisters used, vacuum of canisters before and after samples collected,
- apparent moisture content (dry, moist, saturated, etc.) of the sampling zone, and
- chain of custody protocols and records used to track samples from sampling point to analysis.

3.9 Permanent Port Sub-Slab Soil Vapor Sampling Procedures for Offsite Analysis

Sub-slab soil gas samples for off site analysis will be collected from permanent sub-slab ports according to the following procedures:

- Prior to installation of the sub-slab vapor probe, the building floor should be inspected and any penetrations (cracks, floor drains, utility perforations, sumps, etc.) should be noted and recorded. Probes should be installed at locations where the potential for ambient air infiltration via floor penetrations is minimal.

- After the slab has been inspected and the location of any subsurface utilities determined, the ambient air surrounding the proposed sampling location will be screened with a PID.

- A hammer drill with a 3/8-inch diameter drill bit will be used to drill an inner pilot hole into the concrete slab to a depth of approximately two inches.

- Using the pilot hole as the center, drill an outer hole to an approximate depth of 1 3/8 inch using the one-inch diameter drill bit.

- Clean any cuttings out of the hole.

- Using the 3/8 inch drill bit, continue to drill the pilot hole through the slab and several inches into the sub-slab material.

- Assemble the stainless steel probe:

- Determine the length of stainless steel tubing required to reach from the bottom of the outer hole, through the slab, and into the open cavity below the slab. To avoid obstruction of the probe tube, insure that it does not contact the sub-slab material.
- Attach the measured length of ¼-inch OD stainless tubing to the female connector with the swagelock™ nut and tighten the nut.
- Insert the ¼-inch hex socket plug into the female connector. Tighten the plug. Do not over tighten.
- Place the completed probe into the outer hole. The probe tubing should not contact the sub-slab material and top of the female connector should be flush with the surface of the slab and centered in the outer hole.
- Fill the space between the probe and the inside of the outer hole with anchoring cement and allow to cure.

- Wrap one layer of Teflon thread tape onto the NPT end of the male connector

- Remove the ¼-inch hex socket plug from the female connector

- Screw and tighten the male connector into the female connector.

- A length of Teflon tubing is attached to the probe assembly and connected to the sample system using for purging and sample collection.

- A three-way valve will be used to allow purging of all the lines. Flow rates for both purging and collection must not exceed 100 milliliters per minute to minimize the ambient air infiltration during sampling.

- Purge at least 3 volumes from the subsurface probe and captured in a Tedlar™ bag using a 60 cc syringe. PID readings will be observed from this sample and the highest reading shall be recorded on the appropriate field form.

- Record the initial pressure in the stainless steel summa canister to be used for the sample prior to connecting the tubing. The samples will be collected using laboratory-certified clean summa canisters with flow regulators and a vacuum of 28 inches Hg ± 2 inches. Vacuum readings in the canister should be approximately 28-30 in Hg. If no vacuum reading is obtained, use a different canister as this indicates the canister was not properly evacuated.

- The end of the tubing will be connected directly to the SUMMA canister's regulator intake valve via the three-way valve. Flexible silicone tubing will be used at a minimum and as a tubing adapter only. The sample shall be collected with a 6 Liter laboratory-certified summa canister with dedicated regulator set for a 24-hour sample collection.

- Collect the sample into the summa canister, which will be provided by the subcontracted laboratory.

- When the vacuum gauge reads 5 inches Hg, close the valve. Sampling is complete. A vacuum of 5 inches Hg ± 1 inch must be present when sample collection is terminated to prevent contamination during transit. Record the final pressure reading in the summa canister.

- CDM personnel will label, pack and ship the samples to an NYSDOH ELAP-approved laboratory. The serial numbers for the summa canisters and the regulators will be recorded on the chain of custody. Custody seals will be placed on all coolers/packages containing laboratory samples during shipment.

When sub-slab vapor samples are collected, the following actions should be taken to document conditions during sampling and ultimately to aid in the interpretation of the sampling results:

- historic and current storage and uses of volatile chemicals should be identified, especially if sampling within a commercial or industrial building (e.g., use of volatile chemicals in commercial or industrial processes and/or during building maintenance);

- the use of heating or air conditioning systems during sampling should be noted;

- floor plan sketches should be drawn that include the floor layout with sampling locations, chemical storage areas, garages, doorways, stairways, location of basement sumps or subsurface drains and utility perforations through building foundations, HVAC system air supply and return registers, compass orientation (north), footings that create separate foundation sections, and any other pertinent information should be completed;

- outdoor plot sketches should be drawn that include the building site, area streets, outdoor air sampling locations (if applicable), compass orientation (north), and paved areas;

- weather conditions (e.g., precipitation and indoor and outdoor temperature) and ventilation conditions (e.g., heating system active and windows closed) should be reported; and

- any pertinent observations, such as spills, floor stains, smoke tube results, odors and readings from field instrumentation (e.g., vapors via PID, Jerome Mercury Vapor Analyzer, etc.), should be recorded.

Additional documentation that could be gathered to assist in the interpretation of the results includes information about air flow patterns and pressure relationships obtained by using smoke tubes or other devices (especially between floor levels and between suspected contaminant sources and other areas), the barometric pressure and photographs to accompany floor plan sketches.

The field sampling team should maintain a sample log sheet summarizing the following:

- sample identification,
- date and time of sample collection,
- sampling depth,
- identity of samplers,
- sampling methods and devices,
- soil vapor purge volumes,
- volume of soil vapor extracted,
- if canisters used, vacuum of canisters before and after samples collected,
- apparent moisture content (dry, moist, saturated, etc.) of the sampling zone, and
- chain of custody protocols and records used to track samples from sampling point to analysis.

3.10 Indoor (Ambient) Air Sampling Procedures for Offsite Analysis

All indoor air samples will be collected with a 6 Liter laboratory-certified summa canister regulated for a 24-hour sample collection. Sample collection will be similar to outdoor ambient air sample collection. The summa canister will be placed in such a location as to collect a representative sample from the breathing zone at four or six feet above the floor. Personnel should avoid lingering in the immediate area of the sampling device while samples are being collected.

The New York State Department of Health *Indoor Air Quality Questionnaire and Building Inventory* shall be completed for each structure where indoor air testing is being conducted. The following actions should be taken to document conditions during indoor air sampling and ultimately to aid in the interpretation of the sampling results:

- historic and current uses and storage of volatile chemicals should be identified, especially if sampling within a commercial or industrial building (e.g., use of volatile chemicals in commercial or industrial processes and/or during building maintenance);

- a product inventory survey documenting sources of volatile chemicals present in the building during the indoor air sampling that could potentially influence the sample results should be completed;

- the use of heating or air conditioning systems during sampling should be noted;

- floor plan sketches should be drawn that include the floor layout with sampling locations, chemical storage areas, garages, doorways, stairways, location of basement sumps or subsurface drains and utility perforations through building foundations, HVAC system supply and return registers, compass orientation

(north), footings that create separate foundation sections, and any other pertinent information should be completed;

- outdoor plot sketches should be drawn that include the building site, area streets, outdoor air sampling locations (if applicable), compass orientation (north), and paved areas;

- weather conditions (e.g., precipitation and indoor and outdoor temperature) and ventilation conditions (e.g., heating system active and windows closed) should be reported; and

- any pertinent observations, such as spills, floor stains, smoke tube results, odors and readings from field instrumentation (e.g., vapors via PID, etc.), should be recorded.

Additional documentation that could be gathered to assist in the interpretation of the results includes information about air flow patterns and pressure relationships obtained by using smoke tubes or other devices (especially between floor levels and between suspected contaminant sources and other areas), the barometric pressure and photographs to accompany floor plan sketches.

The field sampling team should maintain a sample log sheet summarizing the following:

- sample identification,
- date and time of sample collection,
- sampling height,
- identity of samplers,
- sampling methods and devices,
- volume of air sampled,
- vacuum of canisters before and after samples collected, and
- chain of custody protocols and records used to track samples from sampling point to analysis.

3.11 Outdoor (Ambient) Air Sampling Procedures for Offsite Analysis

All outdoor air samples will be collected with a laboratory-certified summa canister regulated for a 24-hour sample collection using a 6 Liter summa canister. The summa canister will be placed in such a location as to collect a representative sample from the breathing zone at four or six feet above the ground.

Personnel will avoid lingering in the immediate area of the sampling device while samples are being collected. Ambient air samples will be collected in a location of as far away as possible from any boring or dust generating activities.

The following actions will be taken to document conditions during ambient air sampling:

- Outdoor plot sketches will be drawn that include the building site, area streets, ambient air sample locations, the location of potential interferences, compass orientation, and paved areas.

- Weather conditions (e.g. precipitation, temperature, wind direction and barometric pressure)

- Any pertinent observations, such as odors, reading from field instruments, and significant activities in the vicinity (e.g. operation of heavy equipment) will be recorded.

The field sampling team will maintain a sample log sheet summarizing the following:

- sample identification,
- date and time of sample collection,
- sampling height,
- identity of samplers,
- sampling methods and devices,
- volume of air sampled,
- vacuum of canisters before and after samples collected, and
- chain of custody protocols and records used to track samples from sampling point to analysis.

3.12 Decontamination

All non-dedicated, non-disposal sampling equipment and tools used to collect samples for chemical analysis will be decontaminated prior to and between each sample interval using an Alconox rinse and potable water rinse prior to reuse. Unless disposable sampling equipment is used, the equipment will be decontaminated by the following procedure:

- Wash with the non-phosphate detergent
- Tap water rinse
- Deionized water rinse
- Air dry and wrap in aluminum foil, shiny side out

Additional cleaning of the drilling equipment with steam may be needed under some circumstances if elevated levels of contamination appear to be present using field monitoring equipment or visible stained soils. Decontamination fluids will be discharge to the ground surface unless visible sheen or odor is detected either on the equipment or the fluids, at which point the decontamination water will be contained in a 55-gallon drum, staged and properly disposed.

3.13 Investigative Derived Waste

Soil cuttings and purge water will be placed and dispersed on the ground unless visible contamination or elevated PID readings are observed. If contamination is present, investigative derived waste (IDW) will be contained and analyzed to determine the appropriate disposal methods.

3.13.1 Waste Sampling

Waste classification sampling will occur before the completion of site investigation activities. Representative soil samples (5 grab samples) will be collected from waste containers with a decontaminated stainless steel trowel. The aliquots will be homogenized in a stainless steel bowl and transferred to the sample container(s) for subsequent analysis. Grab samples will be collected from each container containing aqueous wastes.

The requirements for waste characterization will be determined by the disposal facility. The containers of waste will be stored in an area designated by NYSDEC until the analytical results are received and the waste can be characterized for disposal.

3.13.2 Waste Sampling Procedure

Soil Waste

- Scan the sample with the OVM and record readings.
- Collect a sample of the soil from the container using a decontaminated stainless steel trowel in and place the sample in a stainless steel bowl. Homogenize the soil using the trowel. Several samples will be collected and homogenized in the steel bowl to represent each drum.
- Remove the cap from the container
- Fill the sample container as completely as possible by transferring the sample to the container immediately after collected the sample with a stainless steel trowel, and screening the sample with the OVM.
- Close the sample container tightly.
- Label the container and place it into in a cooler with bagged ice sufficient to cool the samples to 4°C.
- Maintain Chain-of-Custody forms for samples.
- Log the description and depth of the sample sent for analysis in the field book.
- Record field information and sample location, including measurements from fixed points in logbook.

Aqueous Waste

- Remove the cap from the drum containing the aqueous waste.
- Fill a sample container(s) as completely as possible by transferring liquid sample from the waste container to the sample container with the COLIWASA (or similar), and screening the sample with an OVM.
- Close the sample container(s) tightly.

- Place sample container(s) in cooler with bagged ice sufficient to cool the samples to 4°C.
- Maintain Chain-of-Custody forms.

3.14 Soil Boring Logs/Geoprobe

Geological logging includes keeping a detailed record of drilling (or excavating) and a geological description of materials on a prepared form. Geological logs are used for all types of drilling and exploratory excavations and include descriptions of both soil and rock. Accurate and consistent descriptions are imperative.

3.14.1 Log Form

When drilling in soils or unconsolidated deposits, the log should be kept on a standard Soil Boring Log Form. The following basic information should be entered on the heading of each log sheet:

- Project name and number
- Boring or well number
- Locations (approximate in relation to an identifiable landmark; will be surveyed)
- Elevations (approximate at the time; will be surveyed)
- Name of drilling contractor
- Drilling method and equipment
- Water level
- Start and finish (times and date)

The following technical information is recorded on the logs:

- Depth of sample below surface
- Sample interval
- Sample type and number
- Length of sample recovered
- Standard penetration test (ASTM-D1586) results if applicable
- Soil description and classification
- Graphic soil symbols
- PID readings

In addition to the items listed above, all pertinent observations about drilling rate, equipment operation, or unusual conditions should be noted. Such information might include the following:

- Size of casing used and method of installation
- Rig reactions such as chatter, rod drops, and bouncing
- Drilling rate changes
- Material changes
- Zones of caving or heaving

3.14.2 Soil Classification

The soil description should be concise and should stress major constituents and characteristics. Soil descriptions should be given in a consistent order and format. The following order is as given in ASTM D2488:

- Soil name. The basic name of the predominant constituent and a single-word modifier indicating the major subordinate constituent.

- Gradation or plasticity. For granular soil (sand or gravel) that should be described as well graded, poorly graded, uniform, or gap-graded, depending on the gradation of the minus 3-inch fraction. Cohesive soil (silts or clays) should be described as non-plastic, slightly plastic, moderately plastic, or highly plastic, depending on the results of the manual evaluation for plasticity as described in ASTM D2488.

- Particle size distribution. An estimate of the percentage and grain-size range of each of the soil's subordinate constituents with emphasis on clay-particle constituents. This description may also include a description of angularity. This parameter is critical for assessing hydrogeology of the site and should be carefully and fully documented.

- Color. The color of the soil using Munsell notation.

- Moisture content. The amount of soil moisture, described as dry, moist, or wet.

- Relative density or consistency. An estimate of density of a granular soil or consistency of a cohesive soil, usually based on standard penetration test results (see Table 3-2 and 3-3).

- Local geologic name. Any specific local name or a generic name (i.e., alluvium, loess). Also use of Unified Soil Classification System of symbols.

The soil logs should also include a complete description of any tests run in the borehole; placement and construction details of piezometers, wells, and other monitoring equipment; abandonment records; geophysical logging techniques used; and notes on readings obtained by air monitoring instruments.

- Additional data in sedimentary rocks includes:
  - Sorting
  - Cementation
  - Density or compaction
  - Rounding

The core should be logged as quickly as possible after removal from the hole. Some materials may degrade rapidly upon exposure, resulting in apparently poor rock, which was not actually present in the subsurface.

Check carefully each core end and try to determine if the fracture is natural or mechanical in origin. Mechanical fractures often can be identified by their orientation, the absence of secondary coatings or filling and slickensides, and its fit with the adjacent core piece. If doubt exists, consider it a natural fracture. If it is determined that the fracture is mechanical, ignore it and consider the two pieces of core as a single piece.

Table 3-2
Relative Density of Noncohesive Soil

Blows/Ft	Relative Density	Field Test
0-4	Very Loose	Easily penetrated w/ ½-inch steel rod pushed by hand
5-10	Loose	Easily penetrated w/ ½-inch steel rod pushed by hand
11-30	Medium	Easily penetrated w/ ½-inch steel driven with a 5- lb hammer
31-50	Dense	Penetrated one foot with a ½-inch steel road driven with 5-lb hammer
>50	Very Dense	Penetrated only a few inches with a ½-inch steel rod driven with a 5-lb hammer

Blows/Ft= Blows per foot
lb = pound

Table 3-3
Relative Consistency of Cohesive Soil

Blows/Ft	Consistency	Pocket Penetrometer (TSF)	Torvance (TSF)	Field Test
<2	Very Soft	<0.25	<0.12	Easily penetrated several inches by fist
2-4	Soft	0.25-0.8	0.12-0.25	Easily penetrated several inches by thumb
5-8	Firm	0.50-1.0	0.25-0.5	Can be penetrated several inches by thumb with moderate effort
9-15	Stiff	1.0-2.0	0.5-1.0	Readily indented by thumb but penetrated only with great effort
16-30	Very Stiff	2.0-4.0	1.0-2.0	Readily indented by thumbnail
>30	Hard	>4.0	>2.0	Indented with difficulty by thumbnail

TSF= Tons per square foot

3.15 Monitoring Well Installation

This section provides procedures for well design and well construction to aid in the development of drilling subcontracts. Drilling operation and well development guidelines are presented to aid the reader in the oversight of the installation of monitoring wells.

The principal reason that monitoring wells are constructed is to collect groundwater samples that, upon analysis, can be used to delineate a contaminant plume and track movement of specific chemical or biological constituents. A secondary consideration is the determination of the physical characteristics of the groundwater flow system to establish flow direction, transmissivity, quantity, etc. The spatial and vertical locations of monitoring wells are important. Of equal importance are the design and construction of monitoring wells that will provide easily obtainable samples and yield reliable, defensible, meaningful information. In general, monitoring well design and construction follows production well design and construction techniques. However, emphasis is placed on the effect these practices may have on the chemistry of the water samples being collected rather than on maximizing well efficiency.

From this emphasis, it follows that an understanding of the chemistry of the suspected pollutants and of the geologic setting in which the monitoring wells are constructed plays a major role in determining the drilling technique and materials used.

3.15.1 Well Siting

The following procedures should be followed:

- Review and be familiar with pertinent proposal sections, specifications, and subcontractor's contracts. Review and be familiar with any regulations governing how, where or when the well is drilled. Review and be familiar with data (supplied by the Client, or any other data available) used for program planning.

- Identify well site on a topographic map or other suitable project base map. Contact landowner at the beginning of well siting. Inquire whether the proposed drill locations will interfere with the landowner's established land use. Unless the property is owned by the client, the landowner is always contacted before entering the property, even if he is leasing back the property from the client.

- Check route to insure a drill rig can access the proposed well site. Plan routes that require the least disturbance of natural vegetation or natural countryside conditions and which would not require grading or other types of work by i.e., backhoes, etc.

- The well site should be reasonably level and absent of large boulders or other hazardous obstructions.

- Check to insure absence of buried high-pressure gas, oil or water lines. If any lines are present relocate the well site a safe distance away from them. Be sure to check with the subcontractor to insure his/her agreement.

- Check to insure absence of overhead power transmission lines. If any overhead power lines are present, relocate the well site a safe distance away from them. Be sure to check with the subcontractor to insure his/her agreement.

- Consult landowner about water source and access, and then notify the driller of these decisions.

- Explain to the driller the need for care and accurate retrieval of drill cuttings and, if necessary, placement and accounting of materials during well completion.

- If necessary, request access agreement to the well site.

3.15.2 Well Design

The following procedures should be followed:

- Examine the geophysical log and determine the exact interval(s) and depth(s) of the completion zone(s). Calculate the quantity of slotted casing or screen, blank casing, sealing materials, gravel pack and cement necessary to complete the well.

- Calculate the quantities of gravel pack, sealing materials and cement figuring the volume of the bore hole [borehole radius squared time the length of the borehole (r_B^2 x L)] minus the volume of the casing [radius of the casing squared times the length of the casing (r_C^2 x L)] which will yield the volume per linear foot.

  A cubic foot of silica sand weighs 100 pounds. Frequently silica sand is packaged in 100-pound sacks but should be purchased and delivered in bulk quantities. A five-gallon bucket is equal to 0.67 cubic feet. Dividing the determined or calculated volume between the well bore and the outside of the casing(s) into 0.67 cubic feet per bucket will yield approximately the number of feet per bucket of silica sand. Dividing the total interval of the intended gravel pack by the number of feet per bucket of gravel pack will yield approximately how many buckets of gravel will be required. This same method can be used if the silica sand arrives in 1-cubic foot sacks (100 pounds) except the final value is approximately the number of feet per sack of silica sand.

  Cement usually comes in 94 pound sacks and can be mixed in the field to obtain volumes between 0.88 cubic feet per sack to 1.50 cubic foot per sack. See Table 3-4 for the most common cement slurry mixtures.

  Clay seals are routinely placed in a well completion above the gravel or filter pack and below the cement or grout cap or plug. The clay seals are generally a bentonite clay and before swelling (in the borehole) has the form of ¼ inch to ½

inch pellets. The pellets generally come in plastic containers of 20 and 50 pounds but can also arrive in boxes or cloth sacks.

Table 3-4
Monitoring Well Grout

Water-Cement Ratio (Gallons water per sack)	Weight per Gallon of Slurry (pounds)	Volume of Mixture per sack (cubic feet)
7 1/2	14.1	1.50
7	14.4	1.43
6 1/2	14.7	1.35
6	15.0	1.28
5 1/2	15.4	1.21
5	15.8	1.14
4 1/2	16.25	1.08
4	16.50	1.00
3 1/2	17.35	0.95
3	18.1	0.88

The volume of the bentonite tablets needed for a specific seal thickness is calculated in the same manner as was done for the gravel pack and cement requirements.

Measure all materials twice during the well construction. First, when estimating the quantity of supplies needed for the completion, second, during well construction. Keep the first estimate in the daily log book record the actual (second measurement) intervals (tops and bottoms), quantity and type of materials placed in the well recorded on the appropriate forms.

3.15.3 Well Construction

The following procedures should be followed:

3.15.3.1 Final Design of Casing - Screen/Slotted Casing String(s)

If there is any doubt about the final design of the casing string, based on data from the pilot hole or the individual drill holes scheduled for completion, verify the design with the hydrogeologist in charge.

It is the rig hydrogeologist's responsibility to insure adequate supplies are maintained at each well site even though it may be the contractor's responsibility for supplying the materials.

3.15.3.2 Installing Casing (Slotted/Screen Casing String(s))

- Plastic or Polyvinylchloride (PVC) Casing - Join all 5 or 10 foot lengths of casing (blank and screen) by flush-joint threading. All pipe is to be cut with a cutting tool which leaves a smooth, square end.

- Both the hydrogeologist and the contractor keep a complete casing-slotted/screen casing string tally. Seal the bottom on the casing-slotted/screen casing string with a cap, glued and screwed permanently in place.

3.15.3.3 Installing Filter Material (Gravel Pack)

- Place the filter material downhole by gravity feed.

- The filter material shall be installed to levels pre-determined by the hydrogeologist. The exact depth for each well is determined from the final well design. However, generally the top of the filter material will be 5 feet above the top of the highest slotted/screened interval.

- Following placement of the filter material "sound" or "tag" this depth with the tremie pipe to insure it is at the prescribed level.

3.15.3.4 Installing Bentonite Pellet Seals (Blanket)

Following the installation of the filter material place a bentonite pellet blanket seal on top of the filter material to prevent contamination of the filter pack by the grout.

The actual amount of the annulus that is filled with bentonite pellets may vary from completion to completion but a minimum of 6 inches of the annulus should be filled with bentonite by gravity feed from the surface. The tremie pipe remains in the bore hold during gravity feed of the bentonite pellets. Calculate the exact volume of pellets needing placement.

3.15.3.5 Grouting

- Grout the annular space above the bentonite pellets as directed by the hydrogeologist.

- The grouted volume of annular space will vary from completion to completion, and sometimes within the same completion. Generally, if the annular space exceeds approximately 20 feet then the grouting is done in more than one stage. Take care to insure that the grout does not displace the bentonite seal or exceed (in weight) the collapse strength of the casing.

- The methods of mixing grout in the field are numerous. The first concern is that the slurry mixture is fluid enough for placement by tremie pipe and heavy enough to give the desired strength and sealing properties required. Reference the table from Halliburton Cementing Tables, 1979 or some other suitable source for the amount of water per sack, and then measure accurately into a large tub (water trough) or steel pit. Mix the correct number of bags of cement with the water at a rate which prevents, clotting or settling out of dry, unmixed cement. Usually this procedure is accomplished with a portable pump that sucks the water or cements mixtures in and then expels it under pressure through a hose that is used in a jetting fashion at the opposite end of the tank, pit or trough.

  Grout also can be mixed using a shovel or hoe. Generally, the grout is placed on the side of the tub, the bag is ruptured, and the cement is slowly added to the water. If the cement has hard spots place on a screen of approximately ¼ inch mesh attached to some type of frame that is placed across the mixing tub. The cement is then "filtered" for the larger; hard pieces or blocks.

- Pumping or Pouring Grout

  Place the mixed grout above the bentonite pellets. The time between placement of the bentonite pellets and the grout should not be less than 15 to 20 minutes. This allows the pellets to settle to the top of the gravel pack and to begin to swell, while not allowing the grout to harden.

  - The grout can either be pumped down the tremie pipe by same pump used for jetting or it can be poured by buckets through a funnel into the tremie pipe. Displacement of the bore hole fluid is almost certain because the grout slurry weighs more than the residual borehole fluid (10 or 11 pounds per gallon for the mud versus 14 to 18 pounds per gallon for the grout).

  - Except under rare circumstances, grout is never poured from the surface nor is it ever poured into standing water.

  - Grout the remainder of the hole by gravity feed from the surface as directed by the hydrogeologist. The quantity of grout placed from the surface should not exceed the collapse strength of the casing and should not be initiated prior to the curing of the grout seal above the bentonite pellets.

3.16 Monitoring Well Development

All completed wells, whether the production or monitoring type, must be developed in order to facilitate unobstructed and continuous groundwater flow into the well. Well development is the process of cleaning the fines from the face of the borehole and the formation near the well screen. During any drilling process the side of the borehole becomes smeared with drilling mud, clays or other fines. This plugging

action substantially reduces the permeability and retards the movement of water into the well screen. If these fines are not removed, especially in formations having low permeability, it then becomes difficult and time consuming to remove sufficient water from the well before obtaining a fresh groundwater sample because the water cannot flow easily into the well.

The development process is best accomplished for monitoring wells by causing the natural formation water inside the well screen to move vigorously in and out through the screen in order to agitate the clay and silt, and move these fines into the screen. The use of water other than the natural formation water is not recommended.

3.16.1 Development Methods

The following well development methods may be used including:

- Surge Block - A surge block is a round plunger with pliable edges such as belting that will not catch on the well screen. Moving the surge block forcefully up and down inside the well screen causes the water to surge in and out through the screen accomplishing the desired cleaning action. Surge blocks are commonly used with cable-tool drilling rigs, but are not easily used by other types of drilling rigs.

- Bailer - A bailer sufficiently heavy that it will sink rapidly through the water can be raised and lowered through the well screen. The resulting agitating action of the water is similar to that caused by a surge block. The bailer, however, has the added advantage of removing the fines each time it is brought to the surface and dumped. Bailers can be custom-made for small diameter wells, and can be hand-operated in shallow wells.

- Surging and pumping - Starting and stopping a pump so that the water is alternately pulled into the well through the screen and backflushed through the screen is an effective development method. Periodically pumping to the surface will remove the fines from the well and permit checking the progress to assure that development is complete.

Well development should continue until the water becomes free of sediment or contains sediment in a lesser amount than was initially present. Conductivity, pH, temperature and turbidity (as measured by a turbidity meter) of the development water must all have stabilized prior to ceasing development. Disposal of development water is site specific and should be discussed in the Sampling and Analysis Plan or Work Plan.

3.17 Low Flow Groundwater Sampling

Low-flow purge and sampling is appropriate at locations where disturbance of the media around the well screen needs to be minimized. A common concern is turbidity

in the monitoring wells and the consequent undesirable effects on metals sampling results.

The low-flow purge and sample method creates less disturbance and agitation in the well, and therefore excess turbidity is not generated during the purging and sampling process. The result is a more rapid stabilization of turbidity and other parameters (pH, temperature, specific conductivity, and dissolved oxygen), and a sample more representative of conditions in the formation is collected.

The low flow purge and sample method consists of using a submersible or bladder pump to purge the well at a very low flow rate (0.5 to 1.5 liter/minute). The pump intake is set approximately in the middle of the well screen, with a stagnant water column over the top of the pump. The well is purged at the low rate until the field parameters (temperature, pH, specific conductivity, turbidity, dissolved oxygen, and Eh) have stabilized. The sample is then collected directly from the pump discharge at a low flow rate.

