1120 WESTCHESTER AVENUE
NYSDEC SITE No. 203083

1120 WESTCHESTER AVENUE
BRONX, NEW YORK 10459
Block 2750 Lot 11

INTERIM REMEDIAL MEASURE WORK PLAN

September 2017

Prepared for:
West Levy LLC
2140 East 7th Street
Brooklyn, NY 11223

AMC Engineering, PLLC
18-36 42nd Street
Astoria, NY 11105

TABLE OF CONTENTS
Interim Remedial Measure Work Plan
1120 Westchester Avenue

TABLE OF CONTENTS
Interim Remedial Measure Work Plan
1120 Westchester Avenue

TABLES

FIGURES

ATTACHMENTS

CERTIFICATION PAGE

I Ariel Czemerinski certify that I am currently a NYS registered professional engineer and that this Interim Remedial Measure Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

September 20, 2017

1.0 INTRODUCTION

This Interim Remedial Measure Work Plan (IRMWP) was prepared on behalf of West Levy LLC for the property located at 1120 Westchester Avenue, Bronx, New York. On January 26, 2017, West Levy LLC signed an Order on Consent with the New York State Department of Environmental Conservation (NYSDEC) to investigate and remediate the chlorinated volatile organic compound (CVOC) contamination identified at the Site.

This Interim Remedial Measure (IRM) Work Plan addresses the remediation of contaminants in soil and soil vapor at the Site through the installation of a soil vapor extraction system. Operation of soil vapor extraction system will remediate impacted soil while preventing the migration of CVOCs into the occupied space of the mixed use building on-site and to adacent mixed use buildings while the process of investigating and developing a comprehensive remedial plan for the Site proceeds.

1.1 SITE LOCATION AND DESCRIPTION

The street address for the Site is 1120 Westchester Avenue, Bronx, NY (**Figure 1**). The Site is located in the City of New York and Borough of the Bronx and is identified as Block 2750, Lot 11 on the New York City Tax Map. The Site is an irregular shaped lot consisting of approximately 16 ft of frontage along Westchester Avenue (**Figure 2**) and a total area of 1,307 sf. The Site is improved with a 2-story/full cellar level mixed-use (commercial-retail /residential building) totaling 1,792 sq ft. According to the NYC Department of Buildings the structure was built in 1922.

The elevation of the Site is approximately 65 feet above the National Geodetic Vertical Datum (NGVD). The area topography gradually slopes downward to the southeast toward the Bronx River. The depth to groundwater beneath the Site is unknown. Based on topography alone, it is anticipated that groundwater would flow to the southeast.

The area surrounding the property is highly urbanized and predominantly consists of multi-family residential buildings with mixed-use buildings (residential w/ first floor retail) along main corridors such as Westchester Avenue.

1.2 CURRENT USE

The cellar level and 1st floor retail space in the building area currently vacant. The single residential apartment on the second floor is currently occupied.

1.3 SUMMARY OF PREVIOUS INVESTIGATIONS

Environmental investigations performed at the Site include the following:

- Vapor Investigation Report - AES (September 2014)
- Phase II Subsurface Investigation Report - AES (February 2015)

1.3.1 September 2014 – Vapor Investigation Report (AES)

In Setember 2014 Associated Environmental Services (AES) performed a vapor intrusion investigation to determine if historic use of the property as a dry cleaner had impacted the Site. The investigation included the collection of two subslab vapor samples in the cellar level, one indoor air samle in the cellar and one on the first floor and one outdoor air sample. Samples were collected in summa canisters over a three hour period and submitted to Alpha laboratories for analysis of volatile organic compounds (VOCs) by EPA method TO15.

The results indicated elevated levels of tetrachloroethylene (PCE) in both subslab samples with concentrations of 119,000 ug/m3 and 125,000 ug/m3. The cellar level indoor air sample had a concentration of 196 ug/m3 while the 1st floor air sample was reported at 45.8 ug/m3. TCE was reported in only one of the subslab samples at a concentration of 179 ug/m3 and in the cellar level indoor air sample at a concentration of 0.274 ug/m3.

AES noted that when compared to the NYSDOH Decision Matrices (NYSDOH, October 2006), the PCE results indicated that mitigation would be needed to minimize exposures.

1.3.2 February 2015 - Phase II Investigation Report (AES)

An initial investigation was performed on December 16, 2014, and included the installation of four shallow soil borings (SB1-SB4) in the cellar of the building. At each location the borings wer completed to a depth of three feet with soil samples collected from the 0-3 ft interval and submitted fior analysis of VOCs by EPA method 8260. Based on the results which identified elevated PCE cocentrations at the B1 and B3 locations and second sampling event was performed on February 12, 2015 which included the installation of six additional shallow borings in the cellar (SB1a-SB1c, SB3a, SB3c) and one deep boring (SB5) to a depth of 32 feet in the sidewalk in front of the building. See **Figure 2** for the location of the Phase II borings.

The results of the phase II investigation concermed the presense of PCE in shallow soil beneath the site in the vicinity of SB1, located to the north of the former dry cleaning machine area, and to a much leser extent in the vicinity of SB3 located in the boiler room. PCE was reported in all four samples from the SB1 arera and ranged in concentration from 2,800 ug/kg in SB1 to 100,000 ug/kg in SB1b. PCE in the SB3 are was limiedted to the SB3 sample at a concentration of 1,500 ug/kg. Petoleum VOCs including 1,2,4-trimethylbenzene (9,000 ug/kg) and xylene (2,700 ug/kg) were reported in SB3 with xylene also reported in SB3c (310 ug/kg).

AES concluded that shallow soil at the site had been affected by historic use as a dry cleaning operation but that it was unlikely that groundwater had been effected.

1.4 SITE GEOLOGY / HYDROGEOLOGY

According to the AES Phase II Report, soil beneath the Site consisted of a brown fine silty-sand with some gravel. Competent bedrock was encountered at approximately three feet below the cellar level slab and twenty-two feet below grade in the sidewalk. According to AES, advancement 10 feet into the bedrock surface failed to encounter groundwater. Based on topography alone, groundwater would be expected to flow southeast toward the Bronx River.

2.0 INTERIM REMEDIAL MEASURE PROGRAM

The IRM proposed for the Site consists of the installation and operation of a soil vapor extraction system (SVE). The IRM will be performed in accordance with the methods and specifications as described under the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation (May, 2010).

2.1 GOVERNING DOCUMENTS

Governing documents and procedures included in the IRM Work Plan include a Site-specific HASP, a Citizen Participation Plan (CPP) and analytical Quality Assurance Project Plan (QAPP). Highlights of these documents and procedures are provided in the following sections.

2.1.1 Health & Safety Plan (HASP)

The HASP takes into account the specific hazards inherent to the site and presents the minimum requirements which are to be met by the remediation contractor, excavation subcontractor, and other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. A HASP has been prepared for the IRM activity at the site and is provided in **Attachment A**.

Contractors and subcontractors will have the option of adopting this HASP or developing their own site-specific document. If a contractor or subcontractor chooses to prepare their own HASP, the Project Remedial Engineer will ensure that it meets the minimum requirements as detailed in the site HASP prepared by EBC and must be submitted to and approved by the NYSDEC.

2.1.2 Quality Assurance Project Plan (QAPP)

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or cold-pak(s) to maintain a temperature of 4^{o}C.

Dedicated disposable sampling materials will be used for both soil and groundwater samples (if collected), eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected.

Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil;
- Rinse with tap water;

- Wash with alconox® detergent solution and scrub ;
- Rinse with tap water;
- Rinse with distilled or deionized water.

Prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will accompany samples each time they are transported to the laboratory. Matrix spike and matrix spike duplicates (MS/MSD) will be collected at the rate of one per 20 samples submitted to the laboratory. Laboratory reports will be upgradeable to ASP category B deliverables for use in the preparation of a data usability report (DUSR). The DUSR will be applicable to all confirmation samples and final round samples. Performance monitoring samples will be in a results-only format. The QAPP prepared for the Site is provided in **Attachment B**.

2.1.3 Community Air Monitoring Plan

Since the work under this IRM involves minimal soil disturbance and will be performed within a windowless cellar of an existing building, impacts to air quality outside of the work zone will be minimal. In addition, the first floor commercial space of the building is vacant limiting the potential for community air impacts to the second floor residents. A Community Air Monitoring Plan which includes periodic monitoring of conditionson the first floor of the building has been developer and is provided undr **Attachment C**.

2.1.4 Soil Management

Soil management will be required for excavation, handling, storage, transport and disposal of all soils/materials that are disturbed/excavated at the Site including excess soil from borings. Soil management includes all of the controls that will be applied to these efforts to assure effective, nuisance-free performance in compliance with all applicable Federal, State and local laws and regulations. Details regaring the management and handling of soil is discussed in **Section 2.6.4** of this IRMWP.

2.2 GENERAL INFORMATION

2.2.1 Project Organization

The Project Manager for the remedial activity will be Mr. Keith Butler. The Remedial Engineer for this project is Mr. Ariel Czemerinski, P.E. Ms. Chawinie Miller will serve as the Quality Assurance Officer.

2.2.2 Remedial Engineer

The Remedial Engineer for this project will be Mr. Ariel Czemerinski, P.E. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the overall remedial program for the Site. The Remedial Engineer will certify that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation

requirements set forth in the IRM Work Plan and any other relevant provisions of ECL 27-1419 have been achieved in conformance with that Plan.

The Remedial Engineer will oversee all aspects of the IRM program, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of back fill material, and management of waste transport and disposal.

2.2.3 IRM Schedule

The estimated duration of the SVE installation activities is two weeks. Start-up testing and sampling will be performed once the system becomes operational.

2.2.4 Pre-Construction Meeting with NYSDEC

A pre-construction meeting or conference call with the Project Manager, Remedial Engineer and Owner's Representative will take place prior to the start of SVE system installation activities. The NYSDEC will be permitted an opportunity to participate in this meeting and will be given advance notice to enable attendance.

2.2.5 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in **Table 1**. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

2.3 REPORTING

2.3.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of each day in which remedial activity takes place. Daily reports will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP readings;
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the IRM or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the IRM will be addressed directly to the NYSDEC Project Manager via personal communication. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

2.3.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within 10 days following the end of the month of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

2.3.3 Construction Completion Report (CCR)

Following completion of all IRM activity, a Construction Completion Report (CCR) will be prepared to document all aspects of the SVE system installation and testing. The CCR will be prepared in accordance with DER-10 guidelines and will include:

- A summary of the results of start-up testing.
- Results of all analyses, including summary tables, laboratory data sheets and the required laboratory data deliverables.
- Photographic documentation of the system installation.
- Copies of manifests for soil disposal.
- Information on backfill imported onto the Site including amount, type and origin and copies of transport tickets from the supplier.
- Certification of the Report by a QEP or P.E. as required.

2.3.4 Deviations from the IRM Work Plan

Minor deviations from the IRMWP will be identified in the daily update report and will be noted in the Construction Completion Report. When deviations are reported, a brief discussion will be provided which will state the following:

- Reasons for deviating from the approved IRMWP;
- Effect of the deviations on overall remedy.

Major changes to the scope of work must be discussed with the NYSDEC and the NYSDOH prior to implementation. If the changes are considered to be significant enough, an addendum to the IRM Work Plan will be prepared and submitted to NYSDEC/NYSDOH for review.

2.4 MOBILIZATION

Mobilization will include the delivery of equipment and materials to the Site. All remediation personnel will receive site orientation and training in accordance with the site specific HASP, and established policies and procedures to be followed during the implementation of the IRMWP. The remediation contractor, construction manager and all associated subcontractors will each receive a copy of the IRMWP and the site specific HASP and will be briefed on their contents.

2.5 SITE PREPARATION

2.5.1 Utility Mark-outs, Easements and Permits

The IRM Contractor and its sub-contractors are solely responsible for the identification of utilities that might be affected by work under the IRMWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this IRMWP. The IRM Contractor and its sub-contractors are solely responsible for safe execution of all invasive and other work performed under this IRMWP. The IRM Contractor and its sub-contractors must obtain any local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this IRMWP including but not limited to NYC Department of Buildings work permits and Notice of No Objection by the Manhattan Transit Authority for excavation adjacent to a subway line. Approval of this IRMWP by NYSDEC does not constitute satisfaction of these requirements.The presence of utilities and easements on the Site will be investigated by the IRM Contractor and it must be determined that no risk or impediment to the planned work under this IRMWP is posed by utilities or easements on the Site. The IRM Contractor will provide copies of all permits and documentation of the utlility investigation to the Remedial Engineer prior to the start of work.

2.5.2 Source Delineation and Sampling Plan

Prior to installation of the SVE system, additional borings will be advanced in the cellar level to delineate the horizontal and vertical extent of the source area(s). Eight borings are proposed as shown in **Figure 3**. At each boring location samples will be collected from the 0-2 ft interval and from the 2-4 ft interval if possible. Samples will be collected by driving a 1-1/4 inch diameter by two foot long core sampler with acetate liners using a slam bar. An experienced environmental professional (EP) will then screen the samples for elevated levels of VOCs using a photoionization detector and for physical evidence of contamination. All observations will be recorded in a bound field notebook. Retained samples (8 to 16) will be submitted to a NYSDOH certified environmental laboratory for analysis of VOCs by USEPA method 8260.

The results of the source delineation sampling will be used to make any needed adjustments in the number, location and depth of the SVE systems vapor extraction pit(s).

2.5.3 Soil Vapor Intrusion Evaluation

A soil vapor intrusion (SVI) evaluation will be performed on the two buildings adjacent to the Site identified as Lots 10 and 12. Performance of the SVI will be contingent upon access being

granted from each building owner and all tenants occupying the areas to be tested. The SVI will include the following:

- Collection of 2 subslab vapor samples over an 8 hr period in buildings located on Lots 10 and 12.
- Collection two indoor air samples (basement level, 1st floor) over an 8 hr period in the buildings on Lots 10 and 12.
- Collection of one outdoor air sample.
- All air samples to be collected in accordance with NYSDOH protocols and analyzed for VOCs by USEPA TO15.

Prior to sampling, the Indoor Air Quaility Questionaire and Building Inventory form (**Attachment D**) will be completed. The SVI evaluation will be performed prior to operation of the SVE system to provide baseline data in the adjacenet buildings. If impacts are noted in the baseline data, then followup sampling will be performed after the system becomes operational.

2.6 SOIL VAPOR EXTRACTION SYSTEM PLAN

Remediation of the CVOC impacted soil will be achieved through the installation of a Soil Vapor Extraction (SVE) system within the identified source area. The system will be installed and operated to address VOC contaminants within the unsaturated zone; specifically impacted soil above the bedrock surface.

The system will consist of a single vapor extraction pit located within the impacted soil zone. The pit will be connected to regenerative blower located at the rear of the cellar. Effluent air will be routed through two vapor phase carbon absorbers connected in series prior to discharge. Details of the SVE system are provided in **Attachment E**. Manufacturers cut sheets for the system equipment and treatment components are provided in **Attachment F**.

2.6.1 Treatment Area

The impacted area is approximately 130 sf in the vicinity of the former dry cleaning machine. Vertically the contamination extends to the bedrock suface approximately three feet below the bottom of the concrete slab.

2.6.2 Radius Of Influence

Soils at the site are described as silty-sand and gravel. Based on extensive experience in designing and operating SVE systems, a typical soil vapor extraction radius of influence (ROI), at a flow rate of 75-100 cubic feet per minute is 40 to 50 ft. A conservative design estimate using a 30 ft ROI was used, however, a 20 ft ROI would still be acceptable for treatment of the impacted area. The ROI will be confirmed during start-up testing by taking vacuum readings at the surrounding observation wells. A vacuum reading of 0.1 inch of water will be taken as the limit of influence of soil vapor extraction for remedial purposes. Note that in addition to remediation of the CVOC soil in the impacted area, the SVE system will also depressurize the slab. Subslab depressurization is taken as 0.01 inch of water and is expected to extend

throughout the entire slab. If during testing, insufficient vacuum is achieved beneath the slab for depressurization purposes a second extraction pit will be installed in the rear half of the building.

2.6.3 SVE Extraction Pit Installation

Using a design ROI of 30 ft with a minimum ROI of 20 ft requires a single extraction pit located just south of the source area as shown on **Figure 4**. The vapor extraction pit will be constructed of 2 ft x 2 ft square x 2 ft deep box excavated below the cellar level concrete slab. A 3-inch diameter will be installed into the center of the pit and the pit backfilled with ¾-inch gravel. The top of the pit will then be sealed with a 20 mil thick vapor barrier membrane and followed by a minimum 2-inch concrete patch.

2.6.4 Soil Management and Disposal

Soil excvated from the extraction pit will be placed in DOT-approved 55-gallon drums, properly manifested and disposed of off-site as a hazardous waste by a licesed hazardous waste disposal company. Soil may be disposed of as non-hazardous if a contained-in determination is made by the NYSDEC. Soil testing will be performed as required by the disposal facility or as required to make the contained in determination.

2.6.5 SVE System Components

The SVE system will include a 1 hp regenerative blower, by Ametek-Rotron, or the functional equivalent as approved by the Remedial Engineer. The blower will be equipped with a dual connection inline filter model as manufactured by Ametek-Rotron, (or the functional equivalent) to prevent abrasive damage to the vanes during continuous operation. The blower assemble will be mounted on a skid package including an appropriately sized motor start controller (max amperage draw 110 at 220 volts) with thermal overload protection.

2.6.6 Effluent Treatment

Effluent air from the blower will be routed through 2 vapor phase granular activated charcoal (GAC) units before discharging to the atmosphere. Each carbon vessel will contain 170-175 bounds of virgin vapor phase carbon. The units will include inlet and outlet fittings and stainless steel internals such as the Econosorb-V as manufactured by the TIGG corporation. The drums will be connected in series with flex hoses or rigid PVC pipes and include a sampling port located between the units. Treated effluent will be discharged though a 2-inch PVC pipe which will extend a minimum of 3 ft above the building roof line.

2.7 SYSTEM OPERATION AND MAINTENANCE

2.7.1 SVE Start-Up Procedures

Following installation of the system, the following items will be inspected and tested to ensure proper operation:

1) Check all exposed/visible SVE piping for evidence of damage, cracks, or leaks.

2) Turn system on and off to ensure the start box is functioning properly;
3) Record vacuum reading at blower;
4) Record vacuum readings at surrounding vapor monitoring points;
5) Take PID readings before, in-between and after carbon vessels.

The results of the initial start-up test, or any subsequent pressure test will be provided to the DEC and DOH for review and approval, and to determine whether a second extraction pit would be needed at the back of the building.

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

A visual inspection of the complete system will be conducted during each monitoring event. SVE system components to be monitored include, but are not limited to, the following:

- Vacuum blower; and,
- General system piping.
- Vacuum gauges at blower.
- Control switches.
- PID Readings from influent line, between carbon drums and at the discharge stack.

Observations and PID readings will recorded on the inspection form (**Attachment G**). The SVE system is not adjustable and the regenerative blower shall not be serviced or repaired at the Site.

2.7.2 Monitoring and Sampling

Confirmation Testing
Confirmation indoor air testing will be completed after the SVE system has been in continuous operation for a minimum of 30 days. Testing will be performed during the heating season (November1 -March 1) and will include one indoor air sample from the cellar, one indoor air sample from the first floor and one indoor air sample from the second floor. Samples will be colelcted in 6-liter summa cannisters over an 8 hr period and submitted to a NYSDOH Certified laboratory for the analysis of VOCs by TO15.

Performance Monitoring
The system will be monitored intitally on a alternate week basis for the first month of operation, going to monthly for next three months of opertion and then quarterly after that. Air samples will be collected at start up and then on a quarterly basis to evaluate the performance of the system. PID readings will be taken during each monitoring event from three locations: system influent (before carbon), between the carbon canisters and from the system discharge (after carbon). Air samples will be collected from the system effluent only and submitted to a NYSDOH certified environmental laboratory for analysis of VOCs by USEPA method TO15.

Initial effluent concentrations will be high as accumulated vapors are removed resulting in accelerated carbon depletion rates. However carbon usage will rapidly diminish over time (1-2 weeks) as the accumulated vapors are removed and effluent concentration is dictacted by the

transfer of VOCs from the sorbed phase to the vapor phase from residually impacted soils. Carbon drums will be set up in series with the between vessel PID readings utilized to determine when break through occurs at the first drum. When this occurs the drum will be changed out and shipped back to the supplier for regeneration. If nuisance odors are observed from the discharge at any time, operation of the system will be temporarily halted until the situation is remedied by changing out the carbon or through other necessary repairs / actions (loose valve / fitting, broken pipe, etc.).

QA/QC
The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

All sampling and analyses will be performed in accordance with the requirements of the Quality Assurance Project Plan (QAPP) prepared for the site. Main Components of the QAPP include:

- QA/QC Objectives for Data Measurement;
- Sampling Program:
- Sample Tracking and 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;
- Preparation of a Data Usability Summary Report (DUSR), which will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.
- Internal QC and Checks;
- QA Performance and System Audits;
- Preventative Maintenance Procedures and Schedules;
- Corrective Action Measures.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel.

2.7.3 Reporting

Sample analysis will be provided by a New York State ELAP certified environmental laboratory. Laboratory reports will include Analytical Systems Protocol July 2005 (ASP) category B data deliverables for use in the preparation of a data usability summary report (DUSR). All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format. All monitoring results will be reported

to NYSDEC on a periodic basis in the Periodic Review Report. A letter report will also be prepared subsequent to each quarterly air sampling event. The report (or letter) will include, at a minimum:

- Date of event;
- Personnel conducting sampling;
- Description of the activities performed;
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air, etc);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (o be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether conditions have changed since the last reporting event.

Reporting of Performance Data in CCR
Chemical labs used for all performance monitoring and sampling analysis will be NYSDOH ELAP laboratory certified in the appropriate categories. The CCR will provide a tabular and map summary of all performance monitoring and post-remedial sample results.

2.7.4 Permits / Authorization

Air discharge under the NYS Class 2 Hazardous Waste Site program will not require a permit from the NYSDEC. An industrial process equipment application will be filed with the NYC Department of Environmental Protection, Bureau of Environmental Compliance, if required.

2.7.5 Schedule

The estimated duration of the SVE installation activities is two weeks. Start-up testing and sampling will be performed once the system becomes operational.

Perform Supplemental Soil Sampling	Within 2 weeks of IRMWP approval.
Reciept of Lab Results	Within 5-7 weekdays of sample arrival at the analytical laboratory. Forward to DEC upon reciept.
Order Equipment and Materials	Within 1 week following the reciept of the soil sample results
Mobilize to the site and begin installation of the SVE system.	Within 1 week following the delivery of the system equipment and components (blower, carbon drums, etc.)
Complete system installation	Within 2 weeks of mobilization.
Perform Start-up testing	Within 1 week of system becoming operational.
Submit CCR	Within 4 weeks of startup testing.

5.0 CONSTRUCTION COMPLETION REPORT (CCR)

Following completion of all IRM activity, a Construction Completion Report (CCR) will be prepared to document all aspects of the SVE system installation. The CCR will be prepared in accordance with DER-10 guidelines and will include:

- A summary of the removal action including a detailed description of the extent and volume of soil excavated.
- All fully executed manifests documenting any off-site transport of waste material.
- Scaled site plan showing the location of all confirmation samples
- Results of all analyses, including summary tables, laboratory data sheets and the required laboratory data deliverables.
- Photographic documentation of the excavation and the overall removal process.
- Information on backfill imported onto the Site including amount, type and origin and copies of transport tickets from the supplier.
- Certification of the Report by a P.E. as required.

TABLES

Table 1
Emergency Contact List

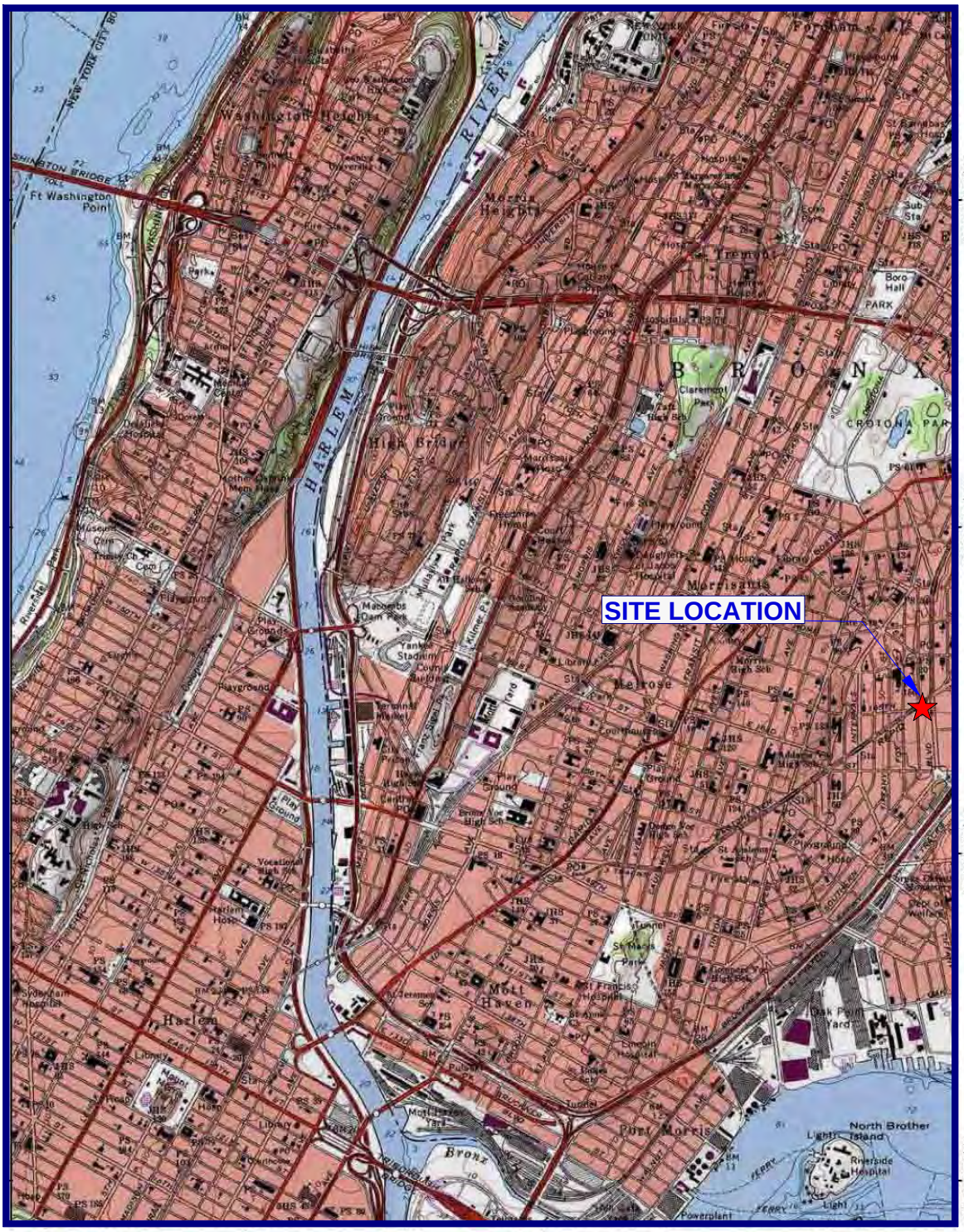
General Contacts

General Emergencies	911
NYC Police	911
NYC Fire Department	911
NYC Department of Health	212-676-2400
Westchester Square Medical Center	718-430-7300
Poison Control	800-222-1222
National Response Center	800-424-8802
NYSDEC Spills Hotline	800-457-7362

Project Contacts

NYSDEC Project Manager	Man-tsz Yau	718-482-4897
EBC Project Manager	Charles Sosik	631-504-6000
EBC Site Safety Officer	Chawinie Miller	631-504-6000
Remedial Engineer	Ariel Czemerinski	516-987-1662
Owner's Representative	Moris Levy	917-622-3131

FIGURES



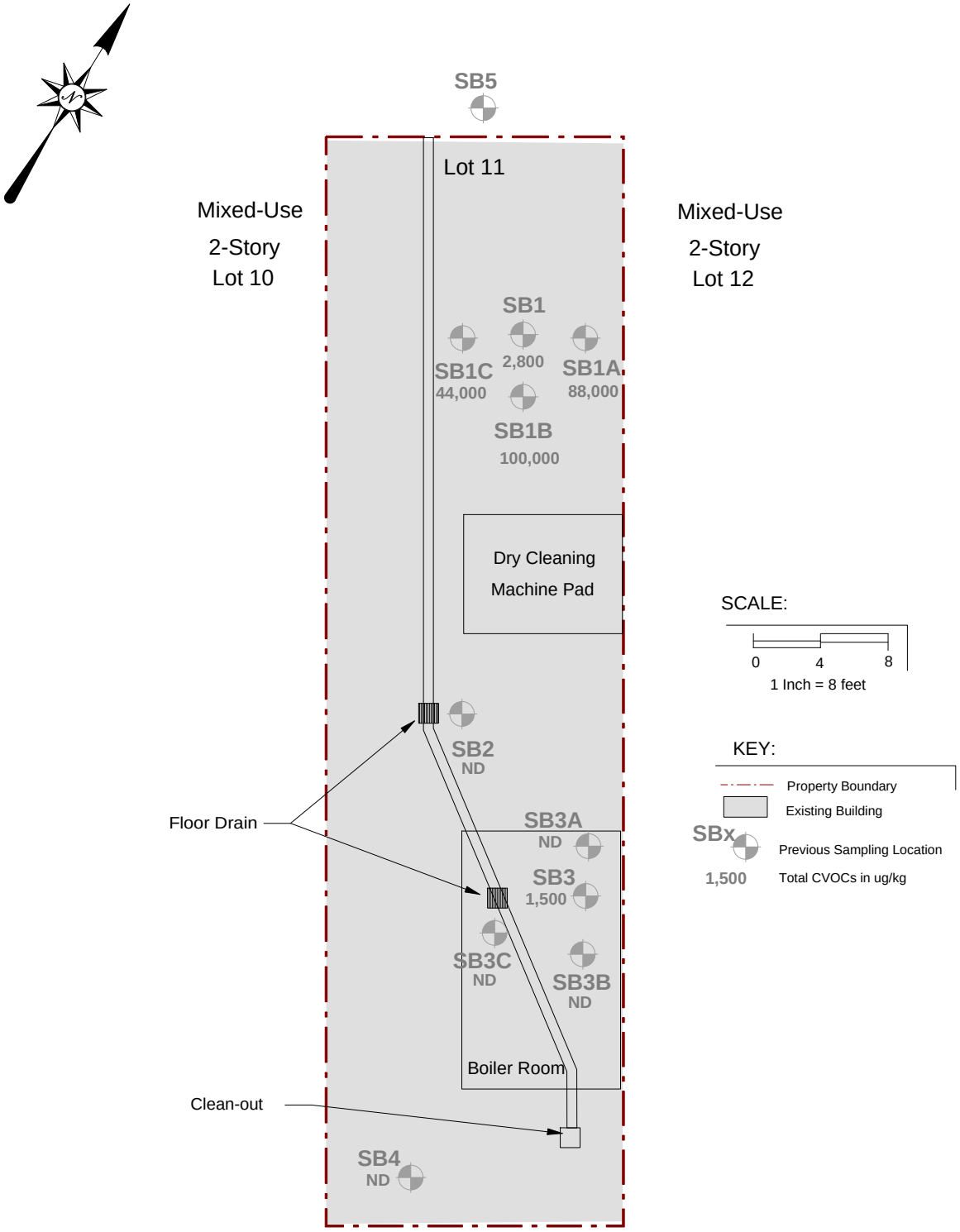
USGS Central Park Quadrangle 1995, Contour Interval = 10 feet

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
Phone 631.504.6000
Fax 631. 924 .2870

1120 WESTCHESTER AVENUE, BRONX NY

FIGURE 1 SITE LOCATION MAP

WESTCHESTER AVENUE



EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
Phone 631.504.6000
Fax 631. 924 .2870

FIGURE 2

SITE ADDRESS: 1120 WESTCHESTER AVENUE, BRONX, NY

DRAWING TITLE: SITE PLAN - PREVIOUS SAMPLING LOCATIONS

WESTCHESTER AVENUE

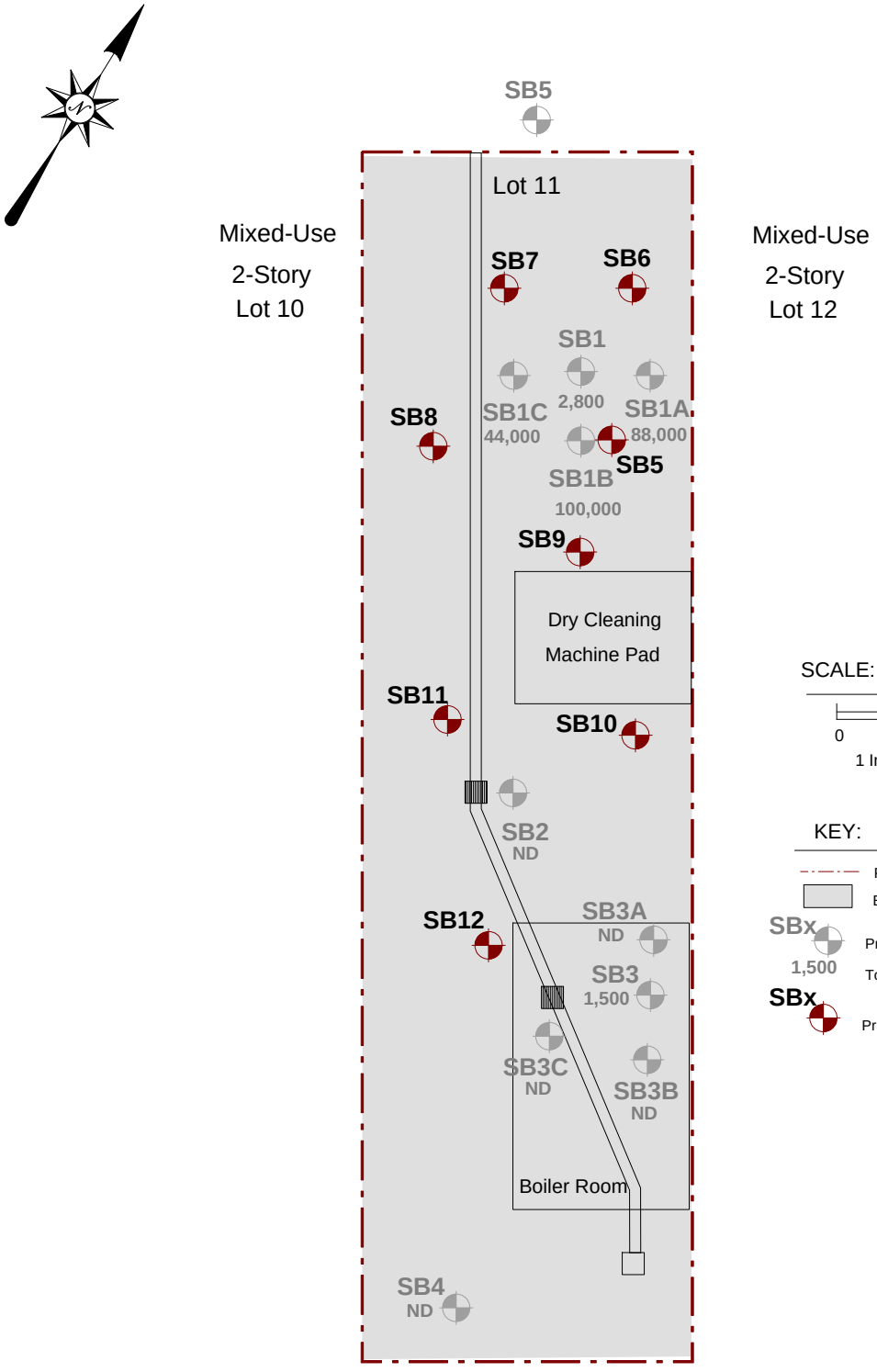


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FIGURE 3

SITE ADDRESS: 1120 WESTCHESTER AVENUE, BRONX, NY

DRAWING TITLE: PROPOSED SUPPLEMENTAL BORING LOCATIONS

WESTCHESTER AVENUE

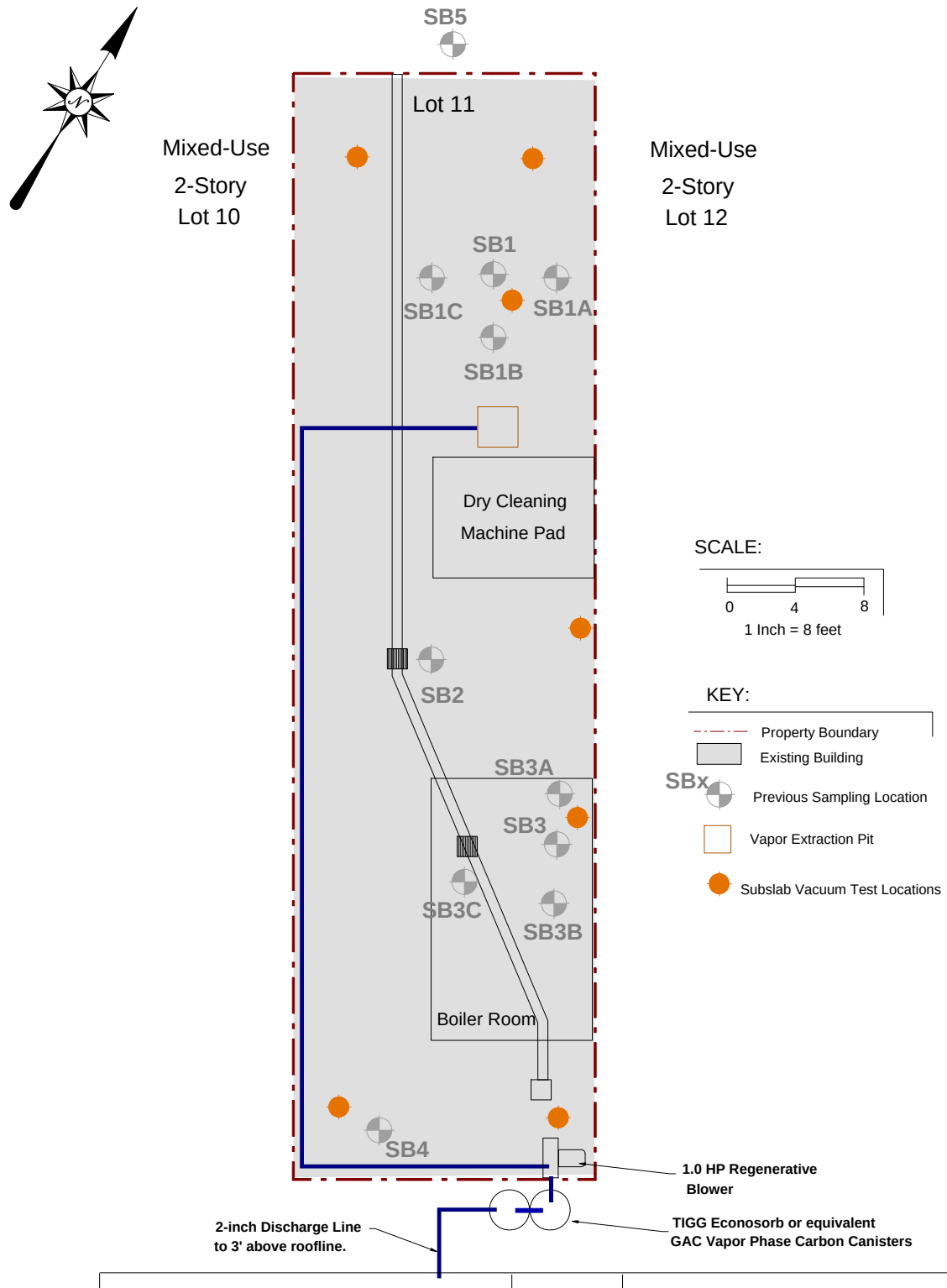

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FIGURE 4

Site Address: 1120 Westchester Avenue, Bronx, NY

Drawing Title: SVE System Layout

ATTACHMENT A
Health and Safety Plan

1120 WESTCHESTER AVENUE
NYSDEC SITE No. 203083

1120 WESTCHESTER AVENUE
BRONX, NEW YORK 10459
Block 2750 Lot 11

CONSTRUCTION HEALTH AND SAFETY PLAN

MARCH 2017

Prepared By:

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 Middle Country Road
Ridge, NY 11961

TABLE OF CONTENTS
CONSTRUCTION HEALTH AND SAFETY PLAN
1120 Westchester Avenue, Bronx, New York

TABLE OF CONTENTS
CONSTRUCTION HEALTH AND SAFETY PLAN
1120 Westchester Avenue, Bronx, New York

FIGURES

APPENDICES

STATEMENT OF COMMITMENT

This Construction Health and Safety Plan (CHASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Interim Remedial Action at 1120 Westchester Avenue, Bronx, New York.

This CHASP, which applies to persons present at the site actually or potentially exposed to hazardous materials, describes emergency response procedures for actual and potential chemical hazards. This CHASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. Contractors and suppliers are retained as independent contractors and are responsible for ensuring the health and safety of their own employees.

1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for the planned Interim Remedial Action at 1120 Westchester Avenue, Bronx, New York to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during remedial activities. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this CHASP, including the attachments, addresses safety and health hazards related to excavation and other soil disturbance activities and is based on the best information available. The CHASP may be revised by EBC at the request of the Client and/or a regulatory agency upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC's project manager, site safety officer and/or the EBC health and safety consultant.

1.1 Training Requirements

Personnel entering the exclusion zone or decontamination zone are required to be certified in health and safety practices for hazardous waste site operations as specified in the Federal OSHA Regulations CFR 1910.120e (revised 3/6/90).

Paragraph (e - 3) of the above referenced regulations requires that all on-site management personnel directly responsible for or who supervise employees engaged in hazardous waste operations, must initially receive 8 hours of supervisor training related to managing hazardous waste work.

Paragraph (e - 8) of the above referenced regulations requires that workers and supervisors receive 8 hours of refresher training annually on the items specified in Paragraph (e-1) and/or (e-3).

Additionally all on-site personnel must receive adequate site-specific training in the form of an on-site Health and Safety briefing prior to participating in field work with emphasis on the following:

- Protection of the adjacent community from hazardous vapors and / or dust which may be released during intrusive activities.
- Identification of chemicals known or suspected to be present on-site and the health effects and hazards of those substances.
- The need for vigilance in personnel protection, and the importance of attention to proper use, fit and care of personnel protective equipment.
- Decontamination procedures.
- Site control including work zones, access and security.
- Hazards and protection against heat or cold.
- The proper observance of daily health and safety practices, such as entry and exit of work zones and site. Proper hygiene during lunch, break, etc.
- Emergency procedures to be followed in case of fire, explosion and sudden release of hazardous gases.

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Health and Safety meetings will be conducted on a daily basis and will cover protective clothing and other equipment to be used that day, potential and chemical and physical hazards, emergency procedures, and conditions and activities from the previous day.

1.2 Medical Monitoring Requirements

Field personnel and visitors entering the exclusion zone or decontamination zone must have completed appropriate medical monitoring required under OSHA 29 CFR 1910.120(f) if respirators or other breathing related PPE is needed. Medical monitoring enables a physician to monitor each employee's health, physical condition, and his fitness to wear respiratory protective equipment and carry out on-site tasks.

1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

The project superintendent and the site safety officer are responsible for informing personnel (EBC employees and/or owner or owners representatives) entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**.

Site conditions may warrant an amendment to the HASP. Amendments to the HASP are acknowledged by completing forms included in **Appendix B**.

1.4 Key Personnel - Roles and Responsibilities

Personnel responsible for implementing this Health and Safety Plan are:

Name	Title	Address	Contact Numbers
Mr. Robert Bennett	EBC – Project Manager	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000
Ms. Chawinie Miller	Health & Safety Manager	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000
Mr. Kevin Waters	Site Safety Officer	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000

The project manager is responsible for overall project administration and, with guidance from the site safety officer, for supervising the implementation of this CHASP. The site safety officer will conduct daily (tail gate or tool box) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.

The site safety officer is also responsible for coordinating health and safety activities related to hazardous material exposure on-site. The site safety officer is responsible for the following:

1. Educating personnel about information in this CHASP and other safety requirements to

be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing, and emergency procedures dealing with fire and first aid.

2. Coordinating site safety decisions with the project manager.

3. Designating exclusion, decontamination and support zones on a daily basis.

4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this CHASP.

5. Maintaining the work zone entry/exit log and site entry/exit log.

6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.

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2.0 SITE BACKGROUND AND SCOPE OF WORK

The street address for the Site is 1120 Westchester Avenue, Bronx, NY (**Figure 1**). The Site is located in the City of New York and Borough of the Bronx and is identified as Block 2750, Lot 11 on the New York City Tax Map. The Site is an irregular shaped lot consisting of approximately 16 ft of frontage along Westchester Avenue (**Figure 2**) and a total area of 1,307 sf. The Site is improved with a 2-story/full cellar level mixed-use (commercial-retail /residential building) totaling 1,792 sq ft. According to the NYC Department of Buildings the structure was built in 1922.

The elevation of the Site is approximately 65 feet above the National Geodetic Vertical Datum (NGVD). The area topography gradually slopes downward to the southeast toward the Bronx River. The depth to groundwater beneath the Site is unknown. Based on topography alone, it is anticipated that groundwater would flow to the southeast.

The area surrounding the property is highly urbanized and predominantly consists of multi-family residential buildings with mixed-use buildings (residential w/ first floor retail) along main corridors such as Westchester Avenue.

2.1 Previous Investigations

September 2014 – Vapor Investigation Report (AES)
In Setember 2014 Associated Environmental Services (AES) performed a vapor intrusion investigation to determine if historic use of the property as a dry cleaner had impacted the Site. The investigation included the collection of two subslab vapor samples in the cellar level, one indoor air samle in the cellar and one on the first floor and one outdoor air sample. Samples were collected in summa canisters over a three hour period and submitted to Alpha laboratories for analysis of volatile organic compounds (VOCs) by EPA method TO15.

The results indicated elevated levels of tetrachloroethylene (PCE) in both subslab samples with concentrations of 119,000 ug/m3 and 125,000 ug/m3. The cellar level indoor air sample had a concentration of 196 ug/m3 while the 1st floor air sample was reported at 45.8 ug/m3. TCE was reported in only one of the subslab samples at a concentration of 179 ug/m3 and in the cellar level indoor air sample at a concentration of 0.274 ug/m3.

AES noted that when compared to the NYSDOH Decision Matrices (NYSDOH, October 2006), the PCE results indicated that mitigation would be needed to minimize exposures.

February 2015 - Phase II Investigation Report (AES)
An initial investigation was performed on December 16, 2014, and included the installation of four shallow soil borings (SB1-SB4) in the cellar of the building. At each location the borings wer completed to a depth of three feet with soil samples collected from the 0-3 ft interval and submitted fior analysis of VOCs by EPA method 8260. Based on the results which identified elevated PCE cocentrations at the B1 and B3 locations and second sampling event was performed on February 12, 2015 which included the installation of six additional shallow borings in the cellar (SB1a-SB1c, SB3a, SB3c) and one deep boring (SB5) to a depth of 32 feet in the sidewalk in front of the building. See **Figure 2** for the location of the Phase II borings.

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The results of the phase II investigation concermed the presense of PCE in shallow soil beneath the site in the vicinity of SB1, located to the north of the former dry cleaning machine area, and to a much leser extent in the vicinity of SB3 located in the boiler room. PCE was reported in all four samples from the SB1 arera and ranged in concentration from 2,800 ug/kg in SB1 to 100,000 ug/kg in SB1b. PCE in the SB3 are was limiedted to the SB3 sample at a concentration of 1,500 ug/kg. Petoleum VOCs including 1,2,4-trimethylbenzene (9,000 ug/kg) and xylene (2,700 ug/kg) were reported in SB3 with xylene also reported in SB3c (310 ug/kg).

AES concluded that shallow soil at the site had been affected by historic use as a dry cleaning operation but that it was unlikely that groundwater had been affected.

2.2 Current Use

The basement and first floor retail areas of the building are currently vacant. The second floor residential apartment is occupied. The Owner intends to lease the first floor area for retail space with the basement available to the retail tenant for storage.

2.3 Description of Interim Remedial Action

Site activities included within the Remedial Action that are included within the scope of this HASP include the following:

1. Installation and operation of a soil vapor extraction system to remediate chlorinated solvents in shallow soil beneath the building's cellar level concrete slab and to mitigate vapors entering the building and potentially migrating off-site;

2. Collection and analysis of source delineation samples to confirm the extent of impact and needed coverage of the remedial system;

3. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;

4. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits and other specifications included in Table 1, (2) all Federal, State and local rules and regulations for handling and transport of material.

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3.0 HAZARD ASSESSMENT

This section identifies the hazards associated with the proposed scope of work, general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

3.1 Physical Hazards

3.1.1 Tripping Hazards

An area of risk associated with on-site activities are presented by uneven ground, concrete, curbstones or equipment which may be present at the site thereby creating a potential tripping hazard. During intrusive work, care should be taken to mark or remove any obstacles within the exclusion zone.

3.1.2 Climbing Hazards

During site activities, workers may have to work on excavating equipment by climbing. The excavating contractor will conform with any applicable NIOSH and OSHA requirements or climbing activities.

3.1.3 Cuts and Lacerations

Field activities that involve excavating activities usually involve contact with various types of machinery. A first aid kit approved by the American Red Cross will be available during all intrusive activities.

3.1.4 Lifting Hazards

Improper lifting by workers is one of the leading causes of industrial injuries. Field workers in the excavation program may be required to lift heavy objects. Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

3.1.5 Utility Hazards

Before conducting any excavation, the excavation contractor will be responsible for locating and verifying all existing utilities at each excavation.

3.1.6 Traffic Hazards

All traffic, vehicular and pedestrian, shall be maintained and protected at all times consistent with local, state and federal agency regulations regarding such traffic and in accordance with NYCDOT guidelines. The excavation contractor shall carry on his operations without undue interference or delays to traffic. The excavation contractor shall furnish all labor, materials, guards, barricades, signs, lights, and anything else necessary to maintain traffic and to protect his work and the public, during operations.

3.2 Work in Extreme Temperatures

Work under extremely hot or cold weather conditions requires special protocols to minimize the chance that employees will be affected by heat or cold stress.

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3.2.1 Heat Stress

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel, which limits the dissipation of body heat and moisture, can cause heat stress.

The following prevention, recognition and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress and to apply the appropriate treatment.

1. Prevention
    a. Provide plenty of fluids. Available in the support zone will be a 50% solution of fruit punch and water or plain water.
    b. Work in Pairs. Individuals should avoid undertaking any activity alone.
    c. Provide cooling devices. A spray hose and a source of water will be provided to reduce body temperature, cool protective clothing and/or act as a quick-drench shower in case of an exposure incident.
    d. Adjustment of the work schedule. As is practical, the most labor-intensive tasks should be carried out during the coolest part of the day.

2. Recognition and Treatment
    a Heat Rash (or prickly heat):
        Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.
        Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.
        Treatment: Remove source or irritation and cool skin with water or wet cloths.

    b. Heat Cramps (or heat prostration)
        Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.
        Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.
        Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.
    c. Heat Stroke
        Cause: Same as heat exhaustion. This is also an extremely serious condition.
        Symptoms: Dry hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.
        Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.

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3.2.2 Cold Exposure

Exposure to cold weather, wet conditions and extreme wind-chill factors may result in excessive loss of body heat (hypothermia) and /or frostbite. To guard against cold exposure and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be readily available, rest periods should be adjusted as needed, and the physical conditions of on-site field personnel should be closely monitored. Personnel and supervisors working on-site will be made aware of the signs and symptoms of frost bite and hypothermia such as shivering, reduced blood pressure, reduced coordination, drowsiness, impaired judgment, fatigue, pupils dilated but reactive to light and numbing of the toes and fingers.

3.3 Chemical Hazards

The Site is impacted with petroleum and chlorinated volatile organic compounds (VOCs) in shallow soil in the northern portion of the Site.

Based on the findings of the previous investigations the following compounds are considered for the site as potential contaminants: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and heavy metals.

Volatile organic compounds reported to be present in soil include the following:

1,2,4-trimethylbenzene	1,3,4-trimethylbenzene	2-isopropyltoluene	n-butylbenzene
n-propylbenzene	napthalene	sec-butylbenzene	xylenes
tetrachloroethene			

VOCs reported to be present in soil vapor include the following

tetrachloroethene	trichloroethene

The primary routes of exposure to these contaminants are inhalation, ingestion and absorption. **Appendix C** includes information sheets for suspected chemicals that may be encountered at the site.

3.3.1 Respirable Dust

Dust may be generated from vehicular traffic and/or excavation activities. If visible observation detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 150 µg/m3 over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

Absorption pathways for dust and direct contact with soils will be mitigated with the implementation of latex gloves, hand washing and decontamination exercises when necessary.

3.3.2 Dust Control and Monitoring During Earthwork

Dust generated during excavation activities or other earthwork may contain contaminants

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identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 $\mu g/m^3$ over site-specific background in the breathing zone as measured by a dust monitor unless the site safety officer directs workers to wear APRs. The site safety officer will use visible dust as an indicator to implement the dust control plan.

3.3.3 Organic Vapors

Elevated levels of chlorinated VOCs were detected in soil and soil gas samples collected during previous investigations at the site. Therefore, excavation activities may cause the release of organic vapors to the atmosphere. The site safety officer will periodically monitor organic vapors with a Photoionization Detector (PID) during excavation activities to determine whether organic vapor concentrations exceed action levels shown in Section 5 and/or the Community Air Monitoring Plan.

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4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program, OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work uniform, coveralls, or tyvek, as needed;
- steel toe and steel shank work boots;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

4.2 Level C

Level C PPE shall be donned when the concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), but are less than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

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- chemical resistant coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves;
- disposable outer gloves;
- hard hat; and,
- ankles/wrists taped.

The exact PPE ensemble is decided on a site-by-site basis by the Site Safety Officer with the intent to provide the most protective and efficient worker PPE.

4.3 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 4.0) and properties of identified or expected contaminants. **It is expected that site work will be performed in Level D.** If air monitoring results indicate the necessity to upgrade the level of protection engineering controls (i.e. Facing equipment away from the wind and placing site personnel upwind of drilling locations, active venting, etc.) will be implemented before requiring the use of respiratory protection.

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5.0 AIR MONITORING AND ACTION LEVELS

29 CFR 1910.120(h) specifies that monitoring shall be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

5.1 Air Monitoring Requirements

If excavation work is performed, air will be monitored for VOCs with a portable ION Science 3000EX photoionization detector, or the equivalent. If necessary, Lower Explosive Limit (LEL) and oxygen will be monitored with a Combustible Gas Indicator (CGI). If appropriate, fugitive dust will be monitored using a MiniRam Model PDM-3 aerosol monitor. Air will be monitored when any of the following conditions apply:

- initial site entry;
- during any work where a potential IDLH condition or flammable atmosphere could develop;
- excavation work begins on another portion of the site;
- contaminants, other than those previously identified, have been discovered;
- each time a different task or activity is initiated;
- during trenching and/or excavation work.

The designated site safety officer will record air monitoring data and ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. Instruments will be zeroed daily and checked for accuracy. Monitoring results will be recorded in a field notebook and will be transferred to instrument reading logs.

5.2 Work Stoppage Responses

The following responses will be initiated whenever one or more of the action levels necessitating a work stoppage are exceeded:

1 The SSO will be consulted immediately
2 All personnel (except as necessary for continued monitoring and contaminant migration, if applicable) will be cleared from the work area (eg from the exclusion zone).
3 Monitoring will be continued until intrusive work resumes.

5.3 Action Levels During Excavation Activities

Instrument readings will be taken in the breathing zone above the excavation pit unless otherwise noted. Each action level is independent of all other action levels in determining responses.

Organic Vapors (PID)	LEL %	Responses
0-1 ppm above background	0%	• Continue excavating • Level D protection • Continue monitoring every 10 minutes

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1-5 ppm Above Background, Sustained Reading	1-10%	• Continue excavating • Go to Level C protection or employ engineering controls • Continue monitoring every 10 minutes
5-25 ppm Above Background, Sustaineed Reading	10-20%	• Discontinue excavating, unless PID is only action level exceeded. • Level C protection or employ engineering controls • Continue monitoring for organic vapors 200 ft downwind • Continuous monitoring for LEL at excavation pit
>25 ppm Above Background, Sustained Reading	>20%	• Discontinue excavating • Withdraw from area, shut off all engine ignition sources. • Allow pit to vent • Continuous monitoring for organic vapors 200 ft downwind.

Notes: Air monitoring will occur in the breathing zone 30 inches above the excavation pit. Readings may also be taken in the excavation pit but will not be used for action levels.

If action levels for any one of the monitoring parameters are exceeded, the appropriate responses listed in the right hand column should be taken. If instrument readings do not return to acceptable levels after the excavation pit has been vented for a period of greater than one-half hour, a decision will then be made whether or not to seal the pit with suppressant foam.

If, during excavation activities, downwind monitoring PID readings are greater than 5 ppm above background for more than one-half hour, excavation will stop until sustained levels are less then 5 ppm (see Community Air Monitoring Plan).

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6.0 SITE CONTROL

6.1 Work Zones

The primary purpose of site controls is to establish the perimeter of a hazardous area, to reduce the migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized persons. When operations are to take place involving hazardous materials, the site safety officer will establish an exclusion zone, a decontamination zone, and a support zone. These zones "float" (move around the site) depending on the tasks being performed on any given day. The site safety officer will outline these locations before work begins and when zones change. The site safety officer records this information in the site log book.

Due to the dimensions of the Site and the work area, it is expected that an exclusion zone will include the northern half of the cellar area. The southern half will serve as the decontamination zone. A support zone if needed will be located outside of the building in the rear yard. All onsite workers engaged in the excavation of hazardous or contaminated materials must provide evidence of OSHA 24 or 40-hour Hazardous Waste Operations and Emergency Response Operations training to conduct work within the exclusion zone established by the site safety officer. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer.

Protective equipment is removed in the decontamination zone. Disposable protective equipment is stored in receptacles staged in the decontamination zone, and non-disposable equipment is decontaminated. All personnel and equipment exit the exclusion zone through the decontamination zone. If a decontamination trailer is provided the first aid equipment, an eye wash unit, and drinking water are kept in the decontamination trailer.

The support zone is used for vehicle parking, daily safety meetings, and supply storage. Eating, drinking, and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye wash unit, first aid equipment, and drinking water are kept at a central location designated by the site safety officer.

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7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment.

7.1 Emergency Equipment On-site

Private telephones:	Site personnel.
Two-way radios:	Site personnel where necessary.
Emergency Alarms:	On-site vehicle horns*.
First aid kits:	On-site, in vehicles or office.
Fire extinguisher:	On-site, in office or on equipment.

* Horns: Air horns will be supplied to personnel at the discretion of the project superintendent or site safety officer.

7.2 Emergency Telephone Numbers

General Emergencies	911
Suffolk County Police	911
NYC Fire Department	911
Westchester Square Medical Center	718-430-7300
NYSDEC Spills Hotline	1-800-457-7362
NYSDEC Project Manager	518-402- 9621
NYC Department of Health	212-676-2400
National Response Center	800-424-8802
Poison Control	800-222-1222
Project Manager	631-504-6000
Site Safety Officer	631-504-6000

7.3 Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall act as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection;

- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;

- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel;

- Determine the cause of incidents and make recommendations to prevent recurrence; and,

- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- Project Manager — Mr. Robert Bennett
- Site Safety Officer — Mr. Kevin Waters (631) 504-6000

7.4 Medical Emergencies

A person who becomes ill or injured in the exclusion zone will be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport. First aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix D**) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital (**Appendix D**).and information on the chemical(s) to which they may have been exposed (**Appendix C**).

7.5 Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use fire fighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

7.6 Evacuation Routes

Evacuation routes established by work area locations for each site will be reviewed prior to commencing site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the site, personnel will follow these instructions:

- Keep upwind of smoke, vapors, or spill location.

- Exit through the decontamination corridor if possible.

- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.

- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.

- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

7.7 Spill Control Procedures

Spills associated with site activities may be attributed to project equipment and include gasoline, diesel and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to site personnel to facilitate the immediate recovery of the spilled material. Daily inspections of site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure equipment soundness. In the event of a spill, site personnel will immediately notify the NYSDEC (1-800-457-7362), and a spill number will be generated.

7.8 Vapor Release Plan

If work zone organic vapor (excluding methane) exceeds 5 ppm, then a downwind reading will be made either 200 feet from the work zone or at the property line, whichever is closer. If readings at this location exceed 5 ppm over background, the work will be stopped.

If 5 ppm of VOCs are recorded over background on a PID at the property line, then an off-site reading will be taken within 20 feet of the nearest residential or commercial property, whichever is closer. If efforts to mitigate the emission source are unsuccessful for 30 minutes, then the designated site safety officer will:

- contact the local police;
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two successive readings are below 5 ppm (non-methane), off-site air monitoring will be halted.
- All property line and off site air monitoring locations and results associated with vapor releases will be recorded in the site safety log book.

APPENDIX A

SITE SAFETY ACKNOWLEDGEMENT FORM

DAILY BREIFING SIGN-IN SHEET

Date:_____ Person Conducting Briefing:_____

Project Name and Location:_____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc…):

_____

_____

_____

_____

2. OTHER ISSUES (HASP changes, attendee comments, etc…):

_____

_____

_____

3. ATTENDEES (Print Name):

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

APPENDIX B

SITE SAFETY PLAN AMENDMENTS

SITE SAFETY PLAN AMENDMENT FORM

Site Safety Plan Amendment #: _____

Site Name: _____

Reason for Amendment: _____

_____

_____

_____

Alternative Procedures: _____

_____

_____

_____

Required Changes in PPE: _____

_____

_____

_____

_____ _____

Project Superintendent (signature) **Date**

_____ _____

Health and Safety Consultant (signature) **Date**

_____ _____

Site Safety Officer (signature) **Date**

APPENDIX C

CHEMICAL HAZARDS

CHEMICAL HAZARDS

The attached International Chemical Safety Cards are provided for contaminants of concern that have been identified in soils and/or groundwater at the site.

International Chemical Safety Cards

1,2,4-TRIMETHYLBENZENE

ICSC: 1433

Pseudocumene

C_9H_{12}

Molecular mass: 120,2

ICSC # 1433
CAS # 95-63-6
RTECS # DC3325000
UN # 1993
EC # 601-043-00-3
March 06, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Alcohol-resistant foam, dry powder, carbon dioxide.
EXPLOSION	Above 44°C explosive vapour/air mixtures may be formed.	Above 44°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS!	
•INHALATION	Confusion. Cough. Dizziness. Drowsiness. Headache. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness. Dry skin.	Protective gloves.	Rinse skin with plenty of water or shower.
•EYES	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants. Well closed. Keep in a well-ventilated room.	Xn symbol N symbol R: 10-20-36/37/38-51/53 S: 2-26-61 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1433

International Chemical Safety Cards

1,2,4-TRIMETHYLBENZENE

ICSC: 1433

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on burning producing toxic and irritating fumes Reacts violently with strong oxidants causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: (as mixed isomers) 25 ppm as TWA (ACGIH 2004). MAK: (as mixed isomers) 20 ppm 100 mg/m³ Peak limitation category: II(2) Pregnancy risk group: C (DFG 2004). OSHA PEL†: none NIOSH REL: TWA 25 ppm (125 mg/m^3) NIOSH IDLH: N.D. See: IDLH INDEX	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes the skin and the respiratory tract If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. Lungs may be affected by repeated or prolonged exposure , resulting in chronic bronchitis The substance may have effects on the central nervous system blood See Notes.
PHYSICAL PROPERTIES	Boiling point: 169°C Melting point: -44°C Relative density (water = 1): 0.88 Solubility in water: very poor Relative vapour density (air = 1): 4.1	Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 44°C c.c. Auto-ignition temperature: 500°C Explosive limits, vol% in air: 0.9-6.4 Octanol/water partition coefficient as log Pow: 3.8
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish. 	

N O T E S

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. See also ICSC 1155 1,3,5-Trimethylbenzene (Mesitylene), ICSC 1362 1,2,3-Trimethylbenzene (Hemimellitene), ICSC 1389 Trimethyl benzene (mixed isomers). 1,3,5-Trimethylbenzene (Mesitylene) is classified as a marine pollutant.

Transport Emergency Card: TEC (R)-30GF1-III
NFPA Code: H0; F2; R0;

ADDITIONAL INFORMATION

International Chemical Safety Cards

1,3,5-TRIMETHYLBENZENE

ICSC: 1155

Mesitylene
C_9H_{12}
Molecular mass: 120.2

ICSC # 1155
CAS # 108-67-8
RTECS # OX6825000
UN # 2325
EC # 601-025-00-5
March 06, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Alcohol-resistant foam, dry powder, carbon dioxide.
EXPLOSION	Above 50°C explosive vapour/air mixtures may be formed.	Above 50°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS!	
•INHALATION	Confusion. Cough. Dizziness. Drowsiness. Headache. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness. Dry skin.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants. Well closed. Keep in a well-ventilated room.	Marine pollutant. Xi symbol N symbol R: 10-37-51/53 S: 2-61 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1155

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

1,3,5-TRIMETHYLBENZENE

ICSC: 1155

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on burning producing toxic and irritating fumes. Reacts violently with strong oxidants causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV (as mixed isomers): 25 ppm; (ACGIH 2001). MAK (all isomers): 20 ppm; 100 mg/m^3; class II 1 © (2001) OSHA PEL†: none NIOSH REL: TWA 25 ppm (125 mg/m^3) NIOSH IDLH: N.D. See: IDLH INDEX	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes the skin and the respiratory tract If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. Lungs may be affected by repeated or prolonged exposure, resulting in chronic bronchitis. The substance may have effects on the central nervous system blood See Notes.
PHYSICAL PROPERTIES	Boiling point: 165°C Melting point: -45°C Relative density (water = 1): 0.86 Solubility in water: very poor Vapour pressure, kPa at 20°C: 0.25	Relative vapour density (air = 1): 4.1 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 50°C (c.c.) Auto-ignition temperature: 550°C Octanol/water partition coefficient as log Pow: 3.42
ENVIRONMENTAL DATA	The substance is harmful to aquatic organisms. Bioaccumulation of this chemical may occur in fish. 	

NOTES

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. See ICSC 1433 1,2,4-Trimethylbenzene (Pseudocumene), ICSC 1362 1,2,3-Trimethylbenzene (Hemimellitene), ICSC 1389 Trimethyl benzene (mixed isomers).

Transport Emergency Card: TEC (R)-30S2325
NFPA Code: H0; F2; R0

ADDITIONAL INFORMATION

International Chemical Safety Cards

NAPHTHALENE

ICSC: 0667

Naphthene
$C_{10}H_8$
Molecular mass: 128.18

ICSC # 0667
CAS # 91-20-3
RTECS # QJ0525000
UN # 1334 (solid); 2304 (molten)
EC # 601-052-00-2
April 21, 2005 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 80°C explosive vapour/air mixtures may be formed. Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION	Headache. Weakness. Nausea. Vomiting. Sweating. Confusion. Jaundice. Dark urine.	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! (Further see Inhalation).	Protective gloves.	Rinse skin with plenty of water or shower.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Diarrhoea. Convulsions. Unconsciousness. (Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: filter respirator for organic gases and vapours. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants, food and feedstuffs . Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 22-40-50/53 S: 2-36/37-46-60-61 UN Hazard Class: 4.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0667

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

NAPHTHALENE

ICSC: 0667

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
WHITE SOLID IN VARIOUS FORMS , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
On combustion, forms irritating and toxic gases. Reacts with strong oxidants .

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 10 ppm as TWA; 15 ppm as STEL; (skin); A4 (not classifiable as a human carcinogen); (ACGIH 2005).
MAK: skin absorption (H);
Carcinogen category: 2; Germ cell mutagen group: 3B; (DFG 2004).
OSHA PEL†: TWA 10 ppm (50 mg/m^3)
NIOSH REL: TWA 10 ppm (50 mg/m^3) ST 15 ppm (75 mg/m^3)
NIOSH IDLH: 250 ppm See: 91203

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. See Notes.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance may cause effects on the blood , resulting in lesions of blood cells (haemolysis) . See Notes. The effects may be delayed. Exposure by ingestion may result in death. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the blood , resulting in chronic haemolytic anaemia. The substance may have effects on the eyes , resulting in the development of cataract. This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 218°C

Sublimation slowly at room temperature
Melting point: 80°C
Density: 1.16
g/cm³
Solubility in water, g/100 ml at 25°C:
none

Vapour pressure, Pa at 25°C: 11
Relative vapour density (air = 1): 4.42
Flash point:
80°C c.c.
Auto-ignition temperature: 540°C
Explosive limits, vol% in air: 0.9-5.9
Octanol/water partition coefficient as log Pow: 3.3

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.

NOTES

Some individuals may be more sensitive to the effect of naphthalene on blood cells.

Transport Emergency Card: TEC (R)-41S1334 (solid); 41GF1-II+III (solid); 41S2304 (molten)

NFPA Code: H2; F2; R0;

ADDITIONAL INFORMATION

ICSC: 0667 **NAPHTHALENE**

IMPORTANT LEGAL NOTICE:

Material Safety Data Sheet

Normal-Butylbenzene, 99+%

ACC# 55434

Section 1 - Chemical Product and Company Identification

MSDS Name: Normal-Butylbenzene, 99+%
Catalog Numbers: AC107850000, AC107850050, AC107850250, AC107850500, AC107851000, AC107852500 AC107852500
Synonyms: 1-Phenylbutane
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
104-51-8	n-Butylbenzene	>99	203-209-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 59 deg C.
Warning! Flammable liquid and vapor. May cause eye and skin irritation. May cause respiratory and digestive tract irritation. The toxicological properties of this material have not been fully investigated.
Target Organs: Liver, nervous system.

Potential Health Effects

Eye: May cause eye irritation. The toxicological properties of this material have not been fully investigated.
Skin: May cause skin irritation. The toxicological properties of this material have not been fully investigated.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. The toxicological properties of this substance have not been fully investigated.
Inhalation: May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated. Vapors may cause dizziness or suffocation.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Flammable liquid and vapor. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Use agent most appropriate to extinguish fire. Do NOT use straight streams of water.
Flash Point: 59 deg C (138.20 deg F)
Autoignition Temperature: 412 deg C (773.60 deg F)
Explosion Limits, Lower:.80 vol %
Upper: 5.80 vol %
NFPA Rating: (estimated) Health: 1; Flammability: 2; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low. Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
n-Butylbenzene	none listed	none listed	none listed

OSHA Vacated PELs: n-Butylbenzene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions. Follow the OSHA respirator regulations found in 29

CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: None reported.
pH: Not available.
Vapor Pressure: 1.33 hPa @ 23 C
Vapor Density: 4.6
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 183 deg C @ 760.00mm Hg
Freezing/Melting Point:-88 deg C
Decomposition Temperature:> 183 deg C
Solubility: insoluble
Specific Gravity/Density:.8600g/cm3
Molecular Formula:C10H14
Molecular Weight:134.22

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, ignition sources, excess heat, strong oxidants.
Incompatibilities with Other Materials: Oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 104-51-8: CY9070000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 104-51-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: Rapidly volatilizes into the atmosphere where it is photochemically degraded by hydroxyl radicals.

Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	BUTYL BENZENES	No information available.
Hazard Class:	3	
UN Number:	UN2709	
Packing Group:	III	

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 104-51-8 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 104-51-8: Effective 6/1/87, Sunset 12/19/95
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 104-51-8: immediate, fire.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 104-51-8 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European / International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

R 10 Flammable.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 24/25 Avoid contact with skin and eyes.
S 33 Take precautionary measures against static discharges.
S 37 Wear suitable gloves.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 9 Keep container in a well-ventilated place.
S 28A After contact with skin, wash immediately with plenty of water
.

WGK (Water Danger/Protection)

CAS# 104-51-8: 1

Canada - DSL/NDSL

CAS# 104-51-8 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B3, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 4/15/1998
Revision #4 Date: 3/16/2007

Material Safety Data Sheet

Version 4.0
Revision Date 07/28/2010
Print Date 12/07/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Propylbenzene
Product Number	:	P52407
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Combustible Liquid

Target Organs

Lungs, Eyes, Kidney

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H335	May cause respiratory irritation.
H401	Toxic to aquatic life.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P331	Do NOT induce vomiting.

HMIS Classification

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	2
Physical hazards:	0

NFPA Rating

Health hazard:	1
Fire:	2
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Ingestion Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 1-Phenylpropane

Formula : C_9H_{12}
Molecular Weight : 120.19 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Propylbenzene			
103-65-1	203-132-9	601-024-00-X	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
For prolonged or repeated contact use protective gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point	-99 °C (-146 °F) - lit.
Boiling point	159 °C (318 °F) - lit.
Flash point	42.0 °C (107.6 °F) - closed cup
Ignition temperature	450 °C (842 °F)
Lower explosion limit	0.8 %(V)
Upper explosion limit	6 %(V)
Density	0.862 g/cm3 at 25 °C (77 °F)
Water solubility	slightly soluble

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - rat - 6,040 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity).

LC50 Inhalation - rat - 2 h - 65000 ppm

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
Damage to the lungs., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information
RTECS: DA8750000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 1.55 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - 2 mg/l - 24 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2364 Class: 3 Packing group: III
Proper shipping name: n-Propyl benzene
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2364 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: PROPYLBENZENE
Marine pollutant: No

IATA
UN-Number: 2364 Class: 3 Packing group: III
Proper shipping name: n-Propylbenzene

15. REGULATORY INFORMATION

OSHA Hazards
Combustible Liquid

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Propylbenzene	103-65-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Propylbenzene	103-65-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Propylbenzene	103-65-1	2007-03-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

International Chemical Safety Cards

o-XYLENE

ICSC: 0084

ortho-Xylene
1,2-Dimethylbenzene
o-Xylol
$C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2

ICSC # 0084
CAS # 95-47-6
RTECS # ZE2450000
UN # 1307
EC # 601-022-00-9
August 03, 2002 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 32°C explosive vapour/air mixtures may be formed.	Above 32°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0084

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

o-XYLENE

ICSC: 0084

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** As a result of flow, agitation, etc., electrostatic charges can be generated. **CHEMICAL DANGERS:** Reacts with strong acids strong oxidants **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m³ Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL†: TWA 100 ppm (435 mg/m^3) NIOSH REL: TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3) NIOSH IDLH: 900 ppm See: 95476	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation, through the skin and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. The substance may have effects on the central nervous system. Exposure to the substance may enhance hearing damage caused by exposure to noise. Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Boiling point: 144°C Melting point: -25°C Relative density (water = 1): 0.88 Solubility in water: none Vapour pressure, kPa at 20°C: 0.7	Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 32°C c.c. Auto-ignition temperature: 463°C Explosive limits, vol% in air: 0.9-6.7 Octanol/water partition coefficient as log Pow: 3.12
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. 	

N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0086 p-Xylene and 0085 m-Xylene.

Transport Emergency Card: TEC (R)-30S1307-III
NFPA Code: H 2; F 3; R 0;

ADDITIONAL INFORMATION

International Chemical Safety Cards

p-XYLENE

ICSC: 0086

para-Xylene
1,4-Dimethylbenzene
p-Xylol
$C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2

ICSC # 0086
CAS # 106-42-3
RTECS # ZE2625000
UN # 1307
EC # 601-022-00-9
August 03, 2002 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 27°C explosive vapour/air mixtures may be formed.	Above 27°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants, strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0086

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

p-XYLENE

ICSC: 0086

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** As a result of flow, agitation, etc., electrostatic charges can be generated. **CHEMICAL DANGERS:** Reacts with strong acids strong oxidants **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m³ Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL†: TWA 100 ppm (435 mg/m^3) NIOSH REL: TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3) NIOSH IDLH: 900 ppm See: 95476 **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation, through the skin and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. The substance may have effects on the central nervous system. Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Boiling point: 138°C Melting point: 13°C Relative density (water = 1): 0.86 Solubility in water: none Vapour pressure, kPa at 20°C: 0.9 Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 27°C c.c. Auto-ignition temperature: 528°C Explosive limits, vol% in air: 1.1-7.0 Octanol/water partition coefficient as log Pow: 3.15
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. 

N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0084 o-Xylene and 0085 m-Xylene.

Transport Emergency Card: TEC (R)-30S1307-III
NFPA Code: H 2; F 3; R 0;

ADDITIONAL INFORMATION

ICSC: 0086 **p-XYLENE**

International Chemical Safety Cards

m-XYLENE

ICSC: 0085

meta-Xylene
1,3-Dimethylbenzene
m-Xylol
$C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2

ICSC # 0085
CAS # 108-38-3
RTECS # ZE2275000
UN # 1307
EC # 601-022-00-9
August 03, 2002 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 27°C explosive vapour/air mixtures may be formed.	Above 27°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0085

International Chemical Safety Cards

m-XYLENE

ICSC: 0085

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** As a result of flow, agitation, etc., electrostatic charges can be generated. **CHEMICAL DANGERS:** Reacts with strong acids strong oxidants **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m³ Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL†: TWA 100 ppm (435 mg/m^3) NIOSH REL: TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3) NIOSH IDLH: 900 ppm See: 95476 **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation, through the skin and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. The substance may have effects on the central nervous system Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Boiling point: 139°C Melting point: -48°C Relative density (water = 1): 0.86 Solubility in water: none Vapour pressure, kPa at 20°C: 0.8 Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 27°C c.c. Auto-ignition temperature: 527°C Explosive limits, vol% in air: 1.1-7.0 Octanol/water partition coefficient as log Pow: 3.20
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. 

N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0084 o-Xylene and 0086 p-Xylene.

NFPA Code: H 2; F 3; R 0;
Transport Emergency Card: TEC (R)-30S1307-III

ADDITIONAL INFORMATION

International Chemical Safety Cards

p-CYMENE

ICSC: 0617

1-Methyl-4-isopropylbenzene
Dolcymene
Camphogen
$C_{10}H_{14}$ / $CH_3C_6H_4CH(CH_3)_2$
Molecular mass: 134.2

ICSC # 0617
CAS # 99-87-6
RTECS # GZ5950000
UN # 2046
November 04, 1997 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Above 47°C explosive vapour/air mixtures may be formed.	Above 47°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS!	
•INHALATION	Dizziness. Drowsiness. Vomiting.	Ventilation.	Fresh air, rest. Half-upright position. Artificial respiration if indicated. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Wear protective gloves when administering first aid.
•EYES	Redness.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Diarrhoea. Drowsiness. Headache. Nausea. Vomiting. Unconsciousness.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. (Extra personal protection: filter respirator for organic gases and vapours).	Fireproof.	UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0617

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

p-CYMENE

ICSC: 0617

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** The vapour is heavier than air. **CHEMICAL DANGERS:** Reacts with oxidants. Attacks rubber. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its vapour and by ingestion. **INHALATION RISK:** No indication can be given about the rate in which a harmful concentration in the air is reached on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes and the skin . Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin.
PHYSICAL PROPERTIES	Boiling point: 177°C Melting point: -68°C Relative density (water = 1): 0.85 Solubility in water, g/100 ml at 25°C: 0.002 Vapour pressure, Pa at 20°C: 200 Relative vapour density (air = 1): 4.62 Flash point: 47°C c.c. Auto-ignition temperature: 435°C Explosive limits, vol% in air: 0.7-5.6 Octanol/water partition coefficient as log Pow: 4.1
ENVIRONMENTAL DATA	

N O T E S

Transport Emergency Card: TEC (R)-30G35

NFPA Code: H2; F2; R0;

ADDITIONAL INFORMATION

ICSC: 0617 **p-CYMENE**

Material Safety Data Sheet

Version 4.0
Revision Date 07/24/2010
Print Date 12/07/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	*sec*-Butylbenzene
Product Number	:	B90408
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Combustible Liquid, Irritant

GHS Label elements, including precautionary statements

Pictogram

Signal word: Warning

Hazard statement(s)

H226	Flammable liquid and vapour.
H315 + H320	Causes skin and eye irritation.
H401	Toxic to aquatic life.

Precautionary statement(s)

P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard:	2
Flammability:	2
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	2
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 2-Phenylbutane

Formula	:	$C_{10}H_{14}$
Molecular Weight	:	134.22 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
sec-Butylbenzene			
135-98-8	205-227-0	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point	75.5 °C (167.9 °F) - lit.
Boiling point	173 - 174 °C (343 - 345 °F) - lit.
Flash point	52.0 °C (125.6 °F) - closed cup
Ignition temperature	418 °C (784 °F)
Lower explosion limit	0.8 %(V)
Density	0.863 g/mL at 25 °C (77 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Dermal - rabbit - > 13,792 mg/kg

Skin corrosion/irritation
Skin - rabbit - irritating - 24 h

Serious eye damage/eye irritation
Eyes - rabbit - Mild eye irritation - 24 h

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information
RTECS: CY9100000

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2709 Class: 3 Packing group: III
Proper shipping name: Butyl benzenes
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2709 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: BUTYLBENZENES
Marine pollutant: No

IATA
UN-Number: 2709 Class: 3 Packing group: III
Proper shipping name: Butylbenzenes

15. REGULATORY INFORMATION

OSHA Hazards
Combustible Liquid, Irritant

DSL Status
This product contains the following components that are not on the Canadian DSL nor NDSL lists.

	CAS-No.
sec-Butylbenzene	135-98-8

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
sec-Butylbenzene	135-98-8	

New Jersey Right To Know Components

	CAS-No.	Revision Date
sec-Butylbenzene	135-98-8	

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

International Chemical Safety Cards

TETRACHLOROETHYLENE

ICSC: 0076

1,1,2,2-Tetrachloroethylene
Perchloroethylene
Tetrachloroethene
C_2Cl_4 / $Cl_2C=CCl_2$
Molecular mass: 165.8

ICSC # 0076
CAS # 127-18-4
RTECS # KX3850000
UN # 1897
EC # 602-028-00-4
April 13, 2000 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		STRICT HYGIENE! PREVENT GENERATION OF MISTS!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea. Weakness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles , face shield .	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Separated from metals ,(see Chemical Dangers), food and feedstuffs . Keep in the dark. Ventilation along the floor.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 40-51/53 S: (2-)23-36/37-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0076

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

TETRACHLOROETHYLENE

ICSC: 0076

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (hydrogen chloride, phosgene, chlorine). The substance decomposes slowly on contact with moisture producing trichloroacetic acid and hydrochloric acid. Reacts with metals such as aluminium, lithium, barium, beryllium.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 25 ppm as TWA, 100 ppm as STEL; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004).
MAK: skin absorption (H);
Carcinogen category: 3B;
(DFG 2004).
OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 3-hours)
NIOSH REL: Ca Minimize workplace exposure concentrations. See Appendix A
NIOSH IDLH: Ca 150 ppm See: 127184

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes , the skin and the respiratory tract . If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure at high levels may result in unconsciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidneys. This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 121°C
Melting point: -22°C
Relative density (water = 1): 1.6
Solubility in water, g/100 ml at 20°C: 0.015

Vapour pressure, kPa at 20°C: 1.9
Relative vapour density (air = 1): 5.8
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.09
Octanol/water partition coefficient as log Pow: 2.9

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.

N O T E S

Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert. Card has been partly updated in April 2005. See section Occupational Exposure Limits.

Transport Emergency Card: TEC (R)-61S1897

NFPA Code: H2; F0; R0;

ADDITIONAL INFORMATION

IMPORTANT LEGAL NOTICE:

International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

1,1,2-Trichloroethylene
Trichloroethene
Ethylene trichloride
Acetylene trichloride
C_2HCl_3 / $ClCH=CCl_2$
Molecular mass: 131.4

ICSC # 0081
CAS # 79-01-6
RTECS # KX4550000
UN # 1710
EC # 602-027-00-9
April 10, 2000 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions. See Notes.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION		Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
•INHALATION	Dizziness. Drowsiness. Headache. Weakness. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment.	Separated from metals (see Chemical Dangers), strong bases, food and feedstuffs . Dry. Keep in the dark. Ventilation along the floor. Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. T symbol R: 45-36/38-52/53-67 S: 53-45-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0081 OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air. As a result of flow, agitation, etc., electrostatic charges can be generated.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (phosgene , hydrogen chloride). The substance decomposes on contact with strong alkali producing dichloroacetylene , which increases fire hazard. Reacts violently with metal powders such as magnesium, aluminium, titanium, and barium. Slowly decomposed by light in presence of moisture, with formation of corrosive hydrochloric acid.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 50 ppm as TWA; 100 ppm as STEL; A5; BEI issued; (ACGIH 2004).
MAK:
Carcinogen category: 1; Germ cell mutagen group: 3B; (DFG 2007).
OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)
NIOSH REL: Ca See Appendix A See Appendix C
NIOSH IDLH: Ca 1000 ppm See: 79016

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes and the skin . Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system , resulting in respiratory failure . Exposure could cause lowering of consciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the central nervous system , resulting in loss of memory. The substance may have effects on the liver and kidneys (see Notes). This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 87°C
Melting point: -73°C
Relative density (water = 1): 1.5
Solubility in water, g/100 ml at 20°C: 0.1
Vapour pressure, kPa at 20°C: 7.8
Relative vapour density (air = 1): 4.5
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.3
Auto-ignition temperature: 410°C
Explosive limits, vol% in air: 8-10.5
Octanol/water partition coefficient as log Pow: 2.42
Electrical conductivity: 800pS/m

ENVIRONMENTAL DATA

The substance is harmful to aquatic organisms. The substance may cause long-term effects in the aquatic environment.

NOTES

Combustible vapour/air mixtures difficult to ignite, may be developed under certain conditions. Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.

Transport Emergency Card: TEC (R)-61S1710

NFPA Code: H2; F1; R0;
Card has been partially updated in October 2004: see Occupational Exposure Limits, EU Classification, Emergency Response.
Card has been partially updated in April 2010: see Occupational Exposure Limits, Ingestion First Aid, Storage.

ADDITIONAL INFORMATION

APPENDIX D

HOSPITAL INFORMATION AND MAP

FIELD ACCIDENT REPORT

FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME _____ PROJECT. NO._____

Date of Accident _____ Time _____ Report By _____

Type of Accident (Check One):

( ) Vehicular ( ) Personal ( ) Property

Name of Injured _____ DOB or Age _____

How Long Employed _____

Names of Witnesses _____

_____

Description of Accident _____

_____

_____

Action Taken _____

_____

_____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)? _____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? _____

_____

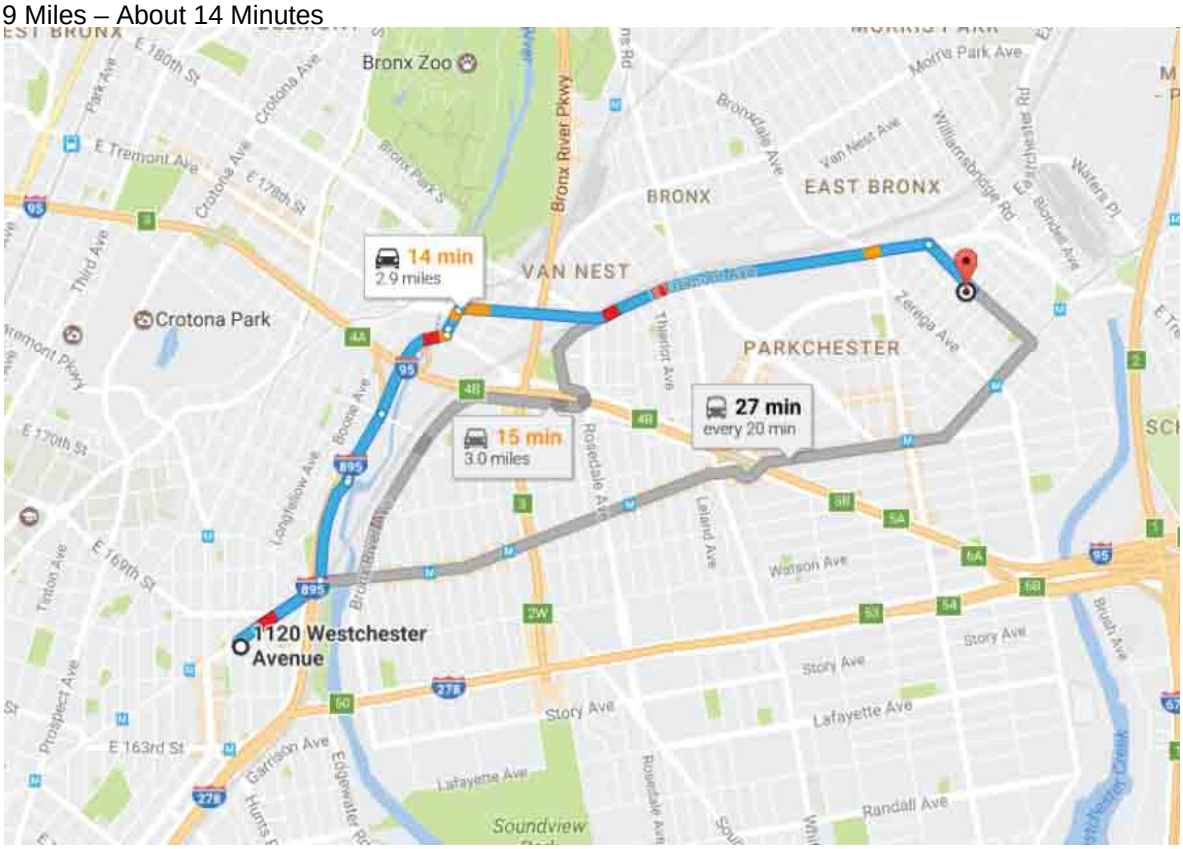
(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

WESTCHESTER SQUARE MONTEFIORE MEDICAL CENTER
2475 St. Raymonds Avenue, Bronx, New York 10461
718-430-7300
2.9 Miles – About 14 Minutes



1. Head northeast on Westchester Ave toward Faile St — 0.3 mi
2. Continue straight onto Sheridan Expy — 0.3 mi
3. Continue straight — 72 ft
4. Take the ramp onto I-895 N — 0.2 mi
5. Use the left lane to take the East 177th Street exit toward East Tremont Avenue — 0.3 mi
6. Turn left onto E 177th St — 95 ft
7. Slight right onto Devoe Ave — 354 ft
8. Turn right onto E Tremont Ave — 1.4 mi
9. Turn right onto St Peters Ave — 56 s (0.2 mi)

ATTACHMENT B
Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN
1120 Westchester Avenue
Bronx, NY

Prepared on behalf of:

West Levy LLC
140 East 7th Street
Brooklyn, NY 11223

Prepared by:

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961

TABLE OF CONTENTS

QUALITY ASSURANCE PROJECT PLAN
1120 Westchester Avenue, Bronx, NY

TABLES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared in accordance with DER-10 to detail procedures to be followed during the course of the sampling and analytical portion of the project, as required by the approved work plan.

To ensure the successful completion of the project each individual responsible for a given component of the project must be aware of the quality assurance objectives of his / her particular work and of the overall project. The Project Director, Charles Sosik will be directly responsible to the client for the overall project conduct and quality assurance/quality control (QA/QC) for the project. The Project Director will be responsible for overseeing all technical and administrative aspects of the project and for directing QA/QC activities. Ms. Chawinie Miller will serve as the Quality Assurance Officer (QAO) and in this role may conduct:

- conduct periodic field and sampling audits;
- interface with the analytical laboratory to resolve problems; and
- interface with the data validator and/or the preparer of the DUSR to resolve problems.

Robert Bennett will serve as the Project Manager and will be responsible for implementation of the Interim Remedial Measure and coordination with field sampling crews and subcontractors. Reporting directly to the Project Manager will be the Field Operations Officer, Kevin Waters; who will serve as the on-Site qualified environmental professional who will record observations, monitor excavation activities and be responsible for the collection and handling of all samples.

1.1 Organization

Project QA will be maintained under the direction of the Project Manager, in accordance with this QAPP. QC for specific tasks will be the responsibility of the individuals and organizations listed below, under the direction and coordination of the Project Manager
.

GENERAL RESPONSIBILITY	SCOPE OF WORK	RESPONSIBILITY OF QUALITY CONTROL
Field Operations	Monitoring of Remedial Activities, sample collection and handling	K. Waters, EBC
Project Manager	Implementation of the Remedial Action according to the RAWP	Robert Bennett, EBC
Laboratory Analysis	Analysis of soil samples by NYSDEC ASP methods Laboratory	NYSDOH-Certified Laboratory
Data review	Review for completeness and compliance	3rd party validation

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 MIDDLE COUNTRY ROAD
RIDGE, NY 11961
PHONE 631.504.6000
FAX 631.924.2870

2.0 QUALITY ASSURANCE PROJECT PLAN OBJECTIVES

2.1 Overview

Overall project goals are defined through the development of Data Quality Objectives (DQOs), which are qualitative and quantitative Statements that specify the quality of the data required to support decisions; DQOs, as described in this section, are based on the end uses of the data as described in the work plan.

In this plan, Quality Assurance and Quality Control are defined as follows:

- Quality Assurance - The overall integrated program for assuring reliability of monitoring and measurement data.

- Quality Control - The routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process.

2.2 QA / QC Requirements for Analytical Laboratory

Samples will be analyzed by a New York State Department of Health (NYSDOH) certified laboratory. Data generated from the laboratory will be used to evaluate chlorinated and other volatile organic compounds (VOCs) in soil and effluent air from a soil vapor extraction treatment system. The QA requirements for all subcontracted analytical laboratory work performed on this project are described below. QA elements to be evaluated include accuracy, precision, sensitivity, representativeness, and completeness. The data generated by the analytical laboratory for this project are required to be sensitive enough to achieve detection levels low enough to meet required quantification limits as specified in NYSDEC Analytical Services Protocol (NYSDEC ASP, 07/2005). The analytical results meeting the required quantification limits will provide data sensitive enough to meet the data quality objectives of this remedial program as described in the work plan. Reporting of the data must be clear, concise, and comprehensive. The QC elements that are important to this project are completeness of field data, sample custody, sample holding times, sample preservation, sample storage, instrument calibration and blank contamination.

2.2.1 Instrument Calibration

Calibration curves will be developed for each of the compounds to be analyzed. Standard concentrations and a blank will be used to produce the initial curves. The development of calibration curves and initial calibration response factors must be consistent with method requirements presented in the most recent version of (NYSDEC ASP 07/2005).

2.2.2 Continuing Instrument Calibration

The initial calibration curve will be verified every 12 hrs by analyzing one calibration standard. The standard concentration will be the midpoint concentration of the initial calibration curve. The calibration check compound must come within 25% relative percent difference (RPD) of the average response factor obtained during initial calibration. If the RPD is greater than 25%, then corrective action must be taken as provided in the specific methodology.

2.2.3 Method Blanks

Method blank or preparation blank is prepared from an analyte-free matrix which includes the same reagents, internal standards and surrogate standards as the related samples. It is carried through the

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 MIDDLE COUNTRY ROAD
RIDGE, NY 11961
PHONE 631.504.6000
FAX 631.924.2870

entire sample preparation and analytical pro cedure. A m ethod blank analysis will be perform ed once for each 12 hr period d uring the an alysis of samples for v olatiles. An acceptable m ethod blank will contain less than two (2) times the CRQL of methylene chloride, acetone and 2-butanone. For all other target compounds, the m ethod blank m ust contain less than or equal to the CRQ L of any single target compound. For non-target peaks in the m ethod blank, the peak area must be less than 10 percent of the nearest in ternal s tandard. The m ethod blank will be us ed to dem onstrate th e level of laboratory background and reagent contamination that might result from the analytical process itself.

2.2.4 Trip Blanks.

Trip blanks consist of a single s et of sam ple contain ers f illed at the labora tory with deio nized. laboratory-grade water. The water u sed will be from the sam e source as that used f or the labo ratory method blank. The containers will be carried into th e field and handled and tr ansported in the sam e way as the sam ples collec ted tha t day. Analysis of the trip blank f or VOCs is used to id entify contamination from the air, shipping containers, or from other items coming in contact with the sample bottles. (The bottles holding the tr ip blanks will be not opened during this pro cedure.) A com plete set of trip blanks will be provided with each shipment of samples to the certified laboratory.

2.2.5 Surrogate Spike Analysis

For organic analyses, all sam ples and blanks will be spiked with su rrogate compounds before purging or extraction in order to m onitor preparation and analyses of sam ples. Surrogate spik e recoveries shall fall with in the adviso ry lim its in a ccordance with the NY5DEC ASP protocols for sam ples falling within the quantification limits without dilution.

2.2.6 Matrix Spike / Matrix Spike Duplicate / Matrix Spike Blank (MS/MSDIMSB) Analysis

MS, MSD and MSB analyses will be perform ed to ev aluate the m atrix effect of the sam ple upon the analytical methodology along with the precision of the instrum ent by measuring recoveries. The MS / MSD / MSB sam ples will be analyzed for each group of sam ples of a si milar m atrix at a rate of 5% (one for every 20 field samples). The RPD will be calculated from the difference between the MS and MSD. Matrix spike bla nk analysis will be pe rformed to indicate the a ppropriateness of the spikin g solution(s) used for the MS/MSD.

2.3 Accuracy

Accuracy is defined as the nearness of a real or the m ean (x) of a set of results to the true v alue. Accuracy is assessed by m eans of r eference samples and percen t recoveries. Accuracy includes both precision and recovery and is expressed as percen t re covery (% REC). The MS sample is use d to determine the percen t recovery. The m atrix s pike percent recovery (% REC) is calculated by the following equation:

$$\%REC = \frac{SSR - SR}{SA} \times 100$$

Where:
SSR = spike sample results
SR = sample results
SA = spike added from spiking mix

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2.4 Precision

Precision is defined as the measurement of agreement of a set of replicate results among themselves without a Precision is defined as the measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed by means of duplicate/replicate sample analyses.

Analytical precision is expressed in terms of RPD. The RPD is calculated using the following formula:

$$RPD = \frac{D^1 - D^2}{(D^1 + D^2)/2} \times 100$$

Where:
RPD = relative percent difference
D^1 = first sample value
D^2 = second sample value (duplicate)

2.5 Sensitivity

The sensitivity objectives for this plan require that data generated by the analytical laboratory achieve quantification levels low enough to meet the required detection limits specified by NYSDEC ASP and to meet all site-specific standards, criteria and guidance values (SGCs) established for this project.

2.6 Representativeness

Representativeness is a measure of the relationship of an individual sample taken from a particular site to the remainder of that site and the relationship of a small aliquot of the sample (i.e., the one used in the actual analysis) to the sample remaining on site. The representativeness of samples is assured by adherence to sampling procedures described in the Interim Remedial Measure Work Plan.

2.7 Completeness

Completeness is a measure of the quantity of data obtained from a measurement system as compared to the amount of data expected from the measurement system. Completeness is defined as the percentage of all results that are not affected by failing QC qualifiers, and should be between 70 and 100% of all analyses performed. The objective of completeness in laboratory reporting is to provide a thorough data support package. The laboratory data package provides documentation of sample analysis and results in the form of summaries, QC data, and raw analytical data. The laboratory will be required to submit data packages that follow NYSDEC ASP reporting format which, at a minimum, will include the following components:

1. All sample chain-of-custody forms.
2. The case narrative(s) presenting a discussion of any problems and/or procedural changes required during analyses. Also presented in the case narrative are sample summary forms.
3. Documentation demonstrating the laboratory's ability to attain the contract specified detection limits for all target analytes in all required matrices.
4. Tabulated target compound results and tentatively identified compounds.
5. Surrogate spike analysis results (organics).
6. Matrix spike/matrix spike duplicate/matrix spike blank results.
7. QC check sample and standard recovery results
8. Blank results (field, trip, and method).
9. Internal standard area and RT summary.

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2.8 Laboratory Custody Procedures

The following elements are important for maintaining the field custody of samples:

- Sample identification
- Sample labels
- Custody records
- Shipping records
- Packaging procedures

Sample labels will be attached to all sampling bottles before field activities begin; each label will contain an identifying number. Each number will have a suffix that identifies the site and where the sample was taken. Approximate sampling locations will be marked on a map with a description of the sample location. The number, type of sample, and sample identification will be entered into the field logbook. A chain-of-custody form, initiated at the analytical laboratory will accompany the sample bottles from the laboratory into the field. Upon receipt of the bottles and cooler, the sampler will sign and date the first received blank space. After each sample is collected and appropriately identified, entries will be made on the chain-of-custody form that will include:

- Site name and address
- Samplers' names and signatures

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3.0 ANALYTICAL PROCEDURES

3.1 Laboratory Analysis

Samples will be analyzed by the NYSDOH ELAP laboratory for one or more of the following parameters: VOCs in soil by USEPA Method 8260 and VOCs in air by USEPA Method TO15. If any modifications or additions to the standard procedures are anticipated, and if any nonstandard sample preparation or analytical protocol is to be used, the modifications and the nonstandard protocol will be explicitly defined and documented. Prior approval by EBC's PM will be necessary for any nonstandard analytical or sample preparation protocol used by the laboratory, i.e., dilution of samples or extracts by greater than a factor of five (5).

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4.0 DATA REDUCTION, REVIEW, AND REPORTING

4.1 Overview

The process of data reduction, review, and reporting ensures the assessments or a conclusion based on the final data accurately reflects actual site conditions. This plan presents the specific procedures, methods, and format that will be employed for data reduction, review and reporting of each measurement parameter determined in the laboratory and field. Also described in this section is the process by which all data, reports, and work plans are proofed and checked for technical and numerical errors prior to final submission.

4.2 Data Reduction

Standard methods and references will be used as guidelines for data handling, reduction, validation, and reporting. All data for the project will be compiled and summarized with an independent verification at each step in the process to prevent transcription/typographical errors. Any computerized entry of data will also undergo verification review.

Sample analysis will be provided by a New York State certified environmental laboratory. Laboratory reports will include ASP category B deliverables for use in the preparation of a data usability summary report (DUSR). All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format. Analytical results shall be presented on standard NYSDEC ASP-B forms or equivalents, and include the dates the samples were received and analyzed, and the actual methodology used. Note that when waste characterization samples are analyzed they will be in results only format and will not be evaluated in the DUSR.

Laboratory QA/QC information required by the method protocols will be compiled, including the application of data QA/QC qualifiers as appropriate. In addition, laboratory worksheets, laboratory notebooks, chains-of-custody, instrument logs, standards records, calibration records, and maintenance records, as applicable, will be provided in the laboratory data packages to determine the validity of data. Specifics on internal laboratory data reduction protocols are identified in the laboratory's SOPs.

Following receipt of the laboratory analytical results by EBC, the data results will be compiled and presented in an appropriate tabular form. Where appropriate, the impacts of QA/QC qualifiers resulting from laboratory or external validation reviews will be assessed in terms of data usability.

4.3 Laboratory Data Reporting

All sample data packages submitted by the analytical laboratory will be required to be reported in conformance to the NYSDEC ASP (7/2005), Category B data deliverable requirements as applicable to the method utilized. All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format. Note that waste characterization samples if analyzed will be in results only format and will not be evaluated in the DUSR.

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5.0 CORRECTIVE ACTION

Review and implementation of systems and procedures may result in recommendations for corrective action. Any deviations from the specified procedures within approved project plans due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of the EBC PM, who in turn shall contact the Quality Assurance/Data Quality Manager or his designee (if applicable).

Procedures have been established to ensure that conditions adverse to data quality are promptly investigated, evaluated and corrected. These procedures for review and implementation of a change are as follows:

- Define the problem.
- Investigate the cause of the problem.
- Develop a corrective action to eliminate the problem, in consultation with the personnel who defined the problem and who will implement the change.
- Complete the required form describing the change and its rationale (see below for form requirements).
- Obtain all required written approvals.
- Implement the corrective action.
- Verify that the change has eliminated the problem.

During the field investigation, all changes to the sampling program will be documented in field logs/sheets and the EBC PM advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify the PM, who will consult with other project staff. All approved corrective actions shall be controlled and documented.

All corrective action documentation shall include an explanation of the problem and a proposed solution which will be maintained in the project file or associated logs. Each report must be approved by the necessary personnel (e.g., the PM) before implementation of the change occurs. The PM shall be responsible for controlling, tracking, implementing and distributing identified changes.

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TABLE 1
SUMMARY OF
SAMPLING PROGRAM RATIONALE AND ANALYSIS

Matrix	Location	Approx. Number of Samples	Frequency	Rationale for Sampling	Laboratory Analysis	Duplicates	Matrix Spikes	Spike Duplicates	Trip Blanks
Soil	Cellar level	8-16	1 sample from 0-2 ft interval, 2nd sample from 2-4 ft if bedrock not encountered.	Delineate horizontal and vertical extent of source area	VOCs by 8260	1 per day	1 per 20 samples	1 per 20 samples	1 per trip
Air	Adjacent building Lots 10 and 12	9	2 Subslab and 2 Indoor air from each building, 1 Outdoor Air	SVI on adjacent buildings	VOCs by TO15	0	0	0	0
Air	Effluent air after carbon treatment	1	Quarterly	Confirm discharge within acceptable levels	VOCs by TO15	0	0	0	0

TABLE 2
SAMPLE COLLECTION AND ANALYSIS PROTOCOLS

Sample Type	Matrix	Sampling Device	Parameter	Sample Container	Sample Preservation	Analytical Method#	CRQL / MDLH	Holding Time
Soil	Soil Scoop	Direct into Jar	VOCs	(1) 2 oz Jar	Cool to 4° C HCL	EPA Method 8260	Compound specific (1-5 ug/kg)	14 days
Air	Air Sum	ma Canister	VOCs	2 or 6 liter Summa Canister	None	EPA Method TO15	Compound specific (0.25 to 1 ug/m3)	30 days

Notes:
All holding times listed are from Verified Time of Sample Receipt (VTSR) unless noted otherwise. * Holding time listed is from time of sample collection.
The number in parentheses in the "Sample Container" column denotes the number of containers needed.
Triple volume required when collected MS/MSD samples
The number of trip blanks are estimated.
CRQL / MDL = Contract Required Quantitation Limit / Method Detection Limit.
MCAWW = Methods for Chemical Analysis of Water and Wastes.
NA = Not available or not applicable.

ATTACHMENT C
Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN

1120 Westchester Avenue
Brooklyn, NY

JUNE - 2017

TABLE OF CONTENTS
COMMUNITY AIR MONITORING PLAN
1120 Westchester Avenue, NY

APPENDICES

1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) has been prepared for the excavation and building activities to be performed under an Interim Remedial Measure Work Plan (IRMWP) at 1120 Westchester Avenue, in the Bronx, NY. The CAMP provides measures for protection for building occupants (i.e., on-site receptors including end floor residents) from potential airborne contaminant releases resulting from remedial activities at the site.

Compliance with this CAMP is required during all activities associated with soil disturbance activities that have the potential to generate airborne particulate matter and volatile organic compounds (VOCs). These activities include excavation and loading of affected soil. This CAMP has been prepared to ensure that remedial activities do not adversely on-site residents and to preclude or minimize airborne migration of site-related contaminants to off-site areas.

1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan as presented in DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC May 3, 2010). This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air;

2.0 AIR MONITORING

Volatile organic compounds (VOCs) related to chlorinated solvent contamination are the constituents of concern at the Site. The appropriate method to monitor air for these constituents during remediation activities is through real-time VOC and air particulate (dust) monitoring.

2.1 Meteorological Data

Not applicable.

2.2 Community Air Monitoring Requirements

To establish ambient air background concentrations, air will be monitored at on the vacant first floor commercial space of the building before soil intrusive activities begin. This point will be monitored periodically in series during the site work.

Fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor (or equivalent). Air will be monitored for VOCs with a portable MiniRAE 3000 photoionization detector (PID), or equivalent. All air monitoring data will be documented in a site log book by the designated site safety officer. The site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. All instruments will be zeroed daily and checked for accuracy.

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur.

Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities.

3.0 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

Volatile organic compounds (VOCs) will be monitored on the first floor of the building on a periodic basis. Outdoor concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. 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.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

All readings will be recorded and made available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report, as shown in Appendix A, will be completed. The Action Limit Report will note the activity being performed at the time the exceedance occurred as well as other relevant information.

3.1 Potential Corrective Measures and VOC Suppression Techniques

If the 15-minute integrated VOC level at the downwind location persists at a concentration that exceeds the upwind level by more than 5 ppm but less than 25 ppm during soil disturbance activities, then vapor suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive organic vapors:

- limiting the excavation size;
- backfilling the excavation;
- spraying water onto the excavation faces and equipment;
- covering soil stockpiles with 6-mil plastic sheeting;
- Applying odor controlling sprays (BioSolve Pinkwater or similar).

4.0 PARTICULATE MONITORING

Air monitoring for particulates (i.e., dust) will be performed continuously during soil disturbance activities using both air monitoring equipment and visual observation within the work area and on the first floor of the building. Monitoring equipment capable of measuring particulate matter smaller than 10 microns (PM_{10}) and capable of integrating (averaging) over periods of 15 minutes or less will be used to take readings at outdoor (i.e., background) work zone and first floor locations, at heights approximately four to five feet above land surface (i.e., the breathing zone). Monitoring equipment will be MIE Data Ram monitors, or equivalent. The audible alarm on the particulate monitoring device will be set at 90 micrograms per cubic meter ($\mu g/m_3$). This setting will allow proactive evaluation of worksite conditions prior to reaching the action level of 100 $\mu g/m^3$ above background. The monitors will be calibrated at least once per day prior to work activities and recalibrated as needed thereafter. In addition, fugitive dust migration will be visually assessed during all intrusive work activities.

The following summarizes particulate action levels and the appropriate responses:

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m3 or less at the monitoring point.

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report as shown in **Appendix A** will be completed. The Action Limit Report will note the activity being performed at the time the exceedance occurred as well as other relevant information.

4.1 Potential Particulate Suppression Techniques

If the integrated particulate level at the first floor location exceeds the outdoor level by more than 100 $\mu g/m^3$ at any time during soil disturbance activities, then dust suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive dusts:

- limiting the excavation size;
- backfilling the excavation;
- spraying water onto the excavation faces and equipment;
- placing excavated soil into drums with covers.

There may also be situations where the dust is generated by soil disturbance activities and migrates to the first floor location, but is not detected by the monitoring equipment at or above the action level. Therefore, if dust is observed leaving the working area, dust suppression techniques such as those listed above will be employed.

If dust suppression techniques do not lower particulates to below 150 $\mu g/m^3$, or visible dust persists, work will be suspended until appropriate corrective measures are identified and implemented to remedy the situation.

All air monitoring readings will be recorded in the field logbook and will be available for the NYSDEC and NYSDOH personnel to review.

5.0 DATA QUALITY ASSURANCE

5.1 Calibration

Instrument calibration shall be documented on instrument calibration and maintenance sheets or in the designated field logbook. All instruments shall be calibrated as required by the manufacturer. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

5.2 Operations

All instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on-site by the SSO for reference.

5.3 Data Review

The SSO will interpret all monitoring data based the established criteria and his/her professional judgment. The SSO shall review the data with the PM to evaluate the potential for 2nd floor resident exposure, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with all sample documentation will be periodically reviewed by the PM.

6.0 RECORDS AND REPORTING

All air readings must be recorded on daily air monitoring log sheets and made available for review by personnel from NYSDEC and NYSDOH.

APPENDIX A
ACTION LIMIT REPORT

CAMP
ACTION LIMIT REPORT

Project Location: _____

Date: _____ Time: _____

Name: _____

Contaminant: _____ PM-10: _____ VOC: _____

Wind Speed: _____ Wind Direction: _____

Temperature: _____ Barometric Pressure: _____

DOWNWIND DATA

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

UPWIND DATA

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

BACKGROUND CORRECTED LEVELS

Monitor ID #: Location: _____ Level Reported: Level Reported: _____

ACTIONS TAKEN

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

ATTACHMENT D
Indoor Air Quality Questionaire 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

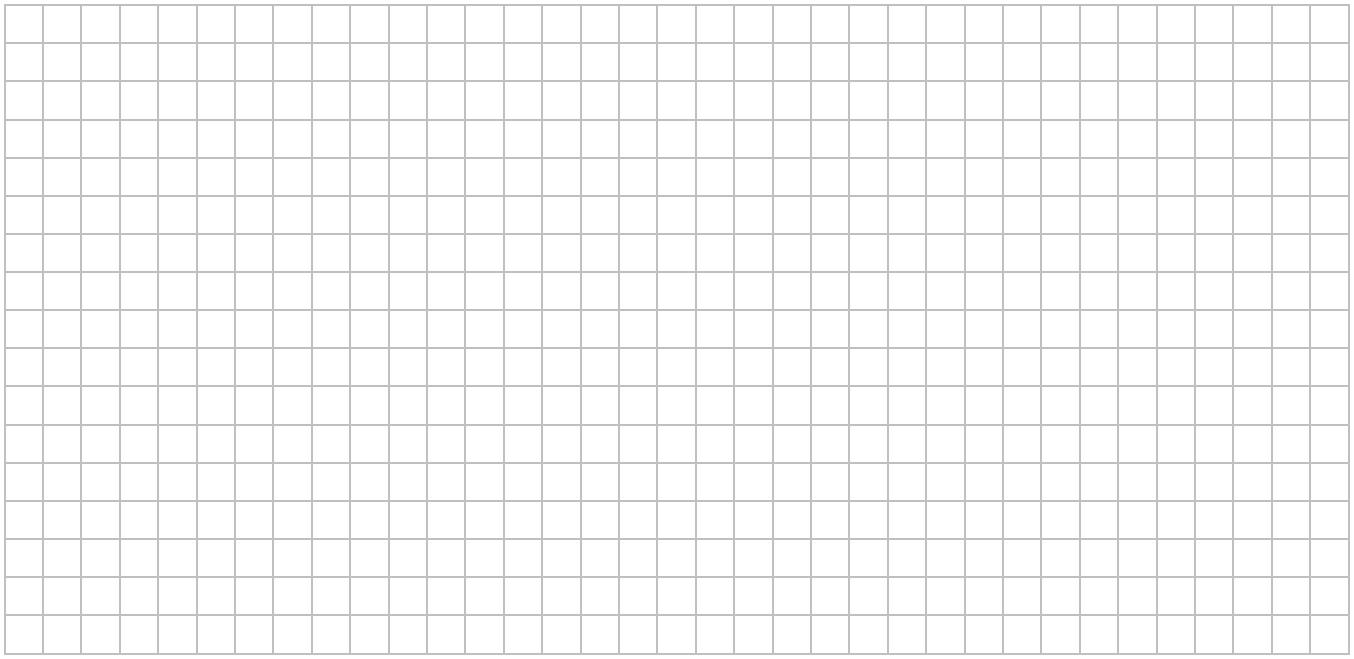
c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

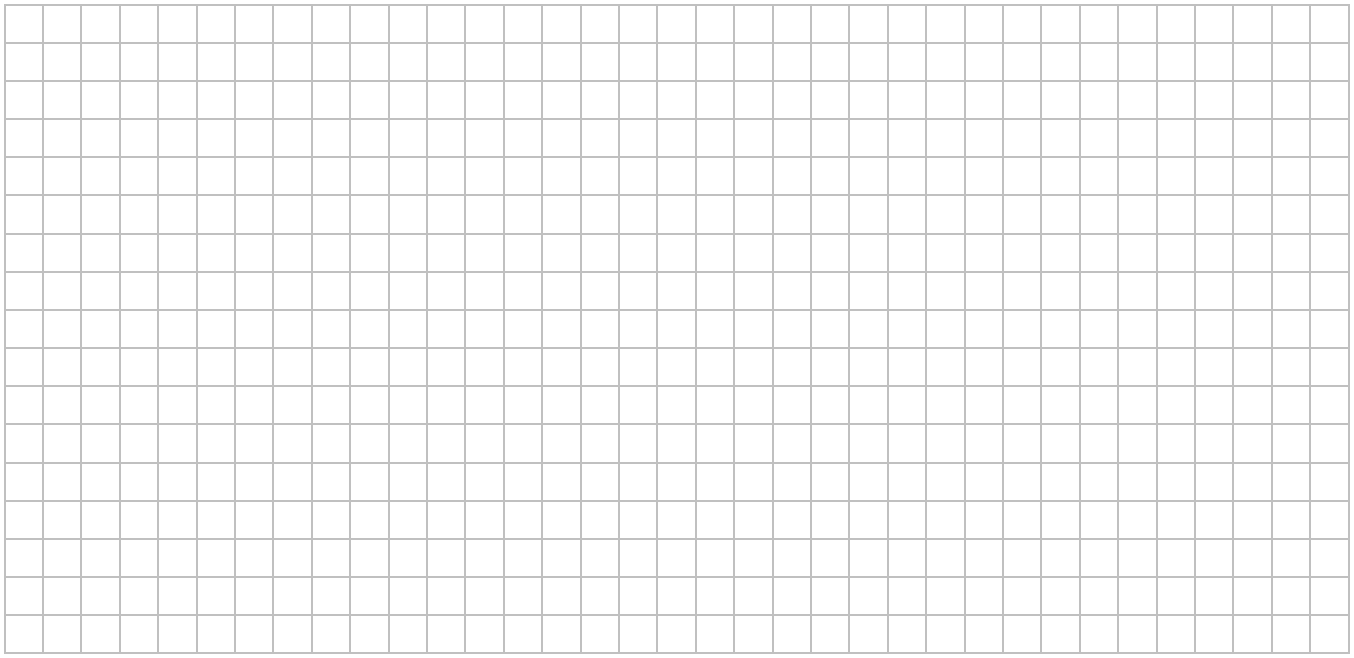
11. FLOOR PLANS

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:



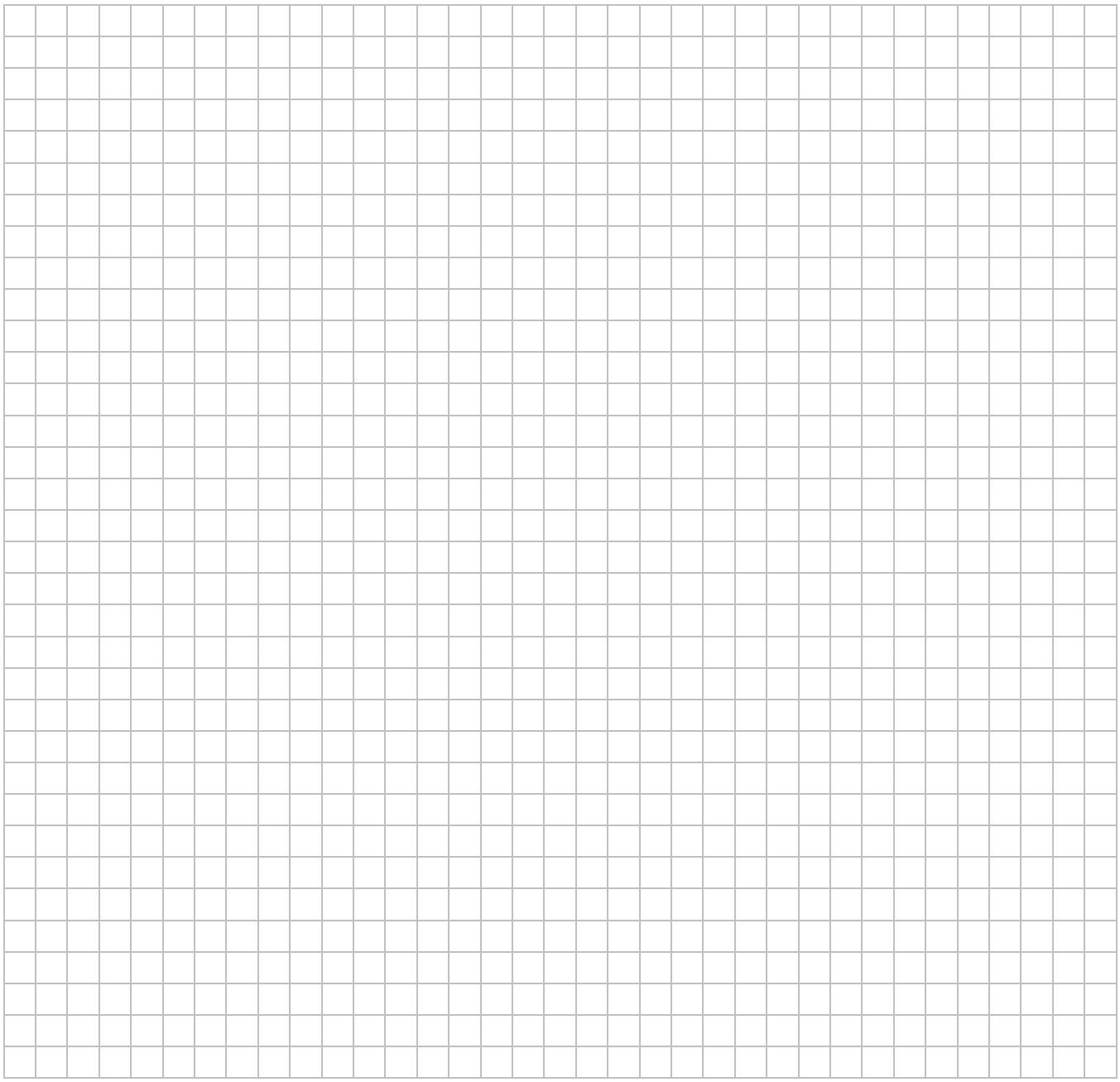
First Floor:



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.

OSR – 3 Example 1 Correct

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 Mary Jones Date/Time Prepared 10/22/04 10:00am

Preparer's Affiliation XYZ Consulting Phone No. 518-555-1212

Purpose of Investigation Thomasville Soil Vapor Intrusion Investigation (Site#32141)

1. OCCUPANT:

Interviewed: (Y)/ N

Last Name: Smith First Name: Carol

Address: 25 Main Street Thomasville, New York 25230

County: Albany

Home Phone: 518-556-2222 Office Phone: 518-556-2400

Number of Occupants/persons at this location 2 Age of Occupants 36, 10

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: Y (N)

Last Name: White First Name: Frank

Address: 64 Mountain Road Bainbridge, New York 26390

County: Dutchess

Home Phone: 845-876-1301 Office Phone: 845-227-2430

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

(Residential)	School	Commercial/Multi-Use
Industrial	Church	Other: _____

Example Correct 2

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? NA

If the property is commercial, type?

Business Type(s) NA

Does it include residences (i.e. multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors 1 Building age 20 years

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

Basement air flows up to 1st floor through plumbing waste line and domestic water line floor penetrations

Airflow near source

Yes, furnace/oil tank area open to rest of basement

Outdoor air infiltration

Outdoor air enters at loose bilco doorway openings, and at sill plate near furnace.

Infiltration into air ducts

Basement air flows into bottom of hot air unit and in loose cold air return joints.

Example Correct

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: 6 (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

Floor drain in laundry area

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: gas

Boiler/furnace located in:	(Basement)	Outdoors	Main Floor	Other _____
Air Conditioning:	Central Air	(Window units)	Open Windows	None

Example Correct 4

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.

Cold air return ductwork on ceiling in basement. Cold air return joints appear loose.

7. OCCUPANCY

Basement / Is lowest level occupied? Full time Occasionally (Seldom) Almost Never

Level	**General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)**
Basement	Storage and laundry
1st Floor	living area and bedrooms
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 etc.)	(Y) N / NA	Please specify lawnmower, car
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? w/in week - windex, tilex
i. Have cosmetic products been used recently?	(Y) N	When & Type? yesterday - hairspray

Example Correct

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? carpet in dining room

l. Have air fresheners been used recently? Y / (N) When & Type? _____

m. Is there a kitchen exhaust fan? (Y) / N If yes, where vented? outside

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, automechanic or autobody shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist etc.)

If yes, what types of solvents are used? hair salon dyes, alcohols, peroxides, acetone

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: June 2000
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: not applicable

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

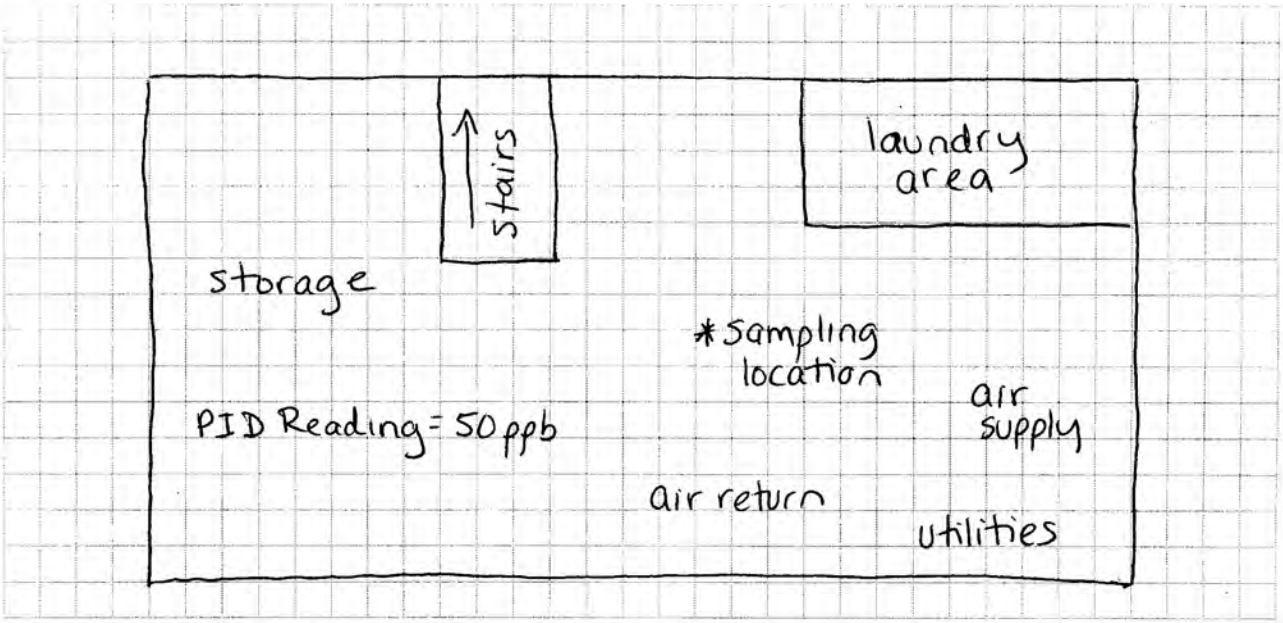
d. Relocation package provided and explained to residents? Y / N

Example Correct

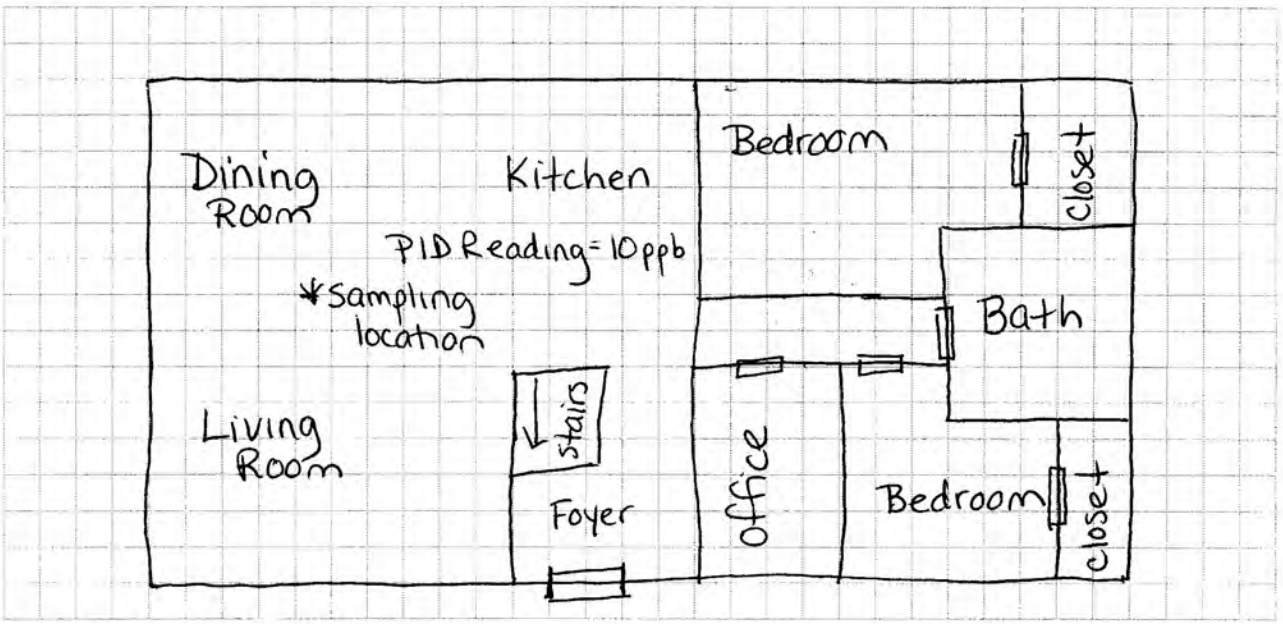
11. FLOOR PLANS

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:

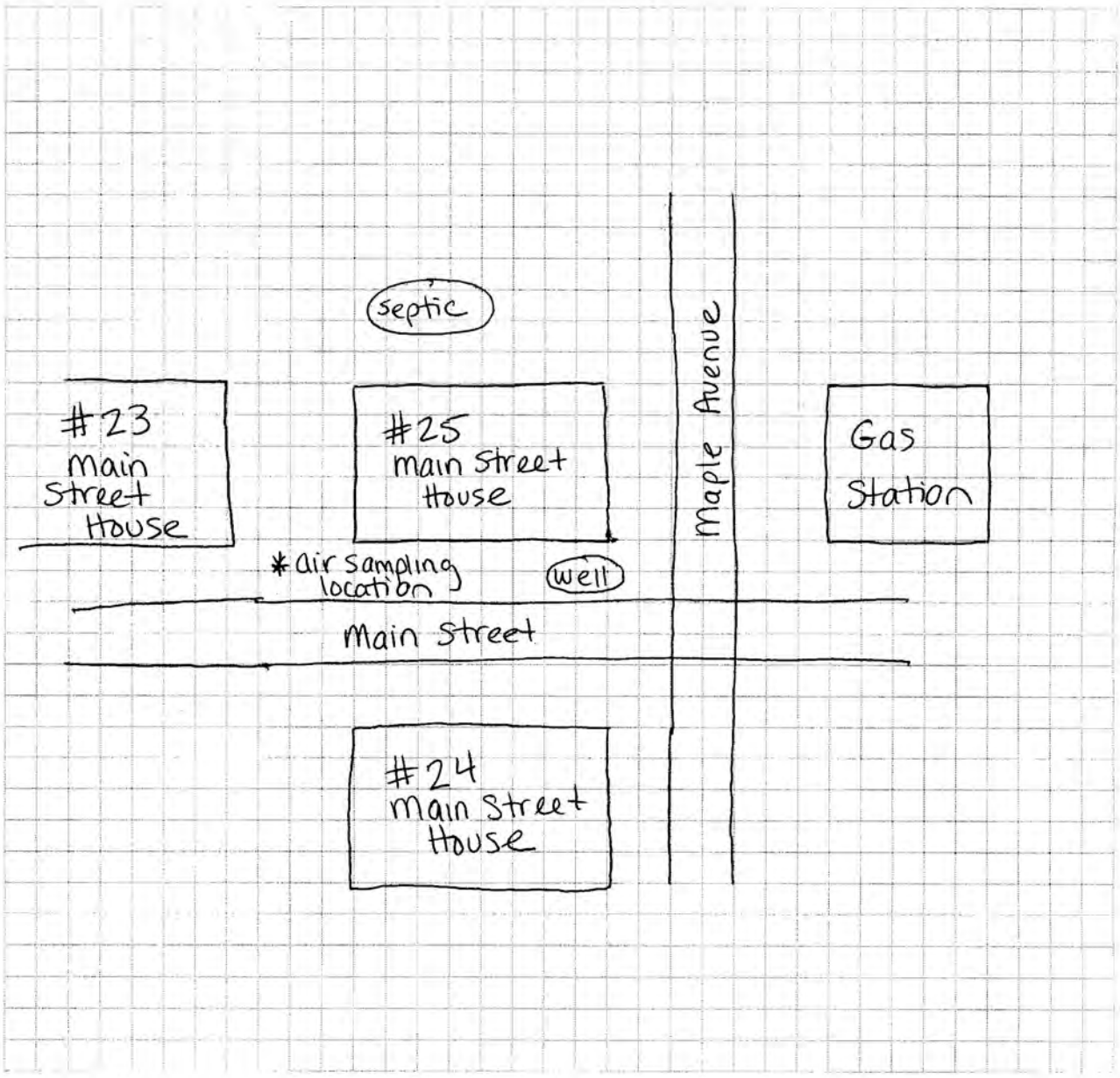


Example Correct 7

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.



N

Wind direction = NE

Example Correct

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: RAE photoionization detector

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (oz.)	Condition*	Chemical Ingredients	Field Instrument Reading	Photo** Y / N
Kitchen	WD-40	12oz	UO	See photo	10 ppb	Y
garage	mineral spirits	24oz	U	benzene, toluene	15 ppb	N
garage	American Semi-Gloss latex paint	64oz	U	titanium dioxide, ethylene, glycol, aluminum hydroxide, 2,2,4-trimethyl 1-1,3-pentanediol isobutyrate, Vinyl acetate	2 ppb	N
garage	Krylon semi-gloss oil paint	64oz	D	butane, propane, titanium dioxide, xylene, ethylbenzene, acetone, MEK, butanol, MIK	10 ppb	N
garage	Rustoleum	12oz	U	talc, calcium carbonate, titanium dioxide, xylene, ethylbenzene, acetone, liquified petroleum gases, pentaerythritol	4 ppb	N
garage	Deep 6 Double Strength Insect Repellent	8oz	D	propane, isobutane, N,N-Diethyl-meta-toluamide	0.5 ppb	N
				Di-n-propyl isocinchomeronate		
basement	12 cans latex paint	128oz	U	talc, titanium dioxide, Kaolin clay, 2,24-trimethyl-1,3 pentanediol isobutyrate, vinyl acetate	0	N

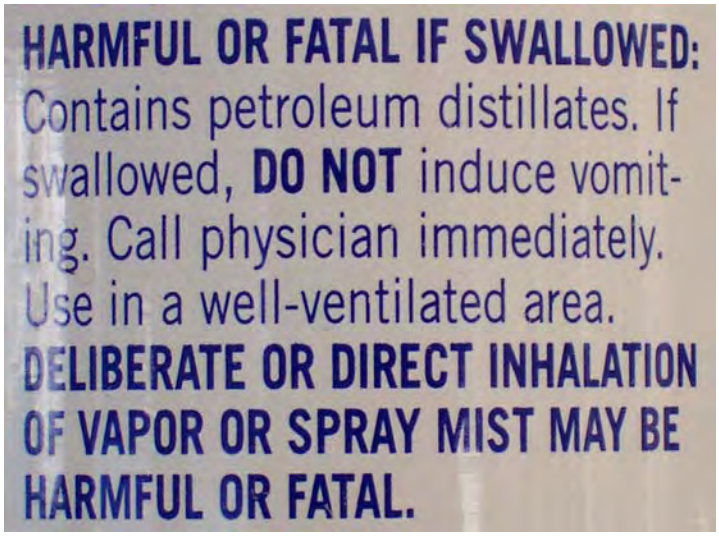
* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**

** 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.

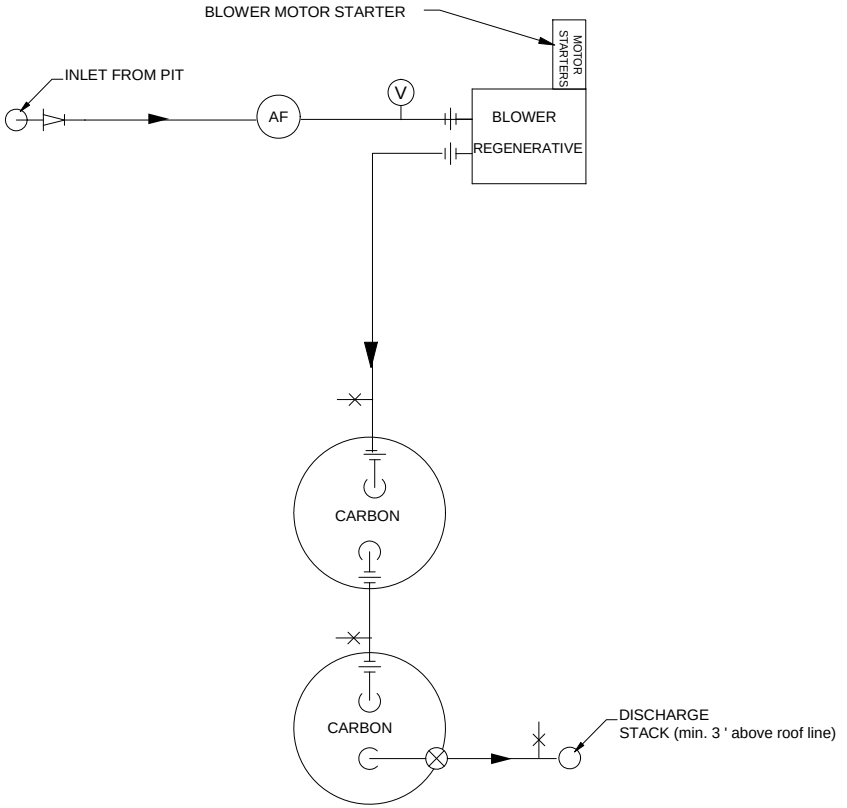
Product Inventory Attachment — 25 Main Street, City

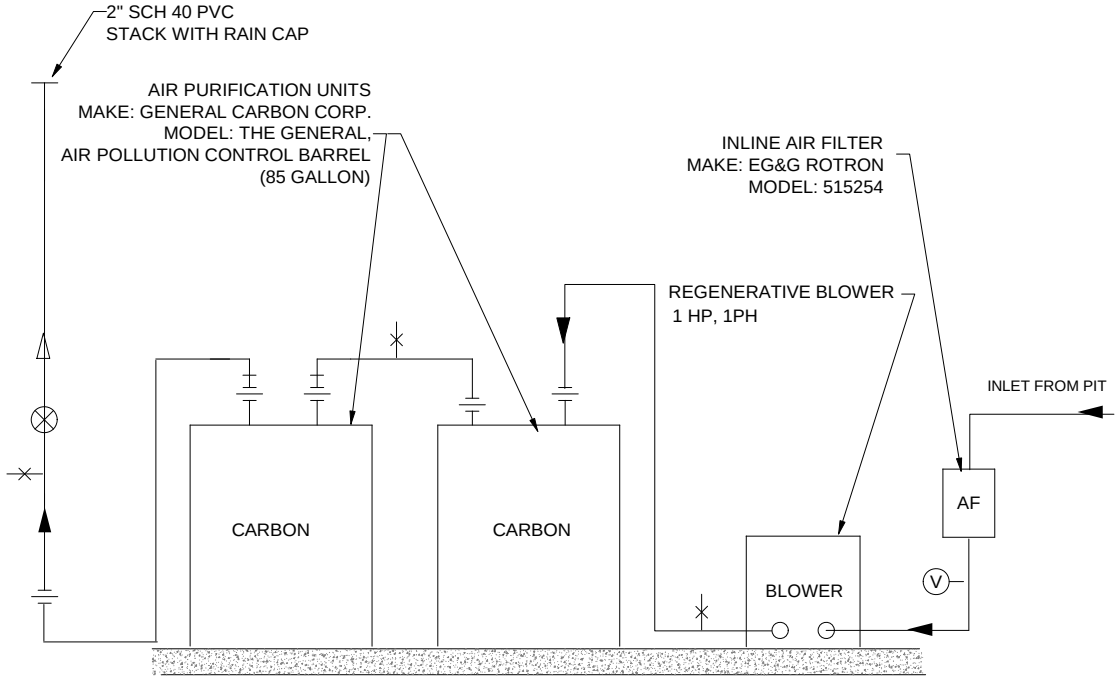
WD-40 FRONT

WD-40 INGREDIENTS



ATTACHMENT E
SVE System Design Details





LEGEND

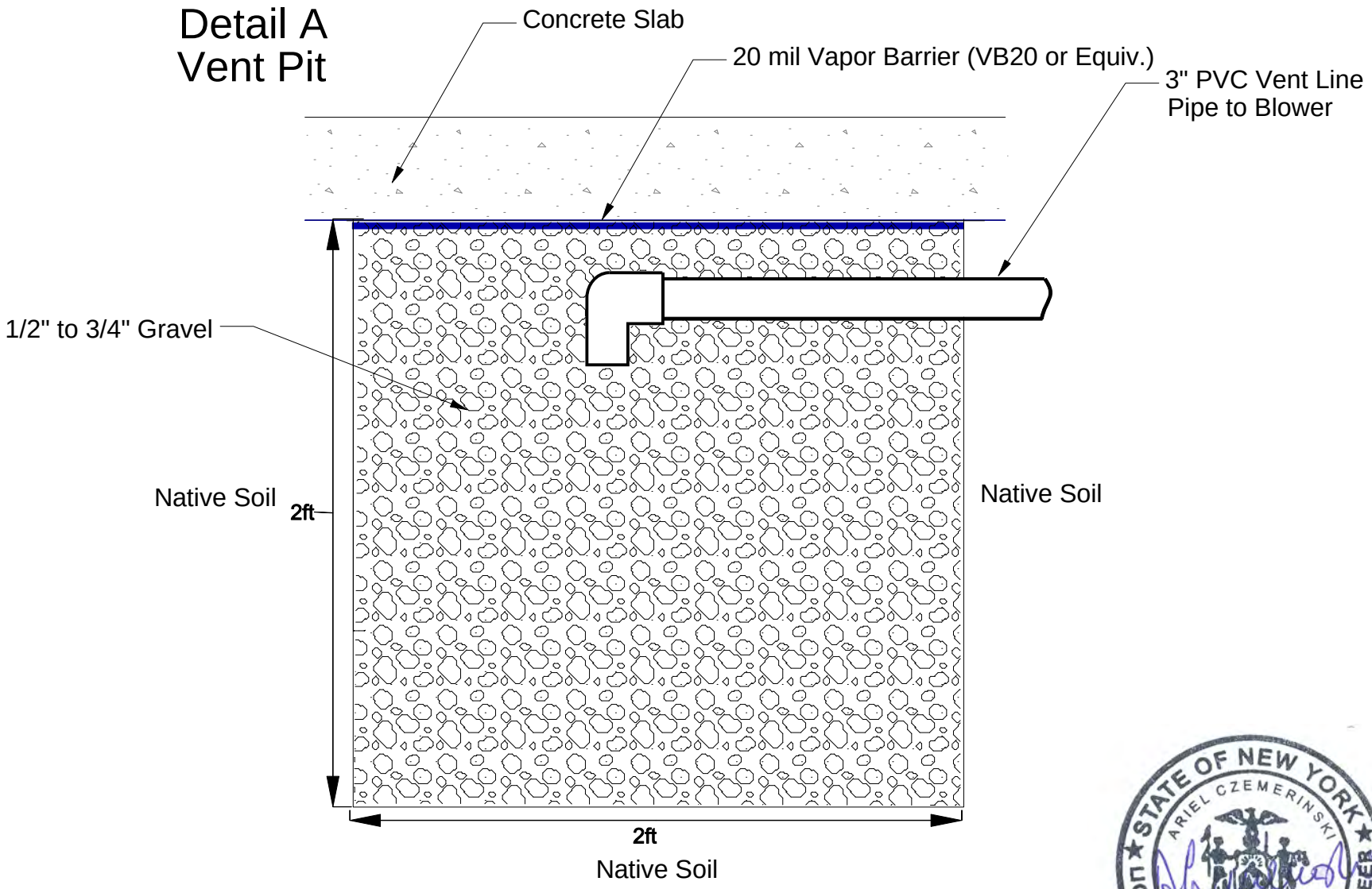
- SCH 40 PVC REDUCER
- V — VACUUM GAUGE
- SCH 40 PVC BALL VALVE
- SAMPLE TAP
- AF — AIR FILTER
- UNION OR QUICK CONNECT
- FLOW DIRECTION

AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

Figure No.
SVE01

Site Name: MIXED-USE BUILDING
Site Address: 1120 WESTCHESTER AVENUE, BRONX, NY
Drawing Title: SVE SYSTEM DETAIL

Detail A
Vent Pit



VAPOR EXTRACTION PIT

CONSTRUCTION DETAIL

N.T.S.

STATE OF NEW YORK ★ ARIEL CZEMERINSKI ★ 076508 ★ LICENSED PROFESSIONAL ENGINEER

AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

Figure No.
SVE02

Site Name: Mixed-use Building
Site Address: 1120 Westchester Avenue, Bronx, NY
Drawing Title: SVE System Extraction Pit Detail

ATTACHMENT F
Manufacturers Specification Sheets

Environmental / Chemical Processing Blowers

EN 454 & CP 454

ROTRON®

1.5 HP Sealed Regenerative w/Explosion-Proof Motor

FEATURES

- Manufactured in the USA - ISO 9001 and NAFTA compliant
- Maximum flow: 120 SCFM
- Maximum pressure: 65 IWG
- Maximum vacuum: 59 IWG
- Standard motor: 1.5 HP, explosion-proof
- Cast aluminum blower housing, impeller , cover & manifold; cast iron flanges (threaded); teflon® lip seal
- UL & CSA approved motor with permanently sealed ball bearings for explosive gas atmospheres Class I Group D minimum
- Sealed blower assembly
- 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

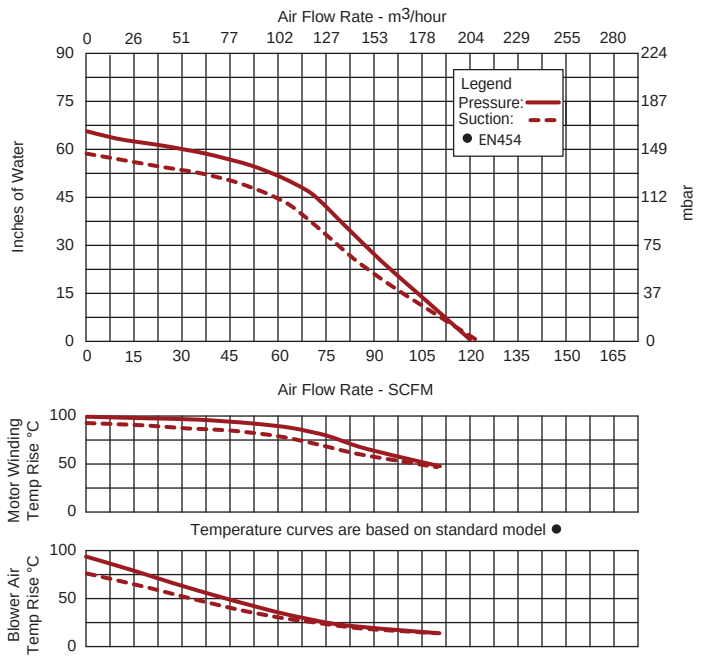
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

ACCESSORIES

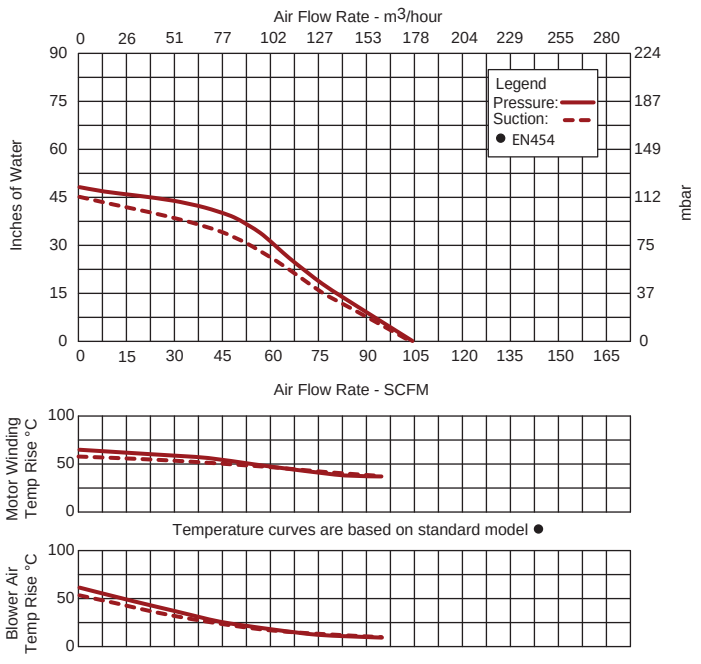
- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges, & relief valves
- Switches - air flow, pressure, vacuum, or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)
- Variable frequency drive package

Blower Performance at Standard Conditions

60 Hz



50 Hz



This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. AMETEK is not responsible for blowers driven beyond factory specified speed, temperature, pressure, flow or without proper alignment. Actual performance will vary depending on the operating environment and application. AMETEK products are not designed for and should not be used in medical life support applications. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For product designed to meet specific applications, contact AMETEK Technical & Industrial Products Sales department.

AMETEK TECHNICAL & INDUSTRIAL PRODUCTS
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www.ametektip.com

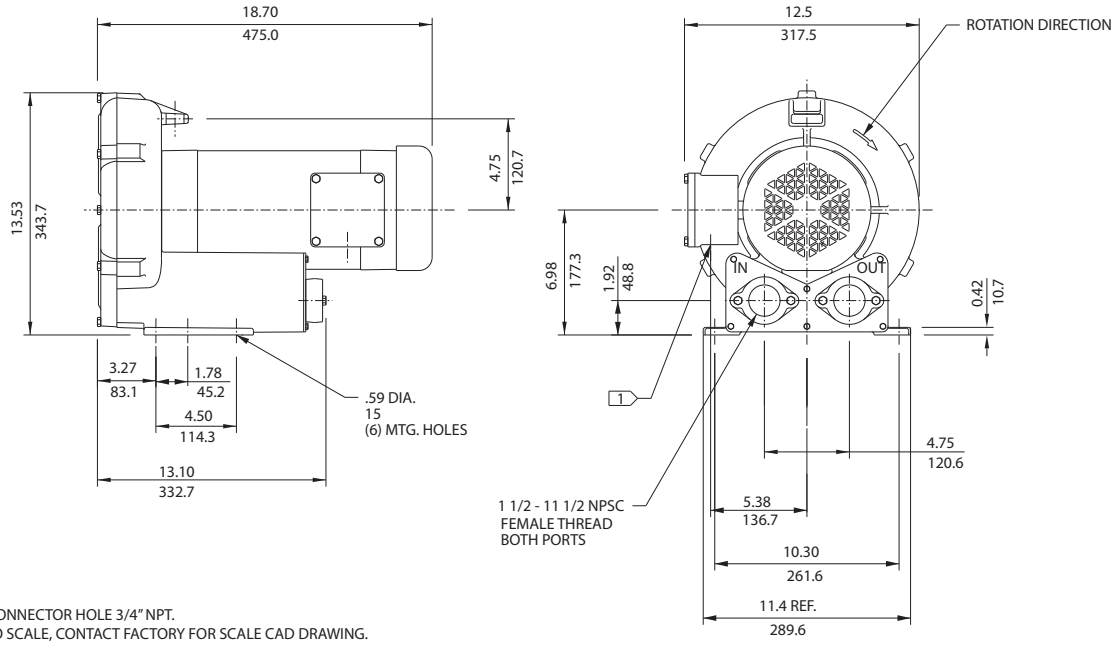
AMETEK® TECHNICAL & INDUSTRIAL PRODUCTS

Environmental / Chemical Processing Blowers

ROTRON®

EN 454 & CP 454

1.5 HP Sealed Regenerative w/Explosion-Proof Motor



IN
MM

NOTES
1. TERMINAL BOX CONNECTOR HOLE 3/4" NPT.
2. DRAWING NOT TO SCALE, CONTACT FACTORY FOR SCALE CAD DRAWING.
3. CONTACT FACTORY FOR BLOWER MODEL LENGTHS NOT SHOWN.

		Part/ Model Number			
		EN454W58ML	EN454W72ML	CP454W72MLR	CP454FR72MLR
Specification	Units	080487	080488	080490	080494
Motor Enclosure - Shaft Mtl.	-	Explosion-proof-CS	Explosion-proof-CS	Chem XP-CS	Chem XP-SS
Horsepower	-	1.5	1.5	1.5	1.5
Phase - Frequency	-	Single-60 hz	Three-60 hz	Three-60 hz	Three-60 hz
Voltage	AC	115/208-230	230/460	230/460	230/460
Motor Nameplate Amps	Amps (A)	15/7.9-7.5	4.6/2.3	4.5/2.3	4.6/2.3
Max. Blower Amps	Amps (A)	19/10.9-9.5	5.6/2.8	5.6/2.8	5.6/2.8
Inrush Amps	Amps (A)	96-48	32/16	32/16	32/16
Service Factor	-	1.0	1.0	1.0	1.0
Starter Size	-	1/0	00/00	00/00	00/00
Thermal Protection	-	Class B - Pilot Duty	Class B - Pilot Duty	Class B - Pilot Duty	Class B - Pilot Duty
XP Motor Class - Group	-	I-D, II-F&G	I-D, II-F&G	I-D, II-F&G	I-D, II-F&G
Shipping Weight	Lbs	90	84	84	84
	Kg	40.8	38.1	38.1	38.1

Voltage - 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.

Operating Temperatures - 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.

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.

XP Motor Class - Group - See Explosive Atmosphere Classification Chart in Section I

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AMETEK®
TECHNICAL & INDUSTRIAL PRODUCTS

ROTRON®

Motor Options

ROTRON strives to provide the most complete variety of desired options on our products including on our motors. By using motor vendors of high quality and versatility, we can provide motor features from multiple released designs to meet your needs (i.e., a Chem Processing Inverter Duty Explosion-proof motor with space heaters and drains wound for 380 V-50 Hz service).

Design Consistency

ROTRON motors are engineered for us to integrally mount with our blower and maximize blower performance. Our vendors are qualified by ROTRON (per motor part number) to ensure the blowers' mechanical and electrical needs merge with your required features. The basic motor requirements on our DR/EN/CP/HiE products include:

- NEMA approved
- CE conformity (non-XP models)
- UL & CSA approved with symbol and file on nameplate
- C-face mount
- Permanently sealed bearings
- Shaft end play, run out and perpendicularity requirements above NEMA standards
- Dual voltage and dual frequency (some models not feasible) to maximize use worldwide
- Single Shafted Totally Enclosed Fan Cooled (TEFC) and Explosion-proof (XP) models
- Double Shafted Open Drip Proof (ODP) models with dual internal fans for circulation
- Class I Group D minimum on explosion-proof motors; many are Class I Group D, Class II F & G
- Commercial Spa (SPA-ODP) motors with automatic thermal overload protection and industry specified terminal strip

Standard Motor Variations

Chemical Processing (CP) features are added to TEFC, XP or HiE designs for corrosive gas service, Marine Duty service and sanitary (food/pharmaceutical) service.

- 303 stainless steel shaft
- Cast iron and steel frame epoxy painted or zinc plated
- Zinc plated hardware
- Stainless steel nameplate
- Non-hygroscopic insulation; double dipped and baked stator
- Epoxy coating on rotor
- Gaskets and joint sealers on all metal-to-metal surfaces
- Oversized conduit box

High Efficiency (HiE) features are added to TEFC, ODP, XP or CP motors for maximum motor efficiency and life. ROTRON HiE motors carry extra phase-to-phase protection for use with inverters between a 1750-3500 RPM range.

Inverter Duty features are added to TEFC, ODP, XP or CP for use with Inverters/Variable Speed Drive Controllers. A wide range of RPM can be handled and should be specified at time of quote. For best compatibility, an inverter should be matched to the motor manufacturers design.

Project Specific Motor Variations

There are no limits to the options you can select or request for your product. Routine motor options include:

- International voltage & frequency (Hz)
- Different shaft material
- Oversized and/or Nema 4 intent T-box
- Space heaters
- Drains
- Regreasable bearings
- Tropicalized windings

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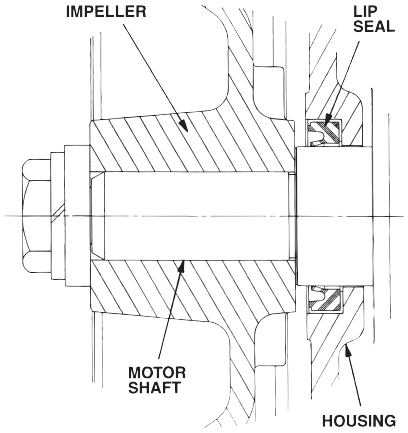
Typical Sealing Options

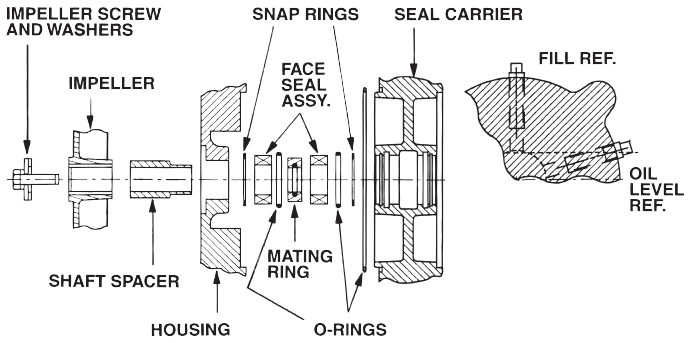
Lo-Leak™ LIP SEAL Option

The Lo-Leak™Lip Seal option is available to control gas leakage for all DR models and is standard on all EN and CP models. Features include: Lip seals to prevent leakage at the motor shaft. RTV sealing compound is used to cut off all leakage paths at the blower's metal-to-metal surfaces. Castings are vacuum impregnated to prevent leakage through castings. Estimate leakage rate = 25 cc/min or less



Double Face Carbon Seal Option

For further minimization of gas leakage on all DR, EN and CP models, a pair of face seals work against each other on opposite sides of a common mating ring to effectively reduce gas leakage at the motor shaft. The face shields are continually lubricated from a reservoir to prolong seal life. The seal is completed by installing the blower to motor bolts with O-rings and sealing the covers to the housing with an RTV sealing compound.
O-rings are also placed between the pipe flanges and the manifold.
All castings are vacuum impregnated.
Estimate leakage rate = 0.5 cc/min or less



Hermetically Sealed Spiral Containment Option

The containment option utilizes a series of O-rings to control gas leakage in Spiral blower models. The O-rings are placed at critical locations on the blower's housing and covers to contain gas leakage.

Hermetically Sealed Mag Drive Option

On DR, EN and CP 101 units, a magnet drive option has been an alternative for complete gas containment.
O-rings are used throughout the product, and magnets attached to the motor shaft spin magnets inside the blower without shaft penetration. Estimated leakage rate = 0.001 cc/mi

Nitrogen Purge / Blanket Option

The nitrogen purge option is a carrier designed to accept a nitrogen line which will purge the space outside the shaft hole. Purges can be designed to bleed the nitrogen into the process called a blanket, or the carrier can have a second tap to carry away the leaking contaminants.

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Chem-Tough™ Chemical Resistance

To stand up in corrosive and hazardous environments, chemical processing blowers have to be tough. That's why Ametek ROTRON routinely applies Chem-Tough™, ROTRON'S own engineered and proprietary process, whenever it builds blowers for handling chemical (vapor) streams. Chem-Tough™ combines the advantages of aluminum oxide ceramic and selected fluorocarbons to give ROTRON blowers unheard-of levels of chemical resistance, hardness, abrasion resistance, permanent lubricity and more.

Chem-Tough™ Brings You the Rotron Advantage

Through this unique proprietary process, Chem-Tough™ gives ROTRON blowers these advantages:

- **Outstanding Chemical Resistance**
  Time after time, Chem-Tough™ finishing shows extremely high resistance to most common chemicals, as well as dramatically improved corrosion resistance over regular hard anodizing. Chem-Tough™ allows aluminum to achieve equivalent corrosion resistance as teflon®. 90-day immersion in acid or alkaline solution (pH 4.0-8.5) has no effect; neither does prolonged exposure to salt water. Far exceeds military specification requirements for salt spray.

- **Abrasion Resistance Equivalent to Steel**
  Excellent for smooth surfaces, Chem-Tough™ surface conversion provides higher wear resistance than either case-hardened steel or hard-chrome plate. Rub any other metal against the Chem-Tough™ finish, and the metal will show nothing but the slightest wear. Chem-Tough™ provides a perfect bond to the parent metal.

- **Increased Hardness**
  With an equivalent hardness of Rc 40-60, Chem-Tough™ is approximately file-hard – the hardness of nitrated steel. Because the Chem-Tough™ surface becomes an integral part of the metal, it simply cannot peel or chip – neither can it be scratched, flaked or nicked under ordinary conditions.

- **Permanent Dry Lubricity**
  By infusing polymers into aluminum, Chem-Tough™ gives the resulting surface a high degree of permanent lubricity and resistance to moisture. The polymers also level off surface asperities, significantly reducing surface tension. The result: blowers converted with Chem-Tough™ have a longer life, operate more efficiently and call for less maintenance.

- **Other Proprietary Processes**
  Food-Tough™ uses the same unique process as Chem-Tough™, and is designed for the food processing, medical and pharmaceutical markets. Food-Tough™ has USDA approval and meets FDA guidelines.

Chem-Tough™ at Work

Chem-Tough™ employs the advantages of anodizing, hardcoat plating, low-friction polymers and dry lubricants to become an integral part of the blower's molecular structure.

Specifically, Chem-Tough™ first converts the aluminum surface to aluminum oxide, forming a new ceramic-like surface. The water in the ceramic is replaced with Teflon®, adding a multi-functional dimension to the surface; in the process, the aluminum crystals expand and form anchor crystals that remain hygroscopic for a short time. Then, under controlled conditions, particles of the specified polymer are infused to interlock with these anchor crystals. The new surface extends .5 mil above and below the original aluminum surface – and forms a permanent molecular bond with the metal.

The result: a plastic/ceramic surface that's harder than steel, is continuously lubricating, and resists damage from chemicals like no other. The kind of protection you need for your chemical processing blowers.

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Chemical Resistance Chart

Chemical Effect Ratings
A – No effect – acceptable
B – Minor effect – acceptable
C – Moderate effect – questionable
D – Severe effect – not recommended
* – Not tested

Chemical	Aluminum	Cast Iron	Carbon Steel	Chem-Tough (Teflon®)	302 Stainless Steel	304 Stainless Steel	316 Stainless Steel	440 Stainless Steel	Hastelloy C
Acetaldehyde	B	*	C	A	A	A	A	*	A
Acetate Solv.	B	B	A	A	A	B	A	B	*
Acetic Acid	B	D	C	A	*	B	A	B	A
Acetic Anhydride	B	B	D	A	B	A	A	B	A
Acetone	A	A	A	A	A	A	A	B	A
Acetylene	A	A	A	*	A	A	A	A	*
Acrylonitrile	B	C	*	*	A	A	C	*	B
Alcohols									
Amyl	C	C	C	A	A	A	A	*	A
BENZYL	B	*	*	*	*	A	A	*	A
Butyl	B	C	C	A	A	A	A	*	A
Diacetone	A	*	A	*	*	A	A	*	A
Ethyl	B	A	A	*	*	A	A	A	A
Hexyl	A	*	A	*	*	A	A	*	A
Isobutyl	B	*	A	*	*	A	A	*	A
Isopropyl	B	C	A	*	*	A	A	*	A
Methyl	B	A	A	A	*	A	A	A	A
Octyl	A	*	A	*	*	A	A	*	A
Propyl	A	*	A	A	*	A	A	*	A
Aluminum Chloride 20%	B	D	A	*	*	D	C	D	A
Aluminum Chloride	D	D	B	A	C	D	C	*	A
Aluminum Hydroxide	A	D	A	A	*	A	A	A	*
Alum Potassium Sulfate (Alum), 10%	A	D	A	A	*	A	*	*	B
Alum Potassium Sulfate (Alum), 100%	B	*	A	A	*	D	A	B	B
Aluminum Sulfate	A	D	A	A	*	C	C	A	A
Amines	A	A	B	A	A	A	A	*	A
Ammonia 10%	*	*	*	A	*	*	A	*	A
Ammonia, Anhydrous	B	D	B	A	A	B	A	A	A
Ammonia, Liquids	D	A	A	A	*	A	A	A	B
Ammonia, Nitrate	C	*	A	*	*	A	A	A	*
Ammonium Bifluoride	D	*	*	*	*	C	A	*	B
Ammonium Carbonate	C	C	B	A	B	A	A	A	B
Ammonium Chloride	C	D	D	A	C	A	C	A	A
Ammonium Hydroxide	C	A	C	A	A	A	A	A	A
Ammonium Nitrate	B	A	D	A	A	A	A	A	A
Ammonium Persulfate	C	D	A	A	*	A	A	A	A
Ammonium Phosphate, Dibasic	B	*	D	A	B	A	A	A	A
Ammonium Phosphate, Monobasic	B	*	A	A	*	A	A	A	A
Ammonium Phosphate, Tribasic	B	C	D	A	B	A	A	A	A
Ammonium Sulfate	B	C	C	A	C	A	B	A	A
Amyl-Acetate	B	*	C	A	B	A	A	C	A
Amyl Alcohol	B	*	A	A	*	A	A	*	A
Amyl Chloride	D	*	A	A	*	C	B	*	A
Aniline	C	*	C	A	B	A	A	A	B
Anti-Freeze	A	B	C	A	*	A	A	*	A
Antimony Trichloride	D	*	*	A	*	D	D	*	A
Aromatic Hydrocarbons	A	A	A	*	*	*	A	*	*
Arsenic Acid	D	D	D	A	B	A	A	*	*

Chemical	Aluminum	Cast Iron	Carbon Steel	Chem-Tough (Teflon®)	302 Stainless Steel	304 Stainless Steel	316 Stainless Steel	440 Stainless Steel	Hastelloy C
Barium Carbonate	B	B	B	A	B	A	A	A	A
Barium Chloride	D	D	C	A	C	A	A	A	A
Barium Hydroxide	D	C	C	A	B	C	A	A	B
Barium Sulfate	D	C	C	A	B	A	A	A	A
Barium Sulfide	D	C	C	A	B	A	A	*	*
Benzaldehyde	B	B	A	A	A	A	A	*	A
Benzene	B	B	C	A	B	A	A	A	B
Benzoic Acid	B	D	*	A	B	A	A	A	A
Benzol	B	*	*	A	*	A	A	*	A
Borax (Sodium Borate)	C	A	C	A	*	A	A	A	A
Boric Acid	B	D	*	A	B	A	A	A	A
Bromine (Wet)	D	D	D	A	D	D	D	D	A
Butadiene	A	C	C	A	A	A	A	*	*
Butane	A	C	C	A	A	A	A	*	*
Butanol	A	*	*	A	*	A	A	*	A
Butylene	A	A	A	A	A	*	A	*	*
Butyl Acetate	A	*	A	A	*	*	C	*	A
Butyric Acid	B	D	*	A	B	B	A	A	A
Calcium Bisulfate	D	D	*	A	C	D	A	*	*
Calcium Bisulfide	C	*	*	A	*	*	B	*	A
Calcium Bisulfite	C	*	*	A	*	D	A	*	A
Calcium Carbonate	C	D	*	A	B	A	A	A	A
Calcium Chloride	C	C	*	A	C	A	D	C	A
Calcium Hydroxide	C	*	*	A	B	A	A	*	A
Calcium Hypochlorite	C	D	*	A	D	A	C	C	B
Calcium Sulfate	B	*	*	A	B	A	A	A	B
Carbon Bisulfide	A	B	*	*	B	A	A	A	*
Carbon Dioxide (Wet)	C	C	*	A	*	A	A	*	A
Carbon Disulfide	C	B	C	A	*	B	A	*	*
Carbon Monoxide	A	*	*	*	*	A	A	*	*
Carbon Tetrachloride	C	C	D	A	B	C	B	A	A
Carbonated Water	A	D	*	*	B	A	A	A	*
Carbonic Acid	A	D	*	A	B	A	B	A	A
Chloracetic Acid	C	D	*	A	D	D	D	D	A
Chlorinated Glue	D	D	*	*	*	A	A	*	*
Chlorine, Anhydrous Liquid	D	C	*	A	*	D	D	D	A
Chlorine (Dry)	D	A	*	A	B	A	A	*	A
Chlorine Water	D	D	*	A	D	*	D	*	B
Chlorobenzene (Mono)	B	B	C	A	A	A	A	*	A
Chloroform	D	D	C	A	A	A	A	A	A
Chlorosulfonic Acid	D	*	D	A	D	D	*	D	B
Chlorox (Bleach)	C	D	C	A	*	A	A	*	A
Chromic Acid 5%	C	D	*	*	*	A	A	B	A
Chromic Acid 50%	C	D	*	A	C	B	B	*	A
Citric Acid	C	D	*	A	*	A	A	A	A
Citric Oils	C	*	*	*	*	A	A	*	*
Copper Chloride	D	D	*	A	C	D	D	B	A
Copper Cyanide	D	D	*	A	*	A	A	A	A
Copper Floborate	D	D	*	A	*	D	D	*	B
Copper Nitrate	D	*	*	A	B	A	A	B	A

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Chemical	Aluminum	Cast Iron	Carbon Steel	Chem-Tough (Teflon®)	302 Stainless Steel	304 Stainless Steel	316 Stainless Steel	440 Stainless Steel	Hastelloy C
Copper Sulfate (5% Solution)	D	D	*	A	*	A	A	A	A
Cresols	B	*	*	*	*	A	A	*	*
Cresylic Acid	C	*	*	A	B	A	A	*	B
Cyclohexane	A	*	A	*	*	A	*	*	*
Detergents	A	*	A	*	*	A	A	*	*
Diesel Fuel	A	A	A	*	A	A	A	*	*
Diethylamine	A	*	*	A	A	A	*	*	*
Dyes	B	*	*	*	*	A	A	*	*
Epsom Salts (Magnesium Sulfate)	A	*	*	*	B	A	A	A	B
Ethane	A	*	*	*	A	A	*	*	*
Ether	A	*	B	*	A	A	A	A	B
Ethyl Acetate	B	*	C	A	*	A	A	*	B
Ethyl Chloride	B	C	D	A	*	A	A	A	B
Ethylene Chloride	C	C	C	A	*	A	A	*	B
Ethylene Dichloride	D	*	C	A	*	A	A	*	B
Ethylene Glycol	A	B	C	A	*	A	A	*	A
Ethylene Oxide	A	*	*	A	*	*	A	*	*
Fatty Acids	B	D	*	A	*	A	A	*	A
Ferric Chloride	D	D	*	A	*	D	D	D	B
Ferric Nitrate	D	*	*	A	*	A	A	A	A
Ferric Sulfate	D	D	*	A	*	A	C	A	A
Ferrous Chloride	D	D	*	A	*	D	D	*	B
Ferrous Sulfate	D	D	D	A	B	A	C	*	B
Fluorine	D	D	D	C	D	D	D	*	A
Fluosilicic Acid	D	D	*	A	*	*	B	*	B
Formaldehyde	A	D	A	A	A	A	A	*	B
Formic Acid	D	D	D	A	C	A	B	B	A
Freon 11	B	C	B	A	A	*	A	*	*
Freon 12 (Wet)	B	*	*	A	*	*	D	*	*
Freon 22	B	*	*	*	*	*	A	*	*
Freon 113	B	*	*	*	*	*	A	*	*
Freon T.F.	B	*	*	*	*	*	A	*	*
Fuel Oils	A	C	B	A	A	A	A	*	A
Furan Resin	A	A	A	A	*	A	A	*	*
Furfural	A	*	A	A	A	A	A	*	B
Gallic Acid	A	D	D	A	B	A	A	*	A
Gasoline	A	A	A	A	A	A	A	A	A
Glycerine	A	B	B	A	A	A	A	A	A
Heptane	A	*	B	A	A	*	A	*	A
Hexane	A	*	B	A	A	A	A	*	A
Hydraulic Oils (Petroleum)	A	A	A	A	A	A	A	*	*
Hydraulic Oils (Synthetic)	A	A	*	*	*	A	A	*	*
Hydrobromic Acid	D	D	D	A	D	D	D	D	A
Hydrochloric Acid (Dry Gas)	D	*	D	A	D	C	A	*	A
Hydrochloric Acid (20%)	D	D	*	A	*	D	D	D	B
Hydrochloric Acid (37%)	D	D	*	A	*	D	D	D	B
Hydrochloric Acid 100%	D	D	*	A	*	D	D	*	C
Hydrocyanic Acid	A	*	C	A	A	A	A	C	A
Hydrofluoric Acid (20%)	D	D	*	A	*	D	D	D	B
Hydrofluoric Acid (75%)	D	D	*	A	*	C	D	*	C

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Hydrofluoric Acid 100%	D	D	D	A	D	D	D	*	B
Hydrofluosilicic Acid (20%)	D	D	*	A	*	D	D	*	B
Hydrofluosilicic Acid	C	*	*	A	*	D	D	*	C
Hydrogen Gas	A	B	B	A	A	A	A	*	*
Hydrogen Peroxide 10%	A	D	*	A	*	C	C	*	A
Hydrogen Peroxide	A	D	D	A	*	A	B	A	A
Hydrogen Sulfide, Aqueous Solution	C	D	*	A	*	A	A	C	A
Hydrogen Sulfide (Dry)	D	B	B	A	A	C	A	*	A
Hydroxyacetic Acid (70%)	D	*	*	*	*	*	*	*	*
Ink	C	D	D	*	A	A	A	*	*
Iodine	D	D	*	A	*	D	D	D	B
Iodoform	A	C	B	A	B	D	A	*	*
Isotane	A	*	*	*	*	*	*	*	*
Isopropyl Acetate	C	*	*	*	*	*	B	*	*
Isopropyl Ether	A	*	A	A	A	*	A	*	*
Jet Fuel (JP3, JP4, JP5)	A	A	A	A	A	A	A	*	*
Kerosene	A	A	B	A	A	A	A	A	A
Ketones	B	A	A	A	A	A	A	*	A
Lacquers	A	C	C	*	A	A	A	*	*
Lactic Acid	C	D	D	A	A	A	B	C	A
Lead Acetate	D	*	D	A	B	A	A	*	A
Lubricants	A	*	*	A	*	A	A	*	A
Magnesium Chloride	D	D	C	A	B	B	B	A	A
Magnesium Hydroxide	D	B	B	A	A	A	A	*	A
Magnesium Sulfate	B	C	B	A	B	B	A	*	B
Maleic Acid	B	*	B	A	C	A	A	A	A
Malic Acid	C	*	D	A	B	A	A	*	A
Mercuric Chloride (Dilute Solution)	D	D	D	A	D	D	D	D	B
Mercuric Cyanide	D	*	D	A	A	A	A	*	*
Mercury	C	A	A	A	A	A	A	A	A
Methane	A	A	A	A	A	A	A	A	A
Methyl Acetate	A	*	B	A	A	*	A	*	A
Methyl Acetone	A	A	A	A	A	*	A	*	*
Methyl Alcohol 10%	C	*	B	A	A	*	A	*	A
Methyl Butyl Ketone	A	*	*	*	*	*	A	*	*
Methyl Cellosolve	A	*	*	*	*	*	*	*	*
Methyl Chloride	D	*	*	A	*	C	A	*	A
Methyl Ethyl Ketone	A	*	*	A	*	A	A	*	A
Methylamine	A	B	B	*	A	*	A	*	*
Methylene Chloride	A	*	B	A	A	A	A	*	A
Naptha	A	B	B	A	A	A	A	A	A
Napthalene	B	B	A	A	B	A	B	*	A
Nickel Chloride	D	D	*	A	*	A	B	*	A
Nickel Sulfate	D	D	D	A	B	A	B	*	B
Nitric Acid (10% Solution)	D	D	D	A	A	A	A	A	A
Nitric Acid (20% Solution)	D	D	*	A	*	A	A	A	A
Nitric Acid (50% Solution)	D	D	*	A	*	A	A	A	A
Nitric Acid (Concentrated Solution)	B	D	*	A	*	D	B	A	B

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Nitrobenzene	C	B	B	A	B	A	B	*	B
Oleum	B	*	B	A	B	*	A	*	*
Oxalic Acid (cold)	C	D	D	A	C	A	B	A	B
Pentane	A	B	B	A	A	C	C	*	B
Perchloroethylene	A	B	B	A	B	A	A	*	*
Petrolatum	B	C	C	A	A	*	A	*	*
Phenol 10%	A	B	D	A	B	A	A	*	B
Phenol (Carbolic Acid)	B	D	D	A	B	A	A	A	A
Phosphoric Acid (to 40% Solution)	D	D	*	A	*	B	A	A	A
Phosphoric Acid (40%-100% Solution)	D	D	*	A	*	C	B	B	A
Phosphoric Acid (Crude)	D	D	D	A	*	D	C	C	A
Phosphoric Anhydride (Molten)	D	*	*	A	*	A	A	*	*
Photographic (Developer)	C	D	*	*	*	C	A	C	A
Phthalic Anhydride	B	C	C	A	B	A	B	*	A
Picric Acid	C	D	D	A	B	A	A	*	A
Potash	C	B	*	*	*	A	*	A	A
Potasium Bicarbonate	C	D	*	A	*	A	*	B	B
Potassium Bromide	C	D	D	A	A	A	*	B	B
Potassium Carbonate	C	B	B	A	B	A	*	A	A
Potassium Chlorate	B	B	B	A	B	A	A	A	B
Potassium Chloride	B	B	B	A	C	A	A	B	A
Potassium Chromate	A	A	*	*	*	*	B	B	B
Potassium Cyanide Solutions	D	B	B	A	B	A	B	A	A
Potassium Dichromate	A	B	C	A	B	A	A	A	B
Potassium Ferrocyanide	C	*	C	A	B	A	*	A	B
Potassium Hydroxide (50%)	D	C	A	A	A	B	B	B	A
Potassium Nitrate	B	*	B	A	B	A	B	A	B
Potassium Permanganate	B	B	B	A	B	A	B	B	B
Potassium Sulfate	A	B	B	A	B	A	B	B	A
Potassium Sulfide	B	B	B	A	A	A	*	A	B
Propane (Liquified)	A	*	B	A	A	A	*	A	*
Propylene Glycol	A	B	B	A	B	B	*	A	*
Pyridine	B	B	A	A	*	C	*	B	*
Pyrogallic Acid	B	B	B	A	B	A	A	A	A
Silver Bromide	D	*	*	*	*	C	C	B	*
Silver Nitrate	D	D	D	A	B	A	B	A	A
Sodium Acetate	B	C	C	A	B	A	A	B	A
Sodium Aluminate	C	*	C	A	B	*	*	A	B
Sodium Bicarbonate	A	C	C	A	B	A	A	A	*
Sodium Bisulfate	D	D	D	A	A	A	*	A	B
Sodium Bisulfite	A	D	*	A	*	A	*	A	B
Sodium Borate	C	C	C	A	B	A	*	A	A
Sodium Carbonate	C	B	B	A	B	A	B	B	A
Sodium Chlorate	B	*	C	A	B	A	*	A	B
Sodium Chloride	C	B	C	A	B	A	C	B	A
Sodium Chromate	D	B	B	A	A	A	A	*	B
Sodium Cyanide	D	B	B	A	B	A	*	A	*
Sodium Fluoride	C	D	D	A	B	C	*	C	A

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Sodium Hydrosulfite	A	*	*	A	*	*	*	*	A
Sodium Hydroxide (20%)	D	A	*	A	*	A	A	A	A
Sodium Hydroxide (50% Solution)	D	B	*	A	*	A	B	*	A
Sodium Hydroxide (80% Solution)	D	C	*	A	*	A	D	*	B
Sodium Hypochlorite (to 20%)	D	C	*	A	*	A	D	*	B
Sodium Hypochlorite	D	D	D	A	D	*	A	*	A
Sodium Hyposulfate	D	*	*	A	*	A	A	*	*
Sodium Metaphosphate	A	B	B	A	A	*	A	*	*
Sodium Metasilicate	B	C	C	A	A	*	A	*	*
Sodium Nitrate	A	A	B	A	B	A	A	A	B
Sodium Perborate	B	B	B	A	B	*	C	*	*
Sodium Peroxide	C	D	C	A	B	A	A	*	B
Sodium Polyphosphate (Mono, Di, Tribasic)	D	*	*	A	*	A	A	*	A
Sodium Silicate	C	*	B	A	B	A	B	A	B
Sodium Sulfate	B	A	B	A	B	A	A	C	B
Sodium Sulfide	D	A	B	A	B	A	B	*	B
Sodium Sulfite	C	A	*	A	*	C	C	*	A
Sodium Thiosulphate ("Hypo")	B	C	B	A	A	A	A	*	*
Stannic Chloride	D	D	D	A	D	D	D	*	B
Stannous Chloride	D	D	D	A	D	D	C	*	A
Stearic Acid	B	C	C	A	B	A	A	A	A
Stoddard Solvent	A	B	B	A	A	A	A	A	A
Styrene	A	*	A	A	A	A	A	*	*
Sulfate Liquors	B	*	*	*	*	C	C	*	A
Sulfur Chloride	D	*	*	A	*	D	D	D	*
Sulfur Dioxide	A	*	*	A	*	A	A	C	B
Sulfur Dioxide (Dry)	A	A	B	A	A	A	A	*	A
Sulfur Trioxide (Dry)	A	B	B	A	A	A	C	*	*
Sulfuric Acid (to 10%)	C	D	*	A	*	D	C	C	A
Sulfuric Acid (10%-75%)	D	D	*	A	*	D	D	D	B
Sulfurous Acid	C	D	D	A	C	C	B	C	B
Tannic Acid	C	C	C	A	B	A	A	A	B
Tanning Liquors	C	*	*	A	*	A	A	*	A
Tartaric Acid	C	D	D	A	B	A	B	B	B
Tetrahydrofuran	D	D	A	A	*	A	A	*	*
Toluene, Toluol	A	A	A	A	A	A	A	*	A
Trichlorethane	C	C	*	A	*	C	A	*	A
Trichlorethylene	B	C	B	A	B	A	A	*	A
Water, Acid, Mine	C	C	*	*	*	A	A	*	*
Water, Distilled, Lab Grade 7	B	D	*	A	*	A	A	*	*
Water, Fresh	A	B	D	A	A	A	A	*	*
Water, Salt	B	D	*	*	*	A	A	*	*
Weed Killers	C	*	*	*	*	A	A	*	*
Whiskey and Wines	D	D	D	A	A	A	A	A	*
Xylene	A	A	B	A	A	A	A	*	A
Zinc Chloride	D	D	D	A	D	A	B	B	B
Zinc Hydrosulphite	D	D	*	*	*	*	A	*	*
Zinc Sulfate	D	C	D	A	B	A	A	A	B

AMETEK TECHNICAL & INDUSTRIAL PRODUCTS
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www.ametektip.com

Filtration - Inline Filter (Dual Connection)

ROTRON®

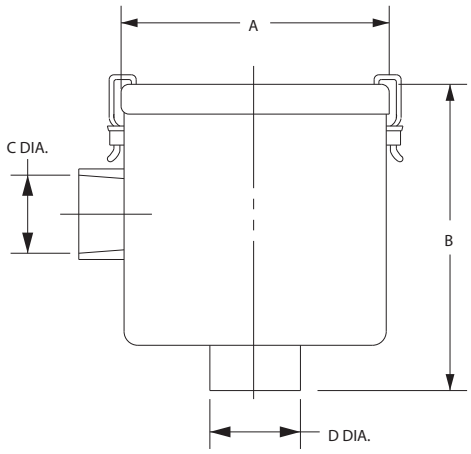
Inline Filters protect the blower from harmful dust and other particles that may be drawn into the blower through the air distribution system. Normally used in vacuum systems.

SPECIFICATIONS:

HOUSING – Steel
MEDIA – Polyester
EFFICIENCY – 97-98% (8 to 10 micron particle size)
FILTER ELEMENT – Replaceable (see filter elements)
NOTE: "Z" MEDIA (1 to 3 micron particle size) available

* Feature 1/4" threaded tap for gauge connection on inlet and outlet

Inline filter PN 271200 is a straight through design
Inlet is directly opposite of outlet



		Part/Model Number							
Specification	**Units**	**271200**	**516461**	**515254**	**515255**	**515256**	**516463***	**516465***	**517611***
Filter Element	-	271078	516434	516434	516435	516435	515135	515135	516515
Ref Blower Model	-	A	B	C, D	E	F	G	H	H
Inlet Connection	-	1.75 SO	1.00 NPSC-F	1.50 NPSC-F	2.00 NPSC-F	2.50 NPSC-F	3.00 NPT-M	4.00 NPT-M	6.00 NPT-M
Outlet Connection	-	2.00 SO	1.00 NPSC-F	1.50 NPSC-F	2.00 NPSC-F	2.50 NPSC-F	3.00 NPT-M	4.00 NPT-M	6.00 NPT-M
Dimension A	Inches	5.25	7.25	7.00	8.00	8.00	14.00	14.00	18.00
	mm	133.4	184.2	177.8	203.2	203.2	355.6	355.6	457.2
Dimension B	Inches	8.31	6.50	6.50	10.25	10.25	26.50	27.00	28.00
	mm	211.1	165.1	165.1	260.4	260.4	673.1	685.8	711.2
Dimension C	Inches	2.00	1.00	1.50	2.00	2.50	3.00	4.00	6.00
	mm	50.8	25.4	38.1	50.8	63.5	76.2	101.6	152.4
Dimension D	Inches	1.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00
	mm	44.5	25.4	38.1	50.8	63.5	76.2	101.6	152.4
Z Media Filter PN	-		517886	517887	517888	517889	517890	517891	517892

Blower Model Reference Key	
A = SPIRAL	E = DR/EN/CP 656, 6, 633, S7
B = DR/EN/CP 068, 083, 101, 202	F = DR/EN/CP 757, 808, 858, S9, P9 (Inlet Only)
C = DR/EN/CP 303, 312, 313, 353	G = DR/EN/CP 833, S13, P13 (Inlet Only)
D = DR/EN/CP 404, 454, 513, 505, 555, 523	H = DR/EN/CP 909, 979, 1233, 14, S15, P15 (Inlet Only)

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AMETEK® TECHNICAL & INDUSTRIAL PRODUCTS

NIXTOX Steel Drum Adsorbers

Modular Activated Carbon Vapor Phase Adsorbers

Solutions for Vapor Phase Remediation & Industrial Emission Control

These economical deep bed activated carbon adsorption units may be used as refillable or disposable adsorbers.

Rain shields are available and condensate drains are standard. The activated carbon units are constructed of carbon steel and provided with a double epoxy / phenolic lining. All adsorption units feature specially constructed vapor distributors to permit full adsorbent utilization and peak removal efficiency.

Custom distributors for high temperature applications are available upon request.

NOTES:

- Nominal design flow may be conservative.
- Desired contact time may allow higher or lower flow rates.
- Dry virgin activated or reactivated carbon provided as standard adsorbent.
- Adsorbent fill is based on a bed density of 27 lb/ft3.
- Adsorbent fill can differ based on variable bed density and alternate adsorbents.
- Pressure drops are based on a dense packed bed of activated carbon.

Modular Activated Carbon Vapor Adsorber Drums

Model #	Design Flow (CFM)	Max Temp	Max Pressure (PSIG)	Diameter/ Height (IN)	Standard Fill (LBS)	Shipping Weight
N-100	100	200	6	24.5/37.75	200	260
N-250	250	130	1	32/47	400	530

Call a TIGG Representative Today at 800-925-0011

TIGG

http://www.tigg.com/NIXTOX-steel-drum.html

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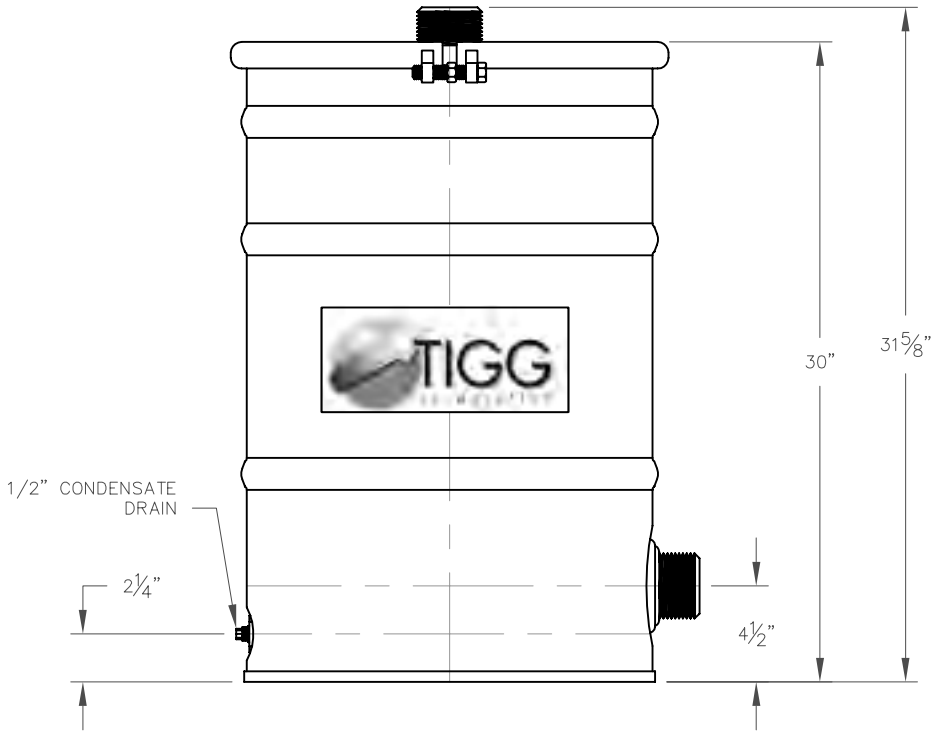
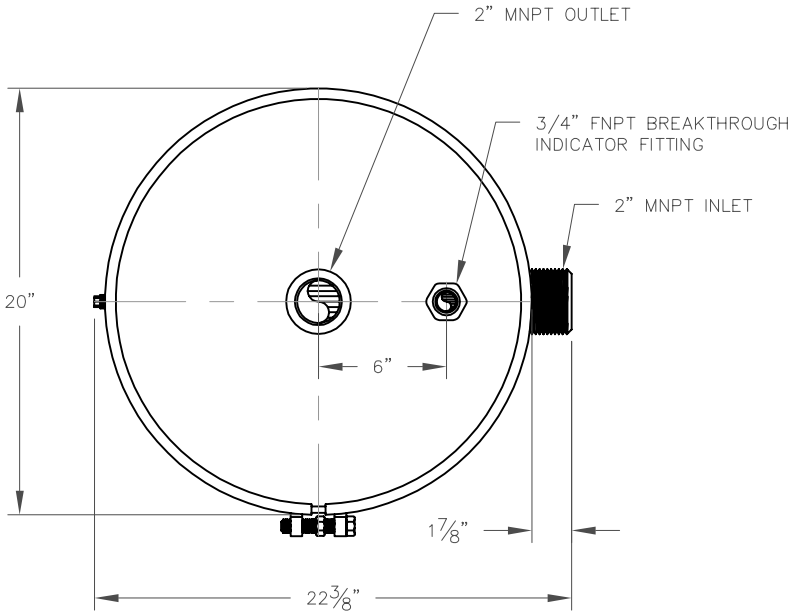
Purifying Air & Water



ELEVATION



PLAN

VESSEL STANDARDS

VESSEL MATERIALS : CARBON STEEL	APPROXIMATE VOLUME OF VESSEL : 4 FT^3
LINING : EPOXY PHENOLIC	STANDARD CARBON FILL : 110 LBS
EXTERIOR PAINT : ACRYLIC ALKYD ENAMEL	SHIP WEIGHT : 145 LBS
INTERNALS : STAINLESS STEEL SCREEN	CARBON TYPE : TIGG 5C 0410 VAPOR PHASE
ADSORBENT OUTLET ASSEMBLY : REMOVABLE COVER	MAXIMUME OPERATING PRESSURE : 6 PSIG
CONDENSATE DRAIN ASSEMBLY : 1/2" PLUG	MAXIMUME OPERATING TEMPERATURE : 200°F

NO.	REVISION	BY	DATE
2	REVISE PRESSURE RATING	JB	1/2/07
1	GENERAL	JB	6/11/03

PROJECT

PROJ. NO. SALES

P.O. NO.

DRAWN BY	ZS
DESIGN BY	BL
CHKD. BY	BL
DATE	2/22/00
SCALE	NTS

TIGG corporation

N-50 DRUM

DWG. NO. N-50-1001

REV. 2

ATTACHMENT G
SVE System Inspection Checklist

SOIL VAPOR EXTRACTION SYSTEM INSPECTION FORM

Date:_____

Time:_____

Weather: _____

Inspector: _____

Extraction Point	Vacuum (iwc)	PID Reading(ppb)
VE-1		
Blower inlet		
Before Carbon		
After Carbon		

Inspection:	Yes / No	Comments
Blower Operating?		
Spare Carbon Drums?		
System Integrity?		

CARBON MONITORING

Carbon filter installation date:_____

Date/Time	Location	PID reading	PID units(ppm or ppb)
	Pre-Carbon		
	Post -Carbon		

Comments/Actions taken: