

**Final Design Work Plan**  
  
for  
  
**Soil Vapor Extraction System**

at

**Nassau Uniform Services  
525 Ray Street  
Freeport, New York 11520**

**Site No. 130063**

**Date: March 20, 2001**

**Revised: November 29, 2001**

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*"Your Environmental Partner"*

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## **1.0 Introduction and Purpose of the Soil Vapor Extraction System**

This work plan describes the installation and operation of a proposed Soil Vapor Extraction System (SVES) at the property known as Nassau Uniform Services, Inc., 525 Ray Street, Freeport, Town of Hempstead, Nassau County, New York.

The installation of the proposed SVES will remediate the elevated concentrations of volatile organic compounds (VOCs) present in the subsurface soils outside and below the interior floor of the building at 525 Ray Street. Elevated concentrations of numerous VOCs were detected in the soil samples collected from borings installed below the building's floor and exterior soils. Four of the most significant VOCs detected are tetrachloroethene, trichloroethene, cis-dichloroethene and vinyl chloride. The later three compounds are breakdown products of tetrachloroethene, a liquid commonly called "PERC" and widely used in the dry cleaning industry.

After completing the Focused Remedial Investigation (FRI), Anson Environmental Ltd. (AEL) recommended the installation and operation of a SVES at 525 Ray Street to effectively remediate the on-site soil contamination to concentration levels that will be acceptable by NYSDEC.

The proposed SVES will address the subsurface soil contamination at three different areas inside and outside the building at 525 Ray Street. Dashed lines on Figure 1 indicate the three contaminated areas. One area is located outside and adjacent to the northwest corner of the building. Much of the contaminated soil at this location was excavated on November 23, 1999, and transported off-site for appropriate disposal. The second contaminated area is outside the north side of the building where an outflow drainpipe is located. The third contaminated area is located below the floor and near the center of the building where dry cleaning machines are located.

On February 1, 2001, AEL completed a SVES pilot test program that verified that such a system could successfully remove the VOC contaminants from the on-site soils.

The SVES design proposed by AEL will use 17 vertical extraction wells that will be installed at strategic locations inside and outside of the building at 525 Ray Street. The 2-inch diameter (DIA) polyvinyl chloride (PVC) extraction wells will be installed to approximately 5-feet below grade surface (bgs) and will be screened from 1-foot to 4-feet bgs.

AEL plans to install one extraction well in the area that was excavated adjacent to the northwest corner of the building. Three extraction wells will be installed in the area at the north side of the building where the outflow pipe is located. Based on radius of influence measurements performed by AEL in 1999, up to 13 extraction wells will be installed inside the building in three areas, namely: garage area, compressor room, and washing machine area. The approximate locations of the extraction wells are designated

X1 to X17 on Figure 1. Extraction Well X4 was installed during the SVE pilot test in January 2001. The 17 extraction wells will be connected to PVC manifolds using 2-inch DIA PVC piping.

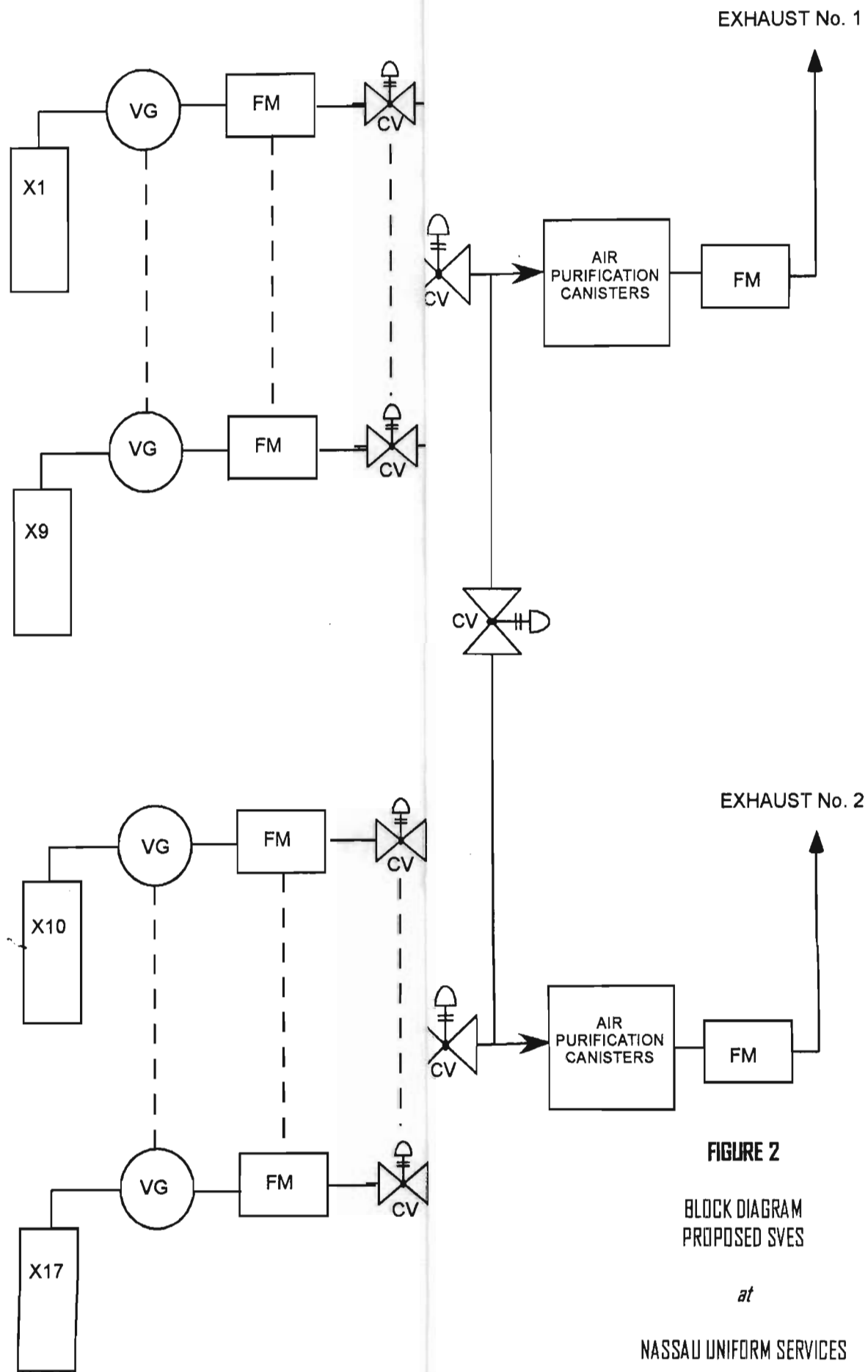
The proposed SVES system will use two 3-horsepower regenerative blowers to create a negative pressure in the manifolds and extraction wells. One blower will be connected through manifolds to 8 extraction wells and the second blower will be connected through manifolds to 9 extraction wells. A block diagram of the proposed SVES is illustrated in Figure 2.

The proposed SVES system will actually consist of two independent soil vapor extraction (SVE) subsystems. Under the influence of the negative pressure created by each blower, the contaminated soil vapors from the extraction wells will move through a specific blower, and subsequently, under a slight positive pressure created at the blower output, the soil vapors will be processed through air purification canisters before being exhausted to the atmosphere.

Each subsystem will be provided with a 4-inch diameter PVC piping to direct exhaust air from the air purification canisters up the north side of the site building to a point approximately 10-feet above its highest point. The building height is approximately 40-feet above grade surface level. Therefore, the SVES emissions will be exhausted to the atmosphere approximately 50-feet above grade surface level. The exit ports of the two exhaust pipes will be located to prevent entry of SVES emissions into the building ventilation system.

Each soil vapor extraction blower will exhaust contaminated vapor into four separate air purification canisters connected in series. The first two canisters will be filled with granular activated carbon and will be used to purify most concentrations of VOCs from the SVES exhaust gas vapor stream. The third and fourth canisters will be filled with potassium permanganate and will be used to remove concentrations of vinyl chloride that may be in the exhaust gas vapor stream. Control valves will be installed in the SVE subsystems to enable cross feeding of contaminated vapors in several ways to minimize downtime in the event of a SVES component failure or air purification canister breakthrough. With the two SVE subsystem configurations the contaminated soil vapors can be remediated at a maximum rate when desired. Later when the soil contamination decreases, the two-subsystem configuration can be altered using control valves so that only one subsystem is operating. This will conserve energy and equipment replacement costs.

SVES wastes will be stored, labeled and delivered for disposal in accordance with RCRA rules and regulations.



**FIGURE 2**

BLOCK DIAGRAM  
PROPOSED SVES

*at*

NASSAU UNIFORM SERVICES

## **2.0 Summary of Existing and Background Information**

This section presents site location descriptions and background information. The background information includes site geology and a summary of previous site investigations.

### **2.1 Site Location, Ownership and Access**

In 1993, NYSDEC designated Nassau Uniform Services an Inactive Hazardous Waste Disposal Site. The size of the subject site location is approximately three-quarters of an acre. Nassau Uniform Services is designated Site Number 130063 on the New York State Registry of Inactive Hazardous Waste Disposal Sites.

The subject property is owned by Nassau Industrial Dry Cleaning Corp., 525 Ray Street Freeport, New York 11520.

### **2.2 Site Description**

Nassau Uniform Services property contains one large building and a parking lot paved with asphalt (Figure 1). The primary access to the unfenced property is from Ray Street.

According to Nassau County Land and Tax Map information, the Nassau Uniform Services property is designated as follows:

Section: 54                      Block: 315                      Lots: 98 through 107

### **2.3 Background Information**

This section contains site geology information and a summary of previous site investigations.

#### **2.3.1 Geology**

The geology of the Nassau Uniform Services property is generally defined to a depth of 12-feet at its western portion. Groundwater Technologies Inc. (GTI) installed the borings that defined the aforementioned western portion of the property on September 23, 1994 (Appendix 1).

The lithologic description of the soil borings indicates that the following soil types are present at the Nassau Uniform Services property:

<u>Depth Below Grade (ft)</u>	<u>Soils Description</u>
0 to 4	mostly brown fine sand, poorly sorted, some gravel, trace clay and fill material.

4 to 8	mostly black organic marsh deposits to approximately 7-foot depth below grade (DBG), then transitions to fine sands and clay material.
8 to 12	gray and brown fine sands to approximately 10-foot DBG, then transitions to orange sand.

In general, the area surrounding Nassau Uniform Services consists of marsh associated with nearby Milburn Creek. The marshlands have been developed by covering them with clean fill and are now occupied by residential and commercial buildings and properties.

Groundwater at the Nassau Uniform Services property has been measured at approximately 5-foot DBG. However, the groundwater on the property is directly influenced by the tidal fluctuations that can range between 5 and 7-foot DBG.

### 2.3.2 Previous Investigations

The following is a brief chronological summary that reflects some of the events that have occurred at or near the Nassau Uniform Services property:

- |                     |  |
|---------------------|--|
| <u>1925 to 1962</u> | Information from the Village of Freeport files indicates that the building now occupied by Nassau Uniform Services was constructed in 1925. This information was obtained from a property diagram that was updated in 1965. No additional information was revealed about the property prior to 1962.   |
| <u>1962 to 1965</u> | Historical aerial photographs taken in 1962 and 1965 illustrated that an addition to the Nassau Uniform Services building was constructed between those years. The addition is placed at the western end of the original building and extends to the adjoining bulkhead.   |
| <u>1964</u>         | During December 1964, Nassau Industrial Services agrees to purchase from American Permac, Inc. the following equipment: <ul style="list-style-type: none"><li>• Two 120-pound SE Industrial dry cleaning machines</li><li>• One Titan 700 Industrial dry cleaning machine</li><li>• One Model 200 Activated Carbon Recovery Unit</li></ul> The aforementioned equipment was delivered and installed in 1965. |
| <u>1965</u>         | In August 1965, Nassau Industrial Uniform Services agrees to purchase a Permac Industrial Cleaning Machine (330 SE).   |



1975 A letter dated October 6, 1975 confirms the Nassau Uniform Services purchase of a Brill X-40 oil skimmer. Western Environmental Engineering supplied the skimmer.

1982 In May 1982, oily waste from the on-site oil/water separator accidentally discharged into the property soils and Milburn Creek. Oil washed from soiled clothing is collected in the oil/water separator and the remaining wastewater is discharged into the local sewer system. Subsequently, Nassau Uniform Services excavated the oil-contaminated soil for disposal.

1984 July 5, 1984, a hydrostatic test was performed on a 2,000-gallon underground gasoline storage tank located at the eastern side of the Nassau Uniform Services building near the front door. The tank test failed and was reported to NYSDEC and Spill Number 84-0959 was assigned to the event. The subsequent site remediation included the removal of the storage tank and the installation of three groundwater monitoring wells on-site

When the storage tank was excavated from the ground, it was reported that several holes were observed in the tank. The three monitoring wells are installed in the Nassau Uniform Services parking lot at the corner of Ray Street and West End Avenue. One monitoring well is installed at the center of the former tank location. The other two monitoring wells are located to the northwest and southeast of the former tank location. One of these two monitoring wells could not be located during recent site inspections.

Nassau County Department of Health (NCDH) inspected the spill location on October 20, 1984. According to NYSDEC database information, Spill Number 84-0959 was closed to their satisfaction on December 30, 1998.

1988 On February 1, 1988, NCDH issued a permit to Nassau Uniform Services to maintain the storage of the following items:

<u>Tank/Storage Area Number</u>	<u>Tank Capacity (gallons)</u>	<u>Type of Toxic/Hazardous Material Stored</u>
1	260	multiple chemical stored
2	2,000	oil, fuel No. 2
3	30	multiple chemicals stored
4	2,000	oil, fuel No. 2
5	2,000	tetrachloroethylene
6	500	tetrachloroethylene

The expiration date for the aforementioned permit was February 1, 1993.

1990

On April 27, 1990, a 2,000-gallon waste oil / tetrachloroethylene tank was excavated and removed after being in place for approximately 12 years. Prior to removal, the tank was reported to be leaking. Subsequently, NCDH collected soil samples from the tank excavation for laboratory analysis. The laboratory analysis of the collected soil samples identified high concentrations of tetrachloroethylene (9,000,000 parts per billion (ppb)), trichloroethene (34,000 ppb), c-1, 2-dichloroethylene (67,000 ppb) and other VOCS.

A letter from NCDH dated June 1, 1990, directed Nassau Uniform Services to perform site remediation as soon as possible.

1991

Soil samples were collected by NCDH on December 17, 1991 from 14-feet beneath the ground surface at the former tank excavation location. Laboratory analysis of the collected soil samples reported the following contaminant concentrations:

tetrachloroethylene	2,900,000 ppb
1, 1,2-trichloroethene	130,000 ppb
1,2-dichloroethylene	38,000 ppb

