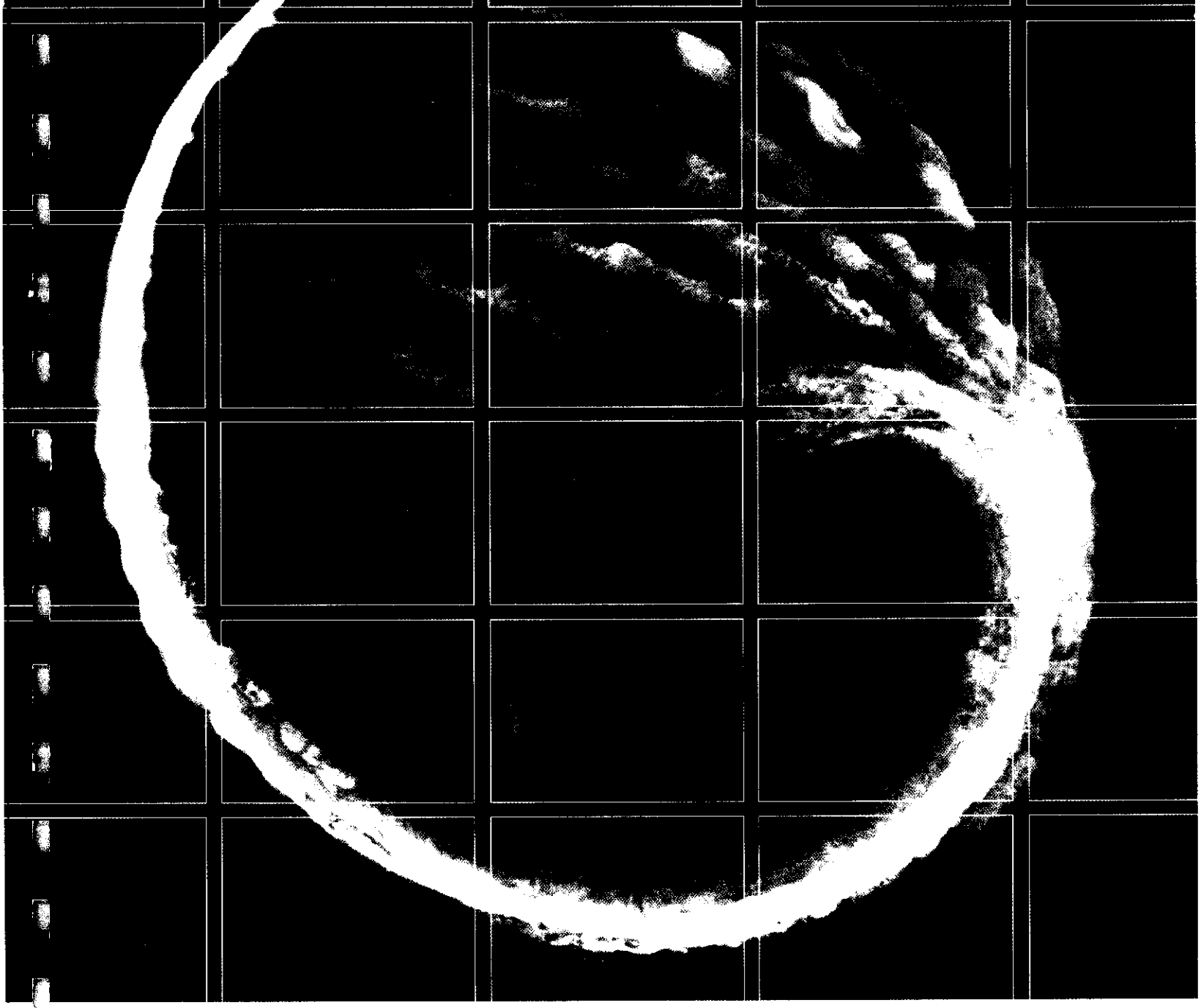

Johnson & Hoffman Manufacturing Corporation

Interim Remedial Measure Soil Vapor Extraction System

February, 2006

Environmental Resources Management
520 Broad Hollow Road
Melville, New York 11747

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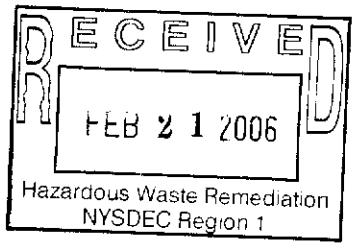
INTERIM REMEDIAL MEASURE SOIL VAPOR EXTRACTION SYSTEM

Engineering Report
Carle Place, New York

February 2006



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Prepared by:

ENVIRONMENTAL RESOURCES MANAGEMENT
520 Broad Hollow Road, Suite 210
Melville, New York 11747

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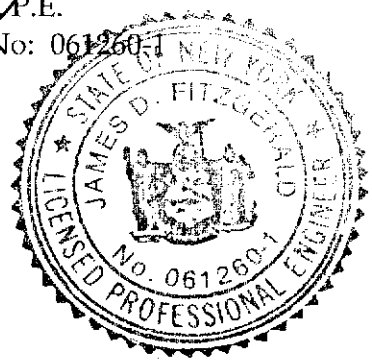
Certification Statement

The Interim Remedial Measure (IRM) consists of a soil vapor extraction system and was designed by James D. Fitzgerald, a New York State Licensed Professional Engineer, or by a person under his direct supervision.

Certified by:

James D. Fitzgerald, P.E.
N.Y.S.P.E. License No: 061260-1



SECTION 1 DIVIDER

1.0 INTRODUCTION

The Johnson & Hoffman Manufacturing Corporation (J&H) facility is located at 40 Voice Road, in Carle Place, Nassau County, New York (the "Site"; see Figure 1-1 for location). This Site has been the subject of several rounds of environmental investigation between 1996 and 2002. The most recent work was performed by Environmental Resources Management (ERM) between October 2000 and August 2002. The August 2003 "Site Investigation Report and Proposed Remedial Action" provided conclusions and recommendation on proposed remedial actions.

This report presents an Interim Remedial Measure (IRM), which is based on the recommendations in the August 2003 report. Specifically, this document presents a design plan for a proposed soil vapor extraction system at the Site. The design for this IRM system is based on an evaluation of all of the information and data presented in previous environmental reports. This report documents the design of a Soil Vapor Extraction (SVE) system including:

- Process & Instrumentation Diagrams
- Plans for System Installation
- Engineering Description of the SVE system
- Process Description
- Well Installation Plan
- Well Schematics
- Equipment Catalog Cuts
- Engineering Calculations

SECTION 2 DIVIDER

2.0 SITE BACKGROUND

The following sections provide a Site description, description of Site topography, Site geology and hydrogeology and the nature and extent of contamination.

2.1 SITE DESCRIPTION

The Site consists of a 59,000-square foot, one story building with associated parking and grass areas, on a 4.054-acre parcel. J&H has occupied the Site since 1962. J&H produces small metal parts at the Site using processes that include metal stamping, deburring and washing.

The Site is bounded to the north by Voice Road, on the opposite side of Voice Road directly north is an electrical substation owned by the Long Island Power Authority (LIPA). Located to the south of the Site is the Long Island Rail Road right-of-way. To the east is a small commercial building occupied by a company called Fun World. An AM radio station is situated west of the Site along with a storage yard for trucks and landscaping equipment. A Site plan is provided as Figure 2-1.

2.1.1 *Topography*

The Site and surrounding area is relatively flat with the exception of a 0.1 acre, storm water recharge basin located along the west side of the south property line. The majority of the Site is paved with some grassy open areas on the south side of the property, which borders a slightly elevated railroad track.

2.1.2 *Site Geology and Hydrogeology*

There are four distinct geologic units that exist regionally (including beneath the Site) and consist of unconsolidated deposits of clay, silt, sand, and gravel that overlie southeast-sloping consolidated bedrock. The geologic units are, in descending order relative to the land surface: Upper Pleistocene deposits, the Magothy Formation, the Raritan Clay Member of the Raritan Formation, and the Lloyd Sand Member of the Raritan Formation. The Upper Pleistocene deposits represent the natural surficial

soils across the Site. The impacted soils addressed in this report are part of the Upper Pleistocene deposits and may include non-native fill-type materials.

The water table occurs approximately 50 feet below grade within the Upper Pleistocene deposits, which is hydrologically known as the Upper Glacial Aquifer. The Upper Glacial is an unconfined aquifer approximately 100 feet thick in the area of the Site (50 feet are saturated). Underlying the Upper Glacial Aquifer is the semi-confined Magothy Aquifer, which is several hundred feet thick and widely used for water supply throughout Long Island.

2.2 *NATURE AND EXTENT OF CONTAMINATION*

Based on the results of the historic investigations performed at the Site, tetrachloroethene (PCE) is present in soil at levels exceeding the New York Recommended Soil Cleanup Objectives (RSCOs), as per the Technical and Administrative Guidance Memorandum No. 4046 (TAGM 4046). As indicated in the August 2003 report, this IRM is proposed for two areas of impacted soils referred to as "Area A" and "Area B". In addition, a third location (Area C) contains soil where concentrations do not exceed RSCO levels, however elevated soil gas concentrations are present. Further information regarding these three areas is provided below:

- Area A (a.k.a "Well MW-2 Area") - Figure 2-2 indicates that the areal extent of soil impacts above the PCE RSCO of 1,400 µg/kg is well defined. The vertical extent of contamination can also be evaluated based on analytical results from soil samples collected at depth within the impacted area. These data are summarized in Table 2-1 and indicate that the impacted soil zone does not extend beyond ten feet below grade.

- Area B (a.k.a. "Concrete Pad Area") - The sample results from soil borings advanced around the concrete pad south of the building indicate full horizontal delineation of the area of impacted soil above the RSCOs (see Figure 2-2). Table 2-1 presents the vertical delineation data from within the impacted zone. These data indicate that the vertical extent of impacted soil is limited to within ten feet below grade.

- Area C (a.k.a. "East Wall Area") – During the performance of a soil gas survey across the southern portion of the Site, a single elevated detection was found at this location. Follow-up soil sampling did not reveal any exceedences of the RSCOs (see soil sample location SB-12 on Figure 2-2).

The Site has previously been investigated via a soil vapor survey, subsurface soil sampling and groundwater sampling. These results are reviewed below.

2.2.1 *Soil Vapor Survey*

Previous subsurface investigations at the Site conducted prior to 2000 identified elevated concentrations of PCE and its associated breakdown products within soils located near the southeast corner of the building in the vicinity of existing monitoring well MW-2 (Area A). A soil gas survey was conducted as a screening exercise to evaluate the source(s) of these contaminants and their approximate areal extent. The soil gas survey started in the vicinity of MW-2 and expanded outward in 20-foot increments. Each soil gas sample was collected by driving a slam bar to four feet below grade. A glass tube was inserted into the resulting hole and the annulus sealed with clay. The tube was purged of at least one volume of soil gas using a small pump. The sample was then collected in a Tedlar bag and analyzed by an on-Site gas chromatograph (GC) equipped with a photo-ionization detector (PID) for PCE and its breakdown products trichloroethene (TCE), and cis-1,2-dichloroethene (DCE).

The soil gas survey results for PCE are presented in Figure 2-3. The detected concentrations of TCE and DCE are uniformly much lower than PCE and therefore have not been contoured. All soil gas data are provided in Appendix A in units of µg/L. To convert these results to µg/m^3, multiply by 1,000. Figure 2-3 shows that soil gas underlying the areas tested in the southern portion of the J&H Site generally contains PCE at levels ranging from <1,000 to 100,000 µg-PCE/m^3. However, the soil gas results indicated there are three locations where soil gas concentrations were elevated in comparison to the rest of the survey area. Each of the locations listed below were found to have soil gas concentrations >200,000 µg-PCE/m^3:

1. The largest area with elevated soil gas surrounds the previously known PCE source area near monitoring well MW-2 (Area A). Soil gas concentrations in this area were found to range from 126,000 µg-PCE/m^3 to 1,071,000 µg-PCE/m^3.
2. A single elevated point of 660,000 µg-PCE/m^3 was found at survey point B-10. This location is just inside a man-door along the east wall of the building.
3. A single elevated point of 311,000 µg-PCE/m^3 was found at survey point L-2. This location is adjacent to a concrete pad and storage trailers south of the building (Area B).

With the exception of the single elevated point at sample B-10, these results correlate well with those areas previously identified with soil concentrations above NYSDEC Recommended Soil Cleanup Objective (RSCO) limits (see Section 2.2.2). Sample point B-10 was not associated with soil concentrations above RSCO limits. However, all three elevated soil gas locations are addressed by the proposed IRM system described in this document.

2.2.2 *Subsurface Soil Findings*

Subsequent to the soil gas survey, three rounds of soil borings and soil sampling were conducted during the 2000 to 2003 time period. Initially, eight soil borings were installed in the locations that exhibited the most highly elevated soil gas contaminant concentrations. Four soil samples were collected from each soil boring in two-foot vertical increments (except where refusal did not permit penetration to the desired depth of eight feet). Each sample was subdivided into two one-foot aliquots, which were initially screened with a portable PID then analyzed using the GC/PID. Based upon the field screening results, two samples from each boring (16 samples total) were submitted to a state certified laboratory for analysis of volatile organics via EPA Method 8021B. The sample with the highest contaminant levels in the field screening was selected for laboratory analysis in each boring. An additional sample was selected for vertical delineation purposes.

In follow-up to these results, additional soil sampling was performed to complete the horizontal and vertical delineation at the two areas where concentrations of volatile organic compounds (VOCs) exceeded the NYSDEC RSCOs. This work included five borings north and west of the impacted area near MW-2. Four additional borings were also installed at

the second impacted area adjacent to a concrete pad south of the building. Three soil samples were collected at each of these nine boring locations (generally from 0'-2', 4'-6' and 8'-10' below grade).

The third and most recent round of soil samples included eight borings installed near the concrete pad area to conclude the delineation in this area. Two samples were selected for analysis in these borings based on PID screening results.

The results of the soil sampling are summarized on Figure 2-2. The soil sampling data is provided in Appendix B. The salient conclusions of the soil investigation are as follows:

- The native soil at the Site consists of well-stratified fine, medium and coarse sand with traces of gravel typical of the Upper Pleistocene deposits. Up to five feet of surficial fill was also found adjacent to and beneath the building consisting of clay, silt, fine to coarse sand and gravel.

- The soil sampling data indicates that the impacted zone in Area A is restricted to an area no greater than 80 feet by 80 feet (6,400 square feet) by 10 feet deep (see Figure 2-2, Table 2-1 and Table 2-2).

- The impacted zone in Area B is approximately 50 feet long by 25 feet wide by up to eight feet deep (see Figure 2-2, Table 2-1 and Table 2-2).

- Soil sampling data from Area C does not indicate any exceedences of the RSCOs.

2.2.3 *Ground Water Findings*

The 2003 report made the following conclusions regarding groundwater quality at the Site:

- Ground water entering the property from upgradient does not contain detectable levels of VOCs.
- A plume of VOC-impacted ground water emanates from the two impacted soil areas and potentially extends off-Site.

This IRM does not directly address groundwater, therefore this media will not be discussed further in this report.

SECTION 3 DIVIDER

3.0 ENGINEERING EVALUATION OF SOIL VAPOR EXTRACTION

3.1 TECHNOLOGY DESCRIPTION

SVE is a relatively simple in-situ remedial technology for addressing VOC contamination in the vadose (unsaturated) zone. To implement this technology, a blower is used to apply a vacuum to an extraction well (or network of wells) that is screened in the vadose zone through the contaminated interval. The vacuum induces a flow of vapor towards the extraction well, and as the vapor passes through the contaminated formation, VOCs volatilize into the vapor stream. The resultant VOC laden vapor is then withdrawn from the extraction well and the contaminants are removed through an emission control device prior to discharging the soil vapor to the atmosphere.

The effectiveness of SVE is greatly dependent on the volatility of the contaminants of concern, the permeability of the contaminated matrix, as well as the number and rate of pore volume exchanges accomplished. The contaminants of concern at the Site include mostly PCE with smaller concentrations of TCE and DCE. All these compounds have sufficient volatility for SVE to be effective (see Section 3.2.2). Based on the geologic data developed at this Site, the subsurface in the impacted areas consist of a shallow fill layer of variable composition, underlain by well stratified fine, medium and coarse sand. The fill material varies from silt and clay to coarse sand and gravel. These areas of fine-grained fill are addressed in this report through the strategic placement of extraction wells, installation of impermeable surface seals and passive inlet air venting. Further discussion of this issue is provided below.

3.2 SYSTEM APPLICABILITY

3.2.1 *Site Geology and Hydrogeology*

The effectiveness of SVE for remediating contaminated sites is highly dependent on site-specific soil permeability conditions. The technology is most effective at sites with homogeneous, high-permeability soils, but has been used at sites with heterogeneous, less-permeable soils and soils containing low-permeability layers with some success (Guidance for the

Design, Installation and Operation of Soil Venting System, Wisconsin Department of Natural Resources, Nov. 2003). As indicated in the past investigative reports, the J&H Site has shallow fine-grained fill under and around the building. In order to address this heterogeneous condition, the proposed SVE system includes nested extraction wells, impermeable surface seals and passive air vents in select locations. The groundwater at the Site occurs approximately 50 feet below grade within the unconfined Upper Glacial Aquifer; therefore upwelling and its ability to hinder airflow in the impacted soil areas are not considered obstacles to the use of SVE at the Site.

3.2.2 *Chemical Contaminants*

Previous subsurface investigations and the soil gas sampling at the Site identified elevated concentrations of tetrachloroethene (PCE) and its associated breakdown products within the Site soil. Chemical properties related to these contaminants are presented in Table 3-1 and include vapor pressure significantly above 0.5 mm Hg and Henry's Law constants above 100 atm. The values for PCE, TCE, and DCE are greater than the minimal values of 0.5 mm. Hg for vapor pressure and 100 atmosphere for Henry's Law Constant suggested in literature (How to Evaluate Alternative Cleanup Technologies for Underground Storage Tanks Sites: A Guide for Corrective Action Planners, USEPA 1995) as amenable to soil vapor extraction remediation.

3.3 *SYSTEM COMPONENTS*

The design calculations and rationale for a proposed soil vapor extraction system are presented in Appendix C. Area A will be addressed by three sets of vertical extraction wells, one shallow and one deeper. Area B will be addressed by a 20-foot long vapor extraction trench. Area C will be addressed by a single shallow extraction point. In general, each extraction point will be piped to a common manifold. Each extraction point will have its own air control valve, gas flow monitoring port, and sample/vacuum monitoring port as depicted in Figure 3-1. The SVE equipment will include the following:

- vacuum blower;
- moisture separator;
- dilution air inlet;
- in-line air filter;

- emission control device; and
- instrumentation and controls.

The vacuum blower will induce a flow of soil vapor from each well and through the moisture separator and air filter. The blower outlet would be piped into the emission control device to remove contaminants from the vapor stream prior to being emitted to the atmosphere.

The capacity of the blower must produce sufficient pore volume changes in a given period of time and a subsurface radius of influence (ROI) that covers the entire impacted zone. A gas flow of 105 cubic feet per minute (cfm) for Area A would correspond to a turnover of 240 pore volumes per month or 8 soil pore-volumes per day. This is considered a relatively aggressive design basis (Engineering and Design - Soil Vapor Extraction and Bioventing: USACE, June 2002). Based on the soil vapor survey results, initial gas vapor concentrations of VOCs could be as high as 100 µg/L, and actual concentrations may be lower.

A gas flow of 11 cfm for Area B would correspond to a turnover of 240 pore volumes per month or 8 soil pore-volumes per day. Assuming a horizontal screen length of approximately 20 feet results in an extraction flow of 0.55 cfm per foot of screen. This is also considered a relatively aggressive design basis.

The purpose of the Area C extraction point is sub-slab depressurization and soil gas migration control. It is being installed as a proactive, precautionary measure and will serve to protect against potential soil gas migration onto the neighboring property to the east. The Area C extraction point is not designed for aggressive soil remediation, as no exceedences of the RSCOs are found at this location. As such, only a small gas flow will be extracted at this location that will not materially affect the overall design basis of the SVE system.

Thus a total gas flow of 116 cfm would be more than sufficient for addressing contaminated soil in both areas simultaneously. The final design would be based on 150% of this design flow or a total design flow of approximately 175 cfm. The applied vacuum necessary to achieve this flow is not known at this time. It is therefore recommended that a portable, pilot SVE system be utilized for confirmation of flow rates, applied vacuum and measured ROI before final selection of a blower. Otherwise all components can be installed as shown.

The SVE system would include a moisture separator to remove condensation or entrained moisture from the vapor stream. Considering that a surface cover will be used and vapor is extracted only from the shallow soil, it is anticipated that very little liquid will accumulate in the moisture separator. Thus an automated system is not necessary to remove liquid from the moisture separator. Any collected moisture would be manually drained and containerized for characterization and off-Site disposal. The moisture separator would include a high level switch that would shut the system down to prevent liquid from being drawn into the vacuum blower.

For emission controls it is recommended that vapor phase granular activated carbon (GAC) be used. GAC is a simple and reliable technology that is very effective for removing the contaminants of concern at the Site. It is proposed that two GAC vessels be used in series to ensure adequate emission controls. Based on the soil sampling results it has been estimated that the total VOC mass would likely not exceed 340 pounds (Appendix C). A conservative loading efficiency for PCE, the primary constituent of concern, onto vapor-phase GAC, is 5 pounds of PCE per 100 pounds of GAC. Spent GAC will be handled as required by applicable law and sent off-Site for regeneration. Following pilot scale testing with small GAC units, a permanent system will be designed in which the GAC will be replaced no more frequently than every 90 days. Detailed discussion of the proposed GAC emission control system is provided in Section 4.6.

3.4 *CONCLUSIONS OF SVE EVALUATION*

There are three areas where soil contains VOCs at concentrations requiring remedial action exceeding the NYSDEC RSCOs:

- the previously known area around well MW-2 (Area A) where soil concentrations exceed the NYSDEC RSCOs;
- near the concrete storage pad and trailers south of the building (Area B) where soil concentrations also exceed the NYSDEC RSCOs; and
- along the east wall of the building (Area C) where a single elevated soil gas sample was found.

Based on an evaluation of potential remedial alternatives, soil vapor extraction (SVE) is the recommended technology for this Site due to the following factors:

- high volatility of the contaminants of concern;
- the favorable ground water conditions (i.e. ground water is 40 feet below impacted soils);
- soils are mostly sand with a predominant coarse to medium grain size (estimated permeabilities of between 1 to 10 Darcies);
- moisture content is expected to be low; and,
- system design can address the presence of some fine-grain materials by placement of nested wells and passive air vents and by pilot testing the blower system for required vacuum requirements.

SECTION 4 DIVIDER

4.0 SOIL VAPOR EXTRACTION SYSTEM DESIGN

4.1 PERFORMANCE ANALYSIS AND DESIGN MODIFICATIONS PLAN

4.1.1 SVE System Objectives and Performance Criteria

The performance criteria refer to the ability of the components of the system, including mechanical devices, to function as designed. The performance objectives of the soil vapor extraction (SVE) system are as follows:

- Soil vapor flow in Areas A and B will be achieved throughout the entire area of soil contamination as depicted in Figure 2-2. Vapors will be extracted from both the shallow and deep wells at each location. The basis for demonstrating this objective will consist of subsurface vacuum measurements. A vacuum level of at least 0.1 inches water column should be achieved in each of the four vapor observation wells (see Figure 4-1).

- Design and/or operational modifications to achieve the required vacuum measurements, can include, but are not necessarily limited to, the following:

  - Flow controls at each extraction point can be adjusted to redirect subsurface gas flow and alter the system radius of influence;
  - Extraction well points and/or air vents can be closed off or operated in an alternating sequence;
  - The blower vacuum capacity can be increased to achieve desired radii of influence;
  - Additional air vents could be installed; and
  - Additional vapor extraction wells could be installed.

- Compliance with the substantive requirements for air emission limits as stipulated in Title 6 of the New York Code of Rules and Regulations and Air Guide-1 must be achieved. Compliance with these aforementioned air emissions criteria will be demonstrated by collecting samples of the inlet and outlet of the carbon adsorption system and analyzing for VOCs by EPA Method TO-15. The total soil

vapor flow rate will also be measured and the mass emission rate of each chemical of concern will be calculated and compared to those shown in Table 4-1. The mass emission rate of each of these contaminants following emission controls should be less than that indicated in Table 4-1. Contaminants of concern include:

- Tetrachloroethene (PCE);
- Trichloroethene (TCE); and
- Total 1,2-Dichloroethene (1,2 DCE).

- Another goal of the project is to reduce the soil concentrations of the contaminants of concern to levels meeting the RSCO levels. To verify achievement of the RSCOs, a total of 12 soil samples (four borings with three samples per boring) will be obtained and analyzed from the locations shown in Figure 4-2. The analytical results of the samples collected will be compiled and a statistical analysis will be performed for each of the above listed contaminants. If, for each of the above listed contaminants, the 95% confidence limit is less than the above listed standards, the project goals will be met. The RSCOs for the contaminants of concern are listed below:

  - Tetrachloroethene (1,400 µg/kg);
  - Trichloroethene (700 µg/kg); and
  - Total 1,2-Dichloroethene (300 µg/kg).

- The final objective of the project is to mitigate soil gas VOC levels and protect against VOCs entering occupied buildings via soil gas intrusion. Acceptable indoor air concentrations are defined in the document entitled Draft Guidance for Evaluating Soil Vapor Intrusion, (NYSDOH, February 2005) and are given below:

  - Tetrachloroethene (100 µg/m^3);
  - Trichloroethene (5.0 µg/m^3); and
  - Total 1,2-Dichloroethene (no guideline established).

- Further investigation is proposed to support the evaluation of VOCs in soil gas and indoor air. These investigation measures are described below in Section 4.1.2.

4.1.2 *Soil Gas and Indoor Air Evaluations*

Soil gas sampling will be conducted on both the J&H Site and the off-Site property to the east. In addition, indoor air sampling will be performed on the J&H Site. These programs are described below. All sub-slab soil vapor and indoor air samples described in this section will be collected on or before 31 March 2006 (i.e., the end of the heating season). The proposed locations of all sampling/monitoring points discussed in this section are shown on Figure 4-3.

On-Site Testing Program

Six subsurface soil gas samples will be collected along the north, south and west Site boundaries (two on each side). Soil gas will also be tested east of the building on the property adjacent to the east (see description of Off-Site Testing Program, below). The soil gas samples will be collected ten (10) feet from any buildings to eliminate negative bias due to building operations, (i.e. HVAC systems or equipment operations). The soil gas samples will be collected five (5) feet below grade using temporary soil gas implants installed via Geoprobe. Glass beads will be installed in the annular space around the implant to a depth of six (6) inches above the implant screen. Washed sand will be added to fill the borehole to within one foot of the ground surface. Tamped, and hydrated bentonite pellets will be used to seal the borehole around the Teflon tubing at the surface. Immediately prior to the collection of the each soil gas sample, one gas volume will be purged from the implant using a vacuum pump.

The on-Site soil gas samples will be collected over a two-hour period. This period is selected to match the duration of the off-Site soil gas samples. Further explanation of sample duration is provided under the description of the off-Site testing program.

Prior to collecting the first soil gas sample, a tracer gas test will be performed to ensure against infiltration of atmospheric air into the sample. The ground surface around the implant will be covered with plastic sheeting, and helium will be injected under the sheeting during implant purging. A sample of the purge air will be collected in a Tedlar bag, and a portable helium indicator will be used to monitor for the presence of helium in the sample. Once it is confirmed that helium (and atmospheric air) is not infiltrating the sample, collection of the soil gas sample will commence. Upon verification that the method of implant installation is satisfactory for the prevention of ambient air short

circuiting, it will not be necessary to continue the use of tracer gas on the remaining implants.

The on-Site testing program will also include the installation of two soil vapor probes beneath the floor slab in the western and northern portions of the building. These probes will be installed to a depth not to exceed two (2) inches into the sub-slab material. Glass beads will be placed in the annular space to a depth of one (1) inch above the probe screen. The remainder of the borehole will be filled to floor level with an approved sealant such as cement, bentonite, beeswax, etc. Each probe will be secured at grade using a method to be determined that is approved by Site operating personnel.

The initial purpose of these probes will be to measure the subsurface vacuum imparted by the operation of the SVE system. If a measurable vacuum is detected, no further work will be performed. If there is no measurable vacuum, samples will be collected using the soil gas sampling procedures described above.

The final component of the on-Site testing program will be the collection of three indoor air samples from within the J&H building. One sample will be collected in a building location above Area A, near extraction wells AV-5 and 6. The second sample will be collected in the Finishing Room north of the Boiler Room. The third sample will be collected in the office area in the northwest portion of the building. These indoor air samples will be collected over an 8-hour period (i.e., a typical work shift).

The on-Site indoor air and soil gas samples will be collected using a Summa Canister at a flow rate of 0.2 liters per minute or less. Each sample will be analyzed using EPA Method TO-15. The on-Site soil gas samples will be collected prior to SVE system start-up, concurrent with the collection of the off-Site soil gas samples. The on-Site indoor air samples will also be collected prior to SVE system start-up.

Off-Site Testing Program

Two off-Site soil gas samples will be collected on the neighboring property to the east. These samples will be collected using the soil gas sampling procedures described above. Due to the location of these samples in an active driveway, the maximum period available for collection is two hours. These samples will be collected prior to start-up of the SVE system and will be scheduled such that if the results indicate

further off-Site investigation is necessary, this follow-up work can be conducted prior to 31 March 2006. Should these samples indicate that soil gas concentrations are within acceptable levels and off-Site migration has not occurred, no further investigation will be required.

Data Evaluation

All soil gas and indoor air sample results will be compared to the draft NYSDOH guidelines of 100 µg-PCE/m^3 and 5.0 µg-TCE/m^3 and to the decision matrices included in the February 2005 NYSDOH Draft Guidance.

4.1.3 *SVE System Shutdown Criteria*

Operation of the SVE system will be discontinued and a shutdown request will be submitted to NYSDEC if any of the following three conditions occur:

1. All of the effectiveness criteria discussed above in Section 4.1.1 are met;

2. The SVE system has been operating for a period of at least 12 months, asymptotic conditions as defined below have occurred; or

3. A final remedy is implemented that addresses the remaining contaminants.

An asymptotic condition is defined as follows: the monthly mass of total VOCs removed during three consecutive months of operation are less than 10% of the maximum mass of total VOCs removed in any prior one month period. A reduction in the mass of VOCs removed in one month to 10 percent of the maximum mass previously removed in a single month is indicative of a significant decline in the effectiveness of the system. Essentially, when this criterion is reached, it would take a minimum of 10 months of continued operation at the reduced mass removal rate to extract an amount equal to the maximum mass of VOC that had been removed in a prior month. This criterion illustrates that the operation of the system has reached a point of diminishing returns. Furthermore, it must also be demonstrated that a good faith effort has been made to maximize the VOC mass removal efficiency (i.e., maximizing mass removal rates) such as through the use of pulsed operations, as discussed below.

In order to maximize VOC removal efficiency, once asymptotic conditions are encountered, pulsed operation will be employed. Based on VOC monitoring data and mass removal rates, pulsed operation typically requires shutdown of the system for a one-week period followed by two to three weeks of operation. Pulsed operation shall be determined effective when the mass removal rate for pulsed operation is equal to, or less than, the mass removal rate over the same period for continuous operation.

Shutdown will be requested once continuous and pulsed modes of operation reach asymptotic conditions. Any shutdown request will be subject to NYSDEC approval.

4.2 *EXTRACTION WELL AND TRENCH CONSTRUCTION AND LAYOUT*

The radius of influence (ROI) is defined as the radius at which significant soil gas flow is induced toward a given extraction well. The ROI governs the well spacing needed for complete coverage of the contaminated area and hence the number of wells required. Airflow will short-circuit to the atmosphere when the wells have a shallow screened interval and there is no impermeable cover on the ground surface, or there is no layer of low-permeability soils above the screened interval. In this case, the ROI would be small. The ROI can be increased when the surface is covered with concrete or asphalt, when there is a layer of low-permeability soil above the top of the well screen, and/or when the tops of the well screens are deep below the ground surface.

Based on the foregoing, the proposed layout for the SVE wells and vapor observation monitoring wells is presented in Figure 4-1. The proposed system is discussed in further detail below.

Area A System

Based on the delineation of Area A, the soil that requires remediation is restricted to an area approximately 80 feet by 80 feet (6,400 square feet) by 10 feet deep. Based on our experience in applying SVE, we anticipate that a single SVE well would have a radius of influence (ROI) of at least 30 feet. The ROI will likely be significantly greater than 30 feet in the naturally occurring Upper Pleistocene deposits, while the ROI in the shallow fill material will probably closer to the 30 foot estimate. However, the

presence of this heterogeneous stratigraphy requires special design consideration as discussed below.

Boring logs from within the Area A impacted area indicate the presence of the fine-grained fill material in borings SB-8 (to 7.0 feet below grade), SB-11 (4.0 feet) and SB-13 (greater than 6.0 feet and less than 12.0 feet). This fin-grained material will be addressed by installing nested pairs of extraction wells at each location. The shallow extraction well will be screened from immediately below the floor slab to the bottom of the fill material as determined in the field at the time of well installation. The screen zone of the deeper extraction well will be installed immediately below the bottom of the shallow well screen zone.

Based on a 30-foot ROI and using a 20% overlap to ensure complete coverage, each extraction well would address an area of 2,260 square feet (sq. ft.). Thus, three pairs of extraction wells would be needed to address the two lithologies underlying Area A. These wells will be arranged in a triangular patter with a passive inlet in the center to prevent a stagnation zone. Two additional passive inlet wells are also proposed at two indoor areas to promote flow through the higher concentration area. Further detail on the passive air inlet wells is given in Section 4.3.

The Area A system also includes an impermeable asphalt surface vapor barrier over portions of the impacted area not currently covered with either concrete or asphalt. This would prevent atmospheric short-circuiting and will also prevent precipitation from being withdrawn with extracted vapors. During well installations, drill cuttings will be placed beneath the impermeable surface vapor barrier.

Area B System

The soil sampling data indicates that the impacted zone in Area B is approximately 50 feet long by 25 feet wide by up to eight feet deep. Considering the shallow depth of contamination in this area and the absence of a building, it is recommended that a single horizontal extraction trench be installed as shown in Figure 4-1. The assumed 30-foot ROI is provided on Figure 4-1 and shows that the extraction trench is expected to address all of Area B, with a significant safety factor.

The horizontal extraction well will be installed by excavating a narrow trench (approximately one-foot wide) and installing a perforated pipe. The trench would be backfilled with gravel and covered with the excavated soil. The trench and the remainder of Area B, not currently

covered by asphalt or concrete, would then be capped with an impermeable cover to prevent atmospheric short-circuiting and to prevent precipitation from being drawn into the SVE system. The perforated pipe would be installed at approximately four to five feet below grade.

Boring logs from within the impacted area indicate the presence of the same shallow fine-grained fill material found in Area A. The fine-grained fill material was identified in borings SB-9 (to 1.0 feet below grade) and SB-16 (2.0 feet), however none was found in boring SB-24.

The Area B system includes two passive air inlet wells as shown on Figure 4-1 to enhance airflow through this fine-grained zone. These wells were positioned in the portion of Area B most distant from the extraction trench. Further detail on the passive air inlet wells is given in Section 4.3.

Area C System

The Area C system includes a single shallow extraction well. An impermeable asphalt surface barrier will cover the currently unpaved area between the east wall of the building and the property line. This surface barrier will be contiguous with the surface barrier in Area A (see Figure 4-1). The depth of the Area C extraction well will be determined in the field. This well will extend to a depth below the bottom of the wastewater trench adjacent to the west, and the bottom of the foundation wall adjacent to the east.

4.3 *DESIGN OF SVE WELLS, PASSIVE INLET WELLS AND VAPOR EXTRACTION TRENCH*

4.3.1 *Vapor Extraction Wells*

A schematic for the SVE wells is shown in Figure 4-4. The SVE wells will be constructed of 4" diameter PVC riser and 40-slot, PVC well screen. The SVE wells will be installed with a 6 5/8" ID Hollow Stem Auger (HAS). The annulus created from the HSA will be backfilled with a #4 sand pack from the well bottom to 6"-12" above the well screen. A 12"-24" bentonite seal will be installed above the sand pack. The remaining annulus (if any) will be backfilled with a cement/bentonite grout. Cuttings generated from drilling will be placed in Area A and covered with either concrete or asphalt.

During installation of each SVE well, continuous soil samples will be collected and screened with a PID. This information will be used to define the bottom of the fine-grained fill material and the bottom of the impacted soil zone. These data will be utilized in selecting the final screened intervals for each pair of extraction wells. Figure 4-4 shows the anticipated depths and screen lengths for each shallow-deep pair of extraction wells. These dimensions may be adjusted based on the data collected at the time of installation.

4.3.2 *Passive Air Inlet Wells/Vapor Monitoring Wells*

The five passive air inlet wells shown on Figure 4-1 (three in Area A and two in Area B) will be screened within the shallow fine-grained fill material to enhance the flow of soil gas through this less permeable zone. During installation of these wells, continuous soil samples will be collected and screened with a PID. This information will be used to define the bottom of the fine-grained fill material and the bottom of the impacted soil zone. These data will be utilized in selecting the final screened intervals for each passive air inlet well. These wells will also serve as vapor monitoring points to allow the collection of vacuum measurements for confirmation of the Site-specific ROI.

The passive air inlet wells shall be closed during initial operation of the SVE system and will be used as vacuum monitoring ports. When VOC levels in the extracted soil vapor begin to decrease, the inlet wells will be opened to enhance system effectiveness.

A schematic for the passive air inlet/vapor monitoring well construction is shown in Figure 4-4. As shown in the figure, these wells are envisioned to consist of approximately two feet of 1-inch diameter PVC riser with a three-foot long, 20 slot, PVC well screen, pending any adjustments made at the time of installation. Each well will be installed with a 4 1/4" ID HSA. The annulus created from the HSA will be filled with a #2 sand pack from the well bottom to just above the well screen. A bentonite seal, approximately 12 inches thick, will be installed above the sand pack. The remaining annulus (if any) will be backfilled with a cement/bentonite grout. Cuttings generated from drilling will be placed in Area A and covered with either concrete or asphalt.

4.3.3 *Vapor Extraction Trench*

A schematic for the Area B vapor extraction trench is shown in Figure 4-5. The extraction pipe will be installed approximately four to five feet below

grade, but this may be adjusted in the field based on the thickness of the fine-grained fill material. The depth of this pipe could be critical to the Area B system performance. If the fine-grained strata fill is present and continuous, it will be desirable to place the extraction pipe within this zone. If it is placed below this zone, within the underlying Upper Pleistocene deposits, most of the soil gas flow will be derived from this deeper material and the effectiveness of the remedy in the fill material will be impaired.

Due its proximity to the ground surface, the extraction pipe will be constructed of #20 slot stainless steel. This will provide protection from potential damage due to surface vehicular activity. The extraction pipe will be overlain with native fill and an asphalt surface cap. The asphalt will be installed without a gravel base course to prevent creating a preferential vapor flow zone.

4.4 *SVE SYSTEM MECHANICAL COMPONENTS*

The major components of this remedial system include:

- One SVE blower (175 scfm);
- SVE equipment trailer/enclosure;
- One moisture separator;
- Emissions control system;
- Control System; and
- Supporting instrumentation.

Specifications of the SVE equipment and system components can be found in Figure 4-6. The equipment shall be housed in a trailer, which will provide acoustical and weather protection for the mechanical equipment.

Equipment catalog cuts and operational curves for the major equipment items are included in Appendix D. A detailed equipment list is presented in Table 4-2. A Process & Instrumentation Diagram for the system was previously presented as Figure 3-1.

Specifications for the demolition and replacement of the concrete floor slab is provided in Appendix E. The project Health and Safety Plan is given as Appendix F.

The design SVE flow capacity should be approximately 175 scfm in order to achieve desired pore-volume exchange. A start-up test will be performed using a temporary SVE system to select the blower. This test is described in greater detail in Section 4.5. To account for pressure drop within the SVE piping, the moisture separator, and the air filter, the selected blower will be designed to handle approximately 25 inches water column greater than the vacuum required to achieve the necessary ROI. To account for the pressure drop associated with the air emission control system (which will be installed on the discharge side of the SVE blower), the blower will be designed for a pressure of 12 inches water column (see Appendix C for calculations).

Appurtenant SVE equipment includes:

- Acoustical/weather enclosure;
- Inline air filter with inlet vacuum gauge;
- Vacuum relief valve;
- High discharge temperature switch (explosion proof (XP));
- High differential pressure switch (XP);
- Low flow switch (XP);
- Inlet vacuum gauge;
- Discharge pressure gauge;
- Discharge temperature gauge;
- Dilution air valve;
- Bleed-off vent valve; and
- Moisture separator with a 40-gallon storage capacity and a high level switch (XP).

The SVE system will also be equipped with a control panel that includes: main disconnect switch, start/stop/auto switch, run light, alarm/shutdown relays (including: high temperature, high differential pressure, high moisture separator liquid level, low flow), alarm light, auxiliary shutdown signal to SVE blower, run-time meter, and telemetry to notify operator of a system shutdown.

4.5 *SVE SYSTEM START-UP TEST*

A portable SVE pilot system will be mobilized to the Site for a one-day start-up test after part of the system has been constructed (extraction points, piping, valves, gauges and emission control system). The objective

of the start-up test is to confirm the Site-specific ROI and to collect data necessary to specify a permanent blower for the system.

The Site-specific ROI in the shallow fill material will be determined by closing the air inlet wells and using them in a monitoring mode. These wells are strategically located just beyond the edge of the impacted area and therefore can be used to evaluate if the ROI covers the entire area targeted for remediation. The pilot blower will be operated at a variety of flow rates/vacuum settings while monitoring the subsurface vacuum in the monitoring wells. A vacuum measurement in the monitoring wells of 0.1 inches water column will be taken as evidence that a sufficient ROI has been achieved.

The extraction flow rate and vacuum necessary to achieve the required ROI will provide the information required to select a permanent blower. Should the portable SVE pilot system used for the start-up test be appropriately sized for efficient long-term operation, it may be used in the permanent system.

The start-up test sampling program will include the collection of soil vapor samples from each individual extraction well. In addition, samples of the combined system influent and the carbon exhaust to the atmosphere will also be collected. Each gas sample will be collected using a stainless steel Summa Canister and will be analyzed using EPA Method TO-15. Standard chain-of-custody procedures will be utilized for each sample. For each sampling point, a duplicate sample will be collected in a Tedlar bag for on-Site analysis using a photo-ionization detector (PID) with 11. 7 eV bulb. The results of the PID results and laboratory results will be correlated. The average ratio of the lab results divided by the corresponding PID results will be used to scale future PID results. This ratio will be used during future operations for real-time evaluation of carbon system performance.

4.6 *EMISSIONS CONROL SYSTEM*

The emission control system will consist of two 170-pound carbon canisters of granular activated carbon (GAC) connected in series with a third canister in stand-by. Based on the existing soil and soil gas data, this design will provide adequate treatment and comply with applicable regulations. However, if operating experience indicates otherwise, the

capability exists to upsize to larger GAC vessels that would be able to operate for at least 90 days without replacement.

The exhaust from the SVE blower will be connected to the primary 170-pound GAC canister. This canister will be used to adsorb 99+% of the VOCs in the recovered influent vapor. The second canister will be used to ensure that emissions are below the permitted limits. When breakthrough of the primary canister occurs, it will be removed from the system and the stand-by canister will be added to the end of the train.

It is noted that cis-1,2-DCE and vinyl chloride do not readily adsorb onto GAC. Cis-1,2-DCE is present at low concentrations due to the biological breakdown of the parent compound PCE. The presence of vinyl chloride is also theoretically possible through the same sequential decay pathway, however it has not been detected at the Site. Due to the relatively low concentrations of cis-1,2-DCE (and complete absence of vinyl chloride), and since the geochemical conditions are not favorable for extensive biodegradation of PCE to DCE and vinyl chloride, re-evaluation of the emission control system does not appear necessary. However, even if concentrations of these chemicals increase in the future, the operational response will be to simply change out the GAC units more frequently. Other changes to the emission control system may be considered if necessary, but under no circumstances will emissions be allowed to exceed those allowable under Air Guide-1.

A New York State Risk Screening analysis has been completed to determine the control factors necessary to achieve compliance with Air Guide-1. The analysis has been done for PCE, TCE, and DCE, however PCE is the controlling factor due its much higher concentration. The compliance criteria include the annual maximum allowable discharge ("AGC" in Table 4-1), as well short-term maximum allowable discharge ("SGC" in Table 4-1).

The system design factors utilized in the analysis presented in Table 4-1 include a flow rate of 175 scfm and a 30-foot exhaust stack. By a trial-and-error process, it was determined that the maximum allowable discharge concentration of PCE is 61 µg/L, or 8.8 ppmv. Similarly, the maximum allowable discharge concentration of TCE is 30 µg/L, or 5.5 ppmv. The selected emission control system is easily capable of achieving this level of treatment. Based on this analysis, a concentration of 5.5 ppmv will be used as an action level for carbon changeouts. Monitoring and sampling will be conducted as part of normal operations and maintenance to ensure compliance as discussed in Section 4.12, below.

4.7 *PIPING AND LAYOUT*

The layout of the field piping is presented in Figure 4-6. This drawing indicates pipe sizes and materials of construction.

4.8 *UTILITIES AND AUXILIARY POWER*

Electric service to the SVE system can be provided by existing electrical service at the Site. There currently exists a 208-volt, 3-phase and 110-volt, 1-phase service bus through the building and a panel within 100 feet of the proposed location of the SVE system. The location of panel and service bus is shown in Figure 4-6.

4.9 *EQUIPMENT ENCLOSURE*

The SVE blower will be housed in a trailer enclosure. The trailer enclosure serves two purposes:

1. to protect mechanical equipment from the elements; and

2. to provide acoustical control of the mechanical equipment.

Figure 4-6 shows the equipment to be housed in the enclosure. Placing the major mechanical equipment in a trailer also provides the flexibility of being able to easily move the system at a later date.

4.10 *SYSTEM SAMPLING AND MONITORING PORTS*

The piping from each of the extraction wells will be manifolded together. On each of the SVE lines, prior to the manifold, a sampling port (SP301-307), vacuum gauge (VG301-307), flow measurement element (FE301-307), and a butterfly valve (FCV301-307) will be installed. The sampling port will consist of a petcock valve. This port may be used to extract a vapor sample for analysis. The flow element will allow for the measurement of line velocity with a differential pressure gauge (DPG301-307). The flow element will be located in a straight length of pipe that is at least three feet downstream of the nearest fitting, and at least 15 inches

upstream of the butterfly valve. The differential pressure reading obtained from the flow element will be used in conjunction with the vacuum measurement obtained at VG301-307 and the temperature measurement at TG301 to calculate the flow rate. To regulate, or completely shut off the flow to any extraction line, FCV301-307 may be used.

After these valves, the individual extraction pipes will manifold together into a single header. The manifolded line will then enter the SVE equipment trailer and pass through a butterfly valve (IV301), which can be used to completely stop vapor extraction, if necessary.

Downstream of IV301, a dilution valve (DV300) will be available to combine ambient air with the soil vapor. The dilution air may be used to adjust the flow of air from the vapor extraction piping, and for minimum vacuum loading during blower start-up. It may also be used to dilute extracted vapors in the event that the extracted vapor concentration approaches 25% of the lower explosive limit (LEL), although the potential for this is not anticipated at this Site.

The combined air-vapor stream will then pass through a moisture separator (MS300). The moisture separator will remove any water droplets from the air stream. A sight gauge will indicate the liquid level inside the moisture separator, and a drain (IV302) will be located at the bottom of the separator to allow for pumping of condensate to a drum for collection and testing for appropriate off-Site disposal. If the water level becomes too high in the separator, a liquid level switch (LSH300) will shut down the SVE blower.

A vacuum relief valve (VRV300) is located immediately downstream of MS300. This valve will automatically open if the system line vacuum exceeds 80 inches water column. This condition could be caused by a line blockage and/or excessive backpressure.

The air-vapor stream will pass a flow switch (FSL300) after VRV300. The flow switch will shut down the blower under a low flow condition.

Downstream of FSL300, an inlet air filter (AF300) will remove particulates from the incoming air stream. There will be vacuum gauge ports (VGP304-305) located on either side of AF300 to monitor particulate accumulation in the air filter. The air-vapor stream will then pass through the blower.

A temperature gauge (TG302) and pressure gauge port (PGP300) will be located at the blower outlet for indication of blower operating conditions. A temperature switch (TSH300) will also be located at the blower outlet. This switch will shut down the SVE blower when the outlet temperature exceeds 180 ^{0}F. Possible causes for high outlet temperatures are high inlet temperatures or high differential pressure across the blower. A high differential pressure switch (DPSH300) is also provided as an additional safety control.

A vent valve (VV300) will be located downstream of the blower to allow for a bypass of the GAC. This valve is to be used only for equipment maintenance. Furthermore, it is to be used only when IV301 is closed.

The blower outlet piping will extend outside the SVE enclosure. Outside the blower enclosure, blower effluent piping will continue to the GAC units. Sample ports (SP303-306) will be located at the inlet and outlet of each GAC unit to monitor efficiency. From that point the air-vapor stream will ultimately be discharged through a 30′ emission stack that will be anchored to the building wall.

4.11 *SHUDOWN AND ALARM/AUTODIALER CONDITIONS*

The SVE control system shall be a relay control logic board that operates the blower continuously and contains interlocks for emergency system shutdown designed to protect the equipment and to ensure personnel safety. These controls and the resulting actions are summarized in Table 4-3.

4.12 *OPERATIONS, MAINTENANCE, AND MONITORING PLAN*

Frequent monitoring of the SVE system will be performed during the initial operating period, while the system stabilizes. During this period, it is estimated that two visits per week will be performed to confirm that the system is operating as designed. At a minimum, these two Site visits per week will include measurement of the following parameters:

- System operating temperature;
- Extraction point vacuums;

- Monitoring point vacuums;
- Vapor flow rates;
- Influent soil vapor concentrations (by PID);
- Exhaust gas concentrations (by PID);
- Gas concentrations between the GAC units and individual influent points (by PID); and
- Weekly collection of influent and effluent vapor samples for laboratory analysis (further detail is provided below).

After stable operating conditions have been confirmed, monthly monitoring of the system operation will be conducted. SVE system operational data collected during each regular monthly Site visit will consist of:

- Runtime;
- Temperature readings at all gauges and at operational air vents;
- Pressure/vacuum readings at all gauges;
- Velocity/volumetric flow readings and valve positions from each extraction well and at blower system;
- PID readings at outlet of each extraction well, outlet of blower, outlet of carbon canisters and intermediate carbon canister points;
- Water levels in the knockout drum, volume of collected condensate, and documentation of disposal events (manifests);
- Any shutdown conditions and responses;
- Carbon disposal and documentation of replacement events (manifests); and
- Quarterly collection of vapor samples for laboratory analysis (further detail is provided below).

Each vapor sampling event for laboratory analysis will include one sample from the combined system influent, and one from the emissions to the atmosphere. All samples will be collected using Summa Canisters and will be analyzed using EPA Method TO-15.

Normal monthly maintenance activities will include the following:

- Leak detection and repair; and

- All maintenance items listed in manufacturer equipment recommendations.

Finally, quarterly progress reports, including compliance sample results and operational data will be submitted to NYSDEC.

4.13 *PROJECT SCHEDULE*

A graphical project schedule is provided as Figure 4-7.

TITLE

SITE LOCATION MAP

JOHNSON & HOFFMAN MANUFACTURING CORP.

CARLE PLACE, NEW YORK

PREPARED FOR

CAWSL ENTERPRISES

ERM Environmental Resources Management			SCALE: GRAPHIC	FIGURE: 1-1
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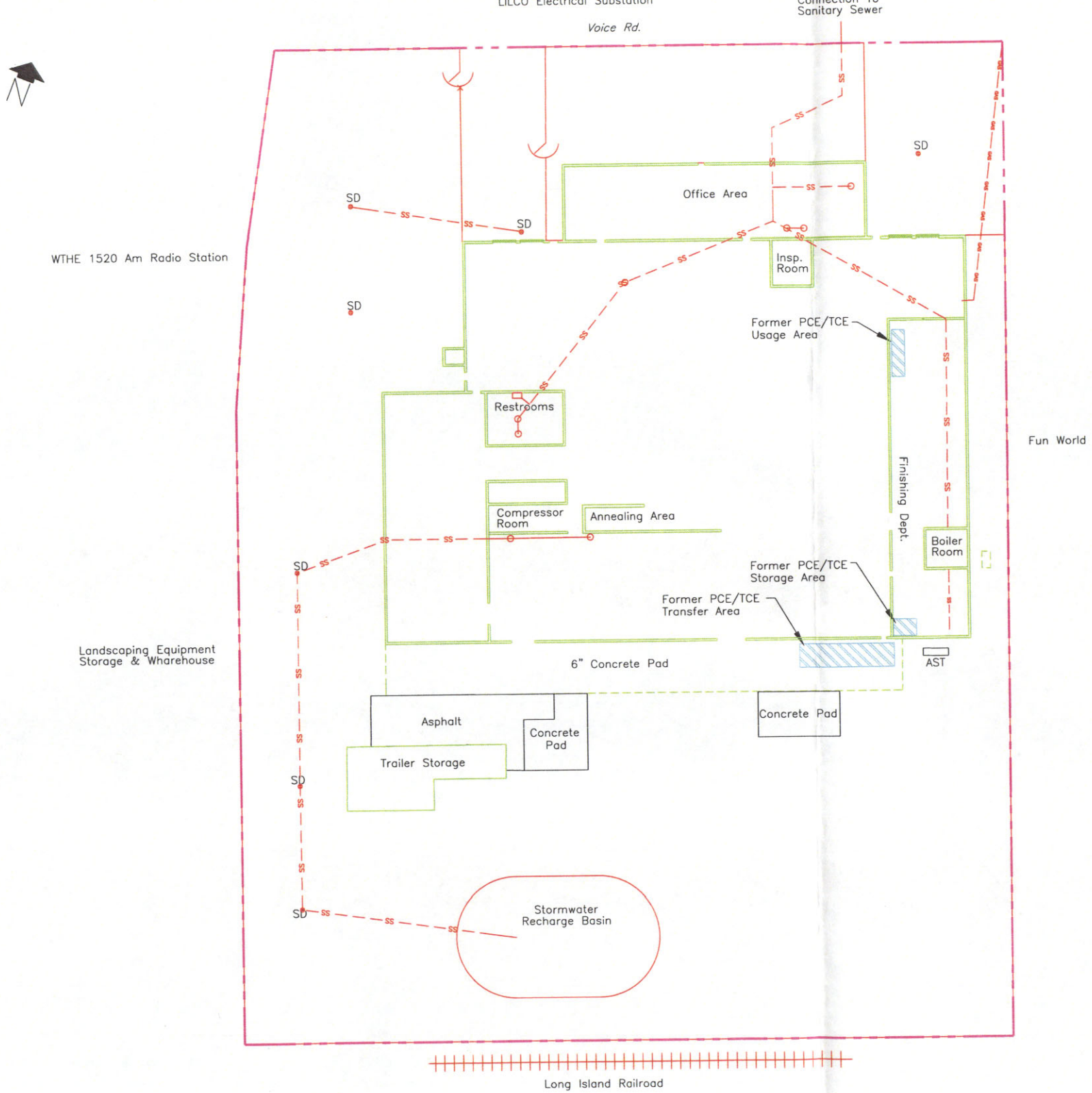
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Former PCE/TCE Usage Area
Restrooms
Fun World
Finishing Dept.
Compressor Room
Annealing Area
Boiler Room
Former PCE/TCE Storage Area
Former PCE/TCE Transfer Area
Landscaping Equipment Storage & Wharehouse
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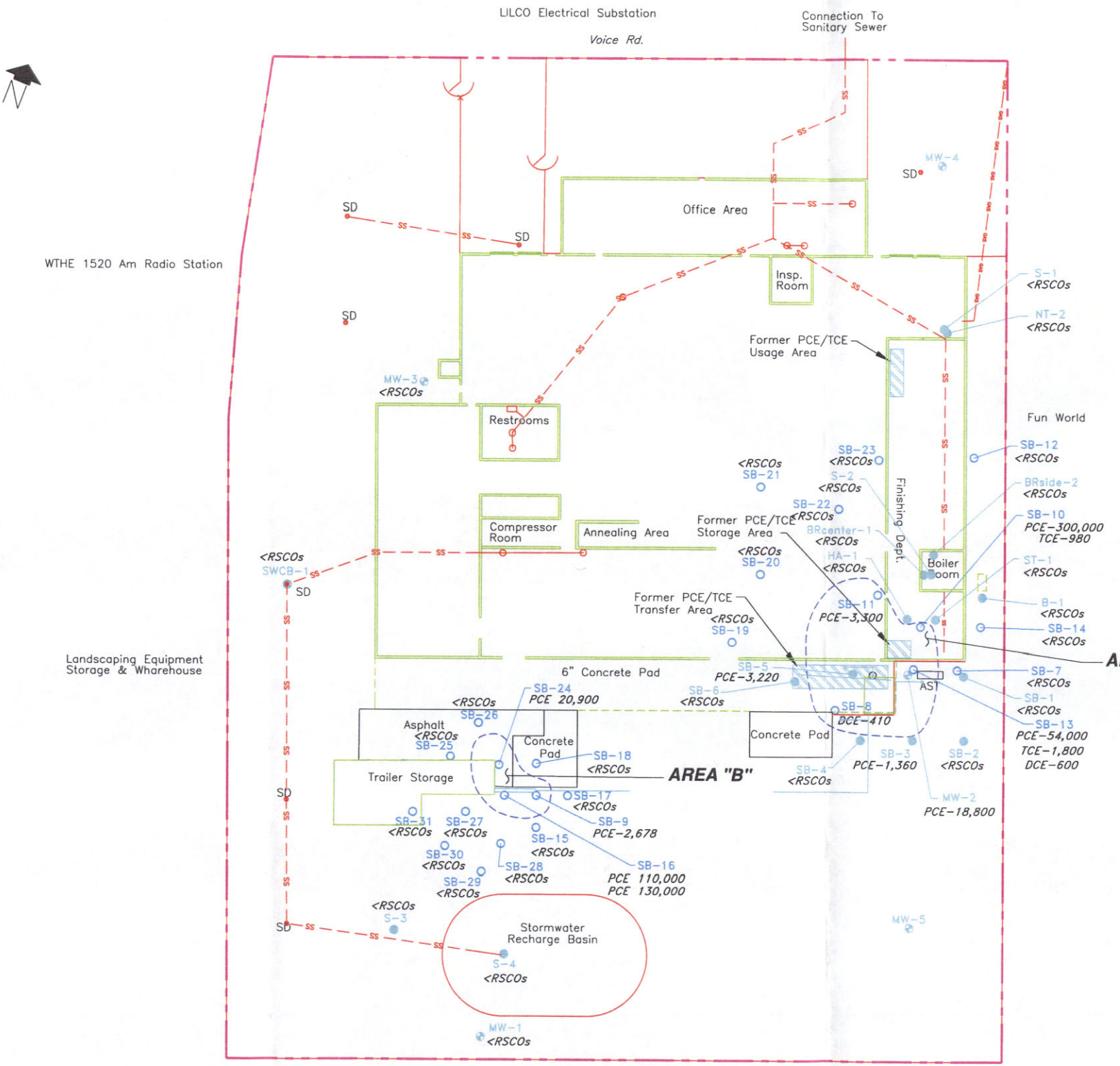
AST
Asphalt
Concrete Pad
Trailer Storage
Concrete Pad
Stormwater Recharge Basin
Long Island Railroad
SD
SS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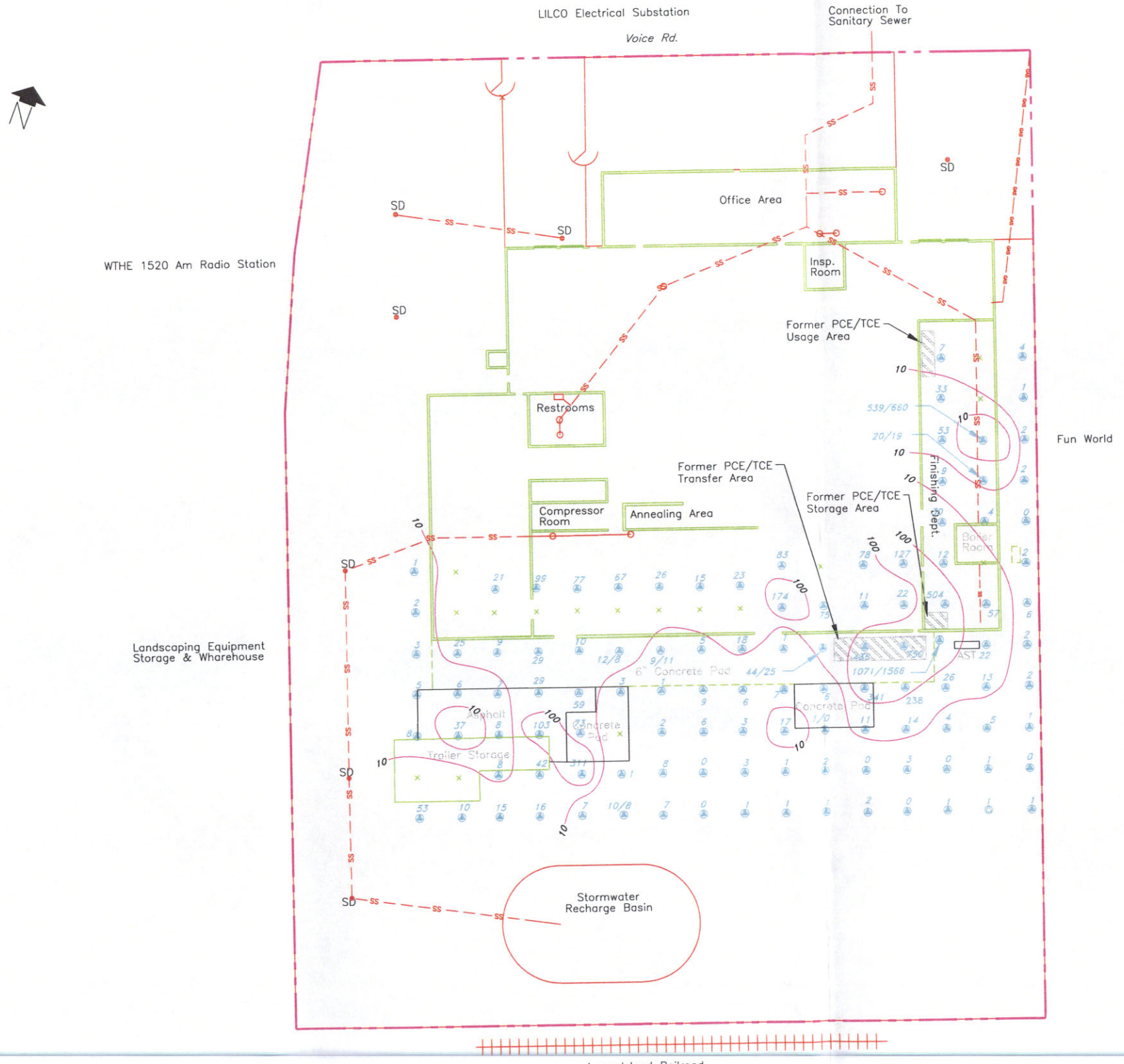
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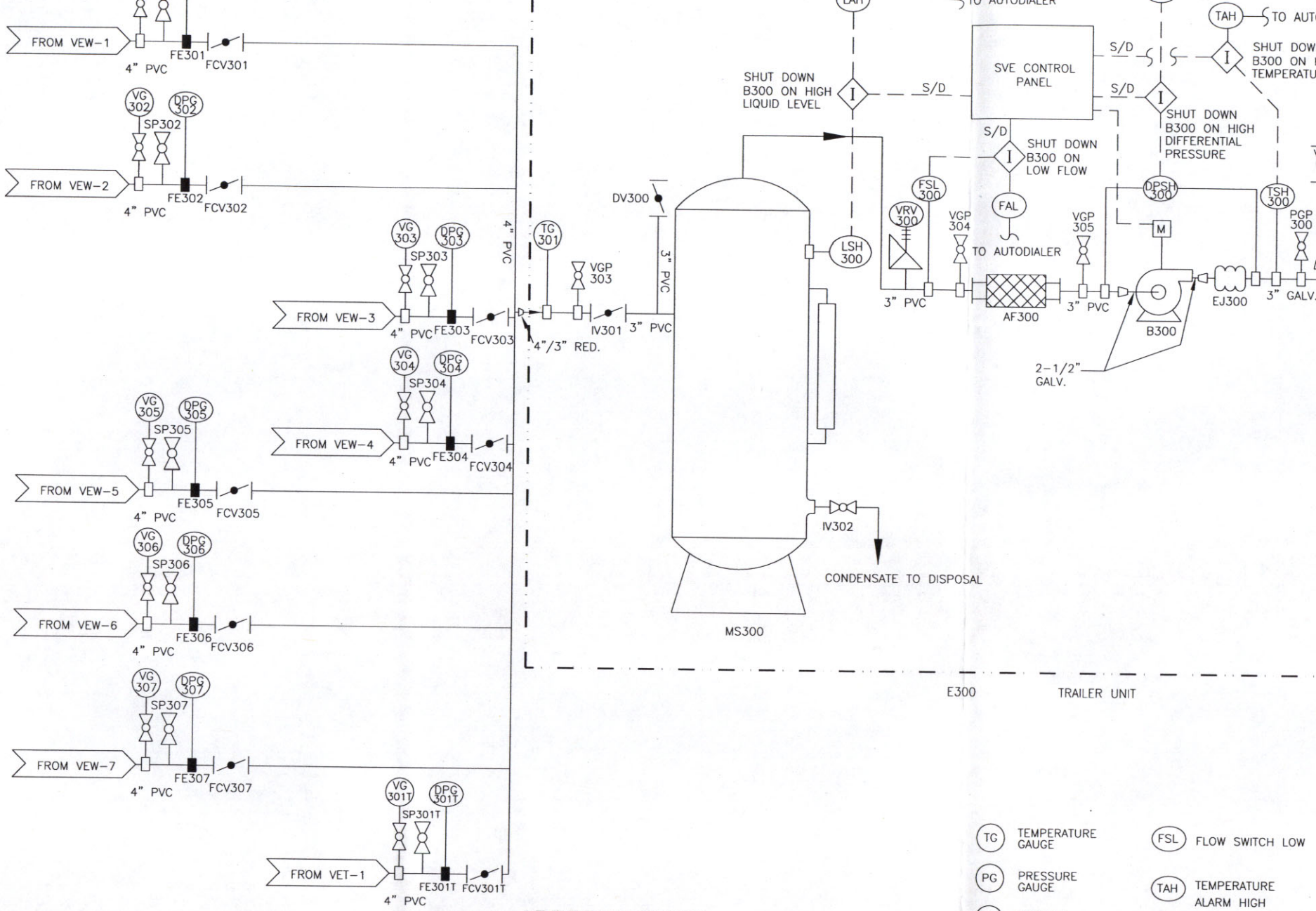

LINE TYPE IDENTIFICATION

- ELECTRICAL
- ENCLOSURE

ABBREVIATIONS

MS	MOISTURE SEPARATOR	E	ENCLOSURE
AF	AIR FILTER	FE	FLOW ELEMENT
B	BLOWER	VET	VAPOR EXTRACTION TRENCH
IV	ISOLATION VALVE	VEW	VAPOR EXTRACTION WELL
DV	DILUTION VALVE	S/D	SHUT DOWN
SP	SAMPLE PORT	EJ	EXPANSION JOINT
VGP	VACUUM GAUGE PORT	GAC	GRANULAR ACTIVATED CARBON
PGP	PRESSURE GAUGE PORT		

- TG — TEMPERATURE GAUGE
- PG — PRESSURE GAUGE
- VG — VACUUM GAUGE
- DPG — DIFFERENTIAL PRESSURE GAUGE
- TSH — TEMPERATURE SWITCH HIGH
- DPSH — DIFFERENTIAL PRESS. SWITCH HIGH
- LSH — LEVEL SWITCH HIGH
- FSL — FLOW SWITCH LOW
- TAH — TEMPERATURE ALARM HIGH
- DPAH — DIFFERENTIAL PRESS ALARM HIGH
- LAH — LEVEL ALARM HIGH
- FAL — FLOW ALARM LOW
- VRV — VACUUM RELIEF VALV

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION

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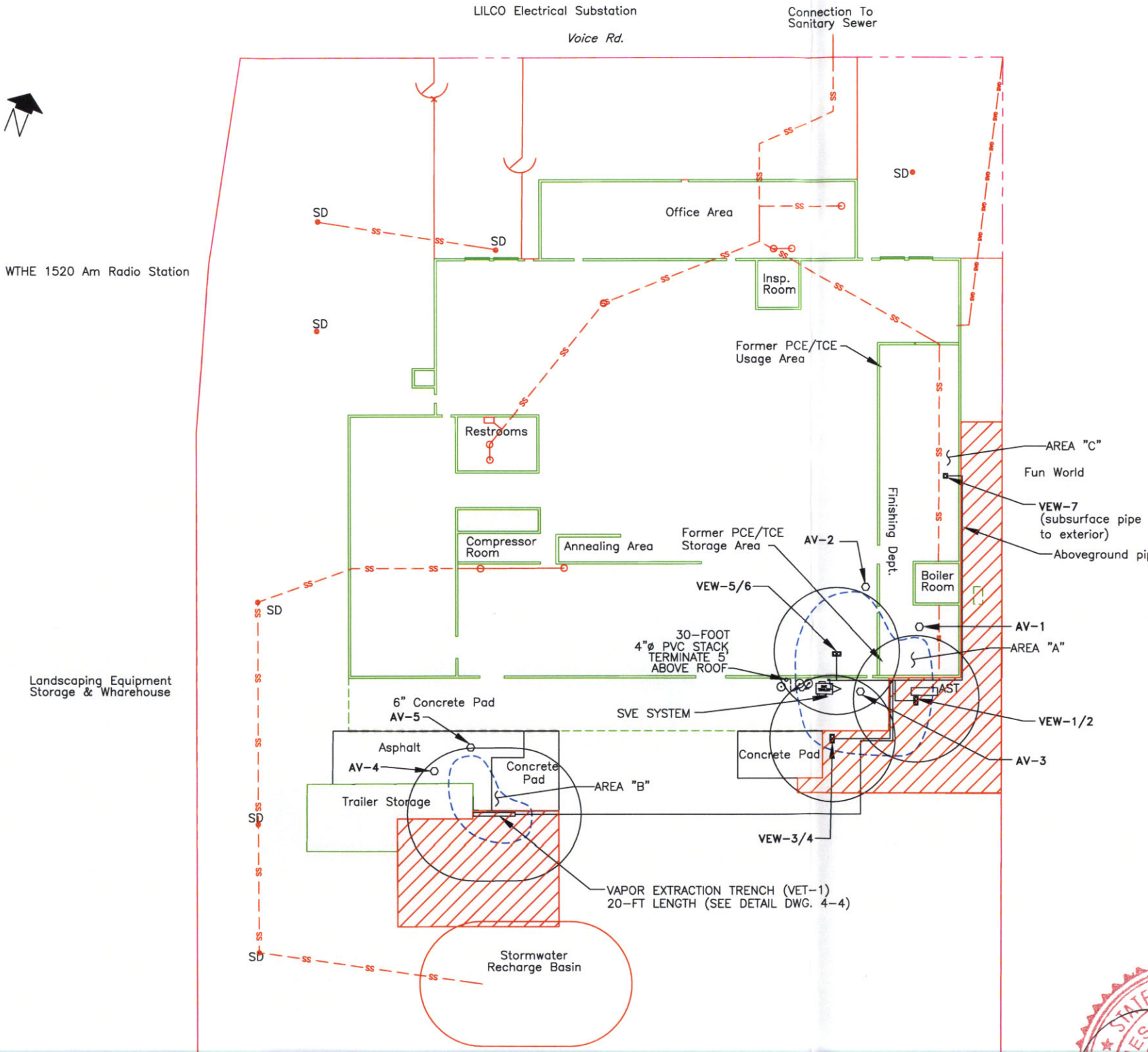
DESIGN ENGINE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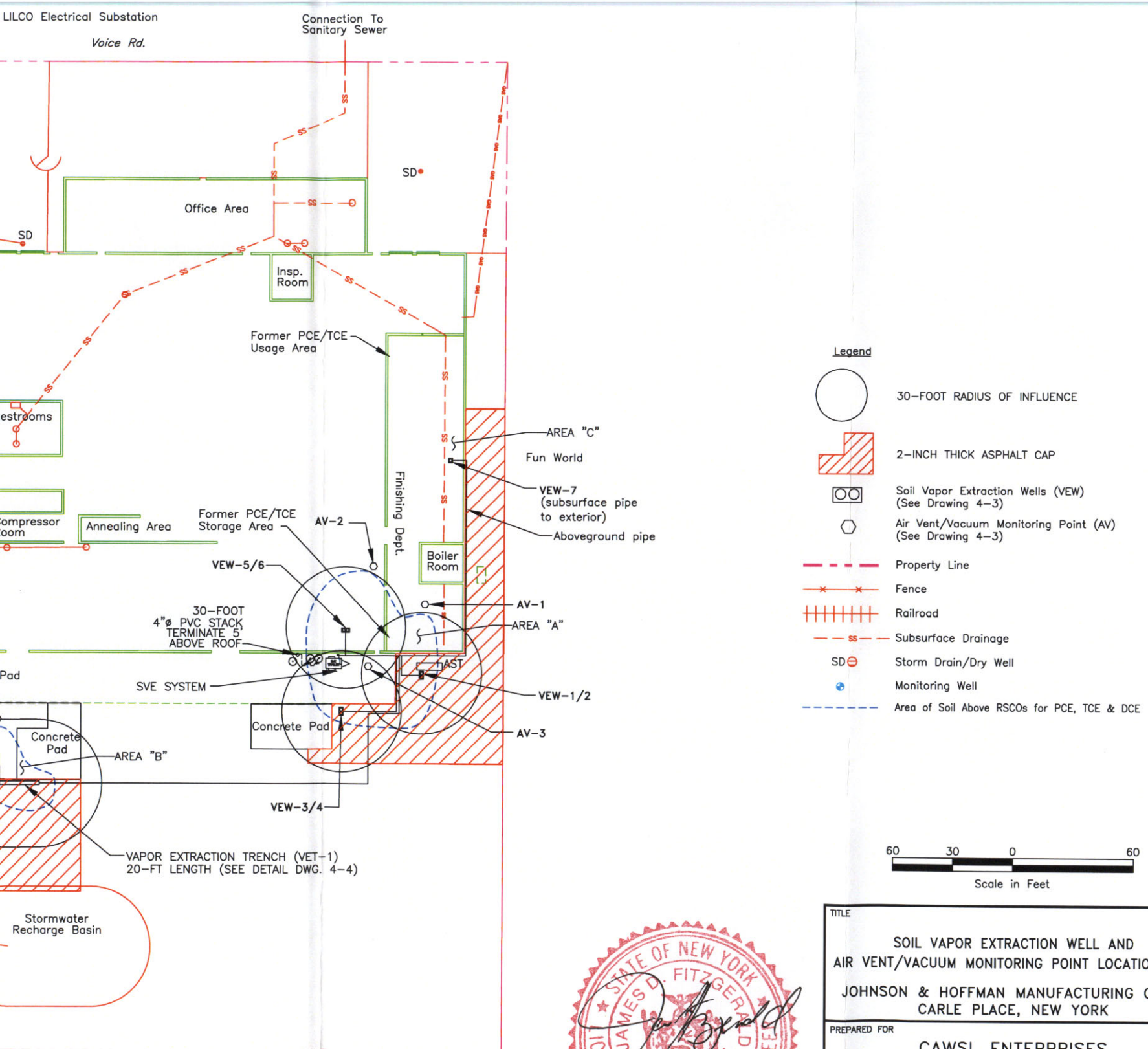
Compressor Room
Annealing Area
Former PCE/TCE Storage Area
Finishing Dept.
Boiler Room
AREA "C"
Fun World
VEW-7
(subsurface pipe to exterior)
Aboveground pi
AV-2
VEW-5/6
AV-1
AREA "A"
30-FOOT 4"ø PVC STACK TERMINATE 5' ABOVE ROOF
AST
SVE SYSTEM
VEW-1/2
AV-3
Landscaping Equipment Storage & Wharehouse
6" Concrete Pad
AV-5
Asphalt
AV-4
Concrete Pad
AREA "B"
Trailer Storage
Concrete Pad
VEW-3/4
VAPOR EXTRACTION TRENCH (VET-1)
20-FT LENGTH (SEE DETAIL DWG. 4-4)
Stormwater Recharge Basin
SD
SS



STATE OF NEW YORK
JAMES D. FITZGERALD
LICENSED PROFESSIONAL ENGINEER

TITLE

SOIL VAPOR EXTRACTION WELL AND AIR VENT/VACUUM MONITORING POINT LOCATION MAP

JOHNSON & HOFFMAN MANUFACTURING CORP.
CARLE PLACE, NEW YORK

PREPARED FOR

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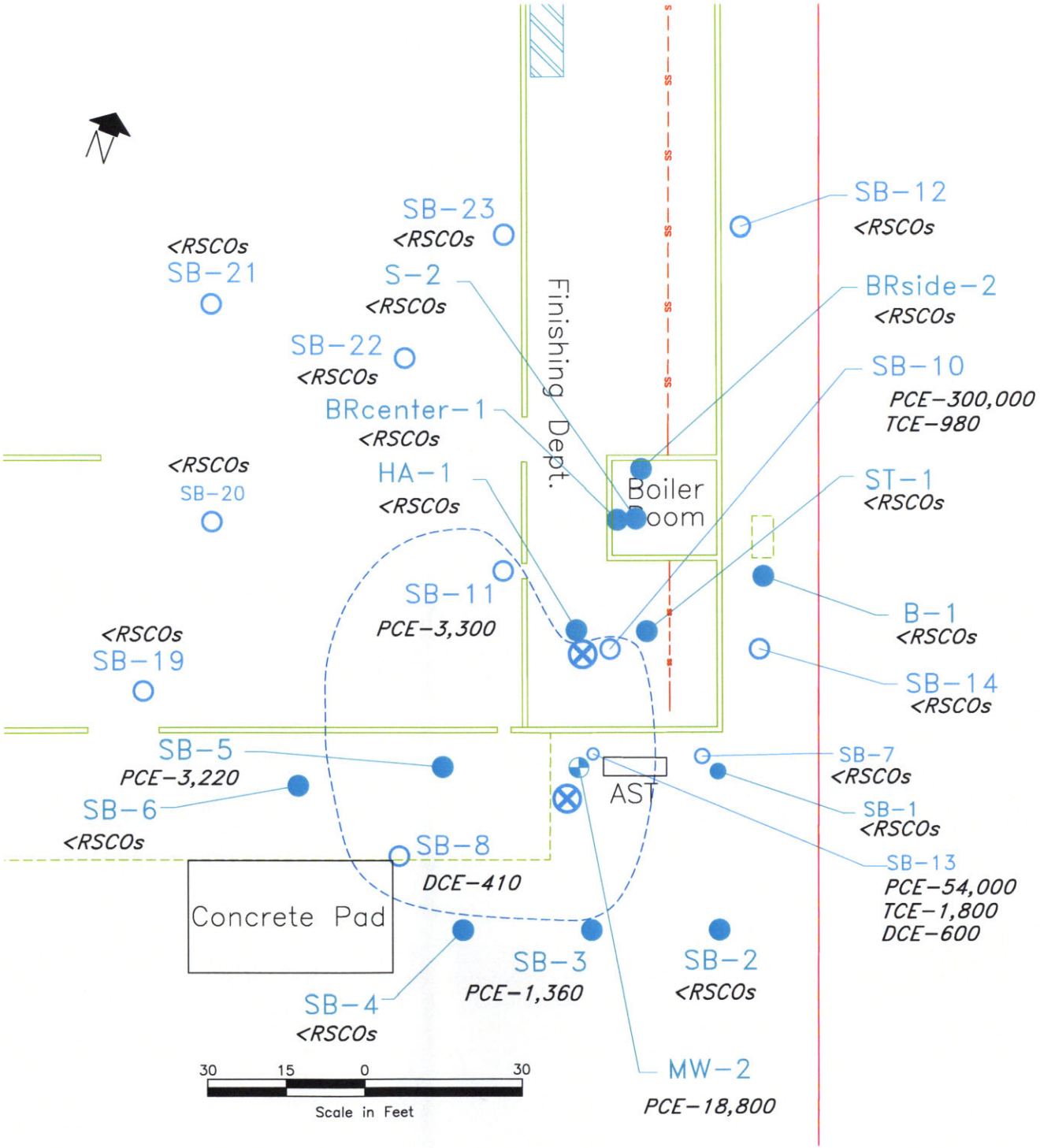
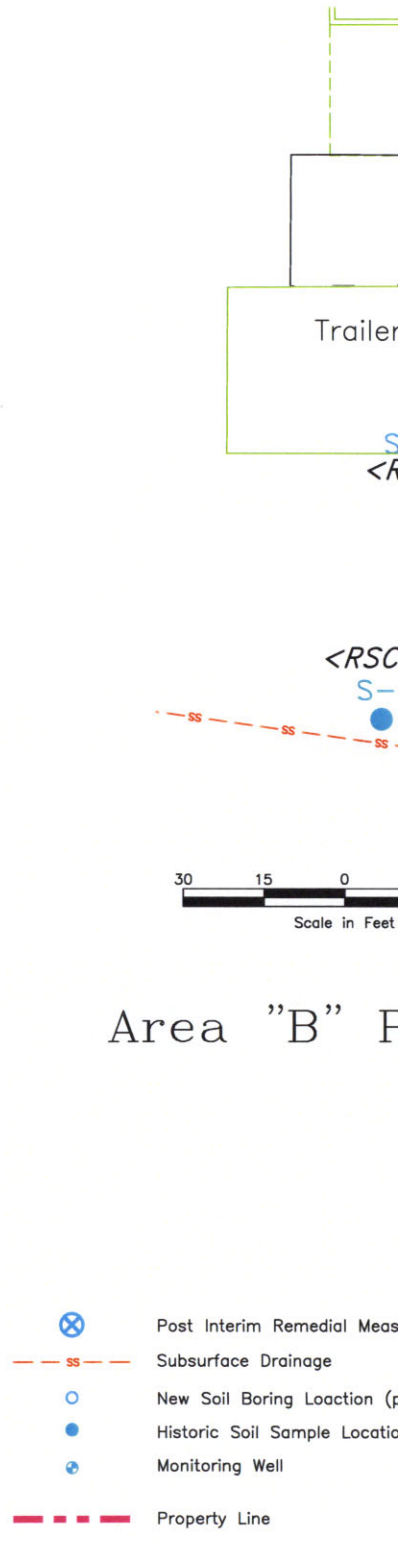
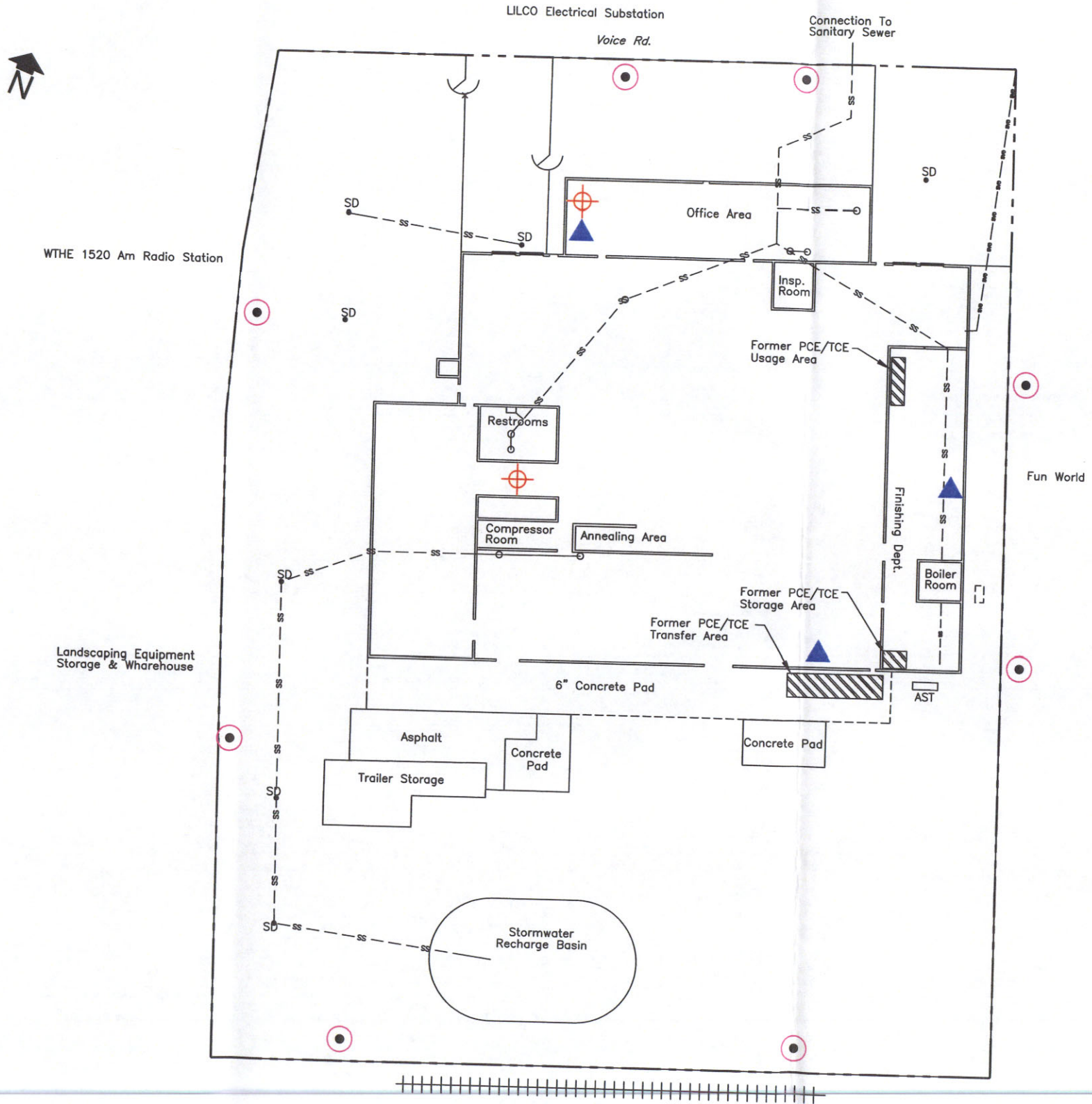
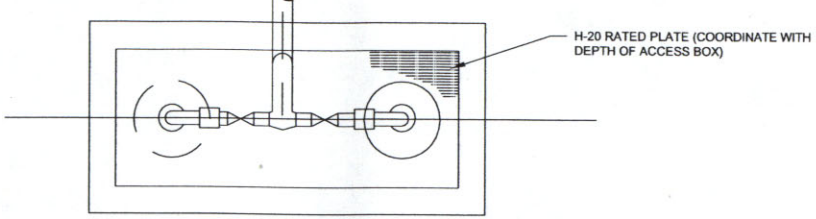


Area "A" Post-IRM Soil Sampling Points

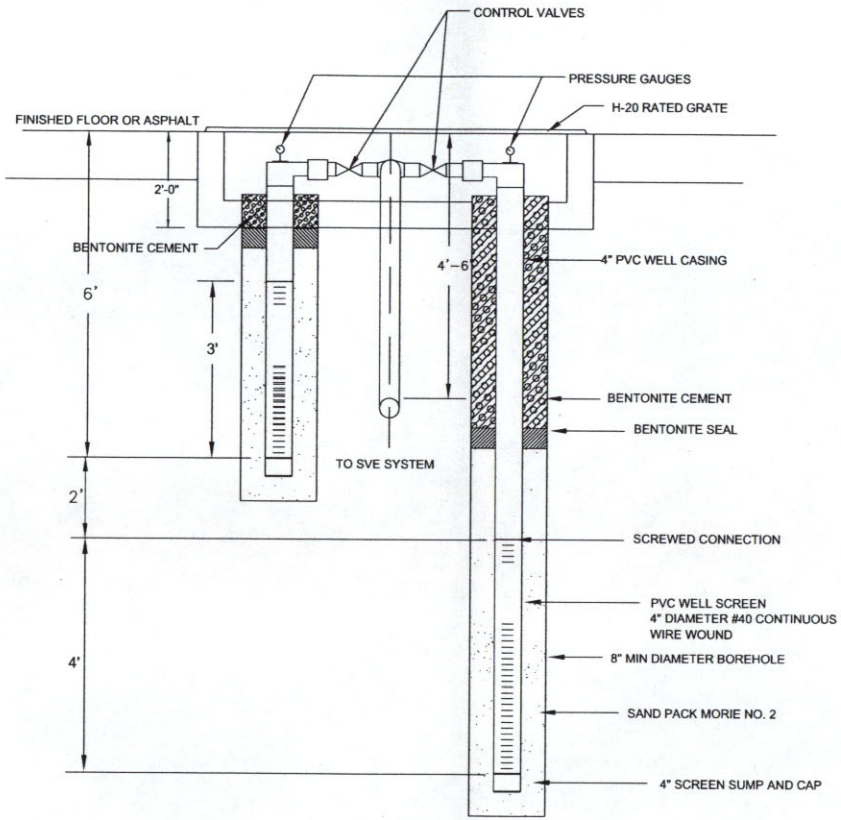


Area "B" P


LILCO Electrical Substation
Voice Rd.
Connection To Sanitary Sewer
N
WTHE 1520 Am Radio Station
SD
SS
Office Area
Insp. Room
Former PCE/TCE Usage Area
Restrooms
Compressor Room
Annealing Area
Finishing Dept.
Boiler Room
Former PCE/TCE Storage Area
Former PCE/TCE Transfer Area
AST
Fun World
Landscaping Equipment Storage & Wharehouse
6" Concrete Pad
Asphalt
Concrete Pad
Trailer Storage
Stormwater Recharge Basin



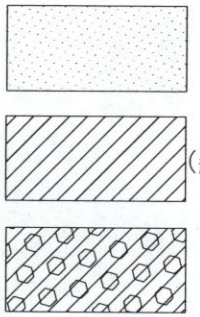
SVE WELL HEAD PLAN



SVE WELL HEAD DETAIL

N.T.S.

LEGEND



– SAND PACK

(#4) – BENTONITE SEAL

– CEMENT/BENTONITE

1"ø, FULL-F

TOP OF ASPHALT

BENTONI

PV
1" DIAMETER #40

5" MIN DIAME

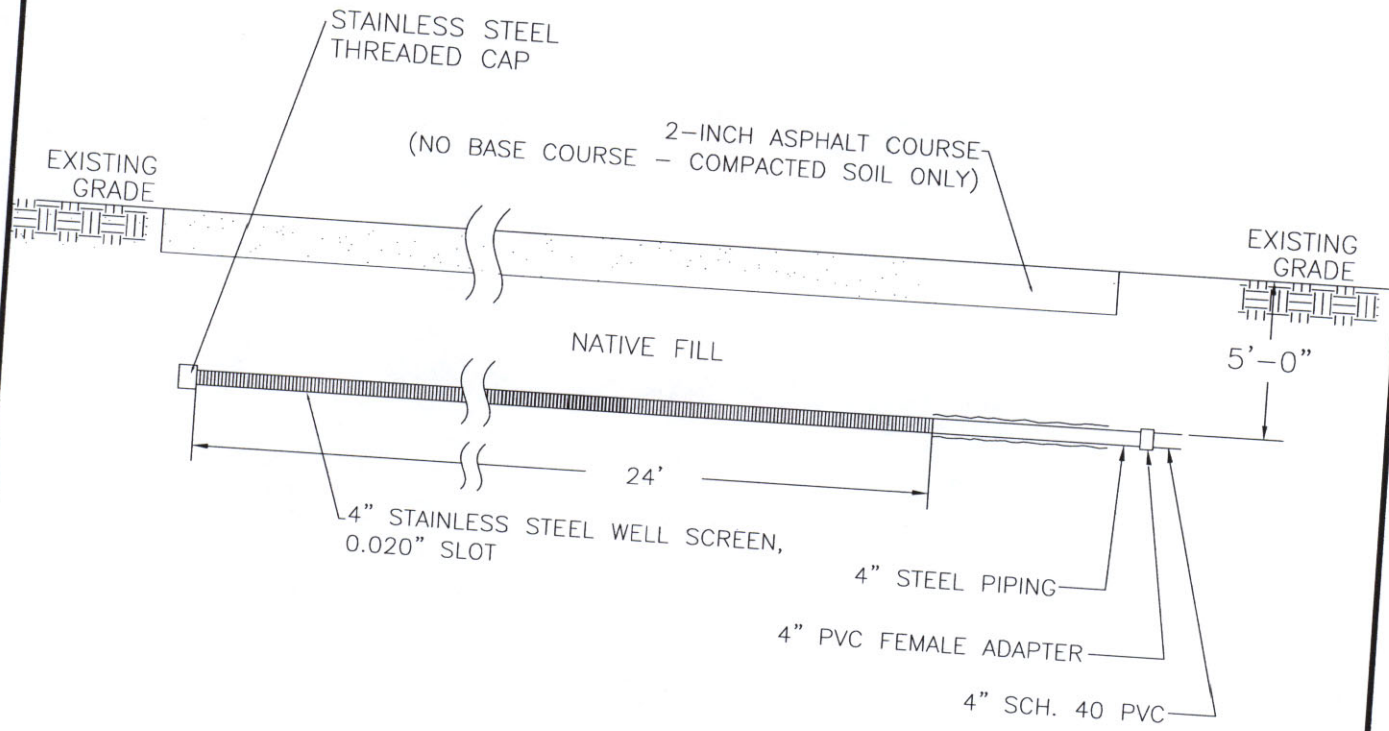
SAND P

1" SCREEN SU

AIR

NOTES:

1. ABOVE GR
2. PIPING TO TOWARDS
3. TAP SAMP
4. DEPTHS O SHALL BE CONDITION
5. VAPOR EX



STATE OF NEW YORK
CARL D. FITZGERALD
LICENSED PROFESSIONAL ENGINEER
No. 061260-1

TITLE

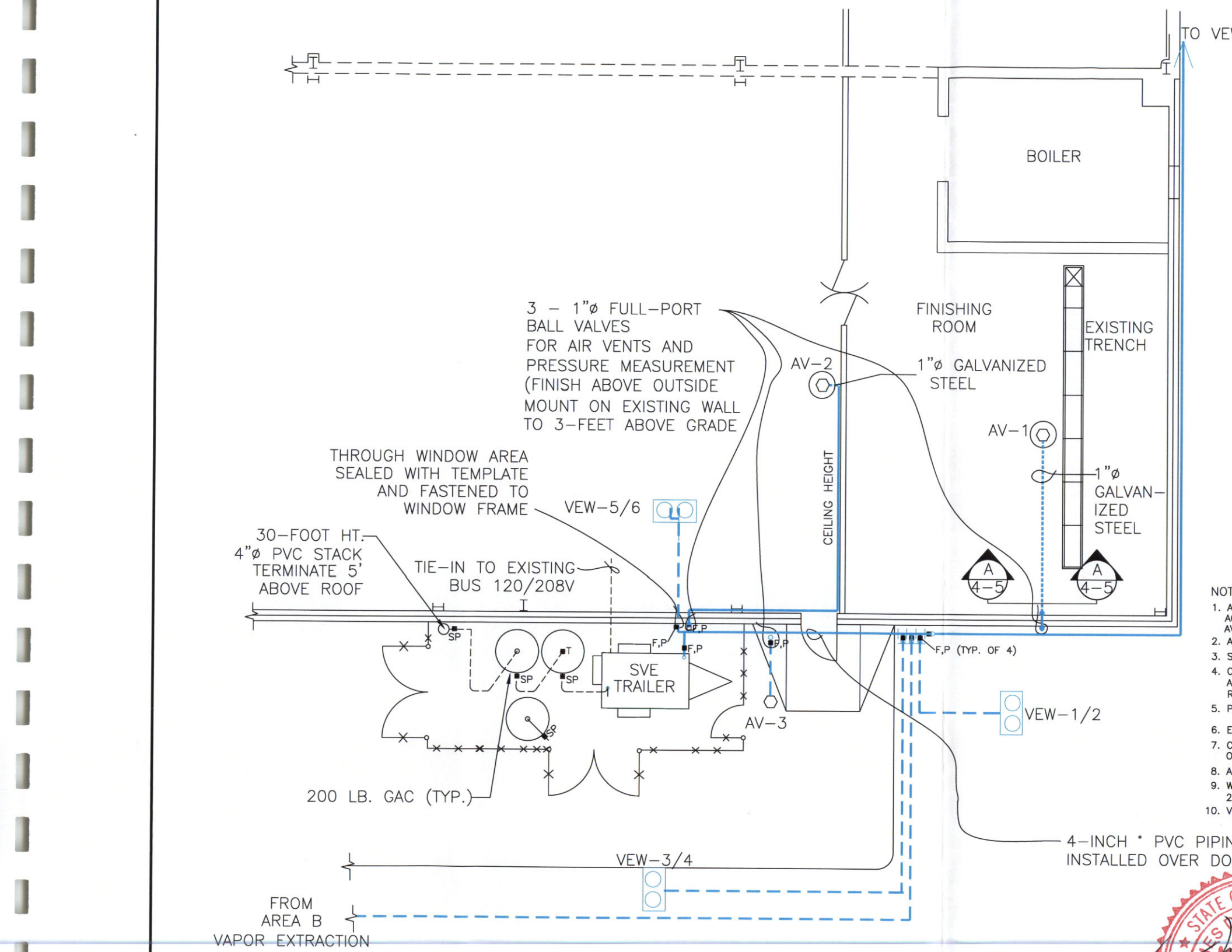
HORIZONTAL EXTRACTION WELL DIAGRAM
JOHNSON & HOFFMAN MANUFACTURING CORP.
CARLE PLACE, NEW YORK

PREPARED FOR

CAWSL ENTERPRISES

ERM Environmental Resources Management

DRAWN:	JOB NO.:	FILE NAME:	SCALE	DATE	FIGURE
EMF	0016791.01	0016791-01-019	GRAPHIC	2/16/05	4-5



NOT
1. A
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O
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9. W
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10. V

ERM.

SOIL VAPOR EXTRACTION IMPLEMENTATION SCHEDULE
J&H MANUFACTURING SITE
CARLE PLACE, NEW YORK

ID	Task Name	Duration	Start	Finish
1	**SOIL VAPOR EXTRACTION IMPLEMENTATION**	**634 days**	**Mon 8/1/05**	**Tue 1/1/08**
2	Preparation of IRM Work Plan	88 days	Mon 8/1/05	Wed 11/30/05
3	First Round of NYSDEC Comments on IRM Work Plan	5 days	Mon 10/10/05	Fri 10/14/05
4	Second Round of NYSDEC Comments on IRM Work Plan	10 days	Mon 12/19/05	Fri 12/30/05
5	Preparation of Contractor Bid Package	22 days	Tue 11/1/05	Wed 11/30/05
6	Contractor Bid Preparation	22 days	Thu 12/1/05	Fri 12/30/05
7	Contract Award and Construction Mobilization	15 days	Mon 1/2/06	Fri 1/20/06
8	Soil Vapor System Construction	25 days	Mon 1/23/06	Fri 2/24/06
9	Soil Vapor System Operation	457 days	Mon 2/27/06	Mon 11/26/07
10	Soil Vapor System Closure Documentation Preparation	66 days	Mon 10/1/07	Mon 12/31/07
11	Soil Vapor System Closure Documentation to NYSDEC	1 day	Tue 1/1/08	Tue 1/1/08

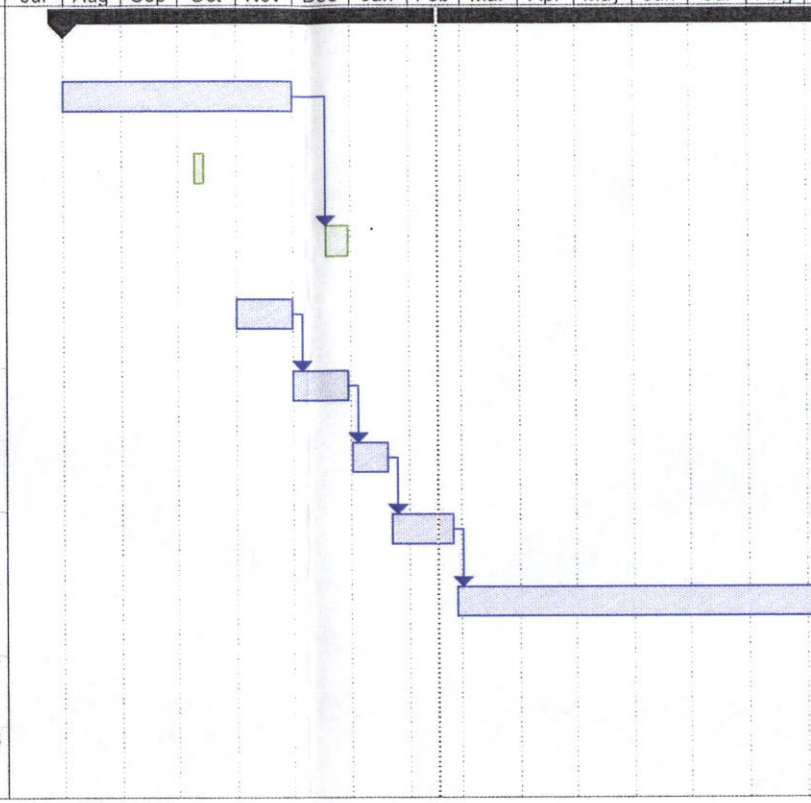


TABLE 2-1
Summary of Vertical Delineation Soil Samples
J&H Manufacturing Site
Carle Place, NY

MW-2 Area

Boring ID	Sample Depth# (feet)	PCE (ug/kg)	TCE (ug/kg)	cis-1,2-DCE (ug/kg)
MW-2	45-47	ND	ND	ND
SB-5	12-14	10.1	ND	ND
SB-8	7-8	15.4	1.1	1.7
SB-10	5-6	2,157*	41.9*	110*
SB-11	4-6	14.2	0.6	1.5
SB-13	12-14	62.1*	1.4*	2.2*
RSCO	-	1,400	700	250

Concrete Pad Area

Boring ID	Sample Depth# (feet)	PCE (ug/kg)	TCE (ug/kg)	1,2-DCE (total) (ug/kg)
SB-9	7-8	817.9	ND	ND
SB-16	8-10	ND	ND	ND
SB-24	10-11	149	3	ND
RSCO	-	1,400	700	250

* = Highest value of Field GC and State-certified lab results
# = Soil sample collected deeper than four feet below grade

TABLE 2-2
ESTIMATED AVERAGE SOIL CONCENTRATION
JOHNSON & HOFFMAN SITE
CARLE PLACE, NEW YORK

1) AREA A

		Conc. (ug/kg)		
	Depth	PCE	TCE	DCE
RSCO		1,400	700	250
MW-2	0-10	**18,800**	0	0
MW-2	45-47	ND	ND	ND
SB-5	0-10	**3,220**	0	0
SB-5	12-14	10.1	ND	ND
SB-8	0-10	0	0	**410**
SB-8	7-8	15.4	1	1.7
SB-10	0-10	**300,000**	**980**	0
SB-10	5-6	**2,157**	**41.9**	110
SB-11	4-6	14	0.6	1.5
SB-11	5-6	**3,300**	0	9
SB-13	0-10	**54,000**	**1,800**	**600**
SB-13	12-14	62.1	1.4	2.2
Average	0-10 feet	42,390	314	126
		99.0%	0.7%	0.3%

2) AREA B

		Conc. (ug/kg)		
	Depth	PCE	TCE	DCE
RSCO		1,400	700	250
SB-9	0-5	**2,678**	0	0
SB-9	7-8	817.9	ND	ND
SB-16	0-5	**130,000**	0	0
SB-16	8-10	ND	ND	ND
SB-24	0-5	**20,900**	0	0
SB-24	10-11	149	3	ND
Average	0-5 feet	51,193	0	0
%	0-5 feet	100%	0%	0%

TABLE 3-1
CHEMICAL PROPERTIES DATA
JOHNSON & HOFFMAN SITE
CARLE PLACE, NEW YORK

Compound	Acronym	Molecular weight (g/mole)	Vapor Pressure (mm Hg)	Density (g/cm3)	Solubility (mg/L)	H (atm)	Log (Kow)
Trichloroethene	TCE	131.39	58	1.47	1000	544	2.53
Tetrachloroethene	PCE	165.83	14	1.63	150	1035	2.6
Trans-1,2-Dichloroethylene	Trans-1,2-DCE	96.94	265	1.26	6300	429	2.09
cis-1,2-Dichloroethylene	cis-1,2-DCE	96.94	(b)	1.28	3500	160	1.74

H= Henry's Law constant (p. 36 , Practical Techniques for Groundwater and Soil Remediation, Evan Nyer, 1993)
Log Kow= Log (octanol-water partition coefficient)
Density= Density of pure liquid
Solubility= Solubility in water at 20C
Vapor pressure= Vapor pressure at 20C

(b): Value pressure unknown; probably near 265 mm Hg

Source: http://site.ifrance.com/amise/text/table321.htm (except for Henry's constant).

TABLE 4-1
AIR GUIDE 1 CALCULATIONS
JOHNSON & HOFFMAN SITE
CARLE PLACE, NEW YORK

Point Source Method - Conservative Approach

Use this method only if the stack height to building height ratio is less than 1.5 (no credit given for plume rise rise due to buoyancy or momentum).

Emission Point: EP-1
h_e - stack height (ft): 30

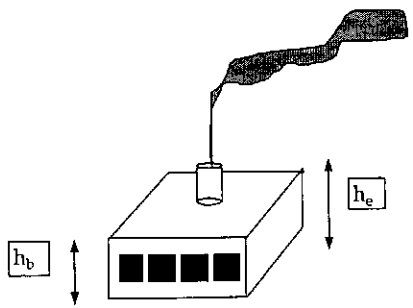
Building Height = 25 feet h_e/h_b = 1.2 Ratio < 1.5 = OK

Contaminant	CAS Number	C (ug/L)	C (ppmv)	Q (lb/hr)	Q_a (lb/yr)	C_a (ug/m^3)	C_p (ug/m^3)	C_{st} (ug/m^3)	AGC (ug/m^3)	SGC (ug/m^3)
Tetrachloroethene (PCE)	00127-18-4	61	8.8	0.040	349.7	0.996	0.995	64.68	1	1,000
Trichloroethene (TCE)	00079-01-6	30	5.5	0.020	172.0	0.490	0.489	31.81	0.5	54,000
Dichloroethene (DCE)	00540-59-0	116,300	28,845.4	76.120	666812.5	1899.469	1897.300	123324.52	1900	None

Equations Used For Air Guide-1 Calculations

Maximum Actual Annual Impact
C_a (ug/m^3) = $(6.0*Q_a)/(h_e^{2.25})$
where Q_a is in lbs/yr and h_e is in feet

Maximum Potential Annual Impact
C_p (ug/m^3) = $(52500*Q)/(h_e^{2.25})$
where Q is lbs/hr and h_e is in feet



Maximum Short Term Impact
C_{st} (ug/m^3) = C_p * 65

Concentration
C (in ppmv) = C (in ug/L) (1 g/1,000,000 ug)(1 g-mol/166 g)(0.0821 L-atm/(mol-K))(293 K/1 atm)(1,000,000 ppm)

Mass flow
Q = (C)(175 ft^3/min)(60 min/hr)(28.3 L/ft^3)(1 g/1,000,000 ug)(1 lb/454 g)
where Q is in lb/hr and C is in ug/L

Q_a = (Q)(8760hr/yr); where Q_a is in lb/yr

Notes:
This calculation determines the concentration of PCE, TCE or DCE at the GAC effluent that would cause an exceedance of the AGC or SGC. At approximately 61 ug/L (9 ppmv), the PCE concentration would cause an exceedance of the AGC. For TCE, this concentration is 30 ug/L (5.5 ppmv), while DCE is much higher. CONCLUSION: The **action level for carbon changeouts indicated by this analysis is 5.5 ppm, based on TCE compliance with its AGC value.**

TABLE 4-2
SVE EQUIPMENT LIST
JOHNSON & HOFFMAN SITE
CARLE PLACE, NEW YORK

#	Item	Quantity	Tag Nos.	Manufacturer/Model	Description
1	SVE Blower	1	B300	See Note 1	See Note 1
2	Flow Element	2	FE301, FE302	Dwyer DS-300-3	Annubar Type
3	Differential Pressure Gauge	2	DPG301, DPG302	Dwyer Magnehelic	
4	Flow Control Valve	2	FCV301, FCV302		3-inch butterfly valve
5	Temperature Gauge	2	TG301, TG302	Trend	
6	Isolation Valve	1	IV301		3-inch butterfly valve
7	Dilution Valve	1	DV300		3-inch butterfly valve
8	Moisture Separator	1	MS300	Rotron MS500B	40 gallon capacity
9	Isolation Valve	1	IV302		1-inch ball valve
10	Liquid Level Switch	1	LSH300	W.E. Anderson FloTect L6	
11	Vacuum Relief Valve	1	VRV300	Rotron 515092	27-inch to 124 inch w.c.
12	Flow Switch	1	FSL300	W.E. Anderson FloTect	Vane Operated
13	In-line Filter	1	AF300	Rotron 516435	
14	Differential Pressure Switch	1	DPSH300	W.E. Anderson H3S1S	
15	Temperature Switch	1	TSH300	United Electric	
16	Vent Valve	1	VV300		2-inch butterfly valve
17	Emission Control System	2	GAC#1, GAC#2, GAC#3	Carbtrol G-2	
18	SVE Control Panel	1			
19	Autodialer	1		Vaco Chatterbox	CB-8
20	Vacuum/Pressure Ports	4	VGP303 TO VGP305, PGP300		1/8-inch barb
21	Sample Ports	6	SP301 TO SP306		1/8-inch barb

NOTES:
1) SVE blower to be specified pending results of startup testing

TABLE 4-3
SVE CONTROL SYSTEM FEATURES
JOHNSON & HOFFMAN SITE
CARLE PLACE, NEW YORK

Control	*Triggering Mechanism*	*Setpoint*	*Action*
High Level Switch (LSH300)	High water level in moisture separator	80% capacity	Shut down SVE blower Autodialer alarm
Low Flow Switch (on time delay) (FSL300)	Low SVE system influent flow	70 scfm	Shut down SVE blower Autodialer alarm
High Differential Pressure Switch (DPSH300)	High differential pressure across SVE blower	100 inches w.c.	Shut down SVE blower Autodialer alarm
Vacuum Relief Valve (VRV300)	Elevated vacuum on blower inlet	80 inches w.c.	Draw in ambient air
High Temperature Switch (TSH300)	Elevated temperature at blower outlet	180oF	Shut down SVE blower Autodialer alarm

APPENDIX A

SOIL GAS SURVEY RESULTS

APPENDIX A
Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Gas Survey
Results in (ug/L-air)

Sample ID	Gas-A1	Gas-A2	Gas-A3	Gas-A4	Gas-A5	Gas-A6	Gas-A7	Gas-A8	Gas-A9	Gas-A10	Gas-A11	Gas-A12
Sampling Date	10/25/2000	11/1/2000	10/25/2000	10/26/2000	10/24/2000	10/26/2000	10/24/2000	10/26/2000	10/25/2000	10/25/2000	10/26/2000	10/25/2000
Analysis Code	15.0	40.0	14.0	13.0	28.0	14.0	26.0	17.0	12.0	11.0	16.0	10.0
Operator Initials	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
1,1 Dichlorethene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
t-1, 2-Dichloroethene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c-1, 2-Dichloroethene	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Trichloroethylene	0.0	0.1	0.1	0.1	0.0	0.5	0.1	0.1	0.1	0.1	0.1	0.1
Tetrachloroethene	0.3	0.2	1.1	2.1	1.6	6.0	1.8	0.4	1.6	1.9	0.9	3.6

Sample ID	Gas-B1	Gas-B2	Gas-B3	Gas-B4	Gas-B5	Gas-B6	Gas-B8	Gas-B9	Gas-B10	Gas-C1	Gas-C2	Gas-C3
Sampling Date	11/1/2000	10/26/2000	10/24/2000	10/26/2000	10/23/2000	10/23/2000	10/24/2000	10/24/2000	10/24/2000	10/25/2000	11/1/2000	10/26/2000
Analysis Code	39.0	9.0	23.0	11.0	17.0	14.0	12.0	14.0	21.0	16.0	28.0	10.0
Operator Initials	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
1,1 Dichlorethene	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.4	0.0	0.0	0.0
t-1, 2-Dichloroethene	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.3	0.0	0.1	0.0
c-1, 2-Dichloroethene	0.0	0.0	0.0	1.8	0.2	0.8	0.0	0.4	12.2	0.0	0.0	0.1
Trichloroethylene	0.1	0.1	0.1	0.8	0.7	1.8	0.3	1.4	38.6	0.2	0.0	0.3
Tetrachloroethene	0.6	1.3	4.7	12.6	21.7	57.3	4.4	18.9	539.4	1.0	0.4	3.6

Sample ID	Gas-C4	Gas-C5	Gas-C6	Gas-C7	Gas-C8	Gas-C9	Gas-C10	Gas-C11	Gas-C12	Gas-D1	Gas-D2	Gas-D3
Sampling Date	10/23/2000	10/23/2000	10/23/2000	10/23/2000	10/24/2000	10/24/2000	10/24/2000	10/24/2000	10/24/2000	11/1/2000	10/24/2000	10/24/2000
Analysis Code	18.0	16.0	13.0	23.0	10.0	13.0	16.0	19.0	20.0	37.0	25.0	19.0
Operator Initials	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
1,1 Dichlorethene	0.8	3.8	2.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
t-1, 2-Dichloroethene	0.1	0.9	0.5	0.5	0.2	0.1	0.1	0.1	0.0	0.0	0.1	0.6
c-1, 2-Dichloroethene	0.5	26.7	19.0	0.1	1.1	0.6	8.5	6.0	0.5	0.0	0.1	0.3
Trichloroethylene	0.9	90.0	43.0	0.4	2.5	1.0	5.2	8.5	4.3	0.0	0.2	0.3
Tetrachloroethene	26.4	1566.4	504.0	11.7	29.8	9.4	53.0	32.8	6.7	0.1	3.2	13.5

APPENDIX A
Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Gas Survey
Results in (ug/L-air)

Sample ID	Gas-D4	Gas-D5	Gas-D6	Gas-E1	Gas-E2	Gas-E3	Gas-E4	Gas-E5	Gas-E6	Gas-E7	Gas-F1	Gas-F2
Sampling Date	10/24/2000	10/24/2000	10/23/2000	10/25/2000	11/1/2000	10/24/2000	10/24/2000	10/23/2000	10/23/2000	10/24/2000	11/1/2000	10/24/2000
Analysis Code	12.0	9.0	20.0	17.0	35.0	20.0	14.0	25.0	21.0	24.0	34.0	29.0
Operator Initials	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
1,1 Dichlorethene	0.0	1.7	0.9	0.0	0.0	0.0	0.1	0.7	0.9	0.0	0.0	0.0
t-1, 2-Dichloroethene	0.3	0.3	0.1	0.0	0.0	0.5	0.9	4.2	0.2	0.4	0.2	0.1
c-1, 2-Dichloroethene	23.9	21.6	0.4	0.2	0.0	0.5	19.2	80.5	0.1	20.4	0.0	0.0
Trichloroethylene	5.3	44.1	0.9	0.3	0.1	0.4	30.3	57.0	0.4	3.9	0.2	0.1
Tetrachloroethene	237.5	750.2	22.2	2.0	0.3	11.4	341.1	436.2	11.1	77.5	0.5	2.0

Sample ID	Gas-F3	Gas-F3(dup)	Gas-F4	Gas-F5	Gas-F5(dup)	Gas-F6	Gas-G1	Gas-G2	Gas-G3	Gas-G4	Gas-G5	Gas-G6
Sampling Date	11/1/2000	11/1/2000	10/24/2000	10/24/2000	10/24/2000	10/26/2000	10/25/2000	11/1/2000	10/24/2000	11/1/2000	11/1/2000	10/26/2000
Analysis Code	31.0	32.0	21.0	16.0	17.0	43.0	18.0	24.0	24.0	23.0	22.0	42.0
Operator Initials	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
1,1 Dichlorethene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
t-1, 2-Dichloroethene	0.1	0.0	0.5	0.4	0.3	0.3	0.0	0.3	0.2	0.1	0.1	0.4
c-1, 2-Dichloroethene	0.2	0.1	0.2	1.6	0.7	6.4	0.0	0.2	1.8	1.0	0.1	11.8
Trichloroethylene	0.2	0.2	0.2	37.0	1.2	4.3	0.1	0.5	2.6	1.5	0.2	9.1
Tetrachloroethene	0.6	0.4	6.1	44.4	24.8	75.2	0.7	1.4	16.6	6.5	1.4	174.0

Sample ID	Gas-G7	Gas-H1	Gas-H2	Gas-H3	Gas-H4	Gas-H5	Gas-H6.5	Gas-I1	Gas-I2	Gas-I3	Gas-I4	Gas-I5
Sampling Date	10/24/2000	11/1/2000	10/24/2000	11/1/2000	10/24/2000	10/24/2000	10/25/2000	10/25/2000	11/1/2000	10/26/2000	10/26/2000	11/1/2000
Analysis Code	22.0	27.0	1.0	26.0	2.0	3.0	41.0	21.0	33.0	39.0	41.0	20.0
Operator Initials	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
1,1 Dichlorethene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
t-1, 2-Dichloroethene	0.2	0.0	0.1	0.3	0.1	0.2	0.1	0.0	0.0	0.0	0.5	0.1
c-1, 2-Dichloroethene	6.9	0.2	0.2	0.6	0.8	1.6	0.6	0.0	0.0	0.7	0.9	1.1
Trichloroethylene	7.0	0.2	0.5	0.9	0.2	2.7	0.9	0.1	0.2	1.1	1.6	0.9
Tetrachloroethene	83.0	1.1	2.7	2.7	6.1	18.2	22.8	0.2	0.3	6.2	8.7	5.3

APPENDIX A
Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Gas Survey
Results in (ug/L-air)

Sample ID	Gas-I6.5	Gas-J1	Gas-J2	Gas-J3	Gas-J4	Gas-J5	Gas-J5(dup)	Gas-J6.5	Gas-K1	Gas-K1(dup)	Gas-K2	Gas-K4
Sampling Date	10/25/2000	10/26/2000	10/26/2000	10/24/2000	11/1/2000	10/24/2000	10/24/2000	10/25/2000	10/26/2000	10/26/2000	10/25/2000	11/1/2000
Analysis Code	42.0	37.0	38.0	9.0	19.0	7.0	8.0	43.0	32.0	33.0	22.0	18.0
Operator Initials	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
1,1 Dichlorethene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
t-1, 2-Dichloroethene	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
c-1, 2-Dichloroethene	1.7	0.0	0.0	0.0	0.0	0.0	0.1	1.4	0.0	0.0	0.0	0.0
Trichloroethylene	2.7	0.2	0.2	0.1	0.1	0.6	0.7	3.2	0.2	0.2	0.2	0.1
Tetrachloroethene	14.5	7.1	8.0	2.0	1.4	8.6	10.6	25.5	9.9	7.6	0.7	2.6

Sample ID	Gas-K5	Gas-K6.5	Gas-L1	Gas-L2	Gas-L3	Gas-L4	Gas-L5	Gas-L6.5	Gas-M1	Gas-M2	Gas-M3	Gas-M4
Sampling Date	10/25/2000	10/25/2000	10/26/2000	10/26/2000	11/1/2000	10/25/2000	11/1/2000	10/25/2000	10/26/2000	10/26/2000	10/25/2000	11/1/2000
Analysis Code	24.0	45.0	31.0	27.0	9.0	29.0	14.0	48.0	25.0	26.0	33.0	10.0
Operator Initials	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
1,1 Dichlorethene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6
t-1, 2-Dichloroethene	0.0	0.0	0.0	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.0
c-1, 2-Dichloroethene	0.0	0.5	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.3	3.8	0.2
Trichloroethylene	0.4	1.8	0.2	0.9	0.8	0.6	0.4	1.0	0.5	0.6	2.1	0.6
Tetrachloroethene	11.7	67.3	6.5	311.0	73.3	58.5	10.1	76.5	15.5	42.0	102.7	28.5

Sample ID	Gas-M5	Gas-M6	Gas-M6.5	Gas-N1	Gas-N2	Gas-N3	Gas-N4	Gas-N5	Gas-N6.5	Gas-O1	Gas-O2	Gas-O3
Sampling Date	10/25/2000	11/1/2000	10/25/2000	10/26/2000	10/26/2000	11/1/2000	10/25/2000	11/1/2000	11/1/2000	10/26/2000	10/26/2000	10/25/2000
Analysis Code	31.0	43.0	49.0	30.0	22.0	11.0	34.0	15.0	42.0	21.0	17.0	39.0
Operator Initials	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
1,1 Dichlorethene	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
t-1, 2-Dichloroethene	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
c-1, 2-Dichloroethene	0.2	0.0	0.0	0.0	0.0	0.1	0.0	1.7	0.0	0.1	0.0	0.7
Trichloroethylene	0.5	1.2	0.1	0.3	0.2	0.4	0.2	0.5	0.4	0.3	0.1	1.8

APPENDIX A
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Carle Place, NY
Soil Gas Survey
Results in (ug/L-air)

Tetrachloroethene	28.5	99.4	2.0	15.2	7.8	7.8	6.9	9.0	20.5	9.9	1.8	36.6

Sample ID	Gas-O4	Gas-O5	Gas-P1	Gas-P3	Gas-P4	Gas-P5	Gas-P6	Gas-P7
Sampling Date	11/1/2000	10/25/2000	10/26/2000	10/25/2000	10/25/2000	10/25/2000	11/2/2000	11/2/2000
Analysis Code	13.0	32.0	20.0	38.0	36.0	37.0	9.0	10.0
Operator Initials	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
1,1 Dichlorethene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
t-1, 2-Dichloroethene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c-1, 2-Dichloroethene	0.0	1.2	0.3	0.1	0.0	0.0	0.0	0.0
Trichloroethylene	0.3	0.7	1.2	0.3	0.2	0.1	0.1	0.2
Tetrachloroethene	5.7	25.0	52.8	8.3	5.2	2.5	1.5	1.1

APPENDIX A
Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Gas Survey
Results in (ug/L-air)

APPENDIX B

SOIL ANALYTICAL RESULTS

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Analytical Results (State-Certified Lab)

Type	NYSDEC	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date Collected	RSCO	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00
Sample ID		SB-7 (3-4')	SB-7 (4-5')	SB-8 (4-5')	SB-8 (5-6')	SB-9(4-5')	SB-9(7-8')	SB-10(4-5')	SB-10(5-6')	SB-11(0-1')
Dichlorodifluoromethane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Chloromethane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Vinyl Chloride	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Bromomethane	200	<5	<5	<5	<5	<5	<2	<5	<5	<2
Chloroethane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Trichlorofluoromethane	1900	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,1-Dichloroethene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Methylene Chloride	400	<5	<5	<5	<5	<5	<2	<5	<5	<2
trans-1,2-Dichloroethene	300	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,1-Dichloroethane	200	<5	<5	<5	<5	<5	<2	<5	<5	<2
2,2-Dichloropropane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
cis-1,2-Dichloroethene	250	**120**	**81**	**410**	**230**	<5	<2	**250**	**110**	**100**
Bromochloromethane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Chloroform	300	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,1,1-Trichloroethane	800	<5	<5	<5	<5	<5	<2	<5	<5	<2
Carbon Tetrachloride	600	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,1-Dichloropropene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Benzene	60	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,2-Dichloroethane	100	<5	<5	<5	<5	<5	<2	<5	<5	<2
Trichloroethylene	700	<5	<5	**130**	**54**	<5	<2	**980**	**30**	**16**
1,2-Dichloropropane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Dibromomethane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Bromodichloromethane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
cis-1,3-Dichloropropene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Toluene	1,500	<5	<5	<5	<5	<5	<2	<5	<5	<2
trans-1,3-Dichloropropene	300	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,1,2-Trichloroethane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Tetrachloroethene	1400	<5	<5	**1300**	**550**	**1300**	**31**	**300000**	**1800**	**3300**
1,3-Dichloropropane	300	<5	<5	<5	<5	<5	<2	<5	<5	<2
chlorodibromomethane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,2-Dibromoethane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Chlorobenzene	1700	<5	<5	<5	<5	<5	<2	<5	<5	<2
Ethylbenzene	5500	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,1,1,2-Tetrachloroethane	600	<5	<5	<5	<5	<5	<2	<5	<5	<2
Xylenes (Total)	1200	<15	<15	<15	<15	<15	<6	<15	<15	<6
Styrene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Bromoform	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Bromobenzene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2

Bold Face indicates constituent detection

Shaded cells indicate detections above NYSDEC Recommended Soil Cleanup Criteria

Results in ug/kg

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Analytical Results (State-Certified Lab)

Type	NYSDEC	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date Collected	RSCO	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00
Sample ID		SB-7 (3-4')	SB-7 (4-5')	SB-8 (4-5')	SB-8 (5-6')	SB-9(4-5')	SB-9(7-8')	SB-10(4-5')	SB-10(5-6')	SB-11(0-1')
1,1,2,2-Tetrachloroethane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Isopropylbenzene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,2,3-Trichloropropane	400	<5	<5	<5	<5	<5	<2	<5	<5	<2
n-Propylbenzene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
2-Chlorotoluene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,3,5-Trimethylbenzene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
4-Chlorotoluene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
tert-Butylbenzene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,2,4-Trimethylbenzene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
sec-Butylbenzene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
p-Isopropyltoluene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,3-Dichlorobenzene	1,600	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,4-Dichlorobenzene	8,500	<5	<5	<5	<5	<5	<2	<5	<5	<2
n-Butylbenzene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,2-Dichlorobenzene	7,900	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,2-Dibromo-3-chloropropane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,2,4-Trichlorobenzene	3,400	<5	<5	<5	<5	<5	<2	**15**	<5	<2
Hexachlorobutadiene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Naphthalene	13,000	<5	<5	<5	<5	<5	<2	<5	<5	<2
1,2,3-Trichlorobenzene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Methyl tert-butyl ether	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
p-Ethyltoluene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Freon 113		<5	<5	<5	<5	<5	<2	<5	<5	<2
1,2,4,5-Tetramethlbenzene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
Acetone	200	**460**	**570**	**100**	<50	**73**	<20	**82**	<50	<20
Methyl Ethyl Ketone	NS	**81**	**81**	<50	<50	<50	<20	<50	<50	<20
Methylisobutylketone	NS	<50	<50	<50	<50	<50	<20	<50	<50	<20
Chlorodifluoromethane	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2
p Diethylbenzene	NS	<5	<5	<5	<5	<5	<2	<5	<5	<2

Bold Face indicates constituent detection

Shaded cells indicate detections above NYSDEC Recommended Soil Cleanup Criteria

Results in ug/kg

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Analytical Results (State-Certified Lab)

Type	NYSDEC	Soil	Soil	Soil	Soil	Duplicate	Soil	Soil	Soil
Date Collected	RSCO	11/02/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00
Sample ID		SB-11(4-6')	SB-12(1-2')	SB-12(4-6')	SB-13(5-6')	SB-13(5-6')	SB-13(12-14')	SB-14(2-4')	SB-14(4-6')
Dichlorodifluoromethane	NS	<2	<2	<2	<5	<5	<5	<5	<5
Chloromethane	NS	<2	<2	<2	<5	<5	<5	<5	<5
Vinyl Chloride	NS	<2	<2	<2	<5	<5	<5	<5	<5
Bromomethane	200	<2	<2	<2	<5	<5	<5	<5	<5
Chloroethane	NS	<2	<2	<2	<5	<5	<5	<5	<5
Trichlorofluoromethane	1900	<2	<2	<2	<5	<5	<5	<5	<5
1,1-Dichloroethene	NS	<2	<2	<2	<5	<5	<5	<5	<5
Methylene Chloride	400	<2	<2	<2	<5	<5	<5	<5	<5
trans-1,2-Dichloroethene	300	<2	<2	<2	<5	<5	<5	<5	<5
1,1-Dichloroethane	200	<2	<2	<2	<5	<5	<5	<5	<5
2,2-Dichloropropane	NS	<2	<2	<2	<5	<5	<5	<5	<5
cis-1,2-Dichloroethene	250	<2	<2	<2	**190**	**600**	<5	**8**	**23**
Bromochloromethane	NS	<2	<2	<2	<5	<5	<5	<5	<5
Chloroform	300	<2	<2	<2	<5	<5	<5	<5	<5
1,1,1-Trichloroethane	800	<2	<2	<2	**11**	**340**	<5	<5	<5
Carbon Tetrachloride	600	<2	<2	<2	<5	<5	<5	<5	<5
1,1-Dichloropropene	NS	<2	<2	<2	<5	<5	<5	<5	<5
Benzene	60	<2	<2	<2	<5	<5	<5	<5	<5
1,2-Dichloroethane	100	<2	<2	<2	<5	<5	<5	<5	<5
Trichloroethylene	700	<2	<2	<2	**140**	**1800**	<5	**25**	**18**
1,2-Dichloropropane	NS	<2	<2	<2	<5	<5	<5	<5	<5
Dibromomethane	NS	<2	<2	<2	<5	<5	<5	<5	<5
Bromodichloromethane	NS	<2	<2	<2	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	NS	<2	<2	<2	<5	<5	<5	<5	<5
Toluene	1,500	<2	<2	<2	**6**	**45**	<5	<5	<5
trans-1,3-Dichloropropene	300	<2	<2	<2	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	NS	<2	<2	<2	<5	<5	<5	<5	<5
Tetrachloroethene	1400	**8**	**6**	<2	**7500**	**54000**	<5	**450**	**450**
1,3-Dichloropropane	300	<2	<2	<2	<5	<5	<5	<5	<5
chlorodibromomethane	NS	<2	<2	<2	<5	<5	<5	<5	<5
1,2-Dibromoethane	NS	<2	<2	<2	<5	<5	<5	<5	<5
Chlorobenzene	1700	<2	<2	<2	<5	<5	<5	<5	<5
Ethylbenzene	5500	<2	<2	<2	**13**	**160**	<5	<5	<5
1,1,1,2-Tetrachloroethane	600	<2	<2	<2	<5	<5	<5	<5	<5
Xylenes (Total)	1200	<6	<6	<6	**86**	**970**	<15	<15	<15
Styrene	NS	<2	<2	<2	<5	<5	<5	<5	<5
Bromobenzene	NS	<2	<2	<2	<5	<5	<5	<5	<5

Bold Face indicates constituent detection

Shaded cells indicate detections above NYSDEC Recommended Soil Cleanup Criteria

Results in ug/kg

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Analytical Results (State-Certified Lab)

Type	NYSDEC	Soil	Soil	Soil	Soil	Duplicate	Soil	Soil	Soil
Date Collected	RSCO	11/02/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00
Sample ID		SB-11(4-6')	SB-12(1-2')	SB-12(4-6')	SB-13(5-6')	SB-13(5-6')	SB-13(12-14')	SB-14(2-4')	SB-14(4-6')
1,1,2,2-Tetrachloroethane	NS	<2	<2	<2	<5	<5	<5	<5	<5
Bromoform	NS	<2	<2	<2	<5	<5	<5	<5	<5
Isopropylbenzene	NS	<2	<2	<2	<5	**8**	<5	<5	<5
1,2,3-Trichloropropane	400	<2	<2	<2	<5	<5	<5	<5	<5
n-Propylbenzene	NS	<2	<2	<2	<5	**18**	<5	<5	<5
2-Chlorotoluene	NS	<2	<2	<2	<5	<5	<5	<5	<5
1,3,5-Trimethylbenzene	NS	<2	<2	<2	<5	**26**	<5	<5	<5
4-Chlorotoluene	NS	<2	<2	<2	<5	<5	<5	<5	<5
tert-Butylbenzene	NS	<2	<2	<2	<5	<5	<5	<5	<5
1,2,4-Trimethylbenzene	NS	<2	<2	<2	**9**	**69**	<5	<5	<5
sec-Butylbenzene	NS	<2	<2	<2	<5	<5	<5	<5	<5
p-Isopropyltoluene	NS	<2	<2	<2	<5	<5	<5	<5	<5
1,3-Dichlorobenzene	1,600	<2	<2	<2	<5	<5	<5	<5	<5
1,4-Dichlorobenzene	8,500	<2	<2	<2	<5	<5	<5	<5	<5
n-Butylbenzene	NS	<2	<2	<2	<5	**8**	<5	<5	<5
1,2-Dichlorobenzene	7,900	<2	<2	<2	<5	<5	<5	<5	<5
1,2-Dibromo-3-chloropropane	NS	<2	<2	<2	<5	<5	<5	<5	<5
1,2,4-Trichlorobenzene	3,400	<2	<2	<2	<5	<5	<5	<5	<5
Hexachlorobutadiene	NS	<2	<2	<2	<5	<5	<5	<5	<5
Naphthalene	13,000	<2	<2	<2	<5	**10**	<5	<5	<5
1,2,3-Trichlorobenzene	NS	<2	<2	<2	<5	<5	<5	<5	<5
Methyl tert-butyl ether	NS	<2	<2	<2	<5	<5	<5	<5	<5
p-Ethyltoluene	NS	<2	<2	<2	**7**	**66**	<5	<5	<5
Freon 113		<2	<2	<2	<5	<5	<5	<5	<5
1245 Tetramethlbenzenen	NS	<2	<2	<2	<5	<5	<5	<5	<5
Acetone	200	**30**	<20	<20	**110**	**140**	<50	**87**	**68**
Methyl Ethyl Ketone	NS	<20	<20	<20	<50	<50	<50	<50	<50
Methylisobutylketone	NS	<20	<20	<20	<50	<50	<50	<50	<50
Chlorodifluoromethane	NS	<2	<2	<2	<5	<5	<5	<5	<5
p Diethylbenzene	NS	<2	<2	<2	<5	<5	<5	<5	<5

Bold Face indicates constituent detection

Shaded cells indicate detections above NYSDEC Recommended Soil Cleanup Criteria

Results in ug/kg

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Analytical Results (State-Certified Lab)

Type Date Collected Sample ID	NYSDEC RSCO	Soil 12/19/2001 SB-15 (0-2')	Soil 12/19/2001 SB-15 (4-6')	Soil 12/19/2001 SB-15 (8-10')	Soil 12/19/2001 SB-16 (0-2')	Duplicate 12/19/2001 SB-16 (0-2') DUP121901	Soil 12/19/2001 SB-16 (4-6')	Soil 12/19/2001 SB-16 (8-10')	Soil 12/19/2001 SB-17 (0-2')
Chloromethane	NS	6 U	5 U	5 U	5500 UJ	5600 UJ	5 U	5 U	5 U
Vinyl chloride	NS	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
Bromomethane	200	6 UJ	5 UJ	5 UJ	5500 UJ	5600 UJ	5 UJ	5 UJ	5 UJ
Chloroethane	NS	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
1,1-Dichloroethene	NS	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
Carbon disulfide		6 U	5 U	5 U	5500 UJ	5600 UJ	5 U	5 U	5 U
Acetone	200	11 UJ	12 UJ	16 UJ	14000 UJ	14000 UJ	**22 J**	**16 J**	**13 J**
Methylene chloride	400	13 UJ	5 UJ	5 UJ	5500 UJ	5600 UJ	5 UJ	5 UJ	5 UJ
1,1-Dichloroethane	200	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
2-Butanone (MEK)	NS	11 UJ	10 UJ	10 UJ	5500 UJ	5600 UJ	10 UJ	10 UJ	11 UJ
Chloroform	300	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
1,1,1-Trichloroethane	800	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
Carbon tetrachloride	600	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	250 [1]	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
Benzene	60	**2 J**	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
1,2-Dichloroethane	100	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
Trichloroethene	700	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
1,2-Dichloropropane	NS	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
Bromodichloromethane	NS	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NS	6 U	5 U	5 U	5500 UJ	5600 UJ	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NS	11 U	10 U	10 U	5500 U	5600 U	10 U	10 U	11 U
Toluene	1,500	**5 J**	5 U	5 U	5500 U	5600 U	**1 J**	5 U	**0.6 J**
trans-1,3-Dichloropropene	300	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
1,1,2-Trichloroethane	NS	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
Tetrachloroethene	1400	**14**	**1 J**	5 U	**110000 J**	**130000 J**	**20 J**	5 UJ	5 UJ
2-Hexanone		11 UJ	10 UJ	10 UJ	5500 UJ	5600 UJ	10 UJ	10 UJ	11 UJ
Dibromochloromethane		6 UJ	5 UJ	5 UJ	5500 U	5600 U	5 U	5 U	5 U
Chlorobenzene	1700	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
Ethylbenzene	5500	**2 J**	5 U	5 U	5500 U	5600 U	**0.6 J**	5 U	**2 J**
Styrene	NS	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
Bromoform	NS	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NS	6 U	5 U	5 U	5500 U	5600 U	5 U	5 U	5 U
Xylenes (total)	1200	**7**	5 U	5 U	5500 U	5600 U	**5 J**	5 U	**1 J**

Bold Face indicates constituent detection
Shaded cells indicate detections above NYSDEC Recommended Soil Cleanup Criteria
Results in ug/kg
1 - Limit is for cis-1,2-dichloroethene

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Analytical Results (State-Certified Lab)

Type Date Collected Sample ID	NYSDEC RSCO	Soil 12/19/2001 SB-17 (4-6')	Soil 12/19/2001 SB-17 (8-10')	Soil 12/19/2001 SB-18 (0-2')	Soil 12/19/2001 SB-18 (4-6')	Soil 12/19/2001 SB-18 (8-10')	Soil 12/19/2001 SB-19 (0-2')	Soil 12/19/2001 SB-19 (4-6')	Soil 12/19/2001 SB-19 (8-10')
Chloromethane	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl chloride	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	200	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Chloroethane	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	200	**7 J**	**14 J**	**32 J**	**17 J**	**14 J**	**18 J**	**11 J**	**11 J**
Methylene chloride	400	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
1,1-Dichloroethane	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NS	10 UJ	10 UJ	11 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Chloroform	300	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane	800	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon tetrachloride	600	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
1,2-Dichloroethene (total)	250 [1]	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	60	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NS	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U
Toluene	1,500	**2 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	300	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	1400	**7 J**	5 U	**15**	5 U	5 U	**4 J**	5 U	5 U
2-Hexanone		10 UJ	10 UJ	11 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Dibromochloromethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	1700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5500	**0.9 J**	5 U	**1 J**	5 U	5 U	5 U	5 U	5 U
Styrene	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NS	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Xylenes (total)	1200	**5**	**2 J**	**6**	5 U	5 U	5 U	5 U	5 U

Bold Face indicates constituent detection
Shaded cells indicate detections above NYSDEC Recommer
Results in ug/kg
1 - Limit is for cis-1,2-dichloroethene

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Analytical Results (State-Certified Lab)

Type Date Collected Sample ID	NYSDEC RSCO	Soil 12/20/2001 SB-20 (0-2')	Soil 12/20/2001 SB-20 (4-6')	Soil 12/20/2001 SB-20 (8-10')	Soil 12/20/2001 SB-21 (0-2')	Soil 12/20/2001 SB-21 (4-6')	Soil 12/20/2001 SB-21 (6-8')	Soil 12/21/2001 SB-22 (0-2')	Soil 12/21/2001 SB-22 (4-6')
Chloromethane	NS	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl chloride	NS	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	200	27 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Chloroethane	NS	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	NS	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide		27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	200	**62 J**	**12 J**	**10 J**	**17 J**	**10 UJ**	**10 UJ**	**19 J**	**7 J**
Methylene chloride	400	27 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
1,1-Dichloroethane	200	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NS	54 UJ	10 UJ	10 UJ	11 UJ	10 UJ	10 UJ	11 UJ	10 UJ
Chloroform	300	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane	800	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon tetrachloride	600	27 U	5 U	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
1,2-Dichloroethene (total)	250 [1]	7 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	60	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	100	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	700	**10 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	NS	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NS	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NS	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NS	54 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
Toluene	1,500	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	300	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	NS	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	1400	**380**	5 U	5 U	**2 J**	5 U	5 U	**11**	5 U
2-Hexanone		54 UJ	10 UJ	10 UJ	11 UJ	10 UJ	10 UJ	11 UJ	10 UJ
Dibromochloromethane		27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	1700	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5500	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NS	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NS	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NS	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Xylenes (total)	1200	27 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Bold Face indicates constituent detection
Shaded cells indicate detections above NYSDEC Recommer
Results in ug/kg
1 - Limit is for cis-1,2-dichloroethene

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Analytical Results (State-Certified Lab)

Type Date Collected Sample ID	NYSDEC RSCO	Soil 12/21/2001 SB-22 (6-8')	Soil 12/21/2001 SB-23 (0-2')	Duplicate 12/21/2001 SB-23 (0-2') (DUP122111)	Soil 12/21/2001 SB-23 (4-6')	Soil 12/21/2001 SB-23 (6-8')	Soil 08/16/2002 SB-24 (1-2')	Soil 08/16/2002 SB-24 (10-11')	Soil 08/16/2002 SB-25 (1-3')
Chloromethane	NS	5 UJ	6 UJ	6 UJ	5 UJ	5 UJ	5.7 U	5.3 U	5.5 U
Vinyl chloride	NS	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Bromomethane	200	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Chloroethane	NS	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
1,1-Dichloroethene	NS	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Carbon disulfide		5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Acetone	200	**34 J**	**51 J**	**37 J**	**9 J**	**10 J**	11 U	11 U	11 U
Methylene chloride	400	5 UJ	6 UJ	8 UJ	5 UJ	5 UJ	5.7 U	5.3 U	5.5 U
1,1-Dichloroethane	200	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
2-Butanone (MEK)	NS	**6 J**	11 UJ	11 UJ	10 UJ	10 UJ	11 U	11 U	11 U
Chloroform	300	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
1,1,1-Trichloroethane	800	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Carbon tetrachloride	600	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
1,2-Dichloroethene (total)	250 [1]	5 U	6 U	6 U	5 U	5 U	**32.3**	5.3 U	5.5 U
Benzene	60	5 U	6 U	6 U	5 U	5 U	1.1 U	1.1 U	1.1 U
1,2-Dichloroethane	100	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Trichloroethene	700	5 U	6 U	6 U	5 U	5 U	**129**	**3 J**	5.5 U
1,2-Dichloropropane	NS	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Bromodichloromethane	NS	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
cis-1,3-Dichloropropene	NS	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
4-Methyl-2-pentanone (MIBK)	NS	10 UJ	11 UJ	11 UJ	10 UJ	10 UJ	5.7 U	5.3 U	5.5 U
Toluene	1,500	5 U	**1 J**	**0.8 J**	5 U	5 U	1.1 U	1.1 U	1.1 U
trans-1,3-Dichloropropene	300	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
1,1,2-Trichloroethane	NS	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Tetrachloroethene	1400	5 U	**2 J**	**1 J**	5 U	5 U	**20000**	**149**	**14.3**
2-Hexanone		10 UJ	11 UJ	11 UJ	10 UJ	10 UJ	5.7 U	5.3 U	5.5 U
Dibromochloromethane		5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Chlorobenzene	1700	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Ethylbenzene	5500	5 U	**0.5 J**	6 UJ	5 U	5 U	1.1 U	1.1 U	1.1 U
Styrene	NS	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Bromoform	NS	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
1,1,2,2-Tetrachloroethane	NS	5 U	6 U	6 U	5 U	5 U	5.7 U	5.3 U	5.5 U
Xylenes (total)	1200	5 U	**2 J**	**1 J**	5 U	5 U	2.3 U	2.1 U	2.2 U

Bold Face indicates constituent detection
Shaded cells indicate detections above NYSDEC Recommer
Results in ug/kg
1 - Limit is for cis-1,2-dichloroethene

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Analytical Results (State-Certified Lab)

Type Date Collected Sample ID	NYSDEC RSCO	Soil 08/16/2002 SB-25 (5-7')	Soil 08/16/2002 SB-26(1-3')	Soil 08/16/2002 SB-26(5-7')	Duplicate 08/16/2002 SB-26(5-7') (DUP081602)	Soil 08/16/2002 SB-27(1-3')	Soil 08/16/2002 SB-27(5-7')	Soil 08/16/2002 SB-28(1-3')	Soil 08/16/2002 SB-28(5-7')
Chloromethane	NS	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Vinyl chloride	NS	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Bromomethane	200	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Chloroethane	NS	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
1,1-Dichloroethene	NS	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Carbon disulfide		5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Acetone	200	10 U	11 U	11 U	10 U	11 U	11 U	11 U	12 U
Methylene chloride	400	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
1,1-Dichloroethane	200	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
2-Butanone (MEK)	NS	10 U	11 U	11 U	10 U	11 U	11 U	11 U	12 U
Chloroform	300	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
1,1,1-Trichloroethane	800	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Carbon tetrachloride	600	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
1,2-Dichloroethene (total)	250 [1]	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Benzene	60	1 U	1.1 U	1.1 U	1 U	1.1 U	1.1 U	1.1 U	1.2 U
1,2-Dichloroethane	100	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Trichloroethene	700	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
1,2-Dichloropropane	NS	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Bromodichloromethane	NS	5.5 U	5.5 U	5.3 U	5.5 U	5.7 U	5.4 U	5.5 U	5.9 U
cis-1,3-Dichloropropene	NS	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
4-Methyl-2-pentanone (MIBK)	NS	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Toluene	1,500	1 U	1.1 U	1.1 U	1 U	1.1 U	1.1 U	1.1 U	1.2 U
trans-1,3-Dichloropropene	300	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
1,1,2-Trichloroethane	NS	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Tetrachloroethene	1400	5.2 U	**9.4**	5.3 U	**1.8**	**9.8**	5.4 U	5.5 U	5.9 U
2-Hexanone		5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Dibromochloromethane		5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Chlorobenzene	1700	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Ethylbenzene	5500	1 U	1.1 U	1.1 U	1 U	1.1 U	1.1 U	1.1 U	1.2 U
Styrene	NS	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Bromoform	NS	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
1,1,2,2-Tetrachloroethane	NS	5.2 U	5.5 U	5.3 U	5.2 U	5.7 U	5.4 U	5.5 U	5.9 U
Xylenes (total)	1200	2.1 U	2.2 U	2.1 U	2.1 U	2.3 U	2.2 U	2.2 U	2.3 U

Bold Face indicates constituent detection
Shaded cells indicate detections above NYSDEC Recommer
Results in ug/kg
1 - Limit is for cis-1,2-dichloroethene

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Analytical Results (State-Certified Lab)

Type Date Collected Sample ID	NYSDEC RSCO	Soil 08/16/2002 **SB-29(1-3')**	Soil 08/16/2002 **SB-29(5-7')**	Soil 08/16/2002 **SB-30(1-3')**	Soil 08/16/2002 **SB-30(5-7')**	Soil 08/16/2002 **SB-31(1-3')**	Soil 08/16/2002 **SB-31(5-7')**
Chloromethane	NS	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Vinyl chloride	NS	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Bromomethane	200	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Chloroethane	NS	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
1,1-Dichloroethene	NS	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Carbon disulfide		5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Acetone	200	11 U	11 U	11 U	11 U	9.9 U	10 U
Methylene chloride	400	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
1,1-Dichloroethane	200	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
2-Butanone (MEK)	NS	11 U	11 U	11 U	11 U	9.9 U	10 U
Chloroform	300	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
1,1,1-Trichloroethane	800	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Carbon tetrachloride	600	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
1,2-Dichloroethene (total)	250 [1]	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Benzene	60	1.1 U	1.1 U	1.1 U	1.1 U	0.99 U	1 U
1,2-Dichloroethane	100	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Trichloroethene	700	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
1,2-Dichloropropane	NS	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Bromodichloromethane	NS	5.5 U	5.7 U	5.6 U	5.5 U	5.5 U	5.1 U
cis-1,3-Dichloropropene	NS	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
4-Methyl-2-pentanone (MIBK)	NS	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Toluene	1,500	1.1 U	1.1 U	**1.3**	1.1 U	0.99 U	1 U
trans-1,3-Dichloropropene	300	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
1,1,2-Trichloroethane	NS	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Tetrachloroethene	1400	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
2-Hexanone		5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Dibromochloromethane		5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Chlorobenzene	1700	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Ethylbenzene	5500	1.1 U	1.1 U	1.1 U	1.1 U	0.99 U	1 U
Styrene	NS	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Bromoform	NS	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
1,1,2,2-Tetrachloroethane	NS	5.5 U	5.7 U	5.6 U	5.5 U	5 U	5.1 U
Xylenes (total)	1200	2.2 U	2.3 U	2.2 U	2.2 U	2 U	2.1 U

Bold Face indicates constituent detection
Shaded cells indicate detections above NYSDEC Recommer
Results in ug/kg
1 - Limit is for cis-1,2-dichloroethene

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Sample Results (Field GC)

Sample ID	NYSDEC RSCO	SB-7(0-1)	SB-7(1-2)	SB-7(2-3)	SB-7(3-4)	SB-7(4-5)	SB-7(5-6)	SB-7(6-7)	SB-7(7-8)	SB-8(0-2)	SB-8(0-2dup)	SB-8(2-4)
Sampling Date		11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00
Analysis Code		17	18	20	21	22	23	24	19	25	32	26
Analysis Date		11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00
Operator Initials		JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM
1,1 Dichlorethene	400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
t-1, 2-Dichloroethene	300	0.0	1.4	1.6	2.8	1.6	2.2	2.0	2.3	0.5	2.5	0.1
c-1, 2-Dichloroethene	250	0.0	14.2	78.5	150.3	80.6	115.1	71.1	1.4	0.6	0.0	10.1
Trichloroethylene	700	0.0	0.6	0.8	0.4	174.7	3.2	6.2	0.4	2.3	0.6	6.4
Tetrachloroethene	1400	0.0	2.9	1.9	1.3	0.8	24.4	15.7	3.2	119.8	28.2	96.8

Sample ID	NYSDEC RSCO	SB-8(2-4)	SB-8(4-5)	SB-8(5-6)	SB-8(6-7)	SB-8(7-8)	SB-9(0-1)	SB-9(1-2)	SB-9(2-4)	SB-9(4-5)	SB-9(5-6)	SB-9(6-7)
Sampling Date		11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00
Analysis Code		26	26	29	30	31	27	37	39	41	42	43
Analysis Date		11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00
Operator Initials		JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM
1,1 Dichlorethene	400	0.0	2.6	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0
t-1, 2-Dichloroethene	300	0.1	8.5	2.6	2.6	0.3	0.3	1.5	0.8	0.1	1.1	1.5
c-1, 2-Dichloroethene	250	10.1	695.4	379.1	212.8	1.7	0.0	0.0	0.0	84.6	0.0	0.0
Trichloroethylene	700	6.4	74.6	94.3	38.6	1.1	2.3	2.0	0.6	2.3	0.0	1.3
Tetrachloroethene	1400	96.8	364.1	749.2	190.3	15.4	2682.3	1185.4	1932.4	2678.3	171.6	918.5

Sample ID	NYSDEC RSCO	SB-9(7-8)	SB-9(7-8dup)	SB-10(0-2)	SB-10(2-3)	SB-10(3-4)	SB-10(4-5)	SB-10(5-6)	SB-11(0-1)	SB-11(1-2)	SB-11(2-3)	SB-11(3-4)
Sampling Date		11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00
Analysis Code		38	46	47	48	50	51	52	59	60	61	62
Analysis Date		11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00	11/02/00
Operator Initials		JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM
1,1 Dichlorethene	400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
t-1, 2-Dichloroethene	300	0.0	1.6	0.3	0.0	0.0	0.0	0.8	5.7	12.3	2.4	1.9
c-1, 2-Dichloroethene	250	0.0	0.0	26.2	8.1	21.7	301.9	64.3	3351	5383	247.6	171.9
Trichloroethylene	700	0.0	0.0	27.9	8.8	62.5	1068.8	41.9	62.3	31.3	3.4	17.1
Tetrachloroethene	1400	817.9	808.6	2405.8	1536.0	7393.1	63755.6	21572	2242.6	371.5	216.1	396.3

Results reported in ug/kg
Shaded cells indicate NYSDEC RSCO exceedence.

APPENDIX B

Johnson & Hoffman Manufacturing Corp.
Carle Place, NY
Soil Sample Results (Field GC)

Sample ID	NYSDEC RSCO	SB-11(4-6)	SB-12(0-1)	SB-12(1-2)	SB-12(4-6)	SB-12(6-8)	SB-13(0-1)	SB-13(1-2)	SB-13(2-4)	SB-13(4-5)	SB-13(5-6)	SB-13(6-8)
Sampling Date		11/02/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00
Analysis Code		63	10	11	12	13	15	16	22	23	24	19
Analysis Date		11/02/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00
Operator Initials		JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM
1,1 Dichlorethene	400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	283.8	56.5	48.0	51.7
t-1, 2-Dichloroethene	300	0.0	0.0	0.0	0.0	0.5	0.0	1.0	52.6	14.3	17.8	19.4
c-1, 2-Dichloroethene	250	1.5	0.0	0.0	0.0	0.0	11.0	50.9	4976.1	1609.7	2751.0	564.2
Trichloroethylene	700	0.6	1.1	0.5	0.6	0.8	16.9	112.5	12433.1	6723.2	3061.6	2284.0
Tetrachloroethene	1400	14.2	1.8	5.8	56.2	3.6	1846.0	7002.9	88223.0	82725.9	62768.9	21026.5

Sample ID	NYSDEC RSCO	SB-13(6-8)DL	SB-13(12-14)	SB-14(0-1)	SB-14(1-2)	SB-14(2-4)	SB-14(2-4dup)	SB-14(4-6)	SB-14(6-8)
Sampling Date		11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00
Analysis Code		20	25	30	31	32	35	34	33
Analysis Date		11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00	11/03/00
Operator Initials		JMM	JMM	JMM	JMM	JMM	JMM	JMM	JMM
1,1 Dichlorethene	400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
t-1, 2-Dichloroethene	300	0.0	0.0	0.1	0.6	1.1	1.2	3.9	0.7
c-1, 2-Dichloroethene	250	498.5	2.2	0.0	1.1	16.0	26.0	87.4	12.6
Trichloroethylene	700	3527.6	1.4	0.4	1.2	25.8	36.7	48.8	2.8
Tetrachloroethene	1400	70626.2	62.1	3.4	12.2	231.8	283.3	672.1	41.2

Results reported in ug/kg
Shaded cells indicate NYSDEC RSCO exceedence.

APPENDIX C

DESIGN CALCULATIONS

APPENDIX C

DESIGN CALCULATIONS
JOHNSON & HOFFMAN SITE
CARLE PLACE, NEW YORK

A. RATIONALE

1) Overall, theoretical calculations or modeling would be based on variables with a degree of uncertainty that would only result in qualitative insight into design parameters.
This typically leads to the need for a pilot program for site-specific emperical data, but in this case the scale of the project is close to the size of a pilot program, therefore conservative estimates will be made for most variables, with the use of available historic data of similar sites, rather than perform a pilot program.
The design shall be flexible to potential modification if necessary.

B. AREAS & DEPTHS OF IMPACTED SOILS

1) Area A =	6,400	square feet (SF)	at	10	feet
Volume Area A =		64,000	cubic feet		
2) Area B =	1,250	SF	at	8	feet
Volume Area B =		10,000	cubic feet		

C. DEPTH TO GROUNDWATER

1) Area A =	50	ft below grade -	10	feet depth of contamination =	40 << applied vacuum - OK
2) Area B =	50	ft below grade -	8	feet depth of contamination =	42 << applied vacuum - OK

D. PORE VOLUME

1) Area A =	19,200 CF	@	30% pore volume (medium to coarse grain sand)
2) Area B =	2,000 CF		20% pore volume (fine to coarse grain sand)

APPENDIX C

DESIGN CALCULATIONS
JOHNSON & HOFFMAN SITE
CARLE PLACE, NEW YORK

E. DESIGN FLOW

1) Pore volumes/month = 240 or 8 vol/day >> 4 pore-volume/day [1,4]

2) Area A = 19,200 CF pore-volume x 240 / 30.5 days per mo./ 24 hrs/day x 60 min/day

Area A = 105 CFM

Area A (3 locations 35 CFM per location

Area A screens 3 CFM/ft-screen with 10 ft screens or 6.99 CFM/ft-screen with 5 nested screen

3) Area B = 2,000 CF pore-volume x 240 / 30.5 days per mo./ 24 hrs/day x 60 min/day

Area B = 11 CFM minimum

Length of extraction pipe in trench Area B = 20 ft
Resulting in extraction rate of 0.55 cfm/ft-pipe

4) Total Design Flow = 105 CFM + 11 CFM

Total Design Flow = 116 + 50% contingency

Total Design Flow = 174 CFM; say 180 CFM

5) Well Diameter = 4 inch nominal throughout.

F. VOLATILITY

1) The contaminants of concern at the Site include PCE and DCE. These compounds have sufficient volatility for SVE to be effective.

2) PCE	Vapor Pressure at 1 atm (273 K) =	0.018 atm =	0.54 in Hg
3) TCE	Vapor Pressure at 1 atm (273 K) =	0.026 atm =	0.78 in Hg
4) DCE	Vapor Pressure at 1 atm (273 K) =	0.035 atm =	1.05 in Hg

APPENDIX C

DESIGN CALCULATIONS
JOHNSON & HOFFMAN SITE
CARLE PLACE, NEW YORK

G. SOIL PERMEABILITY

1) Fine-grain sand	1.0E-08 cm^2 =	1 darcies	based on field observations of soils
2) Medium to coarse grain sand	1.0E-07 cm^2 =	10 darcies	based on field observations of soils
3) Moisture content assumed:	low	area to be effectively capped.	

H. VACUUM REQUIREMENTS

1) Highest vacuum will be dictated by fine-grain sands
2) Based on Figure 5 (attached) from Insitu Treatment Technology, p. 110 [6]
   for "fine sands" with soil permeability of 1 DARCY, 6.8 ft H_2O vacuum (6.2 in. Hg) is required
   to achieve 0.68 cfm/ft-pipe

I. LOADING

1) PCE (C_2Cl_4)
   MW = 166 grams per gram-mol (g/g-mol)
   Soil vapor studies indicate 100 micrograms per liter (ug/L). For PCE this is 14 ppm assuming ideal gas, saturated gas, equilibrium.
   Assume 14 ppm (dilution, non-equilibrium effects, and diffusion-controlled should reduce this value dramatically)

J. RADIUS OF INFLUENCE (ROI)

1) Table 4-1 [5] (see attached)
   ROI for kh/kv of 0.67 (lowest of examples shown) is 40 ft going from 50 in water (3.8 in Hg) vacuum to 0.1 inches water vacuum. Conservatively assume 30 feet for design. Note flow was 50 cfm or 6.67 cfm/ft well screen.
   Due to initial moisture content flow, ROI, and VOC concentrations may be lower. Since capping and minimizing moisture through dehydration, no long-term reduction of these values due to moisture will be made (biodegradation will also be minimized).

APPENDIX C

DESIGN CALCULATIONS
JOHNSON & HOFFMAN MANUFACTURING CORP.
CARLE PLACE, NEW YORK

K. DEPTH OF EXTRACTION AND PASSIVE AIR VENTS

1) Area A
Upper fill material - nested 5-ft screens. One from 0-5 feet and the second screen from 6 to 11 feet.
Alternate vacuum flow through upper screen first to promote air flow through finer-grain fill material.
Passive vents shall be 0 to 4 feet BGS to promote air flow through upper, finer-grained layer.

2) Area B.
Horizontal well at 5 feet BGS to promote air flow through upper 5 feet zone.
Two passive vents along far side of plume to promote air flow through asymetric portion of plume farthest from extraction well in trench. Install passive air vents from 1 to 5 feet BGS.

L. IMPACTED SOILS

1) Area A Average Soil Concentration = 42,829 ug/kg Average combined PCE, TCE, DCE values 1 to 10 feet (see Table 2-2)
2) Area B Average Soil Concentration = 51,193 ug/kg Average combined PCE, TCE, DCE values 1 to 5 feet (See Table 2-2)
3) Soil Wt. Area A = 64,000 CF x 2800 lbs / CY x 1 CY / 27 CF

Soil Wt. Area A = 6,637,037 lbs

4) Soil Wt. Area B = 10,000 CF x 2800 lbs / CY x 1 CY / 27 CF

Soil Wt. Area B = 1,037,037 lbs

5) Contaminant mass Area A = 6,637,037 lbs x 42,829 ug / kg x 0.4536 kg / lb x g / 1.0E+06 ug x lb / 454 g

Contaminant mass Area A = 284 lbs PCE (99%), TCE, DCE

APPENDIX C

DESIGN CALCULATIONS
JOHNSON & HOFFMAN SITE
CARLE PLACE, NEW YORK

L. IMPACTED SOILS (cont'd)

6) Contaminant mass Area B = 1,037,037 lbs x 51,193 ug x kg x 0.4536 kg x lb x 1.0E+06 g x ug x 454 lb g

Contaminant mass Area B = 53 lbs PCE

7) Total PCE = 337

M. CARBON USAGE

1) Assume 1 lb (PCE, TCE, DCE) for 20 lbs carbon average at 140 deg F.

2) Carbon required = 6,741 lb

3) Start out with three 200-pound carbon units and change out as necessary.

REFERENCES
JOHNSON & HOFFMAN MANUFACTURING CORP.
CARLE PLACE, NEW YORK

1) **GROUNDWATER POLLUTION CONTROL PROGRAM, GUIDELINE #5, Minimum Design Requirements and Common Accepted Engineering Practices: Soil Vapor Extraction and Bioventing Systems**
Wyoming Department of Environmental Quality Water Quality Division (June 1998)
"The pilot test must be performed long enough to evacuate a minimum of 1.5 - 2 pore volumes of air in order to gather sufficient and representative data.
This typically can be accomplished within 8 to 12 hours of test operation."
http://deq.state.wy.us/wqd/downloads/ground/guide5.htm
This results in minimum of 183 pore-volumes per month or 4 pore-volumes per day

2) **GROUNDWATER POLLUTION CONTROL PROGRAM, GUIDELINE #5, Minimum Design Requirements and Common Accepted Engineering Practices: Soil Vapor Extraction and Bioventing Systems**
Wyoming Department of Environmental Quality Water Quality Division (June 1998)
"As a rule of thumb, the zone of influence is considered to be the distance from the extraction well at which a vacuum of at least 0.1 inches of water is observed. For sites with contaminated areas of stratified geology, design zones of influence should be defined for each geologic strata.
http://deq.state.wy.us/wqd/downloads/ground/guide5.htm

3) **RETROFITTING HORIZONTAL SPARGE WELLS**
Raveendra Damera, P.E., Dev Murali, P.G, Rebecca A. Kinal, E.I.T) (General Physics Corporation, Columbia, MD)
"The well screens were designed to deliver flow rates of 1.0 cfm/ft ...assuming a conservative average permeability of 10 darcy."
http://www.gpworldwide.com/pdf/envir/envir_horiz_sparge_wells.pdf#search='sve%20flow%20per%20foot%20of%20screen'

4) **Chapter II Soil Vapor Extraction, October 1994, USEPA**
"Centrifugal blowers (such as squirrel-cage fans) should be used for high-flow (up to 280 standard cubic feet per minute), low-vacuum (less than 30 inches of water) applications."
http://www.epa.gov/swerust1/pubs/tum_ch2.pdf#search='sve%20Air%20Permeability%20soil%20types'

5) **Guidance For Design, Installation and Operation of Soil Venting Systems, PUB-RR-185**
Wisconsin Department of Natural Resources (November 2003)
Table 4-1 ROI for kh/kv of 0.67 (lowest of examples shown) is 40 ft going from 50 in water vacuum to 0.1 inches water vacuum.
Also 50 cfm, 7.5 feet screen, 20 feet to based on screen; 20 depth to water table; kh = 10 Darcies; hv = 15 Darcies
Conservatively assume 30 feet for design.

6) **Insitu Treatment Technology**
Geraghty & Miller 1996
Air Flow Genereration Chart

7) ***How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites: A Guide for Corrective Action Plan Reviewers***.
Exhibit II_3 "SVE Evaluation Process Flow Chart
USEPA, 1995, Doc. #EPA 510-B-95-007

APPENDIX D

MAJOR EQUIPMENT

DR 8
Regenerative Blower

FEATURES

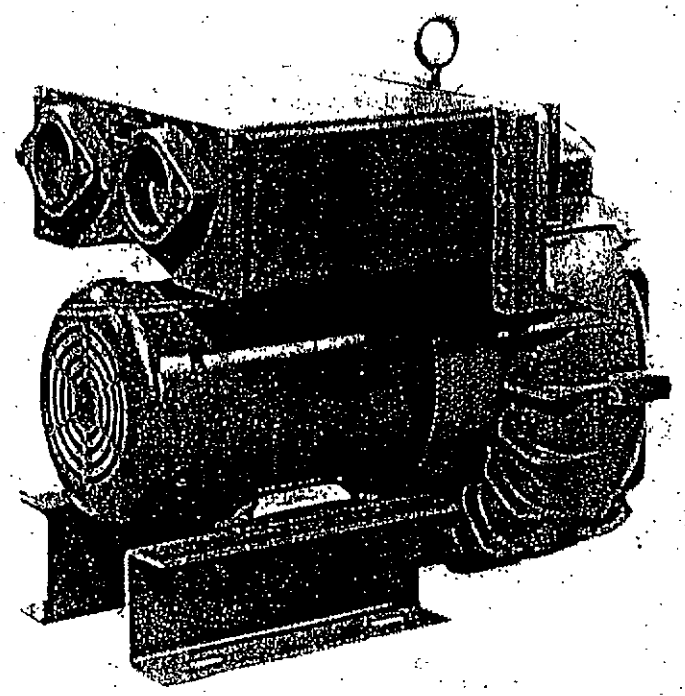
- Manufactured in the USA
- Maximum flow 400 SCFM
- Maximum pressure 128" WG
- Maximum vacuum 7.7" Hg
- 10 HP standard
- Blower construction—cast aluminum housing, impeller and cover
- Inlet and outlet internal muffling
- Noise level within OSHA standards
- Weight: 258 lbs. (116 kg)

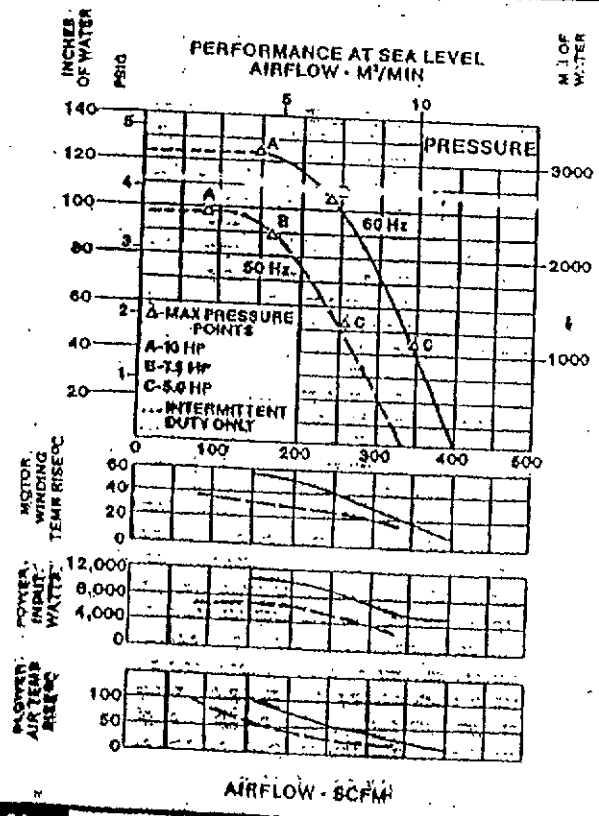
ACCESSORIES

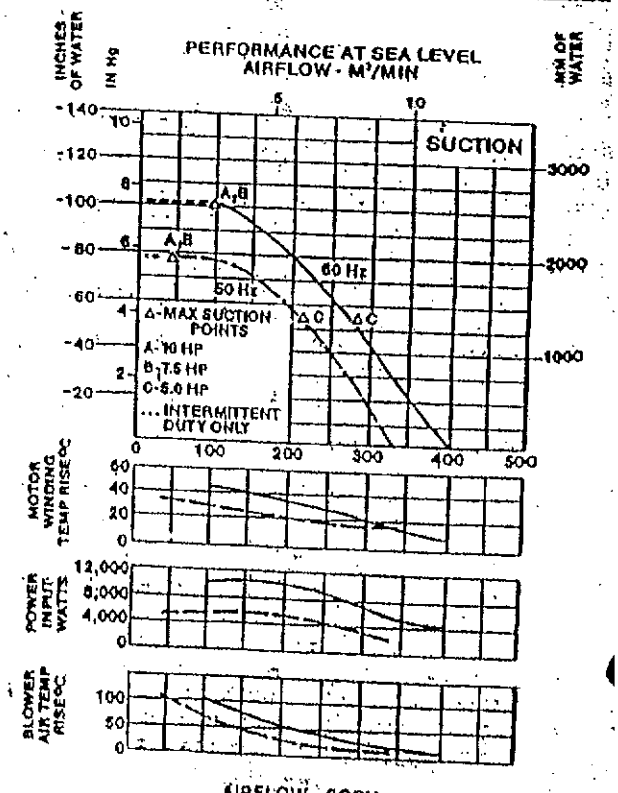
- Additional inlet/outlet mufflers
- Inlet and/or inline filters
- Filter/silencers
- For details see Accessories Section

OPTIONS

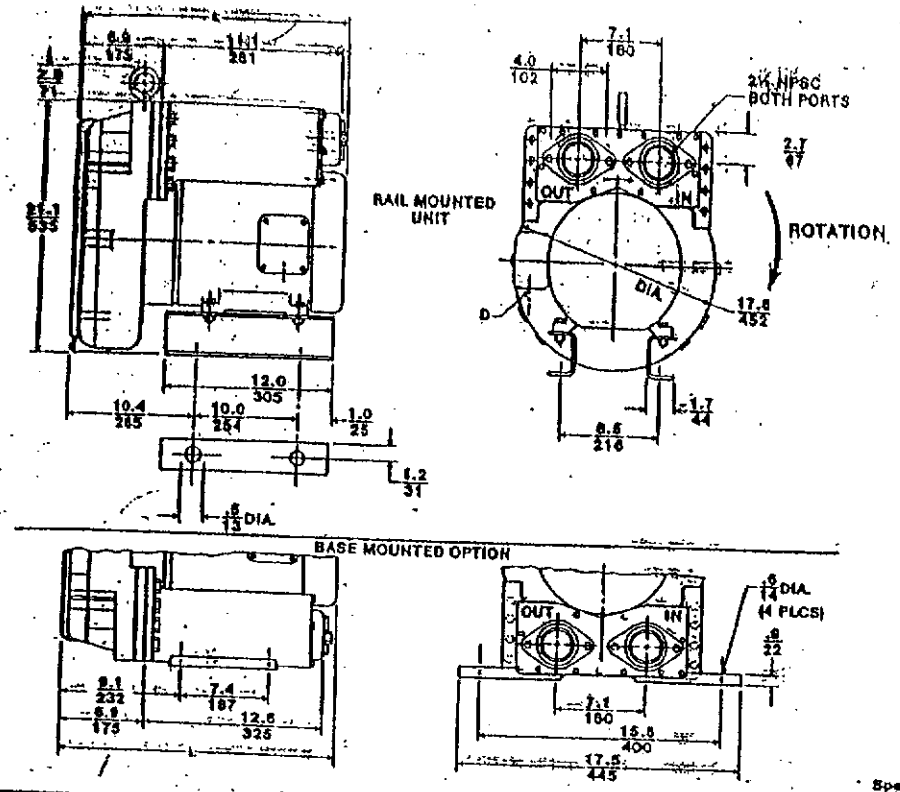
- Smaller and larger horsepower motors
- 575-volt and XP motors
- Surface treatment or plating
- Gas tight sealing
- Bronze housing and impeller
- Belt drive (motorless) model; for details see Remote Drive Section







DR 8
Regenerative Blower



MODEL	L IN / MM	P IN / MM
DR8AY72	23.0 / 584	1.1 / 27
DR8BB72	24.1 / 613	1.1 / 27
DR8BD72	24.4 / 619	X NPT
DR8BB86	24.1 / 613	1.1 / 27
DR8D89	19.6 / 498	1.1 / 27

DIMENSIONS: IN / MM
TOLERANCE: .X ± 1/32

Specifications Subject To Change Without Notice.

SPECIFICATIONS

MODEL	DR8AY72W	DR8BB72W	DR8BD72W	DR8BB86W	DR8D89W
Part No.	036871	036732	036733	036734	036735
Motor Enclosure Type	TEFC	TEFC	XP	TEFC	TEFC
Motor Horsepower	7.5	10	10	10	5.0
Voltage[1]	230/460	230/460	230/460	575	230/460
Phase	3	3	3	3	3
Frequency[1] (Hz)	60	60	60	60	60
Insulation Class[2]	F	F	B	F	F
NEMA Rated Motor Amps	20/10	26/13	26/13	10.4	14/7
Service Factor	1.15	1.15	1.0	1.15	1.15
Locked Rotor Amps	140/70	155/78	155/78	84	96/48
Max. Blower Amps	27.6/13.8	30/15	26/13	11.0	17.2/8.6
Recommended NEMA Starter Size	1/1	2/1	2/1	1	1/0
Weight (lbs/Kg)	258/116	258/116	258/116	258/116	237/106
Model No. (Base Mount Option)	DR8AY72X	DR8BB72X	DR8BD72X	DR8BB86X	DR8D89X
Part No. (Base Mount Option)	036926	036737	036738	036739	
Blower Limitations for Continuous Duty (60 Hz/50 Hz)					
Max. Pressure-In. of water	106/90	126/96	126/96	126 (60 Hz)	45/50
Max. Suction-In. of water	100/78	104/78	104/78	104 (60 Hz)	50/60
Min. Flow-Pressure-SCFM	230/160	130/75	130/75	130 (60 Hz)	340/250
Min. Flow-Suction-SCFM	100/40	80/40	80/40	80 (60 Hz)	280/220

[1] All 3-phase motors are factory tested and certified to operate on 200-230/460 VAC-3 ph-60 Hz and 220-240/380-415 VAC-3 ph-50 Hz.

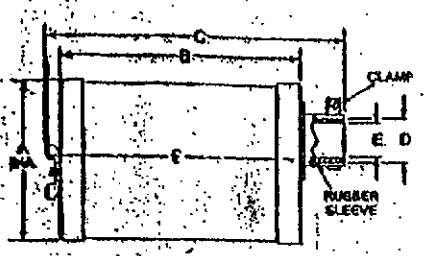
[2] Maximum operating temperatures: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F insulation or 130°C for Class B insulation. Blower outlet air temperature should not exceed 140°C (air temperature rise plus ambient).

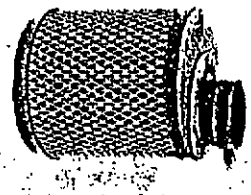
Blower Model Reference Key	
A=Spiral	E=DR606, DR707, DR4, DR5, DR6, DR7, DR75
B=DR606, DR063, DR101, DR302	F=DR8, DR9, DR809, DR85
C=DR303, DR312, DR353	G=DR10, DR11, DR12, DR13
D=DR313, DR404, DR454, DR505, DR513, DR523, DR543, DR555	H=DR14, DR15

Inlet Filter (Single Connection)

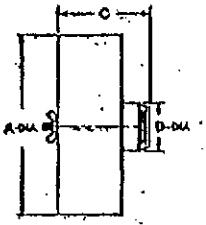
Inlet Filters protect the blower and the air distribution system from dust, and other airborne particles and contaminants. Normally used in pressure systems.

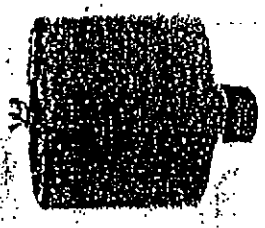
SPECIFICATIONS:
HOUSING-Steel
MEDIA-Polyester
EFFICIENCY-97-98% (8 to 10 micron particle size)
FILTER ELEMENT-Replaceable (see filter elements)
NOTE: "Z" MEDIA (1 to 3 micron particle size) available





4T7411 FOR SPIRAL BLOWERS





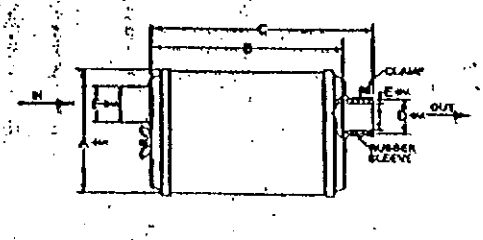
FOR DR BLOWER MODELS

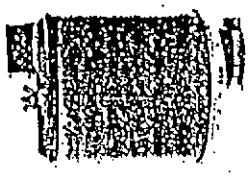
Part Number	Z Media Filter	Reference Blower Model	Connection		Dimensions (inches)					Filter Element
			Inlet	Outlet	A	B	C	D	E	
4T7411		A	2.00 SO		4.56	5.06	7.00	2.00	1.75	271078
517609		B	0.75 NPT		9.25		9.75	0.75		517612
516466	517865	B	1.00 NPT		6.00		6.50	1.00		515132
515122	517866	C,D	1.50 NPT		6.00		6.50	1.50		515132
515123	517867	E	2.00 NPT		7.75		7.25	2.00		515133
515124	517868	E	2.00 NPT		10.00		12.25	2.00		515134
515125	517869	F	2.50 NPT		10.00		12.50	2.50		515134
515145	517870	G	3.00 NPT		10.00		13.00	3.00		515134
515151	517871	H	4.00 NPT		10.00		14.00	4.00		515135
516511	517872	H	6.00 NPT		16.00		15.00	6.00		516515
517347		H	6.00 NPT		22.50		23.00	6.00		517348

Inline Filter (Dual Connection)

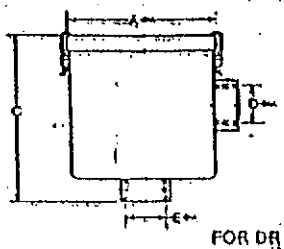
Inline Filters protect the blower from harmful dust and other particles that may be drawn into the blower through the air distribution system. Normally used in vacuum systems.

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





271200 FOR SPIRAL BLOWERS



FOR DR BLOWER MODELS

Part Number	Z Media Filter	Reference Blower Model	Connection		Dimensions (inches)						Filter Element
			Inlet	Outlet	A	B	C	D	E	F	
271200		A	1.75 SO	2.00 SO	6.25	6.25	6.31	2.00	1.75	1.75	271078
517610		B	0.75 NPSC	0.75 NPSC	6.50		4.38	0.75	0.75		517613
516461	517866	B	1.00 NPSC	1.00 NPSC	7.25		6.50	1.00	1.00		516434
515254	517867	C,D	1.50 NPSC	1.50 NPSC	7.00		6.50	1.50	1.50		516434
515255	517868	E	2.00 NPSC	2.00 NPSC	8.00		10.25	2.00	2.00		516435
515256	517869	F	2.50 NPSC	2.50 NPSC	8.00		10.25	2.50	2.50		516435
515463	517870	G	3.00 NPSC	3.00 NPSC	14.00		26.50	3.00	3.00		515135
515465	517871	H	4.00 NPSC	4.00 NPSC	14.00		27.00	4.00	4.00		515135
517611	517872	H	6.00 NPSC	6.00 NPSC	16.00		28.00	6.00	6.00		516515
517353		H	6.00 NPSC	6.00 NPSC	22.00		36.00	6.00	6.00		517348

odel Reference Key	
CP 068, 083, 101, 202	E = DR/EN/CP 606, S543, 6, 623, S7, S75
CP 303, 812, 813, 353	F = DR/EN/CP 707, 808, S85, 858, S9, P9 (Inlet Only)
N/CP 404, 454, 513, 505, 555, 523	G = DR/EN/CP 823, 813, P13 (Inlet Only)
	H = DR/EN/CP 909, 1223, 14, S15, P15 (Inlet Only)

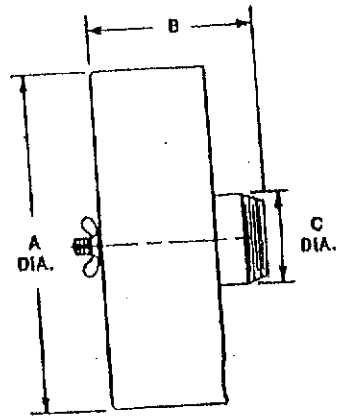
Silencers (Single Connection)

otal silencing only. (Used to augment existing muffling systems.)

incers reduce noise levels while ensuring clean
ovided to the blower and the air distribution
Normally used in pressure applications.

ICATIONS:

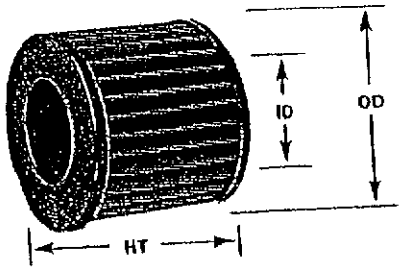
ING – Steel
– Polyester
ENCY – 97-98% (8 to 10 micron particle size)
H ELEMENT – Replaceable (see filter elements)



art Number	Z Media Filter	Reference Blower Model	Connection Inlet	Dimensions (inches) A	B	C	Filter Element
516487	517878	B	1.00 NPT	6.00	6.50	1.00	515132
516489	517879	C,D	1.50 NPT	6.00	6.50	1.50	515132
516491	517880	E	2.00 NPT	10.00	7.25	2.00	515133
516493	517881	E	2.00 NPT	10.00	12.25	2.00	515134
516495	517882	F	2.50 NPT	10.00	12.50	2.50	515134
516497	517883	G	3.00 NPT	10.00	12.50	3.00	515134
516499	517884	H	4.00 NPT	16.00	14.00	4.00	515135
516513	517885	H	6.00 NPT	16.00	15.00	6.00	516515

lter Element

Rotron Air Filters and Filter/Silencers have
placeable filter elements. The filter media is polyester
signed for high efficiency over a wide spectrum of
ndustrial applications. See filter element cross
ference table.



FOR DR BLOWER MODELS

Standard Replacement Filter Element Cross Reference Table					
271200 477411 515122	271078 271078 515132	515158 515254 515255	515134 516434 516435	516489 516491 516493	515132 515133 515134
515123 515124 515125	515133 515134 515134	515256 516461 516463	516435 516434 515135	516495 516497 516499	515134 515134 515135
515145 515151 515157	515134 515135 515133	516465 516466 516467	515135 515132 515133	516511 516513 517611	516515 516515 516515

Part Number	Z Media Filter	ID (Inches)	OD (Inches)	HT (Inches)	Area (Sq/Ft)
515132	517873	3.00	4.38	4.75	1.5
515133	517874	3.63	5.88	4.75	2.3
515134	517875	4.63	5.88	9.50	4.5
515135	517876	4.75	7.88	9.63	8.3
516434	517893	2.56	5.00	4.75	2.0
516435	517894	3.50	5.88	8.75	4.5
516515	517877	8.00	11.75	9.63	19.0

Filtration Accessories

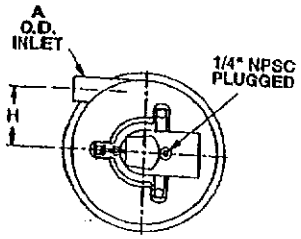
Blower Connection Key
NPT – American National Standard Taper Pipe Thread (Male)
NPSC – American National Standard Straight Pipe Thread for Coupling (Female)
SO – Slip On (Smooth – No Threads)

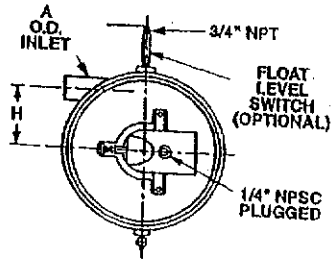
Moisture Separator™

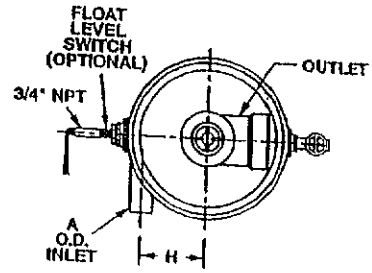
By separating and containing entrained liquids, Rotron's moisture separator helps protect our regenerative blowers and the end treatment system from corrosion and mineralization damage. Recommended for all soil vacuum extraction applications.

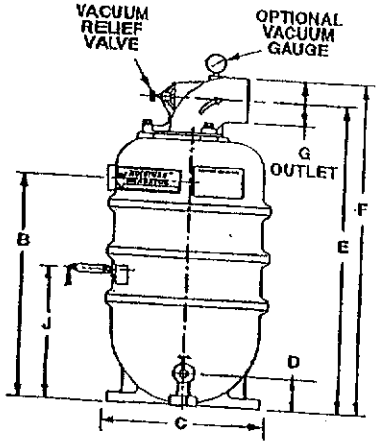
SPECIFICATIONS:

SEPARATION METHOD – High Efficiency Cyclonic
RELIEF VALVE MATERIAL – Brass & Stainless Steel
FLOAT MATERIAL – Copper
FLOAT SWITCH – SPDT, Explosion-proof
NEMA 7&9, 5 Amp max.

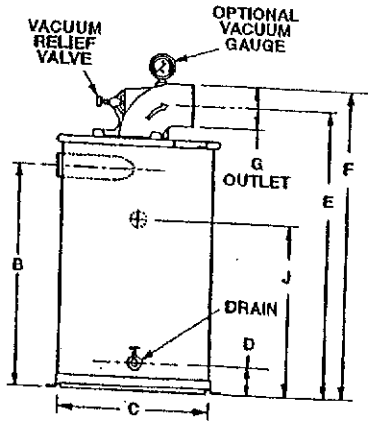




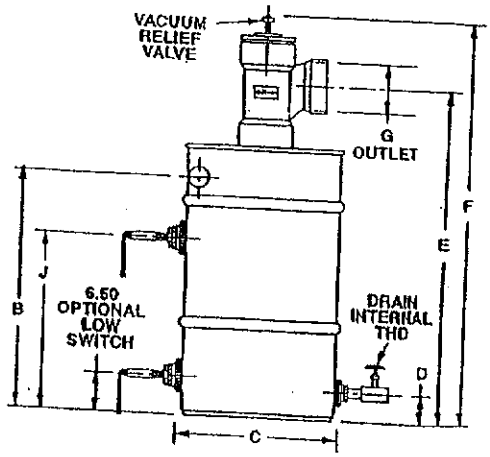




PLASTIC "P" DESIGN



METAL "D" DESIGN



METAL "B" DESIGN

Model	Part No.	CFM Max.	A Dia.	B	C Dia.	D	E	F	G Dia.	H	J Switch	Drain Internal THD	Shipping Weight
MS200PS	038519	200	2.38	22.46	16.42	3.25	31.05	33.30	4.50 OD	6.00	13.25	3/4" NPT	42 lb.
MS300PS	038520	300	2.88										
MS200DS	080086	200	2.00	22.12	16.75	2.75	27.92	30.17		6.61	12.62		
MS300DS	080087	300	2.50							6.56			
MS350BS	038357	350	3.25	28.00	23.00	4.00	37.25	39.50	6.63 ID	9.75	17.50	1" NPT	82 lb.
MS500BS	038354	500											
MS600BS	038353	600	4.00	27.50			37.37	54.50		9.25			95 lb.
MS1000BS	038914	1000	6.00	31.00	27.00		47.32	51.70	9.25 OD	10.00	19.88		96 lb.
													150 lb.

Models without float switch available. Metal MS200/300DS models are not the standard stocked, but are available.

Blower Model Reference Key	
A = SPIRAL	E = DR/EN/CP 606, S543, 6, 623, S7, S75
B = DR/EN/CP 068, 083, 101, 202	F = DR/EN/CP 707, 808, S85, 858, S9, P9 (Inlet Only)
C = DR/EN/CP 303, 312, 313, 353	G = DR/EN/CP 823, S13, P13 (Inlet Only)
D = DR/EN/CP 404, 454, 513, 505, 555, 523	H = DR/EN/CP 909, 1223, 14, S15, P15 (Inlet Only)

Filtration Accessories

2.0 Moisture Separator™ Specifications

2.1 DUTY

The moisture separator shall be designed for use in a soil vapor extraction system capable of continuous operation with a pressure drop of less than six inches of water at the rated flow of _____ SCFM. The separator shall be capable of operation under various inlet conditions ranging from a fine mist to slugs of water with high efficiency.

2.2 PRINCIPLE OF OPERATION

The moisture separator shall incorporate cyclonic separation to remove entrained water. The separator must protect against an overflow by fail safe mechanical means. An electrical switch or contact(s) alone is not an acceptable means of protection against overflow, but is a good backup.

2.3 CONSTRUCTION

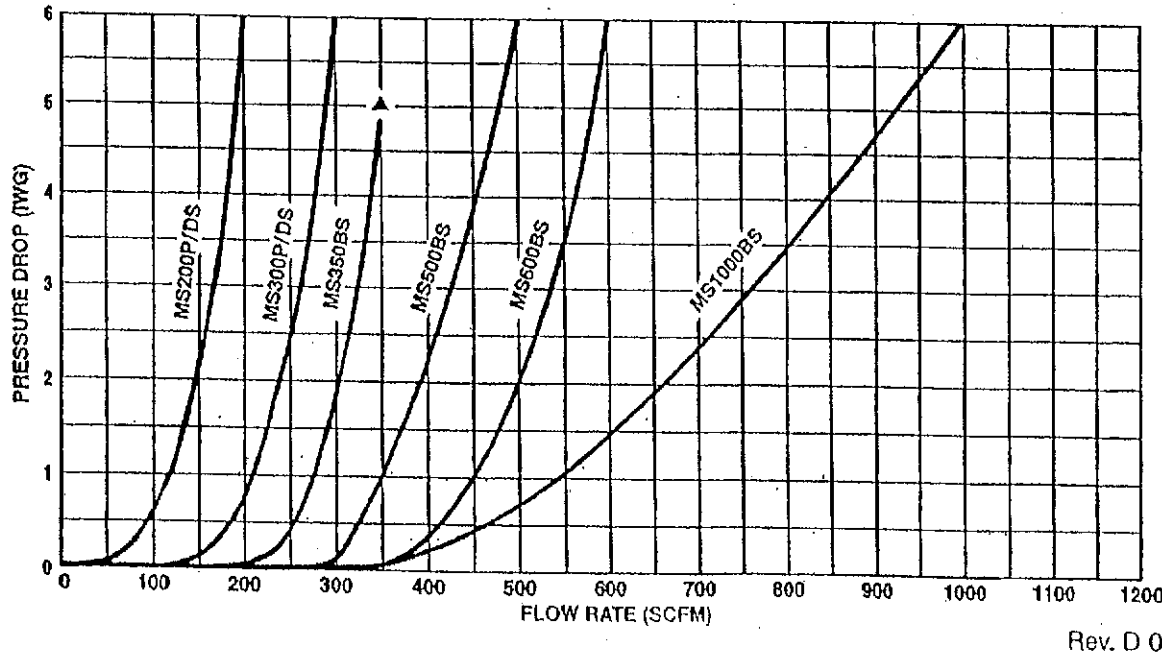
The body of the moisture separator shall be constructed of heavy wall plastic or heavy gauge cold rolled steel. The steel interior and exterior shall be epoxy (powder) coated to resist abrasion, corrosion, and chipping that might expose the surface. The inlet shall be tangentially located and welded to the body. The outlet port shall be constructed of PVC or cast aluminum alloy, flanged and sealed to the center of the top of the separator. The separator shall incorporate a non-sparking copper float ball and an adjustable relief valve to protect against overflow and overheating the blower.

2.4 CAPACITY AND DIMENSIONS

The moisture separator must have a liquid capacity of _____ gallons. The inlet shall be _____ inch OD slip-on type. The outlet shall be _____ inch OD slip-on type.

For DR/EN/CP Blower Model	Selector Moisture Separator Model	Liquid-holding Capacity (gallons)	Inlet (OD)	Outlet	Max Vacuum Allowed (IHg)
404 454 505 513	MS200PS	7	2.38	4.5" OD	12
523 555 623 823	MS200DS	10	2.0		22
606	MS300PS	7	2.88		12
6	MS300DS	10	2.5		22
707					
808	MS350BS	40	3.25	6.63" ID	
858 1223	MS500BS				
909	MS600BS		4.0"		
14	MS1000BS	65	6.0"	9.25" OD	

2.5 PRESSURE DROP



Liquid Filled Pressure Gauges

Glycerine Filled Gauges

Stainless Steel Pressure Gauges

ANSI Grade A – 1% of Full Scale Accuracy

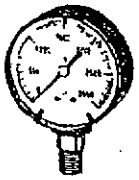
Glycerine filled gauges feature corrosion-resistant all stainless steel construction. Case is 304 stainless and bourdon tube, internal mechanism, and socket are 316 stainless. Laminated safety glass lens resists breakage. Full blowout relief to protect internal mechanism. Case is sealed and water tight. The pointer is adjustable on 4" dial gauges.

Connection: ¼" npt bottom. Glycerine-filled gauges are not for use with strong oxidizing agents.

PSI READING Total Grad.	Fig. Int. 2½"/4"	Grad. Marks 2½"/4"	2½" Dial No.	2½" Dial NET EACH	4" Dial No.	4" Dial NET EACH
60	10/ 10	2/ 1	4088K31	$51.71	4088K51	$110.41
100	20/ 10	2/ 1	4088K32	51.71	4088K52	110.41
160	20/ 20	5/ 2	4088K33	51.71	4088K53	110.41
200	20/ 20	5/ 2	4088K34	51.71	4088K54	110.41
300	50/ 30	10/ 5	4088K35	51.71	4088K55	110.41
400	50/ 50	10/ 5	4088K36	51.71	4088K56	110.41
600	100/100	10/10	4088K37	51.71	4088K57	110.41
1000	100/100	20/10	4088K38	51.71	4088K58	110.41
1500	300/300	50/25	4088K39	59.29	4088K59	126.55
2000	200/200	50/20	4088K41	59.29	4088K61	126.55
3000	500/500	100/50	4088K42	59.29	4088K62	126.55
5000	1000/500	100/50	4088K43	59.29	4088K63	126.55

ABS Pressure Gauges

Accuracy: ±2% of Full Scale



Gauges provide the advantages of glycerine filling at economy prices. Glycerine filling stabilizes the pointer in vibrating conditions and protects gauge components. Gauges are ideal for air compressors, hydraulic presses, and pumps.

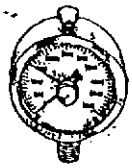
Tough ABS plastic case with brass internal parts. 2½" diameter aluminum dial has white background with black markings. Acrylic lens. A restrictor for use with air and gas is included. Blowout disc ejects at excessive pressure within case.

Phosphor bronze bourdon tube through 600 psi and stainless steel coil tube on higher pressures. Connection: Brass ¼" npt bottom or center back mount. Note: Not for use with highly oxidizing chemicals and acetone and ketone.

PRESSURE READING Total Grad.	Figure Int.	Grad. Marks	BOTTOM CONN. No.	BOTTOM CONN. NET EACH	CENTER BACK CONN. No.	CENTER BACK CONN. NET EACH
30" Hg	5"	0.5	3845K11	$16.51	3845K31	$21.37
30	5	0.5	3845K12	16.51	3845K32	21.37
60	5	1.0	3845K13	19.51	3845K33	19.88
100	10	1.0	3845K14	19.51	3845K34	19.88
160	20	5.0	3845K15	19.51	3845K35	19.88
200	20	5.0	3845K16	19.51	3845K36	19.88
300	30	5.0	3845K17	19.51	3845K37	19.88
400	50	10.0	3845K18	19.51	3845K38	19.88
600	50	10.0	3845K19	19.51	3845K39	19.88
1000	200	20.0	3845K2	21.58	3845K4	24.16
1500	300	50.0	3845K21	21.58	3845K41	24.16
2000	400	50.0	3845K22	21.58	3845K42	24.16
3000	500	100.0	3845K23	21.58	3845K43	24.16
5000	1000	100.0	3845K24	21.58	3845K44	24.16
6000	500	200.0	3845K25	21.58	3845K45	24.16

Maximum Indicating Brass Pressure Gauges

Accuracy: ±1.5% of Full Scale



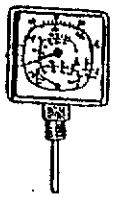
Gauges feature a maximum indication pointer for reference. Gauges have a standard black pointer plus a red maximum indication pointer that can be reset by turning a knob in center of dial. Gauges are 2½" diameter. Cast brass case with polished brass ring, phosphor bronze bourdon tube, brass socket, and acrylic lens. White coated aluminum dial with black numerals. High pressure blowout disc. Connection: ¼" bottom.

PSI READING Total Grad.	Fig. Int.	Grad. Marks	No.	NET EACH
15	1	0.1	3842K51	$42.09
30	5	0.2	3842K52	42.09
60	5	0.5	3842K53	42.09
100	10	1	3842K54	42.09
160	20	1	3842K55	42.09
200	20	2	3842K56	42.09
300	50	2	3842K57	42.09

PSI READING Total Grad.	Fig. Int.	Grad. Marks	No.	NET EACH
400	50	5	3842K58	$42.09
600	50	5	3842K59	42.09
1000	100	10	3842K61	42.09
1500	300	10	3842K62	50.00
3000	500	20	3842K63	50.00
5000	500	50	3842K64	50.00

Special Purpose Gauges

Heating System Gauges



Gauges measure pressure, temperature, and altitude on hot water heating systems.

Drawn steel, 3½" square case. Phosphor bronze bourdon pressure tube. Glass covered aluminum dial shows Psi and kPa scales.

Temperature range is 60° to 260°F (20° to 120°C). Accuracy: Pressure scale, ANSI Grade B 2%; temperature scale, ± 5% of span. Connection: ½" npt bottom or lower back.

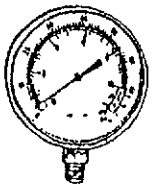
Range PSI	Altitude Feet	Bottom Connection No.	Bottom Connection NET EACH	Back Connection No.	Back Connection NET EACH
0- 60	0-70	4013K1	$33.92	4013K3	$33.15
0-100	0-70	4013K5	35.15	4013K6	35.15
0-200	None	4013K2	34.58	4013K4	40.94

4-in-1 Compound Gauges

Three gauges in one case measure hydraulic and pneumatic pressures in three ranges plus 0-30" Hg vacuum.

The gauges are 0-150 psi, 0-600 psi, and high (choose 0-3000 or 0-5000 psi). Gauges are mounted in a moisture resistant steel case. Pressure sensors protect low and medium pressure gauges from high pressure. Rubber covered, steel braided hose with ¼" npt swivel fitting. Gauges also have BAR scales.

Hose Length	0-3000 PSI No.	0-3000 PSI NET EACH	0-5000 PSI No.	0-5000 PSI NET EACH
12"	4054K61	$165.43	4054K63	$165.43
36"	4054K62	174.63	4054K64	174.63



Low Pressure Heating System Gauges

Low pressure bourdon tube gauge for use in low pressure heating systems and boiler service.

Features retarded pressure range from 10 to 30 psi to protect gauge against pressure surges. Has phosphor bronze C-style bourdon tube.

Dial has expanded range from 0 to 10 psi with 2 psi figure intervals and ⅛ to ½ in. graduation marks. Also has kPa scale. Accuracy is ANSI Grade B 2% except in retarded range where accuracy is not guaranteed.

White coated 3½" aluminum dial with easy to read black graduations covered by modified acrylic window. Ambient temperature and temperature of operating medium should not exceed 160°F.

Drawn steel case is phosphatized for rust resistance. Connections: ¼" npt bottom.

No. 4001K11 ..... NET EACH $18.30

5" Diameter Bimetal Thermometers

2½-Inch Stem

Temperature Range	Dly.	STRAIGHT FORM No.	STRAIGHT FORM NET EACH	ANGLE FORM No.	ANGLE FORM NET EACH
-40° to 160°F	2"	3944K113	$58.22	3949K113	$42.46
0° to 220°F	2"	3944K115	58.22	3949K115	42.46
20° to 240°F	2"	3944K116	58.22	3949K116	42.46
50° to 500°F	5"	3944K119	58.22	3949K119	42.46
150° to 750°F	10"	3944K121	58.22	3949K121	42.46
0° to 200°C	2"	3944K127	58.22	3949K127	42.46

4-Inch Stem

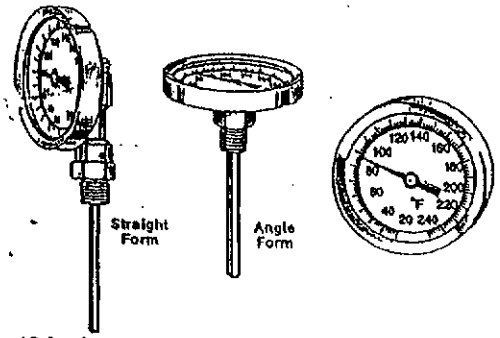
Temperature Range	Dly.	STRAIGHT FORM No.	STRAIGHT FORM NET EACH	ANGLE FORM No.	ANGLE FORM NET EACH
0° to 220°F	2"	3944K145	$58.22	3949K145	$42.46
20° to 240°F	2"	3944K146	58.22	3949K146	42.46
50° to 500°F	5"	3944K149	58.22	3949K149	42.46
150° to 750°F	10"	3944K151	58.22	3949K151	42.46
0° to 150°C	1"	3944K156	58.22	3949K156	42.46
0° to 300°C	5"	3944K159	58.22	3949K159	42.46

6-Inch Stem

Temperature Range	Dly.	STRAIGHT FORM No.	STRAIGHT FORM NET EACH	ANGLE FORM No.	ANGLE FORM NET EACH
-40° to 160°F	2"	3944K173	$58.22	3949K173	$42.46
0° to 220°F	2"	3944K175	58.22	3949K175	42.46
20° to 240°F	2"	3944K176	58.22	3949K176	39.28
50° to 500°F	5"	3944K179	58.22	3949K179	42.46
150° to 750°F	10"	3944K181	58.22	3949K181	42.46
0° to 150°C	1"	3944K186	58.22	3949K186	42.46
0° to 200°C	2"	3944K187	58.22	3949K187	42.46
0° to 300°C	5"	3944K189	58.22	3949K189	42.46

12-Inch Stem

Temperature Range	Dly.	STRAIGHT FORM No.	STRAIGHT FORM NET EACH	ANGLE FORM No.	ANGLE FORM NET EACH
-40° to 160°F	2"	3944K243	$58.55	3949K243	$46.14
0° to 220°F	2"	3944K245	58.55	3949K245	46.14
20° to 240°F	2"	3944K642	63.30	3949K246	46.14
50° to 500°F	5"	3944K249	58.55	3949K249	46.14
150° to 750°F	10"	3944K251	58.55	3949K251	46.14
0° to 150°C	1"	3944K256	58.55	3949K256	46.14
0° to 300°C	5"	3944K259	58.55	3949K259	46.14



18-Inch Stem

Temperature Range	Dly.	STRAIGHT FORM No.	STRAIGHT FORM NET EACH	ANGLE FORM No.	ANGLE FORM NET EACH
-40° to 160°F	2"	3944K273	$70.95	3949K273	$55.19
0° to 220°F	2"	3944K275	70.95	3949K275	55.19
20° to 240°F	2"	3944K276	70.95	3949K276	55.19
50° to 500°F	5"	3944K279	70.95	3949K279	55.19
150° to 750°F	10"	3944K281	70.95	3949K281	55.19
0° to 300°C	5"	3944K289	70.95	3949K289	55.19

24-Inch Stem

Temperature Range	Dly.	STRAIGHT FORM No.	STRAIGHT FORM NET EACH	ANGLE FORM No.	ANGLE FORM NET EACH
-40° to 160°F	2"	3944K313	$78.51	3949K313	$60.16
0° to 220°F	2"	3944K315	78.51	3949K315	60.16
20° to 240°F	2"	3944K316	78.51	3949K316	60.16
50° to 500°F	5"	3944K319	78.51	3949K319	60.16
150° to 750°F	10"	3944K123	78.51	3949K321	60.16
-10° to 110°C	1"	3944K523	78.51	3949K325	60.16
0° to 300°C	5"	3944K329	72.63	3949K329	60.16

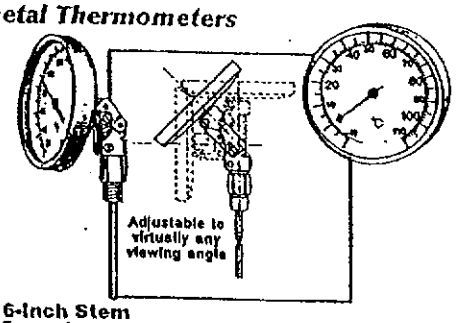
Adjustable Angle Bimetal Thermometers

Get clear, accurate temperature readings from any angle with these 5" diameter dial units. Thermometer head assembly adjusts from parallel to perpendicular to the stem and any position in between. Readjustments are a snap too—assembly locks securely into any new position without recalibration.

All stainless steel construction resists corrosion, most acids and bases, plus weather, moisture, dust, and fumes. Easy-to-read, anti-parallax dial is white aluminum with black figures and calibration marks. Crystal is tempered glass. External adjustment lets you recalibrate unit in the field plus offers maximum precision at any desired point within the scale range.

Accuracy: ±1% of full scale range with the stem immersed 2" in liquid; 4" in gas. Units may be mounted directly or with separable thermowell (socket). Stem is ¼" in diameter with ½" NPT threaded connection.

Thermometers are also available with stem lengths of 9", 15", 18", and 24". To order specify No. 3948K666, stem length, and temperature range. Prices on request.



2½-Inch Stem

Temperature Range	Dly.	No.	NET EACH
-150° to 125°F	5"	3948K271	$76.00
0° to 200°F	2"	3948K117	79.80
20° to 240°F	2"	3948K118	79.80
50° to 300°F	2"	3948K119	79.80
200° to 1000°F	10"	3948K124*	79.19
-50° to 120°C	2"	3948K133	79.80
0° to 200°C	2"	3948K135	79.80

4-Inch Stem

Temperature Range	Dly.	No.	NET EACH
-150° to 125°F	5"	3948K142	$66.69
0° to 200°F	2"	3948K147	66.69
50° to 300°F	2"	3948K149	66.69
50° to 550°F	5"	3948K152	66.69
200° to 700°F	5"	3948K272	66.69
200° to 1000°F	10"	3948K154*	66.69
-20° to 120°C	2"	3948K163	66.69
0° to 300°C	5"	3948K167	66.69
100° to 500°C	5"	3948K168	66.69

6-Inch Stem

Temperature Range	Dly.	No.	NET EACH
-20° to 120°F	2"	3948K273	$66.69
0° to 200°F	2"	3948K177	66.69
50° to 300°F	2"	3948K179	66.69
50° to 550°F	5"	3948K182	66.69
200° to 700°F	5"	3948K274	66.69
200° to 1000°F	10"	3948K184*	66.69
-50° to 50°C	1"	3948K191	66.69
-20° to 120°C	2"	3948K193	66.69
0° to 200°C	2"	3948K195	66.69
0° to 300°C	5"	3948K197	66.69

12-Inch Stem

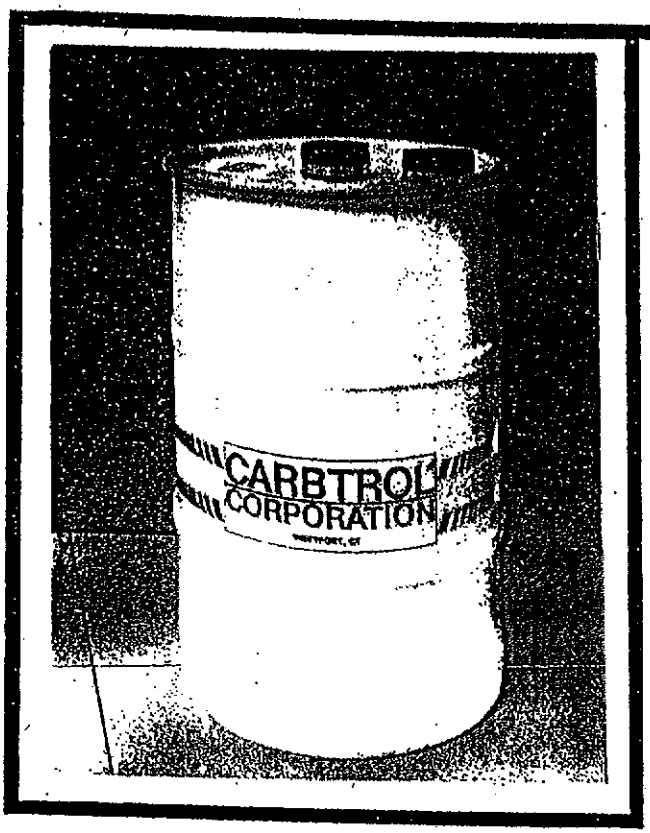
Temperature Range	Dly.	No.	NET EACH
-150° to 125°F	5"	3948K275	$90.34
0° to 200°F	2"	3948K247	90.34
50° to 300°F	2"	3948K249	90.34
50° to 550°F	5"	3948K252	90.34
200° to 700°F	5"	3948K276	90.34
200° to 1000°F	10"	3948K254*	90.34
-20° to 120°C	2"	3948K263	90.34
0° to 300°C	5"	3948K267	90.34
100° to 500°C	5"	3948K268	90.34

* Not recommended for continuous use over 800° F (427° C).

CARBTROL®

AIR PURIFICATION CANISTERS 140-200 LB. ACTIVATED CARBON

G-1
G-2
G-3



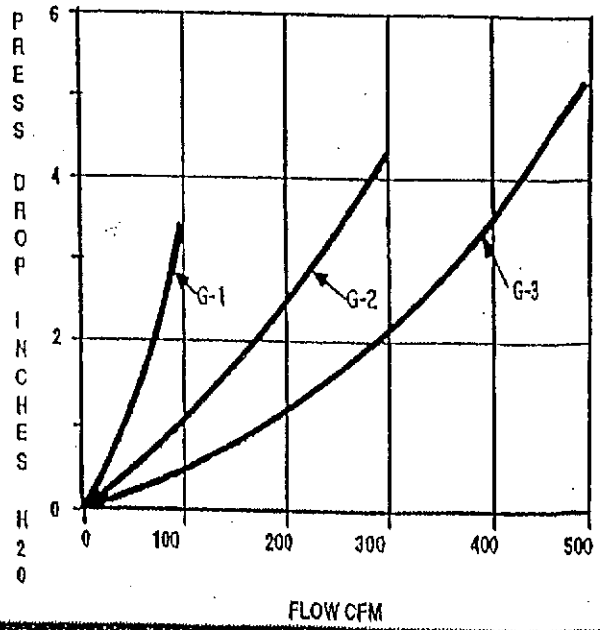
The CARBTROL "G" Series canisters handle flows up to 500 CFM.

FEATURES

- High activity carbon.
- Epoxy lined steel or polyethylene construction.
- DOT rated. Acceptable for shipment of hazardous spent carbon.
- Side drain for removal of accumulated condensate.
- Low pressure drop.
- PVC Internal Piping.
- High Temperature (180° F) steel units available.

APPLICATIONS

- Soil vapor remediation
- Air stripper exhausts
- Tank vents
- Exhaust hoods
- Work area purification
- Sewage plant odor control

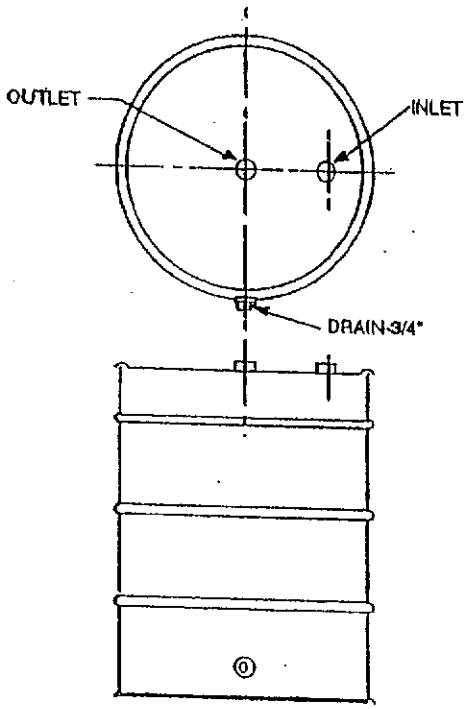


CARBTROL® CORPORATION
51 Riverside Avenue, Westport, CT 06880 • 1-800-242-1150 • (203) 226-5

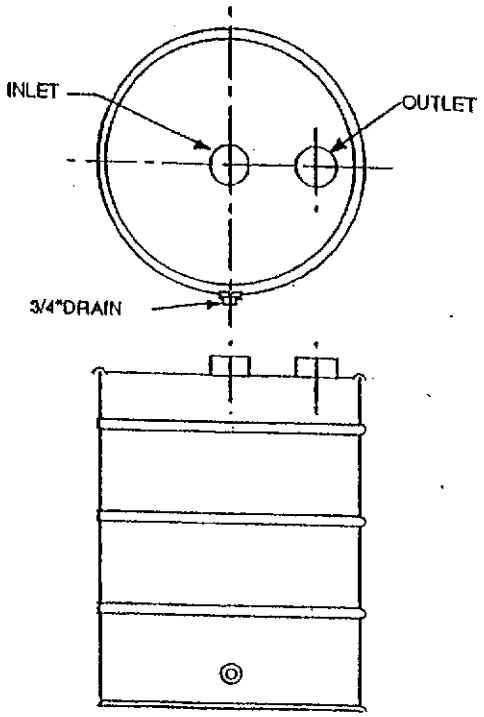
CARBTROL®

AIR PURIFICATION CANISTERS
140-200 LB. ACTIVATED CARBON

G-1
G-2
G-3



MODEL G-1



MODEL G-2, G-3

SPECIFICATIONS

MODEL	DIAMETER/HEIGHT	CARBON WEIGHT	INLET/OUTLET	MAX. RATED FLOW	APPRO SHIP W
G-1 *	24"/36"	200 lbs.	2"/2"	100 CFM	240 lbs
G-2 *	24"/36"	170 lbs.	4"/4"	300 CFM	210 lbs
G-3P	24"/36"	140 lbs.	6"/6"	500 CFM	180 lbs
G-3S	24"/34"	140 lbs.	4"/4"	500 CFM	180 lbs

* Specify: Polyethylene (P) or Epoxy Lined Steel (S)

CARBTROL® CORPORATION
51 Riverside Avenue, Westport, CT 06880 • 1-800-242-1150 • (203) 226-5

FLOTECT Vane Operated Flow Switch

INSTALLATION AND OPERATING INSTRUCTIONS

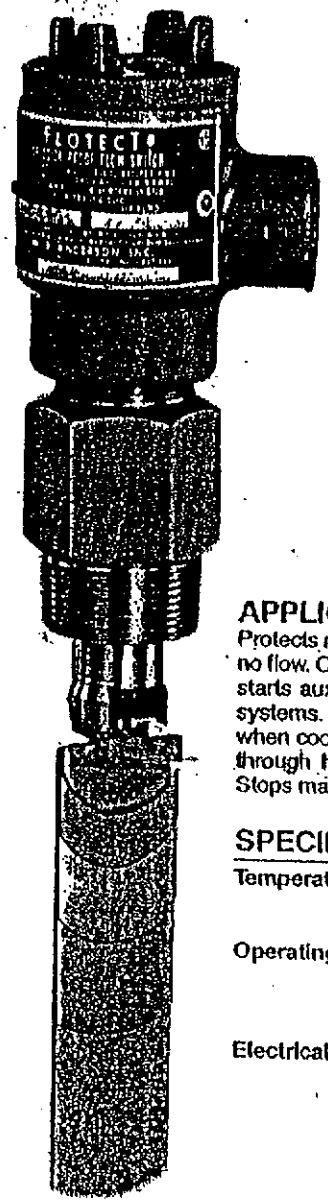
Explosion-Proof; U.L. and C.S.A. listed – Class I, Groups C, D; Class II, Groups E, F, G.
CENELEC: EExd 11B T6.

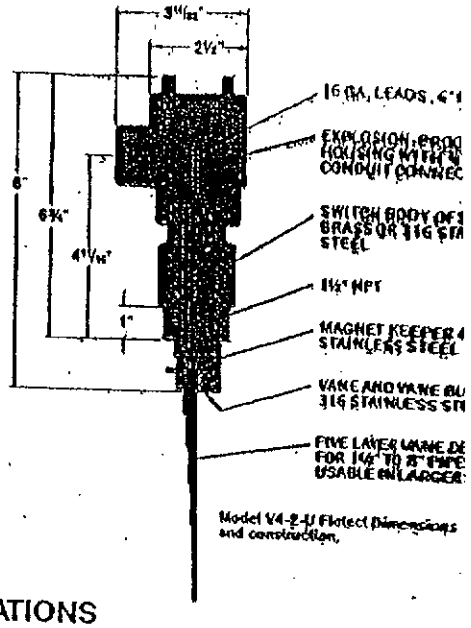
Dependable protection against flow variation or stopping in pipelines for fluids, gasses and flowing solids.

Supplied with custom or universal multi-layer vanes for field installation in pipes from 1½".

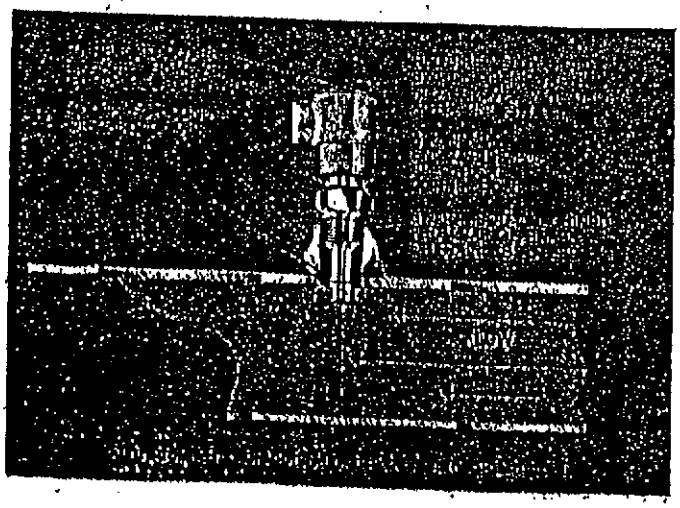
Compact and reliable, the Flotect V4 Flow switch operates automatically to protect equipment and pipeline systems against damage from reduction or loss of flow. Installed in thousands of pipelines and processing plants around the world, this unique magnetically actuated switching design gives superior performance. Universal multi-layer vane accommodates pipe sizes from 1½" up. Custom vanes are available with factory calibration. There are no bellows, springs, or seals to fail. Instead, the free-swinging vane attracts a magnet within the solid metal switch body above, actuating a snap switch by means of a simple lever arm.

Features include: Simplicity of design and a leak-proof switch body, machined from bar stock for pressures to 2000 psig, (138 bar), it eliminates the possibility of process fluid entering the switch compartment. The threaded conduit enclosure cover permits easy inspection or replacement of electrical assembly without shutting down the process, or removing electrical conduit. Power must be disconnected. The unit fits directly into pipeline with tee, thredolet or flange for easy installation. Pendulum-like vane action responds accurately to fluid flow rate. The custom vane or multi-layer vane is sensitive to low velocity flows, yet it is rugged enough to withstand high flow surges. If desired, a delay timer can be wired into the installation. All units are explosion-proof and listed with U.L. and C.S.A. for Class I, Groups C and D, Class II, Groups E, F and G or are flame-proof to CENELEC EExd IIB T6.





Model V4-2-U Flotect Dimensions and construction.



APPLICATIONS

Protects motors, pumps and other equipment against low flo
no flow. Controls sequential operation of pumps, etc. Automa
starts auxiliary pumps and engines or actuates alarm and
systems. Stops water cooled engines, machines and proc
when coolant flow is interrupted, Shuts down burner when ai
through heating coil fails. Controls dampers according to
Stops machines if cooling oil flow ceases.

SPECIFICATIONS

Temperature limits:	Standard 275°F (135°C). High temperature option (not U.L., C.S.A. o CENELEC), 400°F (205°C) max.
Operating Pressure:	Brass 1000psig (69bar) 316S.S. 2000psig(138bar) Ratings to 5000psig(345bar) available (SPDT only).
Electrical Rating:	U.L. and CENELEC: 10A@125/250 V C.S.A.; 5A@125/250 Vac, 5A resistive Inductive@30Vdc Optional ratings (not UL, CSA or CENELEC); MV option; Gold contacts, 0.1A@125 Vac MT option; 400°F (205° 5A@125/250Vac
Wiring:	U.L./C.S.A. unit; 16 gauge copper wire, 6" long, mechanically and solder bonde to switch. CENELEC unit: Terminal board.
Switch body:	One piece milled and bored Brass or 31 SS. Other materials on request.
Vane:	316 SS 1⅛" (40mm) wide. Std. trim includes 430 SS and silver solder. Other materials on request.
Piping Connection:	1½" NPT std for mounting in 1½" thredolet. For other mounting see back page. Thredolet fittings available.
Installation:	Within 5° of vertical for proper operation. Units for horizontal installation (vertical pipes) on request.
Weight:	4lb.-5oz. (1.96Kg)
Options:	All 316SS wetted parts. Teflon coated wetted parts. DPDT circuits. Cartridge heater to melt paraffin, etc. Time delay

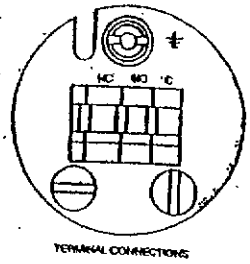
INSTALLATION

1. Remove packing material from switch body-cap and remove tape from magnet keeper. Adjust vane length if necessary on multi-layer vanes only. Install switch in threadolet previously welded to line. In some cases, it may be necessary to install the switch in a flange or tee. Note: extreme care must be excercised in welding the fitting to the line so that it is plumb and level.

2. The arrow on the side of the switch must point in the direction of flow.

3. **U.L. and C.S.A. units only:** Thread connecting wires through conduit and connect.
   Black – Common
   Blue – N.O.
   Red – N.C.
   Note: Double pole, double throw switches have dual black, blue and red leads. These are connected in the same manner as single pole, double throw switches, as described above.

   CENELEC units only: Wire in accordance with local electrical codes. Cable should enter enclosure housing through an approved Ex cable gland (not supplied). Stripped and tinned leads are simply pushed into wire entry of terminal block. Depress spring release with small screwdriver when inserting or removing fine stranded leads. Be sure strands do not bridge across terminal spacing. Double pole, double throw switches have dual terminal blocks.



TERMINAL CONNECTIONS

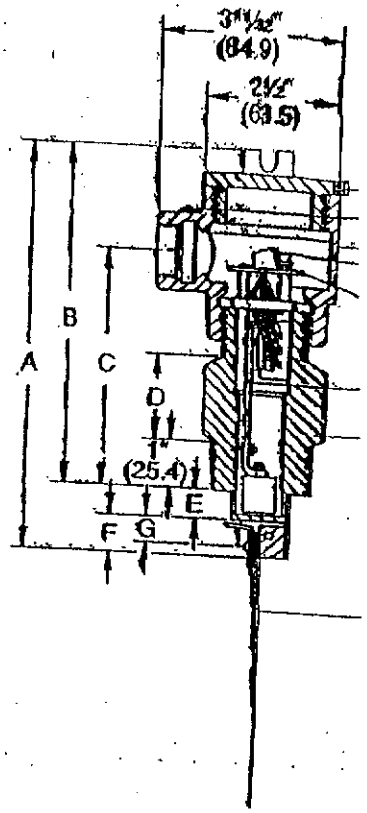
   Note: The switch is deactivated and contacts are in normal condition when there is no flow in the line.

4. Make sure conduit or cable are properly sealed. Electrical components must be kept free of moisture, including condensation, at all times. **CAUTION:** To prevent ignition of hazardous atmosphere, disconnect the device from the supply circuit before opening. Keep assembly tightly closed when in operation.

5. Inspect and clean wetted parts at regular intervals.

6. **CENELEC units only:** The "T" class is dependent upon the ambient temperature of the media. The approved ratings are: T6 at 75°C, T5 at 90°C; T4 at 125°C; T3 at 135°C.

7. Custom vane units have been calibrated at factory to meet requirements. Do not change.



CENELEC unit shown, for U.L./C.S.A. unit see first page.

DIM.	V4		V4-2	
	IN.	MM	IN.	MM
A	8 1/16	206	8	203
B	6	152	6 3/4	171
C	4 11/16	119	3 15/16	100
D	1	25.4	1 3/4	44
E	1 5/16	33	7/16	14
F	7/8	22	11/16	17
G	11/16	17	1/2	13

ADJUSTMENT OF MULTI-LAYER VANE

Remove only those layers which are too long. Leave the smallest layers to reinforce the vane. The longest vane fits 6" (150mm) or larger pipe, the second longest vane fits 4" (100mm) pipe, etc. Actuation-Deactuation rates are shown in the charts on the next page.
To remove vane layers, proceed as follows:

1. Remove the two screws and lockwashers holding the layers together. Do not lose these special corrosion resistant type 316 stainless steel screws and lockwashers.

2. Remove the unwanted layers.

3. Resecure the vane with the original two screws and lockwashers.

4. With a hammer, lightly peen the ends of the screws so that they can't back out.

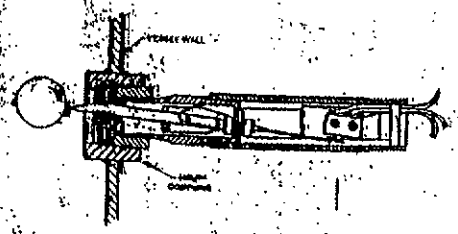
5. If you lose the screws or lockwashers, don't replace with other parts which may corrode and break. That would void the warrantee and might cause severe damage to equipment located downstream of the switch.

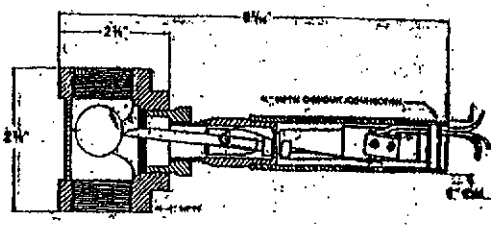
PARTS LIST

1. Cover lock. (CENELEC unit only).
2. External ground. (CENELEC unit only).
3. Enclosure housing and cover.
4. Terminal block. (CENELEC unit only, UL/CSA unit has 6" leads).
5. Internal ground.
* 6. Magnet arm and switch assembly.
7. Switch body.
* 8. Vane assembly.

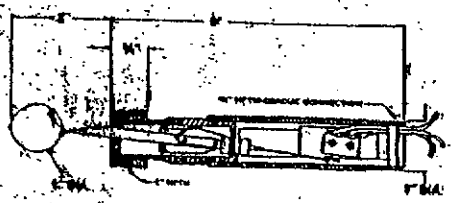
FLOTECT® Model L6 Level Sv

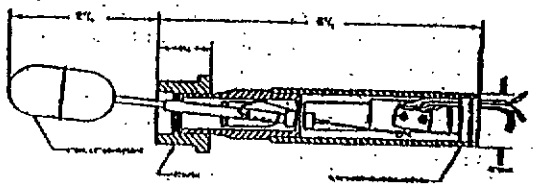
INSTALLATION AND OPERATING INSTRUCTIO





L-6 WITH EXTERNAL FLOAT CHA





L-6 FOR THRU—WALL INSTALLATION

INSTALLATION

1. **Carefully unpack switch**, making sure to remove any packing from inside float chamber and/or lower housing.
2. **Switch must be indexed** during installation, so that the arrow on the side of the switch points down.
3. **If switch is installed "thru-wall"**, a 1" half-coupling must be welded in the vessel wall as shown above. Half-coupling extend through the wall as shown above. Do not attempt to use thredolets, full couplings or other types of fittings.
4. **Pass the connecting wires** through external conduit and connect. Switch is deactivated and contacts are in norm dition when level is below switch.

   Black - Common
   Blue - N. O.
   Red - N. O.

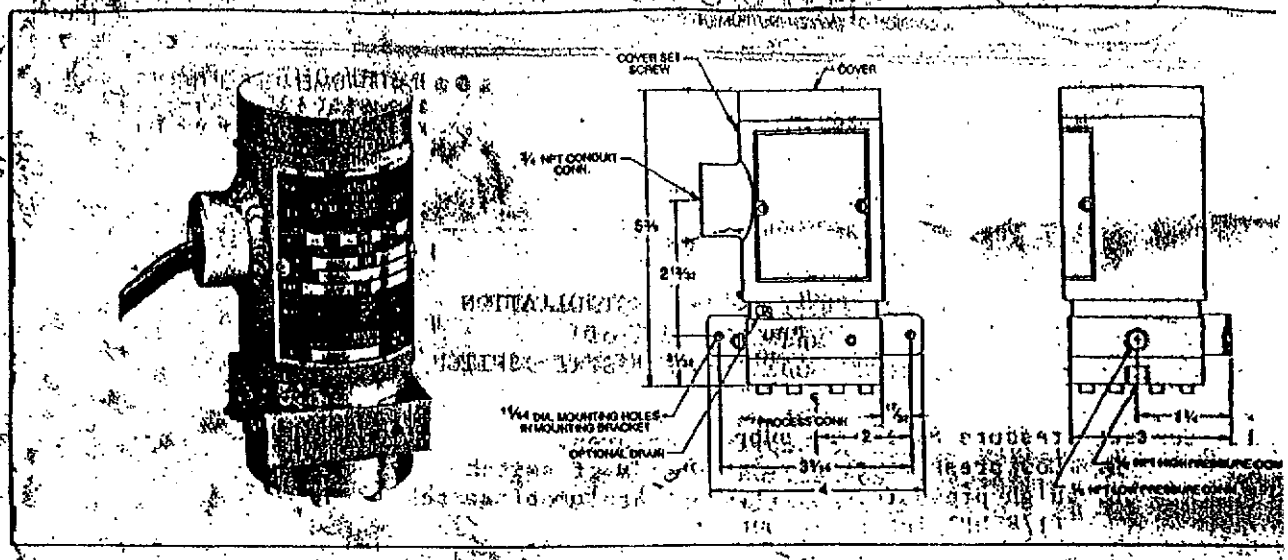
   Note: Double pole, double throw switches [illegible] black, blue and red leads. These are connected in the same mar single pole double throw switches as desc[illegible].
5. **Make sure** conduit and wiring meet appropriate [illegible] for hazardous areas. Make sure conduit is properly sealed. Care be taken in hot/cold or outdoor installations to prevent condensation inside conduit. Electrical components must be kep of moisture at all times. CAUTION: To prevent ignition of hazardous atmosphere, disconnect device from the supply circuit before opening. Keep assembly tightly closed when in operation.
6. Inspect and clean wetted parts at regular intervals.

W.E. Anderson

Series H3

Explosion-Proof Differential Pressure Swit

Compact, low cost, explosion-proof and weatherproof U.L. listed Setpoints from 10" w.c. to 200 PSID – rated 1500 PSI.



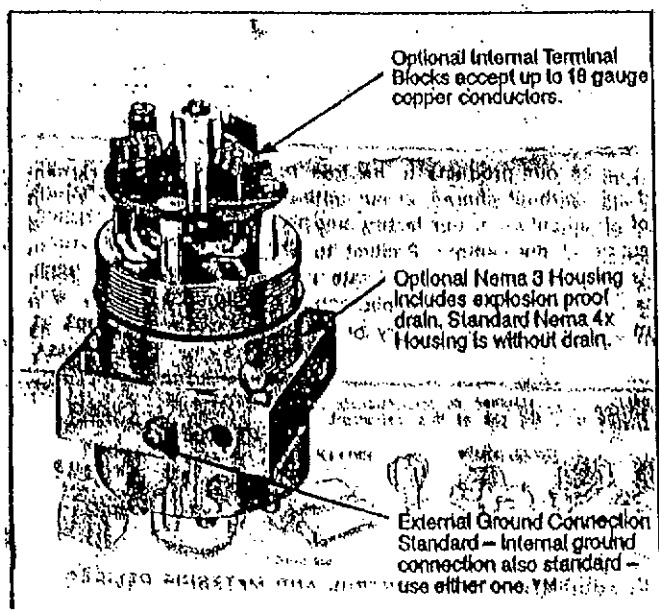
PHYSICAL DATA

Maximum Temperature: 220°F
Maximum Pressure: 1500 PSI
Pressure Connections: ¼" NPT
Electrical Ratings: SPDT or optional DPDT contacts rated 5A @ 125/250 VAC and 5A per pole @ 30 VDC
Wiring Connections: 16 Gauge x 18" long leads
Options: Internal terminal blocks
Conduit Connection: ¾" NPT

Set Point Adjustment: Screw type, field adjustable
Housing: Aluminum
Body: Aluminum or optional type 316 stainless steel
Trim: Type 316 stainless steel
Diaphragm: Nitrile, Optional Viton
Calibration Spring: 316 stainless steel
Weight: 2¼ lbs

APPLICATIONS

- High pressure filters
- Liquid level control in pressurized tanks
- Pump protection
- Cooling fluid
- Water treatment
- Flow across orifice plates
- Fuel filters



Explosion proof, heavy duty, industrial unit has p and unique new design which provides sensitivity (ential pressures as low as 10 inches of water, yet total pressure of 1500 psi. Unit yields deadbands imately 5% of range, with zero setpoint shift due t tion in working pressures. Friction is minimized repeatability increased by allowing range spring directly on diaphragm plate. Rolling diaphragm maintains constant effective area to further redu tion. Diaphragm is allowed to "seat," allowing app of full rated pressure, up to 1500 psi, on either hig pressure port, without damage. Special overtravel prevents overtightening of range adjust screw.

Integral explosion proof and weatherproof housi bines compact size and low cost. Standard unit Nema 4X. Optional Nema 3 rated housing is avail screw on housing locks threaded cover in place, r chance of tampering. Optional internal electrical tions eliminate need for nearby explosion proof j box. Switch incorporates both internal and e ground connections. Entire unit is UL listed for ha locations.

Suggested Specification:

Pressure switches shall be diaphragm operat (Viton) (Nitrile) diaphragm and seals. Body shall 316 stainless steel) (aluminum) with type 316 s steel trim. Switch shall withstand, without dama psi applied to either process port. Switch shall exh setpoint shift due to variation in working pressu trical connections shall be (internal screw type t blocks) (18" leads). Contact shall be (SPDT) (DPD 5A @ 125/250 VAC. Housing shall be weatherproo 4x) (Nema 3) and explosion proof Division I and II ABCDEFG. Entire switch shall be U.L. listed.

Switch shall be W.E. Anderson model H3.

Model	Operating Range	Rated Pressure	Appro Dead
H3S1S*	10-180 IWC	1500 PSI	0.5
H3S2S	0.5-15 PSID	1500 PSI	0.75
H3S3S	5-70 PSID	1500 PSI	3.5
H3S4S	10-200 PSID	1500 PSI	10

Temperature Switches

Mercoid® Bulb and capillary type in 10 standard ranges.

A Division of DWYER INSTRUMENTS, INC.

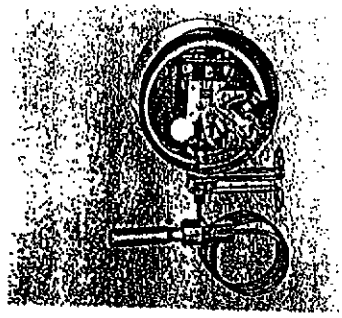
SERIES DA-7035

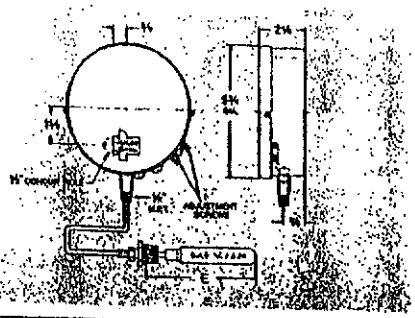
PHYSICAL DATA

Maximum ambient temperature: 180°F.
Maximum bulb temperature: See chart.
Bulb connection: ¾" N.P.T. male.
Electrical rating: 15A @ 120/240VAC, SPDT.
Housing: Pressed steel with transparent cover.
Maximum bulb pressure: 300 psi.
Capillary length: 6' standard.
Weight: 5 lbs.

FEATURES

- Snap-action switch standard.
- C.S.A. listed.
- Vapor pressure activated Bourdon tube.
- Visible dial, calibrated in ° F. and ° C.
- Visible on/off indication.
- Operating ranges to 530°F.
- Adjustable deadband.





Model Number	Min. Deadband When set at: Hi	Med	Lo	Max. Temp. Not to Exceed	Bulb No. Material	Bulb Length "E"	Adjustable Operating Range °F.
DA-7035-15-1A	8°	23°	38°	120°	2" Copper	4¼"	60-130°
DA-7035-15-2A	9°	10°	17°	240°	2" Copper	4¼"	0-75°
DA-7035-15-3	2°	11°	18°	120°	2A Copper	12¾"	25-100°
DA-7035-15-4	2°	11°	22°	170°	2A Copper	12¾"	50-150°
DA-7035-15-5A	7°	10°	18°	220°	2" Copper	2¾"	100-200°
DA-7035-15-6A	8°	11°	22°	285°	2" Copper	2¾"	140-250°
DA-7035-15-7A	10°	14°	23°	320°	2" Copper	2¾"	200-300°
DA-7035-15-8	8°	11°	21°	400°	2" Copper	2¾"	250-380°
DA-7035-15-8A	9°	15°	25°	440°	2" S.S.	4¾"	280-415°
DA-7035-15-9	9°	17°	32°	550°	2" S.S.	4¾"	370-530°

Model DA-7035 temperature switches use the same time proven Bourdon tube and switching mechanism used in our DA pressure switch. Bourdon tube provides high sensitivity and long life. Fully adjustable deadband makes the unit suitable for a wide range of control applications. Visible, calibrated dial and external adjustments make changing set points simple and fast.

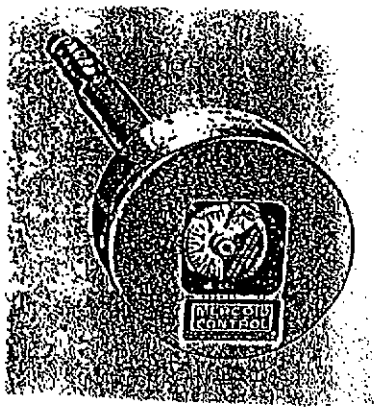
Suggested Specification

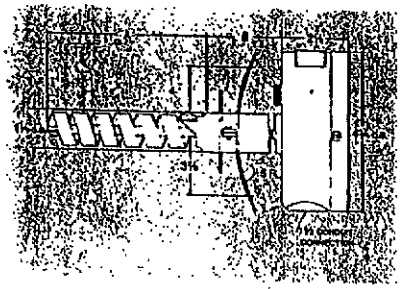
Temperature switch shall be bulb and capillary type, operated by vapor pressure acting on a Bourdon tube. Switch shall have adjustable deadband. Deadband shall be adjustable up to a maximum of 100% of switch range. Switch shall have calibrated dial and two pointers indicating high and low set points. Switch shall have visible on/off indicator. Switch shall be Mercoid Corp. catalog No. DA-7035-153 _____ for required operating range.

SERIES M-51

Bi-Metal Air Temperature Switches

Double adjustable, heavy duty; universal mounting, automatic reset





FEATURES

- U.L. listed.
- Automatic or Manual reset.
- SPST mercury switch (SPDT switches available).
- Visible dial shows duct temperature.
- Two adjustments: one sets high temperature set point, the other sets low temperature reset.

Designed for use as a limit switch, fan control, or alarm switch, Model M-51 is used on all types of air conditioning ducts, furnaces, ovens, dryers etc. Unit may also be used with damper control system to prevent spread of fire through ducts. Adjustments for both set and reset points. Visible dial shows duct temperature and switch set points.

PHYSICAL DATA

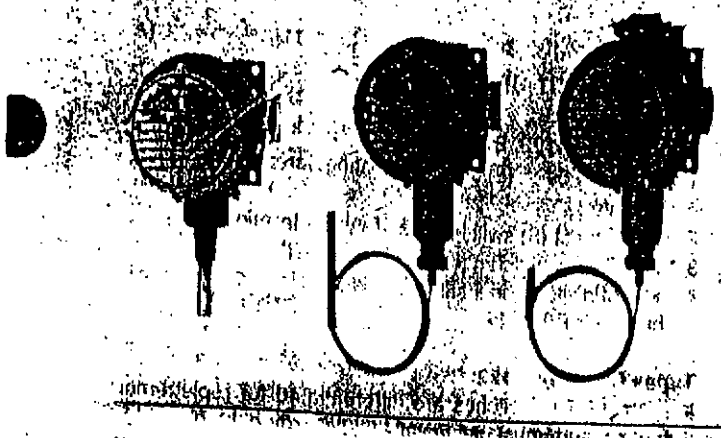
Max. Ambient Temperature: 180°F.
Max. Bi-Metal Temperature: See chart.
Mounting: reversible flange for flat or curved surfaces.
Dial Calibration: Degrees F.
Housing: Steel with glass fronted cover.
Electrical Rating: 10A @ 120V; 5A @ 240V. AC/DC. Motor Rating: 120/240V AC. Single phase, ¼ Hp; 120/240V D.C. ½ Hp. (SPST mercury switch).
Weight: 5 Lbs.

Suggested Specification

Temperature switch shall be direct acting bi-metal type with fully adjustable set and reset points. Switch shall have visible dial and shall indicate duct temperature and switch settings. Dial shall be calibrated in degrees F. Switch shall be U.L. listed. Switch shall be Mercoid Catalog No. M-51 _____.

Switch Action & Max. Temp. Rating	Adj. Range °F.	Minimum Dead Band	Dimension "A"	Reset	Model Number*
OPENS 450°	25-125°	12° F.	4¼"	w/Automatic	M-51A-1
OPENS 450°	25-125°	12° F.	4¼"	w/Manual	M-51B-1
OPENS 450°	50-300°	20° F.	4¼"	w/Automatic	M-51A-2
OPENS 450°	50-300°	20° F.	4¼"	w/Manual	M-51B-2

*Also FM approved.



UNITED ELECTRIC CONTROLS COMPANY
Installation and Maintenance Instructions

120 Series Explosion Proof* Temperature Controls
Remote Types E121, E122, E122P, F120
Local Types B121, B122, C120

FM, UL & CSA Listed. Meets Division 1 and 2; Class I, Groups B, C & D; Class II, Groups E, F, & G; and Class III and Heat Trace Units.
NOTE: Class I, Group B - CSA approval does not cover options 1530 and/or M450.

IMT120-8

WARNING: Misuse or misapplication of this product may cause explosion and personal injury. These instructions must be thoroughly read and understood before unit is installed.

OPERATION

Temperature variations of a liquid filled sensing bulb are hydraulically transmitted to a bellows or diaphragm which either actuates or deactuates one or two snap-acting switches at a predetermined setpoint(s). Setpoints are adjusted by turning an external calibrated knob and pointer (B, E types) or internal adjustment screw (C, F types).

PART I - INSTALLATION

IMPORTANT: Install unit where shock, vibration and temperature fluctuations are minimal. Orient unit so that moisture is prevented from entering the enclosure. It is imperative that properly rated explosion-proof sealing fittings be used for electrical wire entry. Do not mount unit in ambient temperatures exceeding published limits.

MOUNTING STANDARD CONTROLS WITH MANUAL RESET OPTION (CODE 1530)
120 Series remote mounted temperature controls should be mounted vertically (temperature assembly facing down) or horizontally (electrical conduit facing up, see breather drain option). Controls may be surface mounted via the 4-1/4" screw clearance holes on the enclosure or through the use of a mounting bracket (see Mounting Dimensions on back page).

MOUNTING CONTROLS WITH BREATHER DRAIN OPTION (CODE M450) (Not available on FM approved units)
Types C120, F120
Mount with breather drain facing down and conduit connection facing up (see Figure 1). The conduit connection must be properly sealed (potted) for this type of installation.

TYPES B121, B122, E121 & E122
Mount in vertical position with temperature assembly and breather drain facing down (see Figure 2).

CAUTION: Always hold a wrench on the pressure housing hex when mounting unit. Do not tighten by turning enclosure. This will damage sensor and weaken solder or welded joints.

** Enclosures are designed to withstand gas vapor explosions without bursting or loosening of joints, and are capable of arresting the propagation of flame from the interior of the enclosure to the surrounding atmosphere.*

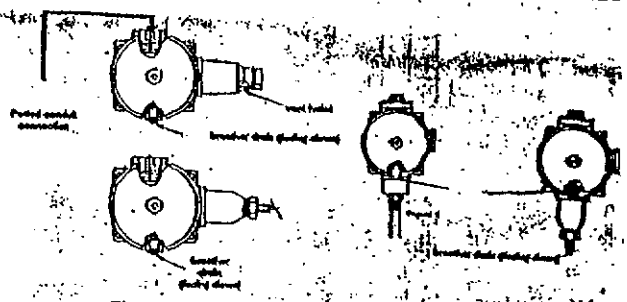


Figure 1
C120, F120

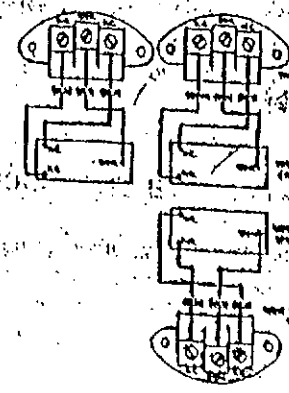
Figure 2
B121, B122, E121, E122

PART II - WIRING

WARNING: Disconnect all supply circuits before wiring unit.
IMPORTANT: Electrical ratings stated in literature and on nameplates must not be exceeded--overload on a switch can cause failure on the first cycle. Wire units according to national and local electrical codes. Maximum recommended wire size is 14 AWG. **CAUTION:** The recommended tightening torque for field wiring terminals is 7 to 17 lb/in. **WARNING:** To prevent seizure of enclosure cover, DO NOT remove lubricant (petrolatum). Threads should also be free of dirt, etc. **NOTE:** Replacing cover hand tight (5 full threads engaged) is sufficient to maintain proper protection. Additional tightening may be required to fully engage cover "O" ring and seal enclosure for rain-tight protection.

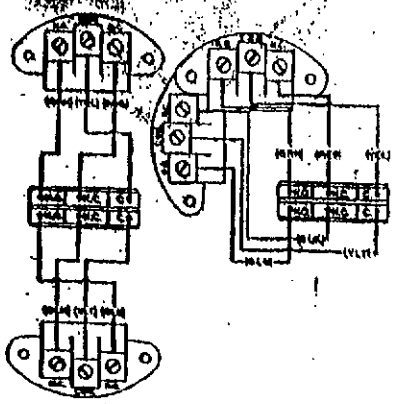
Remove cover and wire controller according to appropriate Diagrams.

TYPES B121, C120, C120H, E121, F120 & F120H	TYPES B122 E122 & E122P



OPTION 1010
TYPE E121

OPTION 1010
TYPE F120



PART III - SETPOINT ADJUSTMENTS

NOTE: For setpoint adjustments and recalibration, connect control to a calibrated temperature source and stabilize unit.

Types C120, F120

Adjust setpoint by holding plunger with 1/4" wrench and turning 1/4" hex adjusting screw clockwise (in) to increase or counter-clockwise (out) to decrease setting. Turn adjustment screw until switch transfers. Turning "in" for switch transfer achieves temperature "fall" setting. Turning "out" for switch transfer achieves temperature "rise" setting.

Type B121 and E121

Adjust setpoint by turning external knob and pointer to desired setting on scale.

Recalibration- To adjust setpoint after replacing switch(es) and/or thermal assembly:

Slowly turn adjustment knob until switch transfers. Compare switch transfer point to actual temperature. If they do not agree, loosen set screws on adjustment knob and align pointer to indicate actual temperature.

Turning knob from low to high temperature for switch transfer achieves temperature "fall" setting. Turning knob from high to low temperature for switch transfer achieves temp. "rise" setting.

Type B122 and E122

Individual switches may be set together or apart up to 100% of range. When not set together, the front switch can not be set higher than the rear switch. Turning external knobs will increase or decrease each switch setting independently.

Recalibration - Follow procedure above for Type B121 and E121 for each switch.

PART IV - REPLACEMENT PROCEDURES

IMPORTANT: Use only factory authorized replacement parts and procedures. Components for replacement parts include the switches and the thermal assemblies only. Order parts by name plate information on model, range and electrical rating.

REPLACEMENT OF SWITCHES

Type B121, C120, E121 & F120

1. Remove cover, (2) switch mounting screws, switch and insulator.
2. Disconnect (3) switch wires at switch terminal.
3. Install new switch and wire per PART II.
4. Mount switch and insulator inside enclosure and recalibrate per PART III.

Types B122 and E122

IMPORTANT: Switches are differentiated for replacement purposes and must be installed according to procedure below. Front (top) switch has a white identification mark which is visible through the insulator when switches are properly installed. If it is not visible after installation, check replacement procedure.

NOTE: Switch characteristics between front and rear switches differ in order to maintain consistent control differential. Replace only with original switch type.

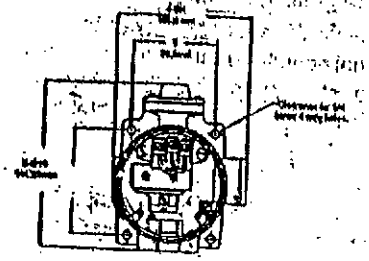
1. Remove cover, unscrew (4) terminal block mounting screws and remove switch and insulator.
2. Unhook extension spring from conduit wire guide and remove wire guide.
3. Remove (2) switch mounting screws, switch and insulator.
4. Loosen (2) set screws on low set adjusting knob.
5. Turn low set adjusting screw counter-clockwise until switch bracket and actuating lever assembly can be removed. (Be sure that extension spring is on bracket and washer is on plunger.)
6. Unscrew (2) bias plate screws and remove bias plate.
7. Remove (2) switch mounting screws, switch and insulator.
8. Disconnect (6) wires at switch terminals.
9. Assemble new switches and insulators, mounting one switch to switch bracket and lever assembly.
10. Replace bias plate with flat edge facing conduit and slot facing sensor assembly.
11. Position switch bracket and lever assembly so that fingers of lever are on top of washer and turn low set adjustment screw clockwise until lever actuates switch.
12. Hook extension spring onto wire guide and replace terminal block insulator.
13. Tighten set screws and install terminal blocks. Wire per PART II.
14. Recalibrate per PART III.
15. Replace cover.

Type E122P (Dual Switch Models)

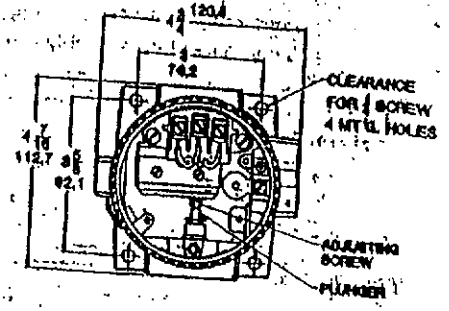
1. Remove cover, unscrew and remove terminal blocks and insulator, letting terminal blocks hang.
2. Unscrew terminal block supports and remove (2) switch mounting screws and washers.
3. Lift out dual switch bank and actuating lever assembly.
4. Disconnect (6) wires at switch terminals.
5. Assemble new switches and insulators to the switch bank assembly.
6. Connect wires at the switch terminals.
7. Install switch bank assembly, terminal block supports, insulator and terminal block in control.
8. Adjust temperature setting per Part II.

MOUNTING DIMENSIONS

TYPES B121, B122, E121 & E122

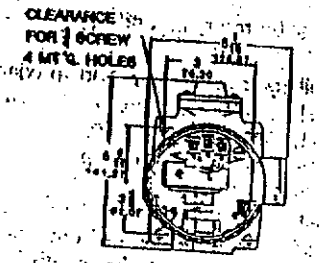


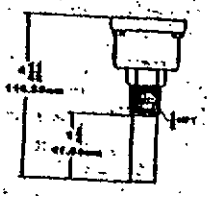
TYPES C120 & F120



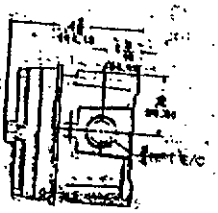
SENSORS

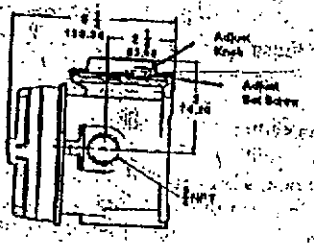
B121, B122 and C120

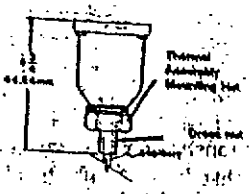


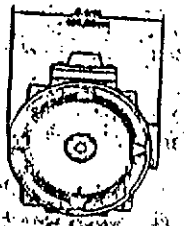


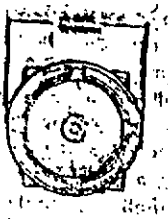
E121, E122 and F120











UNITED ELECTRIC CONTROLS COMPANY
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REPLACEMENT OF THERMAL ASSEMBLY (TA)

Types E121, E122, E122P and F120

1. Place control upside down on work bench.
2. Loosen 3/8" hex dress nut one or two turns to relieve tension on 1 1/8"hex Thermal Assembly (TA) mounting nut.
3. Unscrew TA mounting nut from TA housing and carefuly remove thermal assembly insuring that "cone" spring and compensator assembly remain in TA housing.
4. Insert new TA, seating bellows stem into cone spring and compensator assembly.
5. Screw on TA mounting screw and screw on "dress" nut snugly. Do not overtighten.
6. Recalibrate per PART III.

Types B121, B122, and C120

1. Attach new sensor to housing (using a drop of 3201 Loctite) by screwing units together until fully seated (hand tighten only).
2. Remove old sensor and housing by unscrewing (4)1/4" hex mounting screws. Retain plunger, spring guide and load spring.
3. Insert plunger (pointed and exposed) into sensor and locate spring guide on top.
4. Locate load spring on top of spring guide and attach replacement sensor and housing (being sure the top of spring encircles plunger guide) to enclose. Re-calibrate per PART III.

LIMITED WARRANTY

UE warrants that the product thereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by UE (F.O.B. UE); provided, however, that this warranty applies only to equipment found to be so defective within a period of 12 months after installation by buyer but not to exceed 18 months after delivery by the seller. Except for the limited warranty of repair and replacement stated above, UE disclaims all warranties whatsoever with respect to the product, including all implied warranties of merchantability or fitness for any particular purpose.

LIABILITY LIMITATION

The sole and exclusive remedy of buyer for any liability or seller for any claim, including incurred in connection with (I) breach of any warranty whatsoever expressed or implied, (II) a breach of contract, (III) a negligent act or acts (or negligent failure to act) committed by seller, or (IV) an act for which strict liability will be imputed to seller, is limited to the limited warranty or repair and replacement stated herein. In no event shall the seller be liable for any special, indirect, consequential or other damages or like general nature, including, without limitation, loss of profits or production, or loss or expenses of any nature, incurred by the buyer or any third party.

IMPORTANT: MAXIMUM TEMPERATURE

Maximum Temperature: The highest temperature to w a sensing element may be occasionally operated without versely affecting setpoint calibration and repeatability.

WARNING: Maximum temperature stated in literature an nameplate must never be exceeded, even by surges in system. Occasional operation of unit up to max. tempera is acceptable (e.g. start-up, testing). Continuous opera should be restricted to the designated adjustable range.

RECOMMENDED PRACTICES

United Electric Controls Company recommends careful consideration of the following factors when specifying an installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maxim temperature limits stated in literature and on nameplates m never be exceeded, even by surges in the system.
- Operation of the unit up to proof pressure or max. tempe ture is acceptable on a limited basis (i.e.start-up, testing) continuous operation must be restricted to the designa adjustable range. Excessive cycling at proof pressure maximum temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where dama to a primary unit could endanger life, limb or property. A hi or low limit switch is necessary for applications where dang ous runaway condition could result.
- The adjustable range must be selected so that incorrect, advertent or malicious setting at any range point can not res in an unsafe system condition.
- Install unit where shock, vibration and ambient temperatu fluctuations will not damage unit or affect operation. Orie unit so that moisture does not enter the enclosure via t electrical connection.
- Unit must not be altered or modified after shipment. Cons UE if modification is necessary.
- Monitor operation to observe warning signs of possib damage to unit, such as drift in setpoint. Check unit immed ately.
- Preventative maintenance and periodic testing is necessa for critical applications where damage to unit could endang property or personnel.
- For all applications, a factory set unit should be tested befo use.
- Electrical ratings stated in literature and on nameplate mu not be exceeded. Overload on a switch can cause damag possible on the first cycle. Wire unit according to local a national electrical codes, using wire size recommended Installation sheet.
- Use only factory authorized replacement parts and proc dures.
- Do not mount unit in ambient temperature exceedin published limits.
- For remote mounted temperature units, capillary length beyond 10 feet can increase chance of error, and may requir re-calibration of setpoint in the application.

APPENDIX E

DEMOLITION AND CONCRETE SLAB REPLACEMENT

APPENDIX E
DEMOLITION AND CONCRETE PAVEMENT SLAB REPLACEMENT

Remove and replace all concrete removed during the project with portland cement concrete. Repair any damaged areas of adjacent slabs, caused by slab removal at no cost to the Owner. The following specifications are required:

1) Existing concrete floor to be saw-cut and removed as shown on the design drawings; concrete cuts shall be limited to 6-inch widths for 4-inch pipes and 2-inch for 1-inch pipes.
2) All saw cutting and concrete removal shall be performed wet to suppress dust;
3) Work area shall be curtained-off and actively vented to the exterior of the building;
4) Air quailty monitoring shall be conducted in accordance with the project Health and Safety Plan;
5) New concrete required compressive strength shall be 4,000 pounds per square inch;
6) New concrete to be level and the finished surface shall match the existing adjacent concrete floor;
7) Two part epoxy adhesive to be used to bond new concrete with existing, adjacent concrete;
8) Dowel bars shall be installed to match those in existing concrete;
9) Dowels shall be drilled into cut face of existing concrete and secured with epoxy ;
10) New concrete surfaces shall be protected from vehicle traffic until 4,000 psi compressive strength has been achieved.

APPENDIX F

HEALTH AND SAFETY PLAN

F.0 SITE SPECIFIC HEALTH AND SAFETY PLAN (HASP)

F.1 INTRODUCTION

This Health and Safety Plan (HASP) has been developed by ERM for the Implementation of the Soil Vapor Extraction (SVE) Interim Remedial Measure (IRM) at the J&H Manufacturing Site in Carle Place, NY. The procedures set forth in this HASP are designed to reduce the risk of exposure to chemical substances and physical or other hazards that may be present. The procedures described herein were developed in accordance with OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response, U.S. Dept. of Labor, OSHA.

The recommended health and safety guidelines within this HASP will be modified if future information changes the activities to be performed or the characterization of the area in which work is to be performed.

F.1.1 *Health And Safety Policy Statement*

ERM considers the health, safety, and well being of its employees to be of unconditional importance. Reflecting that concern, it is the policy of management to support the implementation of the Health and Safety Program. The proper resources (financial and human resources) are provided to ensure operation of a comprehensive program. The following policies will be employed:

- Prevention of occupational illnesses, accidents, resulting personal hardship, and financial loss takes precedence in the conduct of our business. Objectives of the Health and Safety Program include the identification of and the elimination or control of all hazards to personnel, products, equipment, and facilities.
- The active participation and involvement of all levels of management are essential to the success of the program. The Health and Safety Program Manager (HSPM) directs, reviews, and evaluates Health and Safety Program activities. The HSPM reports directly to the President of ERM. Local Health and Safety Coordinators report to the HSPM.
- All levels of supervision are responsible for maintaining safe working conditions, instructing each subordinate in proper health and safety practices, and enforcing health and safety program specifications. In addition, each supervisor is responsible for discussing the specifications of the HASP with each employee, and verifying that each employee understands/complies with health and safety directives.
- All employees have personal responsibility to conscientiously follow health and safety procedures, and to notify the project manager of

potential or existing hazards to worker health or safety, so that they may be corrected prior to initiation or continuation of work.

Safe conduct is a condition of employment. Disregard for company safety rules are a serious infraction, and disciplinary action will be taken as outlined in this Section.

F.2 *ERM PROJECT PERSONNEL AND RESPONSIBILITIES*

ERM Project Director (PD) Michael Teetsel
Overall project responsibility; conducts ultimate Quality Assurance/Quality Control (QA/QC) review.

ERM Project Manager (PM): Edward Wong, P.E.
Manages day-to-day activities; reports to PD.

ERM Project Health and Safety Coordinator: Paulina Gravier
Directs development of HASP; provides technical advice on health and safety issues.

ERM Site Safety Officer (SSO): Edward Wong, P.E.
Responsible for implementation of HASP; reports to PD. The SSO may appoint another temporary SSO, as long as that person is properly trained and familiar with the project.

F.3 *FIELD ACTIVITIES*

The objective of the SVE IRM is to remove subsurface soil contamination from on-site Areas of Concern. See SVE IRM Workplan Section 4.0 for design and operational components. A summary of these activities are provided below:

- Remove concrete slab and install shallow soil vapor vents and air venting ports.
- Asphalt areas for capping of soil area.
- Installing and operating a vacuum blower for removal of volatilized contaminants, treatment, and discharge to atmosphere.

F.4 *HAZARD IDENTIFICATION AND CONTROL*

F.4.1 *Hazard Identification Process*

Prior to initiating any new project activity or when there is a change in site conditions, the Site Safety Officer (SSO) will assist project team members

in completing a Job Hazard Analysis (JHA). A copy of the JHA form is located in Attachment 1.

F.4.2 *Chemical Hazards*

Chemicals may be introduced into the body by ingestion, inhalation, or absorption through the skin. Since not all chemicals have the same level of toxicity, the length of time for the exposure and the concentration of the chemical are important in determining the risk. Inhalation and skin contact are the most common routes of entry. Chemicals can be introduced into the body by ingestion when chemicals present on the hands are transferred to food or cigarettes.

Based on historical soil and groundwater sampling, the chemicals of concern that may be encountered at the site are listed as follows:

- Tetrachloroethene (PCE)
- Trichlororethene (TCE)
- cis-1,2-dichloroethene (DCE)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Miscellaneous Metals (Be, Cr, Cd, Ni, Pb, Hg, Zn).

The pertinent health and safety information regarding these substances is provided in Tables F-1 and F-2. Note that among the metals that have been detected in Site soil, lead was detected at the highest concentrations and is therefore assumed to represent the worst-case risk for metals exposure. Safety data for other substances that may be used on the project are proved in Table F-3.

F.4.3 *Ambient Air Monitoring*

Ambient air monitoring will be conducted by ERM during all field activities under the supervision of the SSO. This monitoring will be conducted using direct-reading real-time instruments as indicated in Table F-4. This table also provides action levels for upgrading the level of personal protective equipment (PPE) from Level D to Level C. Alternatively, work in Level D PPE may be stopped and alternate controls may be instituted, if appropriate. A summary of the action levels is provided below:

- Volatile Organic Compounds - Action level shall be 5.0 ppmv as measured by a Photovac photoionization detector (PID) with an 11.6 eV bulb or a flame ionization detector (FID).
- Respirable Dust - Action level shall be 5.0 mg/m^3 as measured by a MIE DR 1000 Personal Data RAM Aerosol Monitor. This action level is also adequately protective with respect to non-volatile chemicals (PAHs and metals) that may be present in site soil (see Table F-2).

Direct reading instrumentation will be calibrated daily per manufacturer's instructions. Cylinders of the appropriate calibration gas will be required for fieldwork lasting longer than one day.

In the event that the action levels are exceeded in an outdoor work zone, additional air monitoring will be conducted on the site perimeter (upwind and downwind) as per the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP). The NYSDOH CAMP is provided as Attachment 2. Additional monitoring might also be conducted under any of the following circumstances.

- Work begins on a new portion of the site.
- Change in job tasks.
- Change in weather.
- Change in ambient levels of hazardous constituents as indicated by the sense of smell or changes in the physical appearance of the soil or groundwater.
- When new hazardous substances are encountered.

F.4.4 Site-Specific and Task-Specific Hazards and Control Strategies

The hazards and control strategies associated with planned work activities are summarized in Table F-5. During the mobilization phase of a specific work task, the project team can quickly review the hazards and control strategies by locating the task or activity to be performed on the table. Hazards that are common to all activities performed at the site at listed first. The hazards listed for a particular task or activity includes the common hazards.

Some construction activities will be conducted within the Site building. This work will be curtained off from the remainder of the indoor space and vented to the exterior if necessary. Ambient air monitoring will be conducted both inside and outside the curtain as described above in Section F.4.3. Should exceedences of the listed action levels be detected outside the curtain, work at that location will be temporarily halted until appropriate controls are put in place so that the job can be completed safely, without unacceptable exposures to plant workers.

F.5 PERSONAL PROTECTIVE EQUIPMENT

The level of PPE selected for a task is based on the following:

- Type and measured concentration of the chemical substance in the ambient atmosphere and its toxicity.

- Potential for exposure to substances in air, splashes of liquids or other direct contact with material due to work being done.
- Knowledge of chemicals on-site along with properties such as toxicity, route of exposure, and contaminant matrix.

In situations where the type of chemical, concentration, and possibilities of contact are not known, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be better identified.

In addition to summarizing the general PPE requirements for tasks performed at the site, Table F-6 also serves as the written certification that the PPE Hazard Assessment has been conducted.

F.5.1 Respiratory Protection

The type of respiratory protection required will be based on the results of ambient air monitoring described above in Section F.4.3 and the professional judgment of the SSO and the Project Health and Safety Coordinator.

As required by 29 CFR 1910.134, *Respiratory Protection*, a cartridge change-out schedule will be developed if it is necessary to upgrade to Level C based on either the results of ambient air monitoring, the results of any models used to predict ambient air concentration; or the professional judgment of the Project Health and Safety Coordinator. At a minimum, new respirator cartridges must be placed on the respirator at the beginning of the shift and after lunch.

F.6 HEAT AND COLD STRESS

F.6.1 Heat Stress

The timing of these activities may be such that heat stress may pose a threat to the health and safety of Site personnel. Acclimation periods and work/rest regimens will be implemented as necessary so that personnel do not suffer adverse effects from heat stress. Heat stress, if necessary, will be monitored in accordance with the American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) for Heat Stress or equivalent when the temperature is greater than 80°F. The following work/rest regimen will be utilized:

Temp °F	*Work-Rest Regimen*
80	Work Break Every 2 hours.
82	75% Work - 25% Rest, each hour.
85	50% Work - 50% Rest, each hour.
88	25% Work - 75% Rest, each hour.
90	Delay work until cooler temperatures prevail.

Special clothing and an appropriate diet and fluid intake will be recommended for all Site personnel to further reduce these temperature-related hazards. A good rule of thumb to prevent dehydration from heat stress is that fluid intake should equal fluid loss from the body, which can be accomplished through frequent small intakes of water. Potable water and/or a drink substitute (i.e., Gatorade) will be available for employee consumption.

F.6.2 Cold Stress

The timing of investigative or remediation activities may be such that cold stress may also present a threat to the health and safety of Site employees. Work/rest schedules, with rest in a warming shelter, will be implemented as necessary to reduce adverse effects from cold exposure. Cold stress, if necessary, will be monitored in accordance with the ACGIH TLV for Cold Stress or equivalent. The addition of wind speed and the resulting wind chill will be considered when determining an appropriate work/rest schedule and appropriate clothing.

Site personnel will be encouraged to consume water to avoid dehydration. Potable water and/or a drink substitute (i.e., Gatorade) shall be available for employee consumption. Workers will wear adequately insulated clothing to limit exposure to cold.

F.7 SAFE WORK PRACTICES AND STANDARD OPERATING PROCEDURES

F.7.1 General Site Provisions

F.7.1.1 Smoking and Eating Areas

Smoking will only be allowed in designated areas. Upon mobilization at the site, the SSO will establish smoking areas per site-specific or client-specific requirements. Individuals caught smoking outside the designated smoking areas will be subject to disciplinary action up to and including immediate termination.

Upon mobilization at the site, the SSO will establish eating and break areas per site-specific or client-specific requirements. Eating will only be allowed in the designated areas and the areas will be maintained in a

clean and sanitary condition.

F.7.1.2 *Temporary Facilities*

This project will not require any temporary facilities.

F.7.1.3 *Standard Operating Procedures*

The following standard operating procedures will be adhered to at all times.

- All personnel entering the site must check in with the SSO.
- All individuals entering the site must demonstrate to the SSO that they have been adequately trained as defined in Section 10.
- All individuals must be familiar with emergency communication methods and how to summon emergency assistance.
- Use of alcoholic beverages before, during operations, or immediately after hours is absolutely forbidden. Alcohol can reduce the ability to detoxify compounds absorbed into the body as the result of minor exposures and may have negative effects with exposure to other chemicals. In addition, alcoholic beverages will dehydrate the body and intensify the effects of heat stress.
- Horseplay of any type is forbidden.
- All unsafe conditions will be immediately reported to the SSO, who will document such conditions in the field log. The SSO will be responsible for ensuring that the unsafe condition is correctly as quickly as possible.
- Smoking, matches, and lighters are only allowed in the designated smoking area.
- Avoid contact with potentially contaminated substances. Avoid, whenever possible, kneeling on the ground, or leaning or sitting on trucks, equipment or the ground. Do not place equipment on potentially contaminated surfaces.

F.7.2 *Safe Work Practices*

F.7.2.1 *Ergonomics*

Ergonomic risk factors include repetitive motion, force, awkward posture, and vibration. The key to preventing ergonomic injuries is education of personnel relative to the hazards and risk factors and implementation of proper controls and work practices.

Several tasks associated with this project have the potential to cause back injuries, if proper lifting techniques are not followed. Site workers should not lift objects that are beyond their physical capabilities and the use of mechanical devices such as forklifts is encouraged. In addition, when shoveling, site workers should not twist their backs while moving materials with the shovel. The proper technique is to move the feet.

Proper lifting techniques are summarized below.

- Place feet shoulder width apart with toes pointing slightly out.
- Bend at your knees keeping back straight.
- Get a good grip on the object and pull object close to your body.
- Tighten abdominal muscles.
- Keep your head up, looking forward, and lift with your legs while maintaining a straight back.
- Keep load close to your body and ensure your view is not obstructed.
- If one end of the load is heavier than the other, the heavier end should be closest to your body.
- Move your feet to relocate the object as opposed to twisting your back.
- When placing the object down, bend your knees and use your leg muscles while keeping your back straight.

<u>Pre-Drilling/Pre-Excavation and Probing Protocol</u>

Prior to mobilizing to the field, the Project Manager will be responsible for ensuring the following issues have been adequately addressed:

- Contacting One-Call or equivalent to identify underground pipelines, utility lines, and fiber optic cable.
- Contacting appropriate municipality to identify underground and sewer lines.
- Contacting posted pipeline companies.
- Request that the Site Operator markout existing subsurface utilities in

the work areas.

- If necessary, engage a subcontractor to perform further markouts, as necessary to ensure safe work conditions.

F.7.3 Fall Protection

This project does not involve working from heights more than six feet above grade.

F.7.4 Weather Related Events

Weather related events that may impact fieldwork include, but are not limited to, rain, snow, thunder, and lightning. The SSO will be responsible for determining what site work can be performed safely in the rain and at what point work will cease due to either quality or safety issues. In the event of thunder and/or lightning, all work will be suspended until 15 minutes have elapsed from the last clap of thunder or flash of lightning.

During rain, lightning and/or thunder events, site workers should seek shelter in either a building or vehicle.

F.7.5 Night Work

Adequate lighting shall be installed for any activities being performed at night. All time-of-day specific noise limits will be maintained at property boundaries.

F.7.6 Noise

Employees performing any noisy task, such as but not limited to, operating heavy equipment, drilling, using power tools, or employees working within 20 feet of the person performing the task will wear hearing protection consisting of either earplugs or earmuffs. Personnel operating a drilling rig or standing within 20 feet of a drilling rig during operation will also wear hearing protection.

F.8 EMPLOYEE TRAINING

All employees and subcontractors working on-site, who may be exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site will receive training meeting the requirements of 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response* (HAZWOPER) before they are permitted to engage in any job task. Employees will not be permitted to participate in or supervise field activities until they have been trained to a level required

by their job function and responsibility. Once on-site all site workers will receive training covering at a minimum the following.

- Names of personnel and alternates responsible for site safety and health
- Safety, health and other hazards present on the site
- Use of PPE
- Safe use of engineering controls and equipment on the site
- Medical surveillance requirements including recognition of symptoms and signs that might indicate overexposure to hazards.

F.8.1 *Subcontractor Training*

The SSO will verify that subcontractor personnel have received all appropriate training as required by this HASP prior to their arriving on-site. Verification will consist of reviewing written training documentation such as copies of training certificates or cards. Copies of the written training documentation will be retained in the project file. Subcontractor personnel will not be allowed to work at the site unless said training documentation is available.

F.8.2 *Medical Surveillance*

All ERM employees are enrolled in a medical surveillance program. All employees receive an initial medical examination and consultation prior to assignment to any job site. In addition, employees receive an annual medical examination, a medical examination upon termination of employment, and a medical examination when the employee exhibits signs or symptoms relating to possible overexposure to hazardous substances or when an injury or exposure above published exposure limits has occurred in an emergency situation.

Additional medical surveillance should be provided for employees who:

- Are or may be exposed to hazardous substances or health hazards at or above published exposure levels for these substances for 30 days or more a year;
- Wear a respirator for 30 days or more a year or as required by 29 CFR 1910.134, *Respiratory Protection*; and
- Are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.

F.8.3 *Daily Tailgate Safety Meeting*

A tailgate safety meeting will be conducted each morning. The daily safety meeting meetings will include awareness concerns such as special concerns regarding health and safety, pollution prevention or a discussion of recent incidents or safety observations. Issues such as any changes to the HASP will be addressed daily. The meetings will include a discussion of what tasks will be completed that day and how those tasks will be conducted safely. The meetings will be documented on the Daily Safety Meeting form found in Attachment 3.

F.9 *SITE CONTROL MEASURES*

The drilling location and surrounding area will be considered the work zone. Drilling will take place in different areas and new work zones will be delineated by the SSO as the drill rig is moved and during monitoring well sampling. The work area will be delineated using traffic cones and/or "Caution" tape. The SSO will ensure that no one enters the work zone without the proper training and requirements. All personnel entering the Work Zone will sign the project sign-in sheet in Attachment 4. Furthermore, all ERM personnel and subcontractor will sign-in at the start of each workday and sign out at the end of each workday.

F.10 *DECONTAMINATION PROCEDURES*

Decontamination involves the orderly controlled removal of contaminants from both personnel and equipment. The purpose of decontamination procedures is to prevent the spreading of contaminated materials into uncontaminated areas. All site personnel should limit contact with contaminated soil, groundwater or equipment in order to reduce the need for extensive decontamination.

F.10.1 *Personnel Decontamination*

The following decontamination procedures will be utilized:

- Clean rubber boots with water.
- Remove all PPE and dispose of the PPE in the designated drums.
- Wash hands and any skin that may have come in contact with affected soil or groundwater with moistened disposable towels, such as baby wipes, or soap and water.

F.10.2 *Equipment Decontamination*

All drilling equipment and the back of the drilling rig shall be decontaminated by steam cleaning prior to performance of the first boring/well installation and between all subsequent borings/well installations. This shall include all hand tools, casing, augers, drill rods and bits, tremie pipe and other related tools and equipment. The steam cleaning equipment shall be capable of generating live steam with a minimum temperature of 212° degrees Fahrenheit. The equipment shall be cleaned to the satisfaction of the ERM's hydrogeologist.

F.11 *CONFINED SPACE ENTRY PROCEDURES*

Entry into permit-required confined spaces is not anticipated or permitted.

F.12 *SPILL CONTAINMENT PROGRAM*

The project activities involve the use of drums or other containers, the drums or containers will meet the appropriate DOT regulations and will be inspected and their integrity assured prior to being moved. Operations will be organized so as to minimize drum or container movement. Drums or containers that cannot be moved without failure will be over packed into an appropriate container.

F.12.1 *Hydraulic Fluid/Engine Oil/Fuel Spills*

In the event of an unexpected release of hydraulic fluid, engine oil, gasoline or diesel fuel, the release material will be absorbed with sorbent pads, which will be placed in a designated drum for disposal. Impacted soil will be excavated and placed on plastic sheeting and covered until characterization and/or disposal can be arranged.

F.13 *SITE COMMUNICATION*

Cell phones will be used for communication between the project team and the client and office.

F.14 *COMMUNICATION AND REVIEW OF SITE-SPECIFIC HEALTH AND SAFETY PLAN*

An initial review of the site-specific HASP will be held either prior to mobilization or after mobilization but prior to commencing work at the site to communicate HASP details and answer questions to individuals working at the site. Daily tailgate safety meetings will be held each morning to review work practices for the day and to discuss safety issues. Any new hazard or safety information will be disseminated at the daily tailgate safety meeting or as needed throughout the day.

F.15 EMERGENCY RESPONSE PLAN

This section describes possible contingencies and emergency procedures to be implemented at the site.

F.15.1 *Personnel Roles and Lines of Authority*

The SSO has primary responsibility for site evacuation and notification in the event of an emergency situation. This includes taking appropriate measures to ensure the safety of site personnel and the public. Possible actions may involve the evacuation of personnel from the site area and ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. If the SSO is not available, the ERM Project Geologist/Engineer will assume these responsibilities. Subcontractors will assist the SSO within the parameters of their scope of work.

F.15.2 *Emergency Alarms*

Because of the small work area and mobility of work areas, an emergency evacuation plan and meeting place will decide on the drilling or sampling locations.

F.15.3 *Reporting Emergencies*

All, including any late developing or aggravated injuries, must receive prompt medical attention. For non-life threatening injuries or illnesses site workers should be transported to the hospital. For life threatening injuries or illnesses, the local emergency responders should be contacted via 911.

The SSO is responsible for reporting all injuries, illnesses, fires, spills/releases, property damage or near misses to the following individuals.

- Injured/involved employee's supervisor
- ERM Project Manager
- ERM Partner-In-Charge
- ERM Project Health and Safety Consultant
- Client Contact

F.15.4 *Emergency Contacts*

In case of an emergency, the SSO will contact the following as appropriate.

TITLE/NAME	*PHONE NUMBERS*
ERM Project Director Michael B. Teetsel, C.P.G	Work: 860-524-5678 Mobile 860-324-6207
Project Manager Edward Wong, P.E.	Work: 631-756-8900 Mobile 516-250-9001
Site Safety Officer Edward Wong, P.E.	Work: 631-756-8900 Mobile 516-250-9001
Project Geologist/Engineer TBD	Work: 631-756-8900 Mobile: TBD
Project Health and Safety Coordinator Paulina Gravier	Work: 212-447-1900 Mobile: 917-664-2590
Mr. Girish Desai, P.E. NYSDEC	Work: 631-444-0243
Local Emergency Responders – all services	Phone: 911
Hospital: Winthrop University Hospital 259 1st Ave. Mineola, NY	Phone: 516-663-0333

F.15.5 *Incident Investigations*

An ERM Incident Form (Attachment 5) will be completed and forwarded to the Project Manager within 24 hours of an incident. All incidents will be investigated in a timely manner. The SSO and/or the Project Manager will schedule the investigation and include project supervision (ERM, subcontractors, and client), the injured/involved employee(s) and the Project Health and Safety Coordinator. Root cause analysis will be performed to assess the apparent cause and identify corrective measures to be implemented to prevent re-occurrence. The last page of the Incident Form is used to document the investigation.

F.15.6 *Directions to Nearest Hospital*

The nearest hospital is *Winthrop University Hospital*. A map and directions to this facility are located in Attachment 6.

Winthrop University Hospital
259 1st Avenue – Mineola, NY
516-663-0333

F.15.7 *Emergency Drills*

In accordance with the HAZWOPER Standard emergency response plans will be rehearsed regularly as part of the overall training program for site operations. The frequency of this drill (rehearsal) is outlined below:

PROJECT DURATION	*DRILL FREQUENCY*
Less than 30 days	None, cover during review and sign-off of HASP
Greater than one month, less than one year	Once
Greater than one year	Annually

All drills will be documented on the Emergency Drill Evaluation Form found in Attachment 8. Drills do not need to be elaborate. A tabletop scenario during the daily safety meeting is an adequate drill.

F.16 *SAFETY EQUIPMENT*

A first aid kit containing first aid items for minor incidents only and a fire extinguisher is maintained in each ERM Northeast vehicle. If you are driving a personal vehicle or a rental vehicle, please rent a first aid kit and fire extinguisher from the equipment room.

F.17 *CERTIFICATION OF FAMILIARITY WITH PLAN*

By signing below, your signature certifies that you have read, understand and will abide by the contents of this HASP.

Name	Signature	Company	Date

Attachment 1

Job Hazard Analysis

ERM.

JOB HAZARD ANALYSIS

Required for those field projects that do not require a HASP (see Project Safety Evaluation Checklist). JHAs also are used to supplement HASPs.

Prior to conducting fieldwork a Job Hazard Analysis must be completed and reviewed with all members of the Project Team. At the time of site mobilization, the job Hazard Analysis will be verified and reviewed again with the Project Team at the beginning of each day as fieldwork continues.

Client:	W.O.#
Project Name:	
Location:	
ERM Project Director:	Date:
ERM Project Manager:	Revision No.:
ERM Project Team:	
Subcontractors:	

Field Work Description

NOTE: For any hazards that are not applicable for your task, mark the left hand column with N/A. Do not leave any hazards blank.

Hazard Identification	Describe Hazard Control (appropriate for site)
Job Location/Setting:	☐ Industrial facility ☐ Commercial are ☐ Urban area ☐ Residential area ☐ Undeveloped/vacant ☐ Lone worker
☐ Chemicals at site List or attach separate page:	☐ MSDS or chemical information available to project team for each chemical (required) ☐ PPE (see PPE Section) ☐ Exposure monitoring ☐ Decontamination: Specify methods:
☐ Chemicals ERM will take to site	☐ Attach copies of MSDSs for all chemicals to en to clients site.
☐ Dust-Describe source	☐ PPE *(see* PPE Section) ☐ Exposure monitoring (see monitoring section) ☐ Dust suppression
☐ Confined Space	Coordinator ERM Health and Safety for assistance

Hazard Identification	Describe Hazard Control (appropriate for site)
☐ Slips (Wet Surface), Trips and Falls ☐ fall less than 6 feet ☐ fall more than 6 feet	☐ Clean/ dry surfaces ☐ Barricade the unsafe area ☐ Eyes on path ☐ Relocate the work area ☐ Use alternate route ☐ Use a construction platform ☐ Tie-off to equipment ☐ Move work to ground level ☐ Fall restraint, guardrails, short lanyard
☐ Electrical Shock	☐ Area around electrical equipment dry ☐ Energy isolation or Lock-out/Tag-out (LOTO) ☐ Grounding ☐ GCFI ☐ Shielding on equipment
☐ Combustible materials, Fire, Explosion	☐ Remove combustible materials ☐ Relocate work ☐ Isolation/ LOTO ☐ Area air monitoring ☐ PPE/ Flame Retardant Clothing (FRC) (See PPE Section) ☐ Fire watch ☐ Fire extinguisher available
☐ Heat/Cold Stress	☐ Work/Rest regimen ☐ Task rotation, shared tasks ☐ Source of cool water/electrolyte replacement drinks ☐ Ventilation
☐ Noise - Describe source	☐ PPE (see PPE Section) ☐ Relocate work ☐ Control noise source
☐ Lighting/ Visibility	☐ Adequate for task ☐ Nighttime considerations ☐ PPE (see PPE Section) ☐ Safety cones
☐ Lifting, Pulling, Pushing, Repetitive Motion	☐ Get equipment designed for the job ☐ Proper technique ☐ Smaller, lighter loads ☐ Prepared for "unexpected release" ☐ Move feet to turn with load
☐ Airborne/Flying Material	☐ Cover/Shield source ☐ PPE (see PPE Section) ☐ Positioning
☐ Rotating/Moving Equipment and Pinch Points	☐ Energy isolation, Lock-out/Tag-out (LOTO) ☐ Guarding, barricading ☐ No loose clothing ☐ Positioning
☐ Sharp Objects	☐ Guarding ☐ PPE (see PPE Section) ☐ Positioning
☐ Falling Objects	☐ Secure objects ☐ Guarding, covers ☐ PPE (see PPE Section) Barricading
☐ Hazards from others working in	☐ Communication: Specify Method
☐ Hazards to other working in vicinity	☐ Communication: Specify Method

Hazard Identification	Describe Hazard Control (appropriate for site)
☐ Environmental Spill	☐ Containment ☐ Waste Plan ☐ Waste containers ☐ Other
☐ Overhead lines/subsurface lines	☐ Spotter ☐ Verify clearance with client ☐ One-Call ☐ Mark line
☐ Site-specific training required	☐ Specify training requirement
☐ Client-specific safety procedure/policy required?	☐ Specify client specific safety procedure or policy (attach a copy)
☐ Client permit required?	☐ Specify method for obtaining permit:
☐ Subcontractor on-site	☐ Obtain proof of required (including site-specific) training ☐ Obtain proof of required (including site-specific) medical surveillance
☐ Other Hazards	☐ Description:

Exposure Monitoring

The following equipment will be used to monitor personnel exposure:

Emergency Plan required for every site job

Method of obtaining assistance	
Evacuation Route	
Prevailing wind direction	
Emergency call list	911 or Other emergency #: ERM Project Manager: ERM Project Director: Client Coordinator: Subcontractor Coordinator:
Emergency assembly area	

Emergency Plan

First aid equipment availability	
Nearest Medical Assistance Address:	Direction or attach map:
Phone Number:	

Personal Protective Equipment Required (Check boxes to indicate PPE requirements)

- ☐ Field clothes (long or short sleeve shirt, long pants)
- ☐ Disposable coveralls: specify type_____
- ☐ High visibility or reflective vests
- ☐ Flame Retardant Clothing
- ☐ Hard-hat
- ☐ Steel toe boots/shoes
- ☐ Disposable shoe covers
- ☐ Respiratory Protection
  - ☐ Half-face cartridge respirator, cartridge type: _____
  - ☐ Cartridge change frequency _____
  - ☐ Other respirator type
- ☐ Gloves: specify type(s)
- ☐ Hearing protection: specify type(s)
- ☐ Eye Protection: specify type

PPE Hazard Assessment Certified by:
(Note: PPE can be certified by any knowledgeable staff member) Date: _____

Project team (including subcontractors) has seen, been briefed and understand the contents of this job Hazard Analysis.

Name	Signature	Date

Attachment 2

Community Air Monitoring Plan

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. 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 the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression

techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

Last Updated: June 20, 2000

Attachment 3

Daily Safety Meeting Form

DAILY SITE SAFETY LOG

Site:
Project:
Time on: _____ Time off: _____
Weather/Temperature: _____
Wind Direction: _____

Site Safety Talk: Yes_____ No_____

Topics: _____
_____
_____
_____

Daily Safety Inspection:

Time:_____ Initials:_____ Time:_____ Initials:_____

Comments:_____
Instrument Calibration:

Instrument Calibration:

Instrument	Time	Calibration Gas	Calibration Conc.	Calibrated?
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Comments:_____

Personal Protective Equipment: Universal Equipment - hard hat, safety glasses and work boots.

Task 1:	Task 2:	Task 3:
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

DAILY SITE SAFETY LOG (continued)

Date:_____

Air Monitoring:

Concentration

Time/Location:	Inst:	Settings:	Inst:	Settings:

Comments (including upgrade, non-compliance, etc.):

_____

_____

_____

_____

_____

Site Safety Officer:_____Signature:_____Date:_____

Attachment 4

Project Sign-in Sheet

SITE SIGN-IN SHEET

Site: Date:___________________

Employee	Company	Time In	Time Out

Attachment 5

ERM Incident Reporting Form

Incident Report

ERM

Instructions: Aim to complete **Part 1 of this form within 24 hours** after the incident and complete **Part 2 within 3 working days** after the incident. In addition to the Project Manager and OpCo Health and Safety Coordinator, who are primarily involved with the investigation, please ensure that the following individuals are made aware of the incident at least verbally within 24 hours and receive the completed incident form as soon as it is completed: **Office Manager; Corporate H&S Director, OpCo President,** and **Regional CEO**. The OpCo H&S Coordinator should keep paper or electronic copies of these reports. If a piece of information does not apply, put N/A in the block.

I. INJURY AND ILLNESS DATA AND SUMMARY

Date and time of incident Date: Time:	Location of incident (Name and address)	
Time injured employee started work on day of incident	Weather conditions	
Reported by	Date reported	List any witnesses
Project Number	Project Manager	Principal-in-Charge
Injured employee's name	Injured employee's department or practice area	
Injured sub-contractor's name	Injured sub-contractor's employer	
Injured person's sex Male ☐ Female ☐	Injured employee's date of hire at ERM	
Type of Incident (circle one) First aid/minor injury All other injuries Vehicle accident Property damage Near miss		

Incident Report

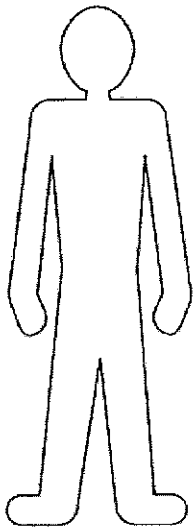
ERM

What activity/task was taking place just prior to the incident? (Describe the activity/task as well as tools, equipment and material involved that set the stage for the incident. What was the worker doing?)
What changed about the situation or task to cause the incident? How did the incident happen? (Describe in detail the incident.)
If the incident involved an injury, describe it. (e.g., cut to left ring finger, sprained right ankle, snake bite to left shin, pulled muscles in the lower back)
Immediate actions taken (Describe actions taken and by whom immediately after the incident occurred.)
What object or substance directly harmed the employee? (Examples, concrete floor, chlorine, H2S, manhole cover. If this question does not apply to the incident, write N/A.)
If medical treatment was given away from worksite, state name and mailing address of both the facility and treating health care professional.

Was employee treated in an emergency room? Yes ☐ No ☐	Was employee hospitalized overnight as an in-patient? Yes ☐ No ☐
Additional Consequences of incident (Describe damage to property/equipment, consequences to other employees or community, schedule.)	

Incident Report

ERM

If the employee died, give date of death.
Is the incident recordable/reportable under any governmental requirement? (To be completed by OpCo Health and Safety Coordinator) Yes ☐ No ☐ Name of person making determination
How many photos of the scene were taken?
(If completed manually) Please note the position of the injury on the diagram and sketch any other instructive diagrams here as well. 

Name of person completing form	Signature of person completely form	
Title of person completing form	Phone number of person completing form	Date form completed

Incident Report

Instructions: This side of the form will be completed as directed by the OpCo Health and Safety Coordinator

II. CAUSES AND PLANS TO PREVENT RECURRENCE

Actions leading to incident. (Circle all that apply and explain.)

Failure to observe warning	Failure to use PPE	Failure to warn	Other
Delayed discovery	Procedure not followed	Abuse/misuse of equipment	

Conditions leading to incident. (Circle all that apply and explain.)

Temperature/weather	Inadequate maintenance	Nature (animal, insects, plants)
Lack of PPE	Lack of proper instructions	Construction deficiencies
Improper design/engineering	Improper/defective tools/ equipment	Other

Job factors leading to incident. (Circle all that apply and explain.)

Leadership/supervision	Work practices	Defective tools/equipment
Inadequate communication	Inadequate training	Inadequate inspections
Inadequate work procedures/practices		Other

Personal factors leading to incident. (Circle all that apply and explain.)

Physical capability	Physical stress/fatigue	Mental stress
Knowledge of task	Employee skills	Attention to details
Other		

Incident Report

ERM

Corrective Actions	Person responsible	Deadline	Date completed
1)	1)	1)	1)
2)	2)	2)	2)
3)	3)	3)	3)
4)	4)	4)	4)

Attachment 6

Hospital Route Map and Directions

Distance (miles)	Turn	Road	Est. Time (hr:min.)	Total (mi.)
		<Start> 40 Voice Road		
0.1	Start (NE)	Voice Road	0:00	
0.1	Turn left	Glen Cove Rd.	0:01	0.1
0.7	Turn left	Westbury Ave.	0:01	0.8
0.3	Turn left	Roosevelt Ave.	0:01	1.1
0.2	Turn right	Cleveland Ave.	0:01	1.3
0.2	Turn left	Mineola Blvd.	0:01	1.5
0.3	Turn right	First Street	0:01	1.8
0.1		<Finish> 259 First St.	0:06	1.96

Est = Estimated

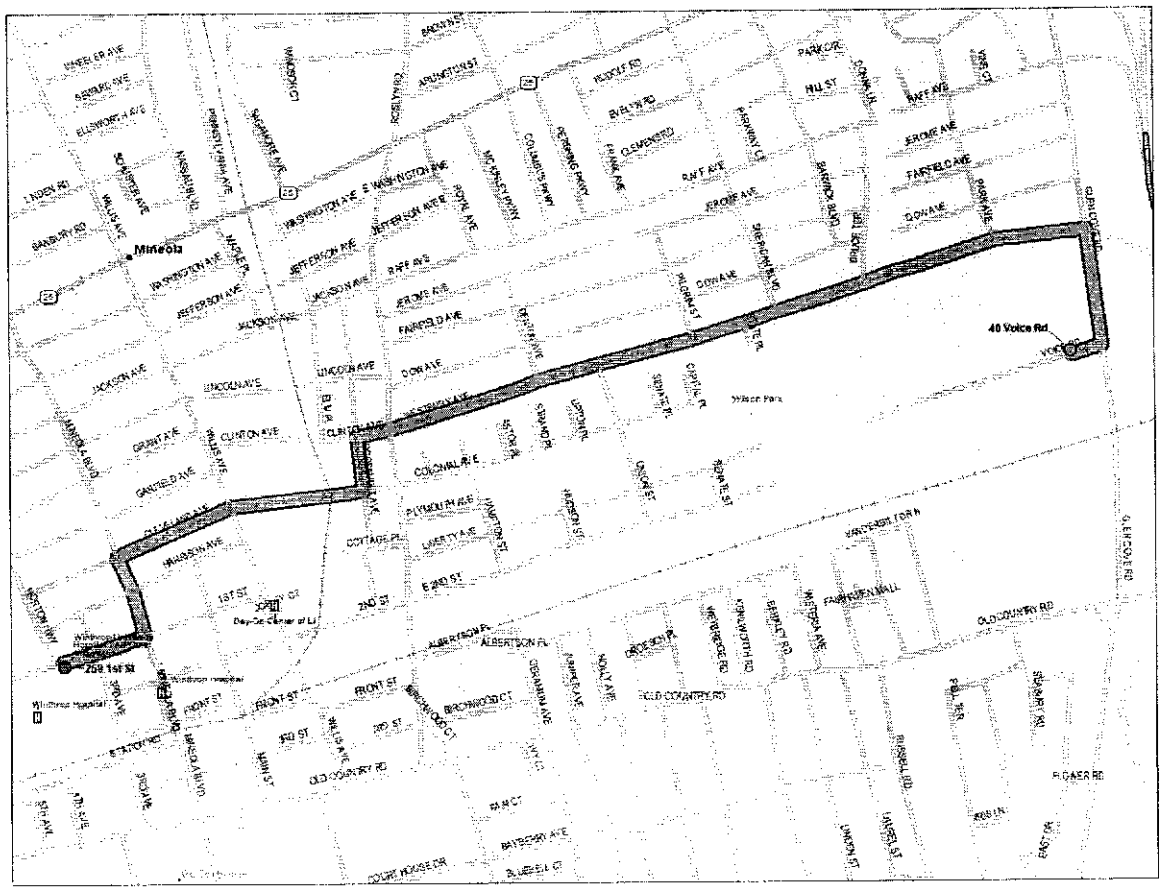


TABLE F-1
SUMMARY OF CHEMICAL HAZARDS FOR CHEMICALS OF CONCERN
J&H MANUFACTURING SITE, CARLE PLACE, NEW YORK

Chemical	Published Exposure Limit [1] (8-hour TWA [2])	Routes of Exposure	Target Organs	Signs/Symptoms of Exposure (Acute versus Chronic Effects)	First Aid &Emergency Response
Chemical Name: **Tetrachloroethylene** CAS: 127-18-4 Vapor Pressure: 14 mm-Hg Ionization Potential: 9.32 eV	100 ppm (OSHA PEL) Carcinogen	Inhalation Skin absorption Ingestion Skin or eye contact	Eyes, skin, respiratory system, liver, kidneys, and central nervous system.	Acute: Irritation eyes, skin, nose, throat, respiratory system, nausea, dizziness Chronic: cancer, liver damage	Flush skin/eyes with water Administer artificial respiration if no breathing If ingested seek medical attention
Chemical Name: **Trichloroethene** CAS: 79-01-6 Vapor Pressure: 58 mm-Hg Ionization Potential: 9.45 eV	100 ppm (OSHA PEL) Carcinogen	Inhalation Skin absorption Ingestion Skin or eye contact	Eyes, skin, respiratory system, heart, liver, kidneys, and central nervous system.	Acute: Irritation eyes, skin, nose, throat, headache, visual disturbance, weakness, exhaustion, nausea, dizziness, vomiting Chronic: cancer, liver damage	Flush skin/eyes with water Administer artificial respiration if no breathing If ingested seek medical attention

TABLE F-1
SUMMARY OF CHEMICAL HAZARDS FOR CHEMICALS OF CONCERN
J&H MANUFACTURING SITE, CARLE PLACE, NEW YORK

Chemical	Published Exposure Limit [1] (8-hour TWA [2])	Routes of Exposure	Target Organs	Signs/Symptoms of Exposure (Acute versus Chronic Effects)	First Aid &Emergency Response
Chemical Name: **cis-1,2-dichloroethene** CAS: 540-59-0 Vapor Pressure: 180-265 mm-Hg Ionization Potential: 9.65 eV	200 ppm (OSHA PEL)	Inhalation Skin absorption Ingestion Skin or eye contact	Eyes, respiratory system, and central nervous system.	Acute: Irritation eyes, skin, nose, throat, CNS depression,	Flush skin/eyes with water Administer artificial respiration if no breathing If ingested seek medical attention
Chemical Name: **PAHs (aka coal tar pitch)** CAS: NA Vapor Pressure: Compound dependent Ionization Potential: Compound dependent	0.1 mg/m3 (NIOSH REL) 0.2 mg/m3 (OSHA PEL)	Inhalation Skin absorption Ingestion Skin or eye contact	Respiratory system, kidneys, skin, bladder.	Acute: dermatitis, bronchitis	Eye: Irrigate Skin: Soap wash promptly Administer artificial respiration if no breathing If ingested seek medical attention immediately

TABLE F-1
SUMMARY OF CHEMICAL HAZARDS FOR CHEMICALS OF CONCERN
J&H MANUFACTURING SITE, CARLE PLACE, NEW YORK

Chemical	Published Exposure Limit [1] (8-hour TWA [2])	Routes of Exposure	Target Organs	Signs/Symptoms of Exposure (Acute versus Chronic Effects)	First Aid &Emergency Response
Chemical Name: **Lead** CAS: 7439-92-1 Vapor Pressure: NA Ionization Potential: NA	0.050 mg/m3 (NIOSH REL) 0.050 mg/m3 (OSHA PEL)	Inhalation Ingestion Skin or eye contact	Eyes, gastrointestinal tract, central nervous system, blood, kidneys, gingival tissue	Acute: Lassitude, facial palor, anorexia, weight loss, malnutrition, abdominal pain, colic, anemia, paralysis of wrists/ankles.	Eye: Irrigate Skin: Soap wash promptly Administer artificial respiration if no breathing If ingested seek medical attention immediately

NOTES:

1. The most conservative published occupational exposure limit is listed. Sources for occupational exposure limits were OSHA and ACGIH.
2. OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit
3. PPM = parts contaminant per million parts air (by volume)
4. All PAHs are categorized by OSHA under "Coal Tar Pitch", all with the same PEL

Sources of information include published exposure limits in 29 CFR 1910.1000 or the 2002 TLV Booklet published by ACGIH, NIOSH pocket guide, Chemical/Physical Properties from Texas Risk Reduction Program, International Chemical Safety Cards, MSDSs, and the HNU listing of Photoionization Characteristics of Selected Compounds.

TABLE F-2
ADDITIONAL CHEMICAL HAZARD DATA FOR NON-VOLATILE COCs (METALS, PAHs)
J&H MANUFACTURING SITE, CARLE PLACE, NEW YORK

Chemical	Maximum Concentration in Site Soil/Sediment (mg/kg)	OSHA PEL or NIOSH REL (mg/m^3)	Airborne Chemical Concentration in 5.0 mg/m^3 of dust (mg/m^3)
Mercury	0.89	0.01	4.45E-06
Lead	255	0.05	1.28E-03
Benzo(a)anthracene	5.8	0.1	2.90E-05
Benzo(a)pyrene	8.5	0.1	4.25E-05
Benzo(b)flouranthene	10.8	0.1	5.40E-05
Benzo(k)flouranthene	10.8	0.1	5.40E-05
Chrysene	12.1	0.1	6.05E-05
Dibenz(a,h)anthracene	1.6	0.1	8.00E-06
Fluoranthene	Not Detected	0.1	NA
Indeno(1,2,3-c,d)pyrene	4.5	0.1	2.25E-05
Pyrene	Not Detected	0.1	NA

NOTES:

1. The most conservative published occupational exposure limit is listed. Sources for occupational exposure limits were OSHA and ACGIH.
2. OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit
3. All PAHs are categorized by OSHA under "Coal Tar Pitch", all with the same PEL and REL

Sources of information include published exposure limits in 29 CFR 1910.1000 or the 2002 TLV Booklet published by ACGIH, NIOSH pocket guide, Chemical/Physical Properties from Texas Risk Reduction Program, International Chemical Safety Cards, MSDSs, and the HNU listing of Photoionization Characteristics of Selected Compounds.

TABLE F-3
SUMMARY OF CHEMICAL HAZARDS FOR CHEMICALS ROUTINELY USED BY ERM
J&H MANUFACTURING SITE, CARLE PLACE, NEW YORK

Chemical	Exposure Limit (1) (8-hr TWA (2))	Routes of Exposure	Target Organs	Signs/Symptoms of Exposure (Acute versus Chronic Effects)	First Aid & Emergency Response
Chemical Name: **Portland Cement** Vapor Pressure: N/A, solid Ionization Potential: N/A, solid	10 mg/m^3 (ACGIH TLV)	Inhalation Skin contact Ingestion	Eyes, skin, respiratory system	Acute Irritation of eyes, skin and respiratory system; skin burns Chronic Contains trace amounts of crystalline silica which cause silicosis and may be carcinogenic	Flush eyes/skin with water Administer artificial respiration if not breathing Seek medical attention immediately if ingested
Chemical Name: **Bentonite** Vapor Pressure: N/A, solid Ionization Potential: N/A, solid	0.05 mg/m^3 (ACGIH TLV for crystalline silica)	Inhalation Skin contact Ingestion	Eyes, skin, respiratory system	Acute Irritation of eyes, skin and respiratory system Chronic Contains trace amounts of crystalline silica which may cause silicosis; potential carcinogenic	Flush eyes/skin with water Administer artificial respiration if not breathing Seek medical attention immediately if ingested
Chemical Name: **Silica sand** Vapor Pressure: N/A, solid Ionization Potential: N/A, solid	0.05 mg/m^3 (ACGIH TLV)	Inhalation Skin contact Ingestion	Eyes, respiratory system	Acute Irritation of eyes; coughing Chronic Silicosis; lung carcinogen	Flush eyes with water Move to fresh air Seek medical attention

TABLE F-3
SUMMARY OF CHEMICAL HAZARDS FOR CHEMICALS ROUTINELY USED BY ERM
J&H MANUFACTURING SITE, CARLE PLACE, NEW YORK

Chemical	Exposure Limit (1) (8-hr TWA (2))	Routes of Exposure	Target Organs	Signs/Symptoms of Exposure (Acute versus Chronic Effects)	First Aid & Emergency Response
Chemical Name: **Isobutylene Balance Air** CAS: N/A, mixture Vapor Pressure: N/A, gas at ambient conditions Ionization Potential: N/A, mixture	None established	Inhalation	Respiratory system	Acute: Simple asphyxiant, difficulty breathing, cyanosis, rapid pulse, impairment of senses, mental disturbances, and convulsions Chronic: None known	Move to fresh air, administer artificial respiration if not breathing See medical attention

NOTES:

1. The most conservative published occupational exposure limit is listed. Sources for occupational exposure limits were OSHA and ACGIH.
2. TWA = time weighted average
3. mg/m^3 = milligrams of contaminant per cubic meter of air
4. ACGIH TLV = American Conference of Governmental Industrial Hygienists Threshold Limit Value
5. ppm = parts of contaminant per million parts of air
6. OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit

Sources of information include published exposure limits in 29 CFR 1910.1000 or the 2002 TLV Booklet published by ACGIH, NIOSH pocket guide, Chemical/Physical Properties from Texas Risk Reduction Program, International Chemical Safety Cards, MSDSs, and the HNU listing of Photoionization Characteristics of Selected Compounds.

TABLE F-4
ACTION LEVELS
J&H MANUFACTURING SITE, CARLE PLACE, NEW YORK

Contaminant	*Action Level (units)**	*Monitoring Instrument*
Dust	5.0 (mg/m^3)	MIE DR 1000 Personal Data RAM Aerosol Monitor
TVOC Concentration (ppm)	5.0 ppm (TWA) in breathing zone	Photovac PID with 11.6 eV lamp or, MiniRae 2000 with 11.6 eV lamp or, Flame ionization detector

* For upgrading from Level D to Level C personal protective equipment (PPE) or stopping work to consider other potential controls.

TABLE F-5
SITE-SPECIFIC AND TASK-SPECIFIC HAZARDS AND CONTROL STRATEGIES
J&H MANUFACTURING SITE, CARLE PLACE, NEW YORK

Task/Activity	*Hazards*	*Control Strategy*
All activities at site Level D PPE	Poisonous plants	• Identify suspect plants • Wash exposed body parts and equipment thoroughly after work in highly-vegetated areas
	Non-stinging insects	• Insect repellant
	Stinging insects	• Survey work area for presence of nests • Eliminate nests
	Thunder/Lightning	• If drilling, cease work following first indication of thunder/lightning • Shelter in buildings or vehicles not underneath trees or near drilling equipment • Begin work after 15 minutes has elapsed from last thunder/lightning
	Cold Stress	• Appropriate clothing • Frequent short breaks in warm dry shelter as needed
	Slip/Trip/Fall	• Awareness of surroundings and footing • Survey areas for snow and ice
Drilling	Heavy equipment movement	• Personnel maintain eye contact with operators when near the rig.
	Dropped equipment, slip, trip or fall.	• Hard hats, steel-toe safety shoes and safety glasses worn during equipment operation.
	Noise	• Hearing protectors with proper noise reduction rating.
Completion, development, and sampling of groundwater well	Splashing of contaminated groundwater	• Safety glasses; chemical-resistant suits (as determined necessary by SSO)

TABLE F-6
PERSONAL PROTECTION EQUIPMENT REQUIREMENTS
J&H MANUFACTURING SITE, CARLE PLACE, NEW YORK

PPE Level	Ensemble Components	Anticipated Use
Level D Should be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards.	• Long pants and shirt with sleeves • Steel-toed footwear • Safety glasses with molded side shields or goggles. • Hard hat if potential for head injury or falling debris is possible/or client requirement • General purpose work gloves if task does not involve water or wet materials • Hearing protection • High visibility traffic vest when in traffic areas	All activities unless otherwise directed by the SSO, PM, and Project Manager and Project Health and Safety Coordinator
Modified Level D	Level D and the following: • Disposal Tyvek coveralls • Steel-toed rubber boots or disposal boot covers over shoes • Thin nitrile gloves • Green nitrile gloves over thin nitrile gloves when primary gloves may tear or puncture	Any of the above-referenced tasks in which there is moderate potential for skin contact
Level C Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is needed.	Level D or Modified Level D and the following: • Half-face air purifying respirator with combination organic vapor/high efficiency particular air (HEPA) cartridges	Any of the above-referenced tasks in which there is moderate potential for skin contact with constituents and data indicating need for respiratory protection. No upgrade to Level C without approval from Project Manager and Project Health and Safety Coordinator
Level B Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection is needed.	Not anticipated to be required	Tasks requiring Level B PPE are not anticipated during this project. If Level B PPE is needed, as determined by the SSO and/or the Project Health and Safety Consultant, the HASP will be revised.
Level A Should be worn when the highest level of respiratory, skin, and eye protection is needed.	Not anticipated to be required	Tasks requiring Level A PPE are not anticipated during this project. If Level A PPE is needed, as determined by the SSO and/or the Project Health and Safety Consultant, the HASP will be revised