- Check and record the condition of the well for any damage or evidence of tampering.
- Remove the well cap.
- Measure well headspace with a PID and record the reading in the field logbook. For wells installed on a landfill, also measure the headspace with a combustible gas indicator.
- Measure and record the depth to water with an electronic water level device and record the measurement in the field logbook. Do not measure the depth to the bottom of the well at this time (to avoid disturbing any sediment that may have accumulated). Obtain depth to bottom information from installation information in the field logbook or drilling logs. Calculate volume of the water column by depth of water column times the cross-sectional area of the well.
- Lower pump to desired sampling depth. During purging, monitor the water level and field parameters (temperature, pH, turbidity, specific conductance and dissolved oxygen) approximately every 3 to 5 minutes. Continue monitoring until the water level stabilizes and field parameters have stabilized to within 10 percent (plus or minus 5 percent) over a minimum of three readings. Turbidity and dissolved oxygen are typically the last parameters to stabilize. Note: once turbidity readings get below 10 NTUs, then the stabilization range can be amended to 20 percent (plus or minus 10 percent) over a minimum of three readings.

  Readings should be taken in a clean container (preferably a less beaker) and the monitoring instrument allowed to stabilize before collection of the next sample. The Horiba instrument takes the readings consecutively and therefore the process

to record all the measurements may take longer than five minutes. If so, measurements should be taken as often as practicable.

- Once the water level and field parameters have stabilized, collect the samples from the pump. Collect samples per Section 3.2.2.1.

- Decontaminate equipment in accordance with Section 3.12.

3.18 Monitoring Well Purging

Well purging can be performed on a volume basis or on a field parameter stabilization basis. In both cases, field parameters are recorded; however, for the former case purging is concluded after a target number of well volumes (typically 3 to 5) regardless of whether parameters have stabilized. In the latter case, purging continues until field parameters stabilize within 10 percent.

3.18. 1 Volumetric Method of Well Purging

The following steps should be followed when purging a well by the volumetric method:

- Don personal protective clothing and equipment as specified in the site-specific health and safety plan.

- Open the well cover and check the condition of the wellhead, including the condition of the surveyed reference mark, if any.

- Monitor the air space at the wellhead, using a PID or equivalent, as soon as well cover is removed according to health and safety requirements.

- Calibrate the required field parameter meters according to manufacturer's specifications.

- Determine the depth to static water level and depth to bottom of well casing. Calculate the volume of water within the well bore based on the following well volumes

Table 3-5 Well Volumes	
Well Diameter (inches)	**Gallons per foot**
2	0.16
4	0.65
6	1.5
8	2.6
10	4.1
12	5.9

Note: Record all data and calculations in the field logbook.

- Set up field parameter probes at the discharge orifice or dedicated probe port of the pump assembly or within the flow-through chamber.
- Prepare the pump and tubing, or bailer, and lower it into the casing.
- Remove the number of well volumes specified in the site-specific plans. Generally, three to five well volumes will be required. Field parameters should be measured and recorded, if required by site-specific plans. In low recharge aquifers, the well commonly will be pumped or bailed to dryness before three well volumes of water are removed. If this is the case, there is no need to continue with purging operations. Record pertinent data in the field logbook.
- Remove the pump assembly or bailer from the well, decontaminate it (if required), and clean up the site. Lock the well cover before leaving. Containerize and/or dispose of development water as required by the site-specific plan.

3.18.2 Indicator Parameter Method of Well Purging

- Don personal protective clothing and equipment as specified in the site-specific health and safety plan.
- Open the well cover and check the condition of the wellhead, including the condition of the surveyed reference mark, if any.
- Monitor the air space at the wellhead, using a PID or equivalent, as soon as well cover is removed according to health and safety requirements.
- Calibrate the required field parameter meters according to manufacturer's specifications.

- Determine the depth to static water level and depth to bottom.
- Set up field parameter probes at the discharge orifice or dedicated probe port of the pump assembly or within the flow-through chamber.
- Assemble the pump and tubing, or bailer, and lower into the casing.
- Begin pumping or bailing the well. Record indicator parameter readings for every purge volume. Maintain a record of the approximate volumes of water produced.
- Continue pumping or bailing until indicator parameter readings remain stable within ±10 percent for three consecutive recording intervals, or in accordance with site-specific plans. Purging should continue until the discharge stream is clear or turbidity becomes asymptotic-low or meets project requirements. In a low recharge aquifer, the well may pump or bail to dryness before indicator parameters stabilize. In this case, there is no need to continue purging. Record pertinent data in the field logbook.
- Remove the pump assembly or bailer from the well, decontaminate (if required), and clean up the site. Lock the well cover before leaving. Containerize and/or dispose of development water as required by the site-specific plans.

3.19 Groundwater Sampling by Bailer

Groundwater is typically sampled by bailer after purging 3 to 5 well volumes per Section 3.18.

- Don personal protective clothing as specified in the site-specific health and safety plan.
- Prepare the area for sample acquisition. If required, cover ground surface around well head with plastic sheeting.
- Open well head and immediately check for organic vapors with PID or flame ionization detector as appropriate.
- Determine static water level and calculate water volume in well.
- Purge well in accordance with Section 3.18.
- Allow water level to recover to a depth at least sufficient for complete submergence of the bailer without contacting well bottom. Ideally, water level should recharge to 75 percent of static level. Samples shall be collected within 3 hours of purging if recharge is sufficient. Wells with a low recharge rate must be collected within 24 hours of purging.

- Securely attach the bailer to the line and test the knot. The opposite end of the line should be secured to prevent loss of bailer into well.
- Lower bailer slowly into the water to prevent aeration, particularly when VOC samples are collected.
- Retrieve filled bailer and fill sample bottles in accordance with Section 3.2.2.1.
- Collect required field parameters and depth to water.
- Decontaminate non-disposable sampling equipment in accordance with Section 3.12.
- Secure well, clean up area.

3.20 Well Abandonment

Once it is deemed that the temporary or permanent monitoring well is no longer needed, the well will be abandoned by a New York State certified well driller as follows:

- The well will be sounded (its depth measured with a weighted line or appropriate method) immediately before it is destroyed to make sure that it contains no obstructions that could interfere with filling and sealing.
- Where possible, remove all material within the original borehole – including the well casing, filter pack and annular seal. If the casing, filter pack and annular seal materials cannot be removed, they may be left in place
- The casing left in place may require perforation or puncturing to allow proper placement of sealing materials. Where the casing is left in the hole, the casing may be cut at the surface.
- Fill well screen with sand per NYSDEC specifications.
- The monitoring well should be filled to the surface with cement grout, or within 20 feet of the surface with bentonite grout. After the placement of the bentonite grout (if used), the remaining portion of the well then should be sealed with a Portland Type I, II or Type I/II cement with 2 percent to 5 percent bentonite.

3.21 Surface Water Sampling

Four surface water sampling scenarios are provided below. These include 1) shallow surface water samples for VOC analysis (preserved and unpreserved), 2) shallow surface water samples for non-VOC or inorganic compound analysis (preserved and unpreserved), 3) deep surface water samples using a weighted bottle sampler and 4) deep surface water samples using a peristaltic pump.

The following steps should be taken when preparing for sampling surface water:

- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.
- Select stream/river sampling locations as directed in work plan.
- Prepare sampling site by laying out clean plastic sheeting on the ground or any flat, level surfaces near the sampling area and place equipment to be used on the plastic.
- Make field measurements as required by the project plans in physical, chemical, and biological characteristics of the water (e.g., temperature, dissolved oxygen, conductivity, pH).
- The samples shall be collected from areas of least to greatest contamination (when known) and, when collecting several samples in 1 day, always collect from downstream to upstream.
- The sampler should be facing upstream when sampling.
- Document the sampling events, recording all information in the designated field logbook and take photographs if required or if possible. Document any and all deviations from this SOP and include rationale for changes.

3.21.1 Collecting Shallow Surface Water Samples

The following steps must be taken when collecting shallow surface water samples:

- Approach the sample location from downstream; do not enter the sample area. Slowly submerge VOA vials completely into an area of gently flowing water and fill. Do not disturb bottom sediments. The sampler and open end of the vials should be pointed upstream. If wading is necessary, approach the sample location from downstream; do not enter the actual sample area. When using gasoline-powered vessels, make sure the engine is turned off.
- Collect samples per Section 3.2.2.1 If preserved bottles are used, collect sample in a dedicated non-preserved bottle and transfer to the preserved bottle.

Note: When collecting samples for VOC analysis, avoid collecting from a surface water point where water is cascading and aerating. Cap the VOC vial while it is under water. After the vial is capped, check the vial to see if there are any air bubbles trapped in it. If air bubbles are present discard the sample.

3.21.2 Collecting Deep Surface Water Samples at Specified Depth Using a Weighted Bottle Sampler

The following steps must be followed when collecting surface water samples at specific depths using a weighted bottle sampler:

- Lower the weighted bottle sampler to the depth specified in the site-specific plan.
- Remove the stopper by pulling on the sampler line; allow the sampler to fill with water.
- Release the sampler line to reseat the stopper and retrieve the sampler to the surface.
- Wipe the weighted bottle sampler dry with a Kimwipe or clean paper towel.
- Remove the stopper slowly. Collect samples per Section 3.2.2.1.
- Decontaminate equipment according to the Section 3.12.

3.21.3 Collecting Deep Surface Water Sample Collection Using a Peristaltic Pump

The following steps must be followed when collecting deep surface water samples using a peristaltic pump:

- Install clean silicon or Teflon tubing on the pump head. Leave sufficient tubing on the discharge side for convenient dispensing of liquid directly into sample containers.
- Select the appropriate length of Teflon intake tubing necessary to reach the specified sampling depth. Attach the intake sampling tube to the intake pump tube.
- Lower the intake tube into the surface water at the specified sampling location to the specified depth; make sure the end of the intake tube does not touch underlying sediments.
- Start the pump and allow at least three tubing volumes of liquid to flow through and rinse the system before collecting any samples. Do not immediately dispense the purged liquid back to the surface water body. Instead, collect the purged liquid and return it to the source after sample collection is complete.
- Fill the specified number of sample containers directly from the discharge line, in accordance with Section 3.2.2.1.
- Drain the pump system, rinse it with deionized water, and wipe it dry. Replace all tubing with new tubing before sampling at another sampling location. Place

all used tubing in plastic bags to be discarded or decontaminated according to the Section 3.12.

3.22 Sediment/Sludge Sampling

The following steps should be taken when preparing for sampling sediment/sludge:

- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.
- Select stream/river sampling locations in accordance with the site-specific work plan.
- Prepare sampling site by laying out clean plastic sheeting on the ground or any flat, level surfaces near the sampling area and place equipment to be used on the plastic.
- The samples shall be collected from areas of least to greatest contamination (when known) and, when collecting several samples in 1 day, always collect from downstream to upstream.
- When sampling sediment and surface water from the same surface water body, collect surface water samples prior to sediment samples.

3.22.1 Sediment/Sludge Sample Collection from Shallow Waters

- Use a decontaminated stainless steel or Teflon, long-handled scoop, corer, push tube, or dredge to collect the entire sample in one grab. If wading is necessary, approach the sample location from downstream. Do not enter the actual sample area.
- Retrieve the sampling device and slowly decant off any liquid phase.
- Collect samples in accordance with Section 3.2.2.2.

3.22.2 Subsurface Sediment/Sludge Sample Collection Using a Corer or Auger from Shallow Waters

- At the specified sampling location, force or drive the corer to the specified depth.
- Twist and withdraw the corer in a smooth motion.
- Retrieve the sampling device, remove the corer nosepiece (if possible), and extrude the sample into the specified sampling container(s). Use a clean stainless steel or Teflon spoon or spatula to completely fill the container(s), ensuring no headspace.
- Collect samples in accordance with Section 3.2.2.2.

3.22.3 Sediment/Sludge Sample Collection Using a Dredge from Deep Waters

- Attach a clean piece of 12- to 19-mm (½- to ¾-inch) braided nylon line or Teflon-coated wire rope to the top of the sampler. The line must be of sufficient length to reach sediment or sludge and have enough slack to release the mechanism. Mark the distance to the bottom on the line.
- Attach the free end of the sampling line to a fixed support to prevent loss of the sampler.
- At the specified sampling location, open the sampler jaws and slowly lower the sampler until contact with the bottom (sediments/sludge) is felt.
- Release tension on the line; allow sufficient slack for the mechanism (latch) to release. Slowly raise the sampler.
- Once the sampler is above the water surface, place the sampler in a stainless steel or Teflon lined tray or pan. Open the sampler.
- Collect samples in accordance with Section 3.2.2.2.

3.22.4 Restrictions/Limitations

Core sampling devices may not be usable if cobbles exist in the sediment/sludge. Bumping of core sampling devices and Ponar dredge samplers may result in the loss of some of the sample.

For VOC analysis or for analysis of any other compound(s) that may be degraded by aeration grab sampling is necessary to minimize sample disturbance and, hence, analyte loss. The representativeness of this sample, however, is difficult to determine because the collected sample represents a single point, is not homogenized, and has been disturbed.

3.23 Subsurface Soil Sampling

Subsurface soil samples may be collected using a hand auger at depths of up to 10 feet (typical). In such cases, CDM typically performs the boring and collects the samples for analysis. For deeper depths, a drilling subcontractor is typically used to perform a boring and collect subsurface soil samples by split spoon or Shelby tube via rotary drilling methods, or by direct push methods. In such cases, the driller provides the soil samples to CDM, and CDM then collects the laboratory samples.

The following steps should be taken when preparing for subsurface soil sampling:

- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.

- Locate sampling location(s) in accordance with project documents (e.g., work plan) and document pertinent information in the appropriate field logbook. When possible, reference locations back to existing site features such as buildings, roads, intersections, etc.

- Processes for verifying depth of sampling must be specified in the site-specific plans.

- Clear away vegetation and debris from the ground surface at the boring location.

- Prepare an area next to the sample collection location for laying out cuttings by placing plastic sheeting on the ground to cover the immediate area surrounding the borehole.

The following general steps must be followed when collecting all subsurface soil samples:

- VOC samples or samples that may be degraded by aeration shall be collected first and with the least disturbance possible.

- Sampling information shall be recorded in the field logbook and on any associated forms.

- Describe lithology, including color, grains size, moisture, odor and other observations.

3.23.1 Manual (Hand) Augering

The following steps must be followed when collecting hand-augered samples:

- Auger to the depth required for sampling. Place cuttings on plastic sheeting or as specified in the site-specific plans. If possible, lay out the cuttings in stratigraphic order.

- Throughout the augering, make detailed notes concerning the geologic features of the soil or sediments in the field logbook.

- Cease augering when the top of the specified sampling depth has been reached. If required, remove the auger from the hole and decontaminate the auger or use a separate decontaminated auger, then obtain the sample.

- Scan sample with organic vapor meter as appropriate.

- Collect samples in accordance with Section 3.2.2.2. Collect VOCs quickly to minimize loss of volatiles.

- When all sampling is complete, dispose of cuttings, plastic sheeting, etc., as specified in the site specific plans.

- Decontaminate all equipment in accordance with Section 3.12

3.23.2 Split-Spoon/Split Barrel Sampling

Note: the first 15 bullets describe activities to be performed by a licensed drilling contractor, not CDM personnel.

The following steps must be followed when collecting split-spoon samples:

- Remove any pavement and subbase material from an area of twice the bit diameter, if necessary.

- The drilling rig will be decontaminated at a separate location prior to drilling.

- Attach the hollow-stem auger with the cutting head, plug, and center rod(s) to the drill rig.

- Begin drilling and proceed to the first designated sample depth, adding auger(s) as necessary.

- Upon reaching the designated sample depth, slightly raise the auger(s) to disengage the cutting head, and rotate the auger without advancement to clean cuttings from the bottom of the hole.

- Remove the plug and center rods.

- If required by the site-specific sampling plan, install decontaminated liners in the splitspoon/split barrel sampler.

- Install a decontaminated split-spoon on the center rod(s) and insert it into the hollow-stem auger. Connect the hammer assembly and lightly tap the rods to seat the drive shoe at the top of undisturbed soil or sediment.

- Mark the center rod in 15-centimeter (6-inch) increments from the top of the auger(s).

- Drive the split-spoon using the hammer. Use a full 76-cm (30-inch) drop as specified by the American Society for Testing and Materials (ASTM) Method D-1586. Record the number of blows required to drive the spoon or tube through each 15-cm (6-inch) increment.

- Cease driving when the full length of the spoon has been driven or upon refusal. Refusal occurs when little or no progress is made for 50 blows of the hammer.

ASTM D1586-99 § 7.2.1 and 7.2.2 defines "refusal" as >50 blows per 6-inch advance or a total of 100 blows.

- Pull the split-spoon free by using upswings of the hammer to loosen the sampler. Pull out the center rod and split-spoon.
- Unscrew the split-spoon assembly from the center rod and place it on the plastic sheeting.
- Remove the drive shoe and head assembly. If necessary, tap the split-spoon assembly with a hammer to loosen threaded couplings.
- With the drive shoe and head assembly off, open (split) the split-spoon, being careful not to disturb the sample.
- Scan sample with organic vapor detector as appropriate.
- Collect samples in accordance with Section 3.2.2.2. Collect VOCs quickly to minimize loss of volatiles.
- When all sampling is complete, dispose of cuttings, plastic sheeting, etc., as specified in the site specific plans.
- Decontaminate all equipment in accordance with Section 3.12.

3.23.3 Direct Push Drilling

Note: The first six bullets describe activities to be performed by a licensed drilling contractor, not CDM personnel.

- Decontaminate equipment.
- Install acetate sleeve in direct push sampler (no acetate sleeve required for split spoon).
- Drive samples from the surface to the desired depth, using either 4-foot or 5-foot long direct push samplers, or 2-foot split spoons.
- Use discrete interval sampling (sampler end is plugged while driving to top of desired sample interval to exclude soil from non-desired depths) when appropriate (for example, deeper than 8 feet or below the water table).
- At top of sampling interval, release plug (if used) and drive sampler across desired sample interval.
- Retrieve sample and provide to CDM.

- Cut open acetate sleeve with two parallel slices, scan with organic vapor meter as appropriate.
- Collect samples in accordance with Section 3.2.2.2.
- At the conclusion of the boring, grout the borehole and decontaminate equipment in accordance with Section 3.12.

3.23.4 Restrictions/Limitations

- Basket or spring retainers may be needed for split-spoon sampling in loose, sandy soils.

3.24 Surface Soil Sampling

The following steps must be followed when preparing for sample collection:

- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.
- Locate sampling location(s) in accordance with project documents (e.g., work plan) and document pertinent information in the appropriate field logbook. When possible, reference locations back to existing site features such as buildings, roads, intersections, etc.
- Processes for verifying depth of sampling must be specified in the site-specific plans.
- Carefully remove vegetation, stones etc. from the ground surface to expose soil.
- Pace clean plastic sheeting on a flat, level surface near the sampling area, if possible, and place equipment to be used on the plastic; place the insulated cooler(s) on separate plastic sheeting.
- A clean, decontaminated trowel, scoop, or spoon will be used for each sample collected. Other equipment may be used (e.g., shovels) if constructed of stainless steel.
- Surface soil samples are normally collected from the least contaminated to the most contaminated areas, if known.
- Document the sampling events, recording the information in the designated field logbook. Document any and all deviations from SOPs in the field logbook and include rationale for changes.
- Collect samples in accordance with Section 3.2.2.2.
- Decontaminate sampling equipment in accordance with Section 3.12.

3.25 Water Level/NAPL Measurement

Water levels can be measured by several instruments. The three most common are covered here – electric water level meter (measures depth to water only), interface probe (measures depth to water and depth to non-aqueous phase liquid) and pressure transducer (typically used to measure depth to water for long term monitoring or aquifer testing).

3.25.1 Procedures for Use of Water Level Meter

- Standing upwind of the well, open the well head and monitor with organic vapor meter as dictated by the site-specific health and safety plan.
- Check that water level meter is functioning correctly (test button, or immerse probe in tap water to test).
- Lower probe slowly into well until contact with water surface is indicated (tone and/or light).
- Slowly raise and re-lower probe until a precise, repeatable depth to water can be measured.
- Record the depth to water from the measuring point of known elevation, usually marked at the top of the casing. If no mark is present, measure from the highest point of the casing or as otherwise instructed in the site-specific work plan.
- Remove and decontaminate probe, secure well.

3.25.2 Procedures for Use of Interface Probe

The interface meter is used to measure the depth to water and the depth to non-aqueous phase liquid (light and/or dense).

- Standing upwind of the well, open the well head and monitor with organic vapor meter as dictated by the site-specific health and safety plan.
- Check that the interface level meter is functioning correctly (test button, or immerse probe in tap water and NAPL to test).
- Lower probe slowly into well until contact with water or NAPL surface is indicated. Water is typically indicated by a steady tone; NAPL is typically indicated by a beeping tone – check manufacturer's specifications.
- Slowly raise and re-lower probe until a precise, repeatable depth to water/NAPL can be measured.
- Record the depth to water/NAPL from the measuring point of known elevation, usually marked at the top of the casing. If no mark is present, measure from the

highest point of the casing or as otherwise instructed in the site-specific work plan.

- Measurement of interface depth between LNAPL and water: For LNAPL, the non-aqueous phase is floating on top of the water column, and the probe must be lowered through the NAPL before encountering water. In this case, shake the probe after water is encountered to help dislodge any NAPL droplets stuck to the probe. Then raise the probe slowly until it re-enters the NAPL. Perform this procedure until a repeatable result is obtained. The interface depth should be recorded in the up direction, never the down direction. When the probe is moving down, past the LNAPL, it may still be coated with product and can therefore yield misleading results. Therefore, it must be shaken in the water and raised to the interface for an accurate result. Record depth from measuring point, per item 5 above.

- Measurement of interface depth between DNAPL and water: For DNAPL, the non-aqueous phase is at the bottom of the well, below the water column. Lower the probe until NAPL is encountered. Then raise the probe, shake it in the water to dislodge any NAPL droplets, and lower it again. Perform this procedure until a repeatable result is obtained. The interface depth should be recorded in the down direction, never in the up direction. When the probe is moving up from the DNAPL it may still be coated with product and can therefore yield misleading results. Therefore, it must be shaken in the water and lowered to the interface for an accurate result. Record depth from measuring point, per item 5 above.

- Remove and decontaminate probe, secure well.

3.26 Tap Water Sampling

Tap water sampling may be performed in residential, commercial or industrial areas for several reasons. The most common tap water samples are used to obtain groundwater samples from private wells.

- Obtain permission to access the property and collect samples.

- Obtain the name(s) of the resident(s) or water supply owner/operator, the exact mailing address, and telephone numbers. This information is required to obtain access to the property to be sampled and to submit a letter of introduction to the owner/representative.

- Determine the location of the tap to be sampled based on its proximity to the water source. It is preferable that the tap water sampling be conducted at a tap located prior to any holding or pressure tanks, filters, water softeners, or other treatment devices that may be present.

- If possible, obtain well construction details, holding tank volumes etc. to evaluate standing volume of water in the system.

- If the sample must be collected at a point in the water line beyond a pressurization or holding tank, a sufficient volume of water should be purged to provide a complete exchange of fresh water into the tank and at the location where the sample is collected. If the sample is collected from a tap or spigot located just before a storage tank, spigots located inside the building or structure should be turned on to prevent any backflow from the storage tank to the sample tap or spigot. It is generally advisable to open as many taps as possible during the purge, to ensure a rapid and complete exchange of water in the tanks.

- Samples collected to determine if system related variables (e.g., transmission pipes, water coolers/heaters, holding/pressurization tanks, etc.) are contributing to the quality of potable water should be collected after a specific time interval (e.g., weekend, holiday, etc.). Sample collection should consist of an initial flush, a sample after several minutes, and another sample after the system has been purged.

- Devices such as hoses, filters, or aerators attached to the tap may harbor a bacterial population and therefore should be removed prior to sampling.

- Sample containers should not be rinsed before use when sampling for bacterial content, and precautions should be taken to avoid splashing drops of water from the ground or sink into either the bottle or cap.

- Samples of the raw water supply and the treated water after chlorination should be collected when sampling at a water treatment plant.

- In the logbook, record the location and describe the general condition of the tap selected for sampling. The rationale used in selecting the tap sampling location, including any discussions with the property owner, should also be recorded. Provide a sketch of the water supply/distribution system noting the location of any filters or holding tanks and the water supply source (i.e., an onsite groundwater well or surface water intake or a water service line from a public water main). If an onsite water supply is present, observe and record the surrounding site features that may provide potential sources of contamination to the water supply.

- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan. Gloves should be changed between sampling locations to avoid possible cross-contamination of the tap water samples.

- Prior to sample collection, the supply system should be purged by turning the cold-water tap on. The following general guidelines should be followed to

determine when the system is adequately purged (refer to the site-specific sampling plans for any other requirements):

- Onsite Water Supply. A minimum of three standing volumes of water (i.e., the static volume of water in the well and holding tank, if present) should be purged. Obtain water temperature, conductivity, and pH measurements after each volume of water is purged. If the standing volume of water in the supply system is unknown, the tap should be allowed to run for a minimum of 15 minutes and temperature, conductivity, and pH measurements, or other parameters as specified by the project plan, should be collected at approximately 3- to 5-minute intervals. (In general, well construction details and holding tank volumes should be obtained prior to conducting the sampling event to estimate the standing volume of the water supply system.) The system is considered adequately purged when the temperature, conductivity, and pH stabilize within 10 percent for three consecutive readings. If these parameters do not stabilize within 15 minutes, then purging should be discontinued and tap water samples may be collected.

- Large Distribution Systems. Because it is impractical to purge the entire volume of standing water in a large distribution network, a tap should be run for a minimum of 5 minutes, which should be adequate to purge the water service line. Obtain temperature, conductivity, and pH measurements at approximately 1-minute intervals. The system is considered adequately purged when the temperature, conductivity, and pH readings, or other parameters as specified by the project plan, stabilize within 10 percent for three consecutive readings. If these parameters do not stabilize within 5 minutes, then purging should be discontinued and tap water samples may be collected. During purging, a 5-gallon bucket and stopwatch may be used to estimate the flow rate if required by the site-specific plans. Dispose the purged water according to the site-specific plans. Record the temperature/conductivity/pH readings, or other parameters as specified by the project plan, the volume of water purged, the flow rate if measured, and the method of disposal in the field logbook.

- After purging the supply system, collect the samples directly from the tap (i.e., if a hose was used for purging, the hose should be disconnected prior to sampling). Any fittings on the end of the faucet that might introduce air into the sample (i.e., a fine mesh screen that is commonly screwed onto the faucet) should be removed prior to sample collection also.

- Obtain a smooth-flowing water stream at moderate pressure with no splashing. Collect samples in accordance with Section 3.2.2.1. chain-of-custody forms.

3.26.1 Restrictions/Limitations

To protect the sample from contamination on the exterior of a tap, a tap should not be chosen for sampling if any of the following conditions exist:

- A leaky tap allowing water to flow out from around the stem of the valve handle and down the outside of the faucet.
- A tap located too close to the bottom of the sink or the ground surface.
- A tap that allows water to run up on the outside of the lip.
- A tap that does not deliver a steady stream of water. A temporary fluctuation in line pressure may cause sheets of microbial growth, lodged in some pipe sections or faucet connections, to break loose.

Careful sampling for VOC analysis, or for any other compound(s) that may be degraded by aeration, is necessary to minimize sample disturbance and, hence, analyte loss.

3.27 Sample Handling, Packaging, and Shipping

The shipping containers (coolers or shuttles) will be provided by the laboratory providing the analysis. These containers, once filled, will be secured with fiber tape, wrapped entirely around the container and will either be delivered directly to the Con Edison laboratory in Astoria Queens by the field crew or picked up by a laboratory provided courier. Consequently, the strict packaging, labeling and shipping of hazardous wastes and substances requirements set forth by the U.S. Department of Transportation (DOT) under CFR 49 will not be necessary. However, the following sample packaging procedures will be followed to guard against sample breakage and to maintain chain-of-custody.

- Check to ensure that the sample is properly filled; tighten cap securely.
- Enclose and seal sample containers in a clear plastic bag.
- Place freezer packages or ice in large ziplock plastic bags and place the bags in a sample cooler so that ice is not in direct contact with sample bottles. Sufficient ice will be added to cool the samples to 4°C.
- Pack noncombustible, absorbent vermiculite around bottles and ice to avoid sample breakage during transport.
- Complete Chain-of-Custody Records and other shipping/sample documentation including air bill numbers for each shipment of samples using a ballpoint pen. Seal documentation in a waterproof plastic bag and tape the bag inside the shipping container under the container lid. Include a return address for the cooler.
- Close the container and seal it with fiber tape and custody seals in such a manner that the custody seals would be broken if the cooler were opened.

3.28 Rock Coring

The rock core will be collected as follows:

- Decontaminate all equipment in accordance with Section 3.12 of the generic QAPP.
- Advance borehole to the desired depth using auger, rotary, air hammer or other drilling method, as appropriate.
- Install a steel casing in the borehole and grout it in place. Casing must be set into competent bedrock. Let the grout set for a minimum of 12 hours.
- Collect core (using specified core barrel) in accordance with ASTM D2113-06, as appropriate for site conditions.
- Record penetration rate.
- Record any fluid loss and depth of loss.
- Place core in new, sturdy, wooden, core boxes.
- Clearly label boxes with borehole number and depth.
- Drilling/coring induced breaks should be marked with 3 parallel lines across the break.
- Photograph full core box, with hole's number and depths clearly visible in the photo.
- Record core data including rock type, fractures and other pertinent information.
- Determine Rock Quality Designation (RQD) for each core run:

$$\text{RQD} = \frac{\text{the total length of core pieces greater than four inches long}}{\text{total core run}}$$

- Measure core lengths along the center line of the core.
- Do not count core pieces that are not "hard and sound" as part of the RQD; however, record such lengths separately.
- Core breaks known to be induced by drilling or core handling should be fitted together and counted as one piece when determining RQD.

3.29 Packer Testing

Packer testing is performed to obtain groundwater samples from discrete intervals within a larger open borehole in bedrock. A dual straddle packer system or single packer system can be used, as appropriate. The single packer is often used when collecting a groundwater sample from near the bottom of the borehole. Inflatable packers, with a submersible pump between the packers (or below the single packer) are typically used. Geophysical logging can be used prior to packer testing to design the packer interval. If packer testing occurs concurrent with drilling, then a single packer is typically used at progressively deeper depths.

Packer testing will be conducted as follows:

- Decontaminate all down hole equipment in accordance with Section 3.12 of the generic QAPP.
- Assemble packer(s) lift pipe and pump. If a straddle packer system will be used, assemble packers at desired spacing.
- Lower packer assembly to desired depth.
- Measure static water level using a water level indicator.
- Inflate packers with nitrogen, with sufficient pressure to seal against borehole wall.
- Calculate volume of water in packer zone and lift pipe using Table 3-5.
- Begin purging with submersible pump; record totalizer readings and flow rates. Dispose/contain water as appropriate for the site.
- Monitor water quality parameters if appropriate.
- Collect water sample based upon volume of water pumped and/or water quality parameters.
- Deflate packers.
- Move system to next test zone or remove from borehole, as appropriate.

3.30 Aquifer Performance Test

Aquifer performance tests are typically performed to characterize the hydraulic properties of wells and aquifers. Properties evaluated include specific capacity, hydraulic conductivity, transmissivity and storativity.

3.30.1 Continuous Background Monitoring

- Baseline groundwater level measurement data will be used to evaluate the effects of outside influences (i.e., influences other than the proposed pump test withdrawal) on groundwater levels. These influences will then be considered when analyzing the pump test data.

- Groundwater level data will be recorded with electronic data loggers at selected well, at 30-minute intervals.

- The loggers will be synchronized to record water levels at the same time.

- A synoptic round of water levels will be made at the wells prior to installing the transducers. After the transducers have been installed and recording has been started, a second round of synoptic water levels will be collected on the day of transducer installation to confirm proper data recording.

- A third round of manual groundwater level measurements will be collected from continuous monitoring points and any other existing wells just prior to beginning pump testing to:

  1) confirm proper data recording by transducers and

  2) obtain a broader baseline groundwater level data set.

- Groundwater level data will also be downloaded from data loggers at this time, saved to electronic media, and reviewed to confirm that groundwater levels have stabilized.

- Precipitation and barometric pressure data will be obtained for the APT period from the local weather station (within approximately 5 miles of the project).

3.30.2 Step Drawdown Test

The step drawdown test (or step test) is required to determine the specific capacity and short term yield of the recovery well and select the pumping rate for the long-term pump test.

- During the test, continuous groundwater levels at the pumping well and select observation points will be recorded logarithmically. An example of a logarithmic schedule is provided below.

Table 3-6
Step Drawdown Test Logarithmic Schedule

Log Cycle	*Elapsed Time*	*Sample Interval*	*Points/Cycle*
1	0-20 seconds	0.2 second	101
2	20-60 seconds	1 second	40
3	1-10 minutes	10 seconds	54
4	10-100 minutes	2 minutes	45
5	100-480 minutes	10 minutes	38

- The drawdown-time data shall be plotted semi-logarithmically.

- The drawdown (y-axis) shall be plotted on a linear scale and time (x-axis) shall be plotted on a logarithmic scale. The drawdown curves shall be extrapolated to the specified time of the proposed long-term test. The rate that results in the maximum drawdown without dropping the water level below the design pumping level within the time period of the long-term test shall be considered the flow rate to be used for the long-term test.

- The specific capacity versus pumping rate should also be plotted to determine if excessive well losses occur at the selected rate.

- A variable rate submersible pump capable of operating across the above flow range will be used to complete testing. A vertical check valve will be placed on the discharge line immediately above the pump. A one-inch diameter polyvinylchloride line will be placed in the well, with the open, bottom end extending to within one foot of the pump. This one-inch line will be used as the stilling pipe for the water level transducer.

After the pumping equipment is installed, the following testing steps will be followed:

- *Step 1* - Connect a flow meter, valve, and sample port to the pump discharge line. Extend the pump discharge line from the pumping well to the existing groundwater treatment system influent sump using flexible, chemical-resistant pipe/hose (e.g., garden hose, polyethylene pipe).

- *Step 2* - Measure and record the static groundwater level reading in the pumping well.

- *Step 3* – Start log cycle for select transducers, and initiate pumping. Set to initial flow rate (Step 1) using the valve (or variable-speed controller). Record the stabilized flow rate and start time for pumping. Confirm proper operation of the pumping well transducer. Confirm that significant leaks are not present along

the above-ground hose/pipe line extending between the pumping well and the influent sump.

- *Step 4* - Monitor the groundwater level in the pumping well using the transducer, and collect manual groundwater level measurements at monitoring points at ± 20 minute intervals.

- *Step 5* - After approximately two hours, calculate the specific capacity of the well (flow/drawdown [gpm/ft]), estimate the maximum well yield based upon the calculated capacity and pump depth, and increase the pumping rate to approximately 50 percent (%) of the calculated maximum yield (Step 2). If 50% of the yield has already been exceeded, adjust the rate to approximately 75% of the yield. Record the flow rate and adjustment time. Confirm proper operation of the pumping well transducer.

- *Step 6* – Monitor the groundwater level in the pumping well using the transducer, and collect manual groundwater level measurements at monitoring points at ± 20 minute intervals.

- *Step 7* – Repeat Steps 5 and 6 for up to two additional steps at approximately 75% and 95% of the maximum well yield (Steps 3 and 4). Be careful not to drop the water level below the top of the pump.

- *Step 8* - Shut off the pump at the end of the last step test (after 4 tests and 8 hours, maximum), and download the groundwater level data from all transducers. Also collect manual groundwater level measurements at approximately 20 minutes and 40 minutes after terminating pump operation. Leave the transducers in place.

3.30.3 Long-Term Constant Rate Test

The long-term constant rate test (72-hour pump test) will be performed at the pumping well on the day after completion of the step test, assuming groundwater levels have recovered to 90% of baseline values. The 72-hour pump test will not commence until this condition is met or a minimum of 72 hours have elapsed since the termination of the step testing. The step test results will be reviewed in advance and used to select the pumping rate for this test, which will equate to approximately 50 to 75% of the calculated short-term, maximum well yield.

- During this test, continuous groundwater levels at the pumping well and select observation points will be recorded logarithmically. An example of a logarithmic logging schedule is provided below.

Table 3-7
Long Term Constant Rate Test Logarithmic Schedule

Log Cycle	*Elapsed Time*	*Sample Interval*	*Points/Cycle*
1	0-20 seconds	0.2 second	101
2	20-60 seconds	1 second	40
3	1-10 minutes	10 seconds	54
4	10-100 minutes	2 minutes	45
5	100-480 minutes	10 minutes	38

The following testing steps will be followed:

- *Step 1* – Manually measure groundwater levels in recovery well and all observation points prior to initiating pumping.
- *Step 2* – Start log cycle for transducers, and initiated pumping at the pre-determined rate by adjusting the valve (or variable-speed controller). Record flow rate and start time. Also check proper data recording at the pumping well transducer.
- *Step 3* - Collect manual groundwater level measurements at 20 minute intervals until drawdown begins to stabilize. Also check pump flow rate and adjust valve as necessary to maintain a constant pumping rate until stabilization (difference between consecutive measurements less than 10%).
- *Step 4* - Perform manual groundwater level measurements and flow rate checks/adjustments at one-hour intervals after the system has approached stabilization. Download and review pressure transducer data at 6-hour intervals to confirm proper data recording and observe data trends.
- *Step 5* - Stop pumping after 72 hours have elapsed, and record time. Leave the transducers in place. Download and review pressure transducer data at 6-hour intervals to confirm proper data recording and observe data trends.

3.30.4 Recovery water level measurement

- Initiate a new log cycle for the transducers immediately upon termination of the constant-rate pumping test.
- Continuous groundwater levels at the pumping well and select observation points will be recorded logarithmically.

- Leave the transducers in place to record continuous groundwater level data until:

    1) the groundwater level at the pumping well has recovered to 90% of its baseline value or

    2) 72 hours (minimum) have elapsed since termination of pump testing.

3.30.5 Discharge Water Management

The water pumped from the well shall be discharged and managed following the plan specific to the project.

3.31 Pre-Packed Direct Push Well Installation

A subcontracted driller will perform the well installation. CDM will oversee the fieldwork.

- Wells will be constructed of a pre-packed 2.5 inch OD (1 inch ID) slotted PVC well screen (pre-packed with sand and stainless steel mesh) and 1-inch ID, schedule 40 PVC riser casings. The pre-packed well screens are manufactured prior to mobilization.
- Thread the drive cap onto the top of the 3.25 inch OD probe rod and advance the drive rod using either the hydraulic hammer or hydraulic probe mechanism.
- Advance the drive rod to the target depth using the hydraulic hammer. Add additional probe rods as necessary to reach the specified sampling depth.
- Lower the well assembly into the probe rod string with threaded PVC riser pipe to the bottom of the probe rod string.
- Install a sand filter around the well screen to directly above the screen. Grain size of the sand will be appropriate for the slot size of the screen (normally 0.01-inch). Retract the probe rods to a point above the screen.
- Install 2-foot grout penetration seal using "00" gravel or bankrun sand.
- Insert a tremie pipe and backfill the remainder of the hole with bentonite-cement grout until it flows at the surface.
- Square cut the well pipe below grade.
- Install protective flushmount casing around new well.

3.32 Membrane Interface Probe (MIP)

In order to provide a screening-level characterization of VOC contamination in subsurface soil in both the vadose and saturated zones, CDM will utilize a MIP to

obtain qualitative, depth-continuous, relative instrument response data for VOCs and electrical conductivity data in the subsurface soil. The MIP data will be used to establish an instrument response gradient in subsurface soils to identify "hot spots" for sampling during the soil boring investigation.

- The MIP utilizes a truck-mounted photo-ionization detector (PID), flame-ionization detector (FID), and an electron-capture devise (ECD).

- The 1.5-inch diameter MIP will be pushed into the subsurface at a penetration rate of approximately 1-foot per minute. The tip of the probe contains a thermister, which provides a heat source to volatilize VOCs. The gasses that are produced pass into the probe through a permeable membrane and enter a sampling loop. The gasses then are transported to the surface and pass through the PID, FID, and ECD. The MIP will produce a response to all compounds that:

  1) Volatilize sufficiently to diffuse through the MIP probe membrane,

  2) are carried to the detector in the carrier gas, and

  3) produce a response on one or more of the detectors (PID, FID, and ECD).

The total response for each detector is related to the total contaminant concentration and the relative response of the detector to the compounds in the carrier gas stream. Therefore, the MIP is considered to produce qualitative data.

A number of "performance checks" have been incorporated into the MIP screening program to provide a basis for evaluating MIP performance during subsurface soil screening activities. The following performance checks will be used during the MIP screening activities:

- Ex situ response check - This performance check will be used to test the response of the probe to a known concentration of a target contaminant in a test cell. This check will be performed in accordance with Geoprobe® Systems Technical Bulletin MK3010 (Geoprobe® 2003)

- Reproducibility check - This performance check includes performance of a replicate push within 5 to 10 feet of a selected push. The MIP profiles for the replicate locations will be compared to assess the reproducibility of the data. As a guideline, MIP responses that are within one order of magnitude will be considered to be reasonable evidence of reproducibility.

- Ex situ response checks will be run at the following times:

  - at the start of each day

- if more than 3 hours elapses between the last response check and the next logging run

- if the MIP probe, membrane, trunk line, dryer, probe rod, or any major components of the MIP system are repaired or replaced.

- Replicate MIP profiles will be run on approximately 1 in 20 samples.

Performance check results will be reviewed for each sample lot to evaluate MIP performance. If MIP performance issues are identified, the MIP subcontractor will take corrective actions to remedy the issues.

3.32.1 MIP Procedure

Prior to initiating any field activities, the field team will review and discuss, in detail, the HASP and any appropriate background documentation. All monitoring and protective equipment will be thoroughly checked at this time. All underground and overhead utilities and structures which may interfere with the progress of the work will be located prior to the commencement of subsurface drilling activities.

- The MIP soil screening will be conducted using a Geoprobe® rig or equivalent direct push rig (as discussed above) and will follow the general drilling procedures outlined in Section 3.23.3.

- At each location the direct push rig will continuously collect data on the lithology and the VOC contamination.

- The MIP technology will provide a continuous depth qualitative readout of VOC concentrations. This probe will be used until the final depth is reached.

- The MIP subcontractor will provide CDM with an electronic data file of each push containing qualitative VOC readings and electrical conductivity readings.

- The screening point boreholes will be tremie-grouted with a cement-bentonite mixture after all sampling has been completed and the boring locations will be restored to pre-existing conditions.

3.33 Fish Sampling

Fish samples will be collected from an adequate number of locations in order to characterize and address project objectives, or as directed by the NYSDEC.

- Samples will be collected using site-specific common fisheries techniques (e.g., seine net, electroshocking, etc.).

- During each investigation, species representative of the site or individual location (i.e., dominant taxa, high percentage of total biomass, etc.) will be targeted for analysis.

- The age and/or trophic level of species and other pertinent sampling design information will be decided after consultation with the NYSDEC.

- Upon capture, sampling crews will taxonomically identify fish retained for analysis and record the weight and total length of representative individuals.

- In order to satisfy analytical requirements, it may be necessary in specific cases (e.g., minnow species) to composite samples consisting of an individual species. When required, the total number of individuals and total weight of the composite will be noted.

- After processing, individual samples will be wrapped in aluminum foil, placed in re-sealable plastic bags and placed on wet or dry ice.

- Samples will be shipped via overnight delivery (see Section 3.27) to the subcontracted analytical laboratory for the analyses specified in the site specific Work Plan.

3.34 Benthic Macroinvertebrate Sampling

Benthic macroinvertebrate (benthos) samples will be collected from an adequate number of locations in order to characterize and address project objectives, or as directed by the NYSDEC.

- Samples will be collected using site-specific sampling techniques (e.g., kick net, surber sampler, etc.).

- During each investigation, species representative of the site or individual location (i.e., dominant taxa, high percentage of total biomass, etc.) will be targeted for analysis. Pertinent sampling design information (e.g., sample size, etc.) will be decided after consultation with the NYSDEC.

- As samples are collected they will be placed into a clean sample vessel (e.g., stainless steal bucket, high density polyethylene bucket, etc.) for sorting.

- Representative species retained for analysis will be taxonomically identified to Order.

- Due to analytical requirements, all samples will consist of a given number of individuals composited together until the proper sample mass is achieved.

- After processing, individual samples will be placed into the appropriate sample container, placed in re-sealable plastic bags and placed on wet ice or dry ice.
- Samples will be shipped via overnight delivery (see Section 3.27) to the subcontracted analytical laboratory for the analyses specified in the site specific Work Plan.

Section 4
Instrument Procedures

4.1 Photoionization Detector

4.1.1 Introduction

This Standard Operating Procedure (SOP) is specific to the HNu PI 101 and the Thermal Environmental Organic Vapor Monitor (OVM) PID. These portable instruments are designed to measure the concentration of trace gases in ambient atmospheres at industrial and hazardous waste sites and are intrinsically safe. The analyzers employ PIDs.

The PID sensor consist of a sealed ultraviolet light source that emits photons which are energetic enough to ionize many trace species (particularly organics) but do not ionize the major compounds of air such as O_2, N_2, CO, CO_2, or H_2O. An ionization chamber adjacent to the ultraviolet lamp source contains a pair of electrodes. When a positive potential is applied to one electrode, the field created drives any ions, formed by absorption of UV light, to the collector electrode where the currents (proportional to concentration) are measured. One major difference between a flame ionization detector (FID) and a PID is that the latter responds to inorganic compounds as well as non methane type organic compounds.

To assess whether the instrument will respond to a particular species, the ionization potential (IP) should be checked. If the IP is less than the lamp energy, or, in some cases, up to 0.2-0.3 electron volts (ev) higher than the lamp energy, instrument response should occur. For example, hydrogen sulfide (IP = 10.5 ev) may be detected with a 10.2 ev lamp, but butane (IP 10.6 ev) will not be detected.

4.1.2 Calibration

Qualified personnel trained in calibration techniques for all field items perform calibration of all CDM field equipment. When a field instrument that requires calibration is obtained from the equipment room, the unit will display a calibration tag denoting the date when the instrument was last calibrated and/or maintained. All field instruments are calibrated each time they leave the equipment facility for a site. A maintenance file is kept for each calibrated field item.

PID and FID detector type instruments come with field calibration kits. A field calibration kit would be used if the instrument is to be kept out at the site for extended periods of time, or if the instrument endures prolonged environmental extremes. In either case, a calibration check standard could be introduced in the instrument to verify its accuracy. If an instrument will not calibrate or shows improper field operation, it should be sent back to the office, and another instrument reissued.

Field personnel should not try to maintain the instruments in the field. If long sampling program is required, be prepared to take more equipment for backup in

case of instrument failure. Records and procedures of all calibration techniques are on file at the CDM equipment management facility in Ten Cambridge Center, Cambridge, Massachusetts.

With the instrument fully calibrated, it is now ready for use. Any results obtained should be reported as parts per millions (ppm) as isobutylene. If you need to convert these numbers based on a benzene standard, HNu offers a conversion table which is available from CDM. Important instrument specifications for each PID detector are listed as follows.

HNu PI 101 Performance	OVM Model 580A
Range - 0.1 to 2000	0 - 2000
Detection limit 0.1 PPM	0.1 PPM

HNu PI 101 Power Requirements	OVM Model 580A
Continuous use, battery >10 hours	8 hours
Recharge time, max >14 hours, 3 hours +	8 hours
NiCd Battery	Gel Cell Battery

Unit can be operated on battery charger.
Both units provide protection circuitry for the battery. This prevents deep discharging of the battery and considerably extends the battery life.

4.1.3 HNu PI 101

4.1.3.1 Procedure

- Before attaching the probe, check the function switch on the control panel to make sure it is in the off position. The 12-pin interface connector for the probe is located just below the span adjustment on the face of the instrument. Carefully match the slotted groove on the probe to the raise slot on the 12-pin connector on the control panel. Once in line, twist the outer ring on the 12-pin connector until it locks into position (a distinct snap noise will be felt when in place).

- Turn the function switch to the battery check position. The needle on the meter should read within or above the green battery arc on the scaleplate. The battery, if needle falls below the green arc, should be recharged before any measurements are taken. If the read LED on the instrument panel should come on, the battery needs charging and the unit cannot be operated without a charger.

- If the battery is functioning properly, turn the function switch to the STANDBY position. If the needle on the instrument does not read 0, then turn the knob on the instrument panel until the needle deflects to the zero point on the meter.

- Once the zero is confirmed, turn the function switch to the 0-20 position. At this point, the needle will read approximately 0.5 ppm. This reading is normal

background for ambient air. For CDM health and safety reasons, the HNU PI 101 should be operated on this range to insure maximum sensitivity in the work area. The unit, however, has 2 other ranges (0-200), (0-2000) should monitoring be required for other purposes such as headspace analysis etc. where readings could exceed the 0-20 ppm range.

4.1.3.2 Limitations

- AC power lines (high-tension lines), or power transformers can interfere with the instruments performance. This situation can be confirmed by noting a deflection of the meter while in the STANDBY position.

- Environmental factors such as humidity, rain and extreme cold can limit the instrument performance. To verify the "water sensitivity" condition, gently blow in the hole at the end of the probe. If the needle deflects positively (on the 0-20 position) by 2 ppm or more, water sensitivity problem exists and the unit should be brought into the warehouse for service. HNU PI 101 should be kept out of the rain as much as possible or covered. This will insure longer operating times with less false positive readings.

- Quenching the detector can limit the instrument performance. This occurs when a compound such as methane at a very high concentration is introduced to the detector. The concentration is so high that the unit does not respond at all or gives a negative reading.

4.1.4 OVM 580A

4.1.4.1 Procedures

- With the unit being fully calibrated before receiving it, you are ready for operation. Located on the right hand side of the unit is a panel. Slide this panel off of the unit. Inside there is a switch that supplies power to the LCD portion of the instrument. Turn this switch on and replace the panel. On the top of the OVM, there is an instrument panel. Locate the on/off switch and turn the unit on. This switch activates the lamp as well as the pump. Turn this switch off when the instrument is not in use, but leave the internal switch on.

- The unit is now in the operation mode with all readings shown on the LCD display. Options for the OVM 580A include automatic recording and alarm settings. Should any options be required, they can be set up before the instrument leaves the CDM equipment warehouse.

  Warning signals associated with the OVM include a Low Battery signal. A flashing B will appear in the left-hand corner of the bottom line of the display when the 580A is in the RUN mode. If a gas concentration >2000 ppm is detected by the OVM, the top line of the display will show OVERRANGE. Once this occurs, the instrument will "lock out" until the unit is brought to a clean area. A

clean area is described as an area where the concentration of organic vapors is below 20 ppm.

4.2 pH Meter

4.2.1 Introduction

pH is the negative logarithm of the effective hydrogen ion concentration (or activity) in gram equivalents per liter used. This expresses both acidity, and alkalinity on a scale whose valves run from 0 to 14. Number 7 represents neutrality, and numbers greater than 7 indicate increasing alkalinity while numbers less than 7 indicate increasing acidity. pH is one of the most commonly analyzed parameters. Water supply treatments such as neutralization, softening, disinfection and corrosion control are all pH dependent. CDM has a variety of pH monitoring instruments in the equipment warehouse.

4.2.2 Orion SA 250 pH Procedures

With the instrument fully calibrated, it is now ready for use. Follow the check out procedures:

- Slide power switch to on position. Attach BNC shorting plug to BNC connector on top of meter.
- If LO BAT indicator on LCD remains on, the battery must be replaced.
- Slide mode switch to mV. Display should read 0 $\pm$ .3.
- Slide mode switch to TEMP. Display should read 25.0. If 25.0 is not displayed, scroll using, and X10 keys, until 25.0 is displayed and press enter.
- Slide mode switch to pH .01. Press iso. Display should read the letters ISO, then a value of 7.000. If 7.000 is not displayed, scroll until 7.00 is displayed and press enter.
- Press slope. Display should read the letters SLP, then a value of 100.0. If 100.0 is not displayed, scroll until 100.0 is displayed and press enter.
- Press sample. Observe the letters pH, then a steady reading of 7.00, $\pm$0.02 should be obtained. If not, press CAL and scroll until 200 is displayed and press enter. Press sample and observe a reading of 7.00.
- Remove the shorting plug. After completing these steps, the meter is ready to use with an electrode.
- Attach electrodes with BNC connectors to sensor input by sliding the connector onto the input, pushing down and turning clockwise to lock into position.

Connect reference electrodes with pin tip connectors by pushing connector straight into reference input.

- Put the temperature probe in the sample and let it stabilize.
- Once temperature is stable, set the unit to read pH (by 0.1 or 0.01) and take a reading in the aqueous sample. (Remembering first to remove the cap on the end of the pH probe.)

4.2.3 Model Tripar Analyzer Procedures

With the instrument fully calibrated, it is now ready for use:

- Connect the pH probe's BNC input connector to the front of the Tripar.
- Put the pH/mV switch on the pH position.
- Turn the parameter display selection switch to TEMP.
- Plug in the gray temperature plug jack in the input temperature sensor connector.
- Put end of temperature probe in the sample.
- Allow the temperature to stabilize.
- Turn the temperature compensation knob to the temperature shown.
- Turn the parameter display selection switch to pH.
- Put pH probe in the aqueous sample (remembering first to remove the cap on the end of the probe). Let it stabilize and record the reading.

4.3 Conductivity Meter

4.3.1 Introduction

Conductivity is a numerical expression of the ability of an aqueous solution to carry an electrical current. This ability depends on the presence of ions in the solution, and their total concentration. Factors such as mobility valence, relative concentration, and temperature also combine to create this occurrence. Solutions of most inorganic acids, bases and salts are relatively good conductors. Organic compounds in aqueous solutions are not good conductors. For example, freshly distilled water has conductivity reading of 0.5 to 2 mhos/cm and increases with time. This increase is caused by absorption of atmospheric carbon dioxide, and to a lesser extent ammonia. While industrial type wastes have conductivity readings of $\pm$10,000 mhos/cm.

4.3.2 Model SCT Procedures

The model 33 SCT has 3 conductivity scales of 0-500, 0-5000, and 0-50,000 mhos/cm. Salinity is scaled 0-40 parts per thousand in a temperature range of -2 to +45^{B}C. Temperature is scaled -2^{B} to +5^{B}C.

With the instrument calibration verified, the unit is now ready for use. The model 33 S-C-T meter face is scaled and calibrated to give an accurate reading of the conductivity of a water sample by measuring the amount of current flow between two fixed electrodes in the probe. The unit also measures salinity in a special range conductivity circuit, which includes a user-adjusted temperature compensator. A precision thermistor in the probe measures temperature by changing its resistance in relation to the temperature of the water.

The start-up procedure is as follows:

- Plug the probe plug receptacle in the side of the meter.
- With the mode select in the OFF position, check to see that the meter needle is centered at the zero mark on the conductivity scale and adjust if necessary.
- Turn the mode control switch to Red Line position.
- Adjust the Red Line control knob so the meter needle lines up with the red line on the meter face. If this cannot be accomplished, replace the batteries. If battery replacement is necessary, use only alkaline "D" cells, as regular carbon zinc batteries will cause errors.
- Place the probe into the solution to be measured.
- Set the mode control to TEMPERATURE. Read the temperature on the bottom scale of the meter in Degrees C. Allow time for the probe temperature to come to equilibrium before taking a reading.
- With the probe in the solution to be tested, adjust the conductivity scale until the meter reading is on scale. (Multiply the reading by the correction on the calibration sticker on the instrument).
- When using the X10 and X100 scales, depress the CELL TEST button. If the reading on the dial moves +2%, the electrode is fouled and needs to be cleaned. Repeat the measurement on another instrument.
- Store the probe in distilled water when not in use.

4.4 Photovac Portable Gas Chromatograph

4.4.1 Introduction

The Photovac portable gas chromatograph (GC) can provide for accurate and specific identification of volatile organic compounds in a field control laboratory.

4.4.2 Equipment Preparation

- The Photovac portable GC should be set up in a sheltered area and, if possible, within a climate controlled area to minimize temperature changes. Do not place the GC near any equipment that causes vibration. A flat table, large enough to accommodate the GC, the printer, a laboratory size oven, and electrical power packs for the GC should be utilized during operation.

- Fill the GC with carrier gas being sure not to pressurize the GC with more than 1500 pounds per square inch (psi) of carrier gas. Check to ensure the pressure of the air feed to the GC column is 40 psi. The carrier gas should contain no more than 2.0 parts per million by volume (ppmV) of total hydrocarbons and not less than 0.1 ppmv of total hydrocarbons. The lower the hydrocarbon concentration the lower the baseline of the GC. A lower baseline minimizes interference of compound identification.

- Install new Teflon septa in the injection port being utilized. The septa should be replaced at the start of each day and after every twenty injections.

4.4.3 Calibration Procedures and Frequency

The Photovac portable GC will be calibrated at the beginning of each day prior to sample analysis.

Gas Standards

Gas standards used to calibrate the GC will be obtained from certified compressed gas cylinders of known concentration. CDM stocks two compressed gas standard cylinders containing the following gases and concentrations:

Cylinder 1

Benzene - 10 ppmv
Toluene - 10 ppmv
Ethyl Benzene - 10 ppmv
M-xylene - 10 ppmv
O-xylene - 10 ppmv
P-xylene - 10 ppmv

Cylinder 2

trans 1,2 Dichloroethylene - 1.05 ppmv
1,1,1 Trichloroethane - 19.3 ppmv
Trichloroethylene - 1.13 ppmv

These gas cylinders were purchased from Scott Specialty Gas Corporation and are certified by Scott to be traceable to NBS standards.

The calibration procedure using these cylinders is as follows:

- A two stage pressure regulator (CGA 350) is attached to the standard gas cylinder to be used.
- A 250 ml glass sampling bulb, determined clean by injecting a volume of air obtained from the bulb onto the GC (described later), is labeled and attached to the effluent port of the second stage of the gas regulator. The Teflon stopcocks of the sampling bulb are opened.
- The sample cylinder valve is opened and the first stage of the regulator is pressurized.
- Slowly the diaphragm valve controlling the gas flow entering the second stage is opened until the pressure reads 2 psig.
- The valve allowing the gas to exit the second stage of the regulator is opened until the gas can be heard escaping from the regulator and passing through the glass sample bulb. Purge the bulb for approximately ten seconds. Close the Teflon stopcock located at the discharge end of the sampling bulb, then, the stopcock closest to the regulator. In this way the calibration gas is collected at the same pressure as the delivery pressure of the second stage of the regulator.
- Using a gas tight 1 ml syringe, extract approximately 500 microliters (µl) of the calibration gas from the glass bulb and purge the volume of gas into the atmosphere. Repeat this step.
- Place the syringe needle in the glass bulb. Pull the syringe plunger back approximately 500 µl of calibration gas enters the syringe barrel. Without removing the syringe from the glass bulb depress the plunger. Pump the syringe in this manner several times.
- Extract the syringe from the glass bulb with approximately 500 µl of calibration gas present. Carefully depress the plunger until 300 µl of calibration gas is present in the syringe barrel. Immediately inject this gas volume into the Photovac GC.
- A response factor for each analyte is obtained as the ratio of the known gas concentration injected and the area under the peak produced by that injection. This integration is performed automatically by the internal Photovac data processor and stored in the library.

- The procedure to obtain a calibration gas sample is repeated and the gas volume is injected into the GC. The GC will identify the compounds in the sample stream that have retention times within +/- 20% of the retention times of the compounds in the library. The area of these identified peaks will be compared to the response factor of the compounds stored in the library and integrate a corresponding concentration.

- If the calibration check concentration does not equal +/- 15% of the library concentration, a new calibration check is performed. If this check fails, a new library is created.

4.4.4 Sample Analyses

The following procedure will be followed when performing analysis of samples.

- The Photovac portable GC is set as described above. The GC function and application file is loaded into memory. This includes all previously established calibration data and retention time information.

- 300 µl of sample are obtained from the sample source and injected into the GC. Samples will be injected as soon as possible after it is collected.

- Immediately after injection the GC is started.

- Each chromatograph run will run for a minimum of 5 minutes. At this time the run will be stopped and the results obtained.

- Following completion of the run, the Photovac GC will produce a hard copy printout of the results. This printout will include the sample identification, time of analysis, and appropriate operating parameters.

This procedure will be followed for all sample runs.

4.4.5 Method Blanks and Duplicates

Prior to any calibration or sample injections, the integrity and level of contamination of each syringe used for injections will be verified.

- Plungers will be removed from the barrel of the syringe and placed into a laboratory oven for 5 minutes. The temperature of the oven should not be above 150 degrees Fahrenheit (F) or below 120 degrees F.

- The syringes will be removed from the oven, cooled, and reassembled.

- Pump the syringe plunger several times, purging the syringe with ambient air.

- Collect approximately 500 µl of ambient air in the syringe and carefully depress the plunger to 300 µl. Immediately inject the gas volume into the GC.

- Detection of the target compounds above the detection limit (50 ppbv for most compounds) will require another decontamination procedure before additional analyses.
- Blanks will be performed after every sample and calibration injection. Blanks will not be performed between duplicate sample injections.
- Duplicate samples will be performed at a minimum of 1 every 10 sample injections.

Section 5
Laboratory Procedures

The term "data quality" refers to the level of uncertainty associated with a particular data set. The data quality associated with environmental measurement data is a function of the sampling plan rationale and procedures used to collect the samples as well as the analytical methods and instrumentation used in making the measurements. Each component has its own potential sources of error and biases that can affect the overall measurement process.

Sources of error that can be traced to the sampling component of environmental data collection are: poor sampling plan design, inconsistent use of standard operating procedures, sample handling and transportation. The most common sources of error that can be traced to the analytical component of the total measurement system are calibration and contamination problems. It is recognized that by far the largest component of the total uncertainty associated with environmental data collection originates from the sampling process. All sampling programs initiated in support of this project will stress forward planning and be well conceived and reviewed prior to the collection of any samples as a way to minimize this major source of potential error.

Uncertainty cannot be eliminated from environmental measurement data. The amount of uncertainty that can be tolerated depends on the objective of the sampling program and the intended use of the data collected. The purpose of the project's quality assurance program is to assure that the data quality of all data collected be of known and ascertainable value.

5.1 Data Quality Criteria

Data quality can be assessed in terms of its precision, accuracy, representativeness, completeness, and comparability. Analytical method detection limits will also be discussed in this section.

5.1.1 Precision

Precision is a measure of the reproducibility of analyses under a given set of conditions. The overall precision of a sampling event is a mixture of sampling and analytical factors. The precision of data collected in support of this project will be assessed on two different levels:

- By calculating the relative percent difference (RPD) of laboratory matrix spike duplicates and/or laboratory replicate samples (a measure of analytical precision).

- By calculating the RPD of field duplicates samples submitted to laboratory "blind" (a measure of the precision of the entire measurement system, including sampling).

Relative percent difference will be calculated according to the following equation:

$$RPD = \frac{|A - B|}{(A + B)/2} \times 100\%$$

where: A = Sample Result
B = Replicate Sample Result

5.1.2 Accuracy

Accuracy is a measurement of the amount of bias that exists in a measurement system. This can be thought of as the degree that the reported value agrees with the supposed "true value". The accuracy of data collected in support of this project will be assessed in the following ways:

- By calculating the percent recovery (%R) of laboratory matrix spikes and/or laboratory control standards
- By documenting the level of contamination that exists (if any) in laboratory method blanks
- By documenting the level of contamination that exists (if any) in field and/or trip blanks submitted to the laboratory "blind" for analysis
- Percent recovery will be calculated according to the following equation:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where: SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Concentration

5.1.3 Representativeness

Unlike the previous two criteria which can be expressed in quantitative terms, representativeness is a qualitative parameter. However, in terms of overall data quality, representativeness may be the most important parameter of all.

The representativeness criterion is concerned with the degree to which a sample reflects (represents) a characteristic of a population, parameter variations at a specific location or an environmental condition. Sample representativeness will be addressed in support of this project through a detailed sampling plan design and rationale and through the proper use of the appropriate sampling standard operating procedures, depending on sample matrix and the parameters to be analyzed.

Composite samples will be collected in situations conducive to compositing techniques (particularly samples collected along the vertical extent of a borehole). The use of composite samples tends to maximize the representativeness of a sampling round because more information is provided about a much broader area than a single grab sample. This is especially true in situations where the objective of sampling is to determine where gross contamination exits on site and the location of any "hot spots". In these cases, broad coverage of the area to be sampled is more important than obtaining the lowest possible detection limits.

5.1.4 Completeness

Completeness is a measure of the amount of usable data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions. Usability will be determined by evaluation of the precision, accuracy, representativeness, and comparability parameters. Those data that are validated as correct, or are qualified as estimated or non-detect are considered usable. Rejected data are not considered usable. A completeness goal of 90% is projected. If this goal is not met, the effect of not meeting this goal will be discussed by the CDM project manager and the NYSDEC site manager. Completeness is calculated using the following equation:

$$Percent\ Completeness = \frac{DO}{DP} \times 100$$

Where:

DO = Data obtained and usable
DP = Data planned to be obtained

There also may be incomplete data while still meeting the 90 percent goal if a critical sample location cannot be sampled.

5.1.5 Comparability

The comparability criterion is a quality characteristic which is an expression of the confidence with which one data set can be compared with another. Comparability issues are of importance at two different levels of a sampling program. The primary comparability issues are concerned with whether the field sampling techniques, analytical procedures, and concentration units of one data set can be compared with another.

The comparability criterion also applies to the environmental conditions/ considerations present at the time of the sampling. Temporal and/or seasonal variations may make data collected from the same location at different times of the year incomparable, or comparable in a relative sense only, for example.

Comparability is judged by comparing results to other similar data sets. Consistency in the acquisition, handling, and analysis of samples is necessary for comparing

results. Data developed under this investigation will be collected and analyzed using Soil Vapor Intrusion Guidance for soil vapor collection and NYSDEC Department of Remediation Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated December 2002 to ensure comparability of results with other analyses performed in a similar manner.

5.1.6 Method Detection Limits

Whenever environmental measurement data is to be used in comparison with predetermined "action levels" or other regulatory requirements, the reported method detection limits of the analytical data is of prime importance. Analytical methods specified in support of this project should have a reported detection limit at least 50% below the required action level to assure that measurements made in the vicinity of the action level are of high quality. In circumstances concerning extremely low action levels or regulatory requirements where analytical techniques will have to be pushed to their limits, every effort will be made to select the most appropriate analytical procedures. It is recognized that analytical detection limits are sample specific and are affected by sample volumes as well as the need for sample concentration or dilution. These circumstances will be accounted for in the review and interpretation of the analytical results.

5.2 Quality Control

Two separate levels of quality control exist for all samples collected in support of this project, internal laboratory quality control and program generated quality control.

5.2.1 Internal Laboratory Quality Control

Internal laboratory quality control is a function of the individual laboratory's QA/QC Plan. A laboratory's QA/QC plan contains specific criteria governing the manner in which analyses are conducted and provide information on the laboratory's performance and control of the sources of error that exist within the lab. Included in the plan are requirements for the type and frequency of quality control check samples that are to be analyzed on a routine basis.

All laboratory analysis conducted in support of this project must include the following quality control check samples:

- Surrogate spikes (where appropriate)
- Matrix spike/matrix spike duplicate or laboratory duplicates and laboratory control samples (where appropriate)
- Method blanks

The laboratory may adhere to the analysis frequency specified in their QA/QC plan for these check samples provided that the specified frequency is equal-to or greater-than the frequency specified in Table 5-1 or as modified/specified by the QAPP.

5.2.2 Program Generated Quality Control

Program generated quality control consists of quality control check samples that are submitted to the laboratory for analysis "blind" along with actual environmental samples. These samples provide quality control information for the entire sampling event, from the actual sampling and handling through laboratory analysis. As such, they can provide the best overall estimate of the total uncertainty associated with the sampling round.

TABLE 5-1

LABORATORY SAMPLE FREQUENCY

QC Check Sample	Frequency of Analysis
Method Blanks	One per analytical batch or one per every twenty samples
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One per analytical batch or one per every twenty samples
Surrogate Spikes	One per every trace organic analysis

The combination of laboratory duplicates and laboratory control samples may be substituted for MS/MSD analysis for parameters where they are more appropriate.

Program generated quality control samples collected in support of this project are:

- Duplicate samples
- Field blanks
- Trip blanks

Each report should have a cover page that references the CDM task number.

The cover page also provides an opportunity to describe in a narrative format any unusual problems or interferences encountered during analysis. In addition, all results should be reported on a dry weight basis for soils and at dilution-corrected concentrations for all samples.

5.2.3 QC Deliverables Package

The following quality control data is required to be reported. For "priority pollutant" type analysis, the following quality control data is required per sample batch:

- Method Blanks associated with each analytical procedure.

- Surrogate Spike Recoveries for volatile organics, PCBs, semi-volatiles and polynuclear aromatic hydrocarbons.
- MS/MSDs for all priority pollutant parameters. One MS/MSD should be run for every 20 samples.

For non-priority pollutant parameters, the following quality control data is required per sample batch:

- Method Blanks
- Laboratory Duplicates -- One duplicate analysis should be performed at a frequency of one per twenty samples.

No specific acceptance criteria for blanks and spike recoveries will be set forth here, however, all laboratories are expected to conform to standard EPA quality control specifications. CDM expects laboratories to reanalyze samples if quality control samples fail to meet EPA specifications.

The quality control data may be presented as a quality control section within the report or it may be integrated among the results.

5.3 Data Quality Requirements

Taking into consideration a project's overall objective and intended use of the data, it should be considered that analyses be conducted in accordance with SW-846, Test Methods for Evaluating Solid Waste, Third Edition procedures. In cases where additional procedures are required, other EPA approved laboratory methods will be used.

5.4 Data Deliverable

Analytical data deliverable will be provided in accordance with NYSDEC requirements (EPA Region 2 EDD, dated December 2003).

5.5 Analytical Data Validation

If a Work Assignment requires the validation of data; i.e., data validation is performed to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use.

Laboratories results shall be supported by sufficient back-up data and QA/QC results to enable the reviewer to conclusively determine the quality of the data. The laboratory will review data prior to its release from the laboratory. Objectives for review are in accordance with the QA/QC objectives stated in each site-specific Work Plan. The laboratory is required to evaluate their ability to meet these objectives. Outlying data will be flagged in accordance with laboratory standard operating procedures, and corrective action will be taken to rectify the problem.

A NYSDEC-approved qualified independent third party data validator will review the data package to determine completeness and compliance in accordance with Standby Contract D004437. A narrative describing how the data did or did not meet the validation criteria is part of the data validation procedure. The validation assessment will describe the overall quality of the data and the data validation report will provide a written statement upon completion of the validation indicating whether or not the data are valid and usable, and include a percent completeness value of usable data.

5.6 Data Usability Summary Report

A Data Usability Summary Report (DUSR) provides a thorough evaluation of analytical data without the third party data validation. The primary objective of a DUSR is to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use. If a Work Assignment requires a DUSR, the DUSR will be developed by a NYSDEC approved qualified environmental scientist in accordance with Standby Contract D004437.

ATTACHMENT 1

NYSDOH Indoor Air Quality Questionnaire and Building Inventory

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No._____

Purpose of Investigation_____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: Y / N

Last Name: _____First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential	School	Commercial/Multi-use
Industrial	Church	Other: _____

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other:_____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors_____ Building age_____

Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

_____

_____

_____

Airflow near source

_____

_____

_____

Outdoor air infiltration

_____

_____

_____

Infiltration into air ducts

_____

_____

_____

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

a. Above grade construction:	wood frame	concrete	stone	brick
b. Basement type:	full	crawlspace	slab	other _____
c. Basement floor:	concrete	dirt	stone	other _____
d. Basement floor:	uncovered	covered	covered with _____	
e. Concrete floor:	unsealed	sealed	sealed with _____	
f. Foundation walls:	poured	block	stone	other _____
g. Foundation walls:	unsealed	sealed	sealed with _____	
h. The basement is:	wet	damp	dry	moldy
i. The basement is:	finished	unfinished	partially finished	
j. Sump present?	Y / N			
k. Water in sump?	Y / N / not applicable			

Basement/Lowest level depth below grade: _____(feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

_____

_____

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation	Heat pump	Hot water baseboard	
Space Heaters	Stream radiation	Radiant floor	
Electric baseboard	Wood stove	Outdoor wood boiler	Other _____

The primary type of fuel used is:

Natural Gas	Fuel Oil	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: _____

Boiler/furnace located in:	Basement	Outdoors	Main Floor	Other_____
Air conditioning:	Central Air	Window units	Open Windows	None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

_____

_____

_____

_____

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level	**General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)**
Basement	_____
1st Floor	_____
2nd Floor	_____
3rd Floor	_____
4th Floor	_____

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage? Y / N

b. Does the garage have a separate heating unit? Y / N / NA

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) Y / N / NA Please specify_____

d. Has the building ever had a fire? Y / N When?_____

e. Is a kerosene or unvented gas space heater present? Y / N Where? _____

f. Is there a workshop or hobby/craft area? Y / N Where & Type? _____

g. Is there smoking in the building? Y / N How frequently? _____

h. Have cleaning products been used recently? Y / N When & Type? _____

i. Have cosmetic products been used recently? Y / N When & Type? _____

j. Has painting/staining been done in the last 6 months? Y / N Where & When? _____

k. Is there new carpet, drapes or other textiles? Y / N Where & When? _____

l. Have air fresheners been used recently? Y / N When & Type? _____

m. Is there a kitchen exhaust fan? Y / N If yes, where vented?_____

n. Is there a bathroom exhaust fan? Y / N If yes, where vented?_____

o. Is there a clothes dryer? Y / N If yes, is it vented outside? Y / N

p. Has there been a pesticide application? Y / N When & Type?_____

Are there odors in the building? Y / N
If yes, please describe: _____

Do any of the building occupants use solvents at work? Y / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist

If yes, what types of solvents are used? _____

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly) No
Yes, use dry-cleaning infrequently (monthly or less) Unknown
Yes, work at a dry-cleaning service

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply:	Public Water	Drilled Well	Driven Well	Dug Well	Other: _____
Sewage Disposal:	Public Sewer	Septic Tank	Leach Field	Dry Well	Other: _____

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: _____

b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel

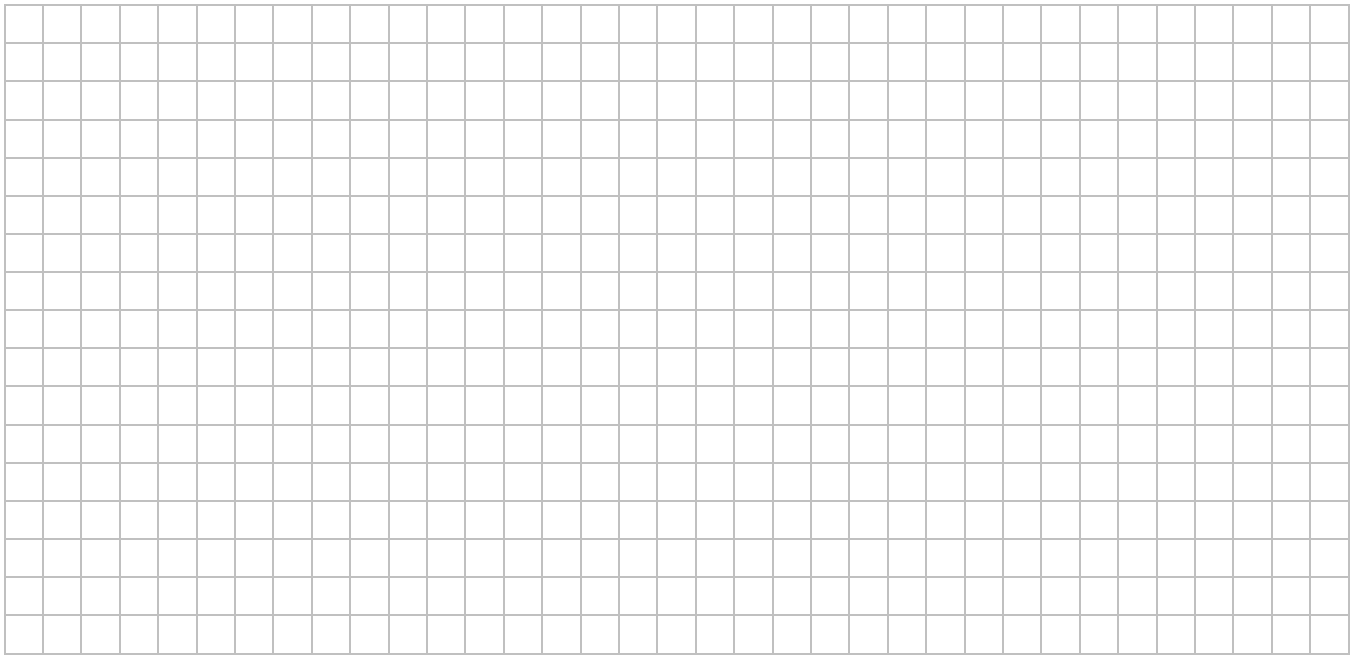
c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

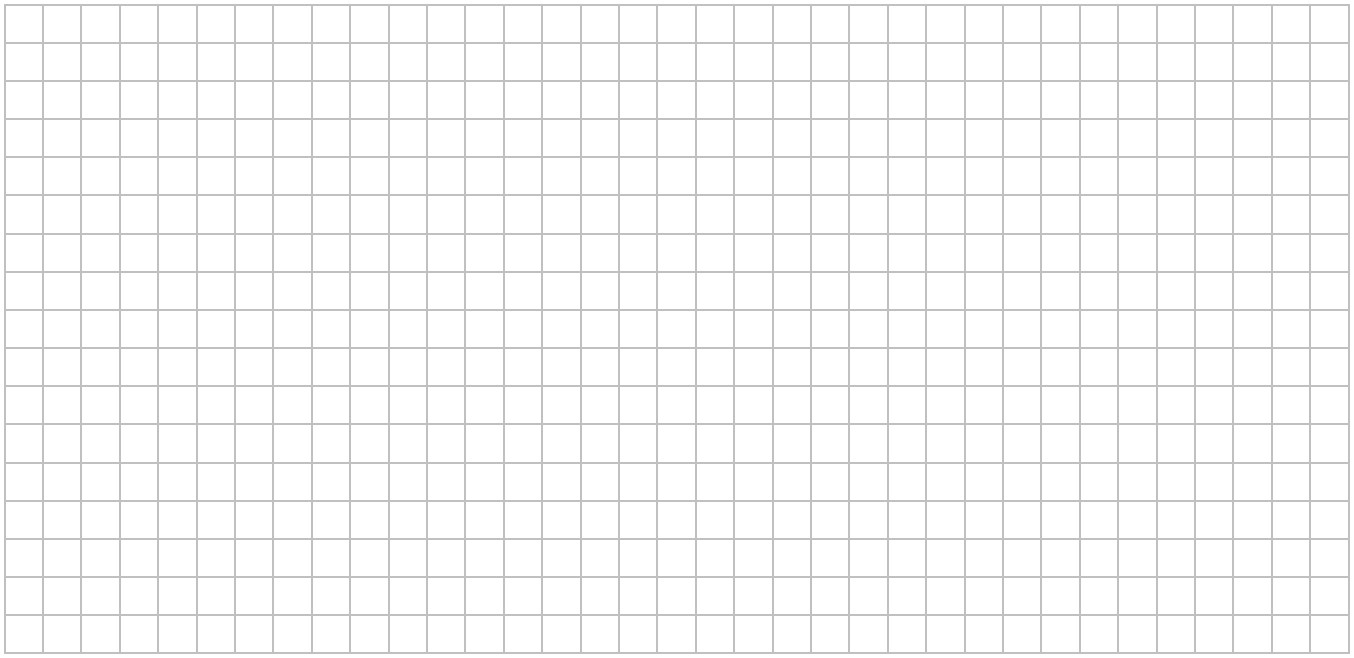
11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:



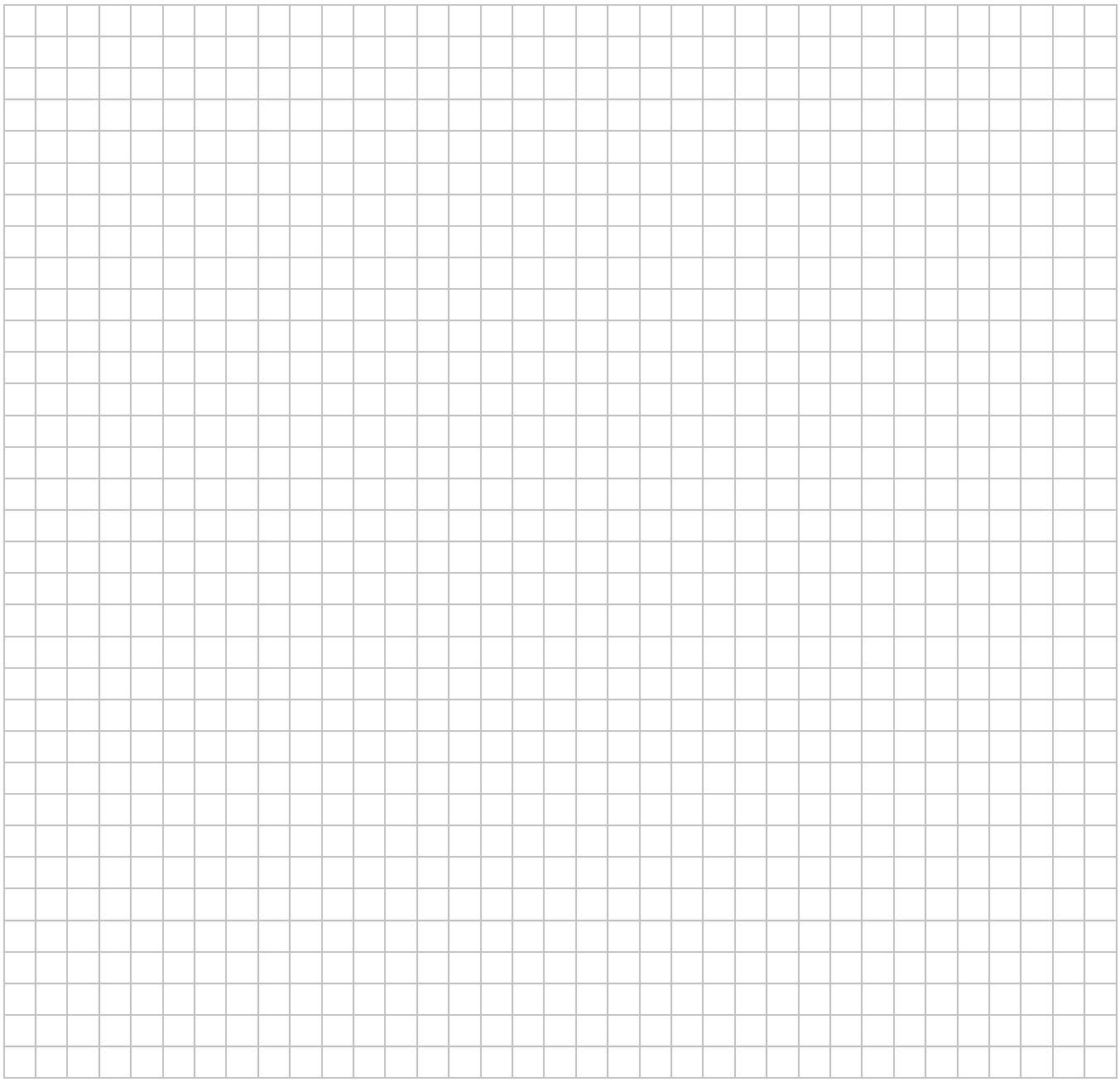
First Floor:



12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo** Y / N

* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**
** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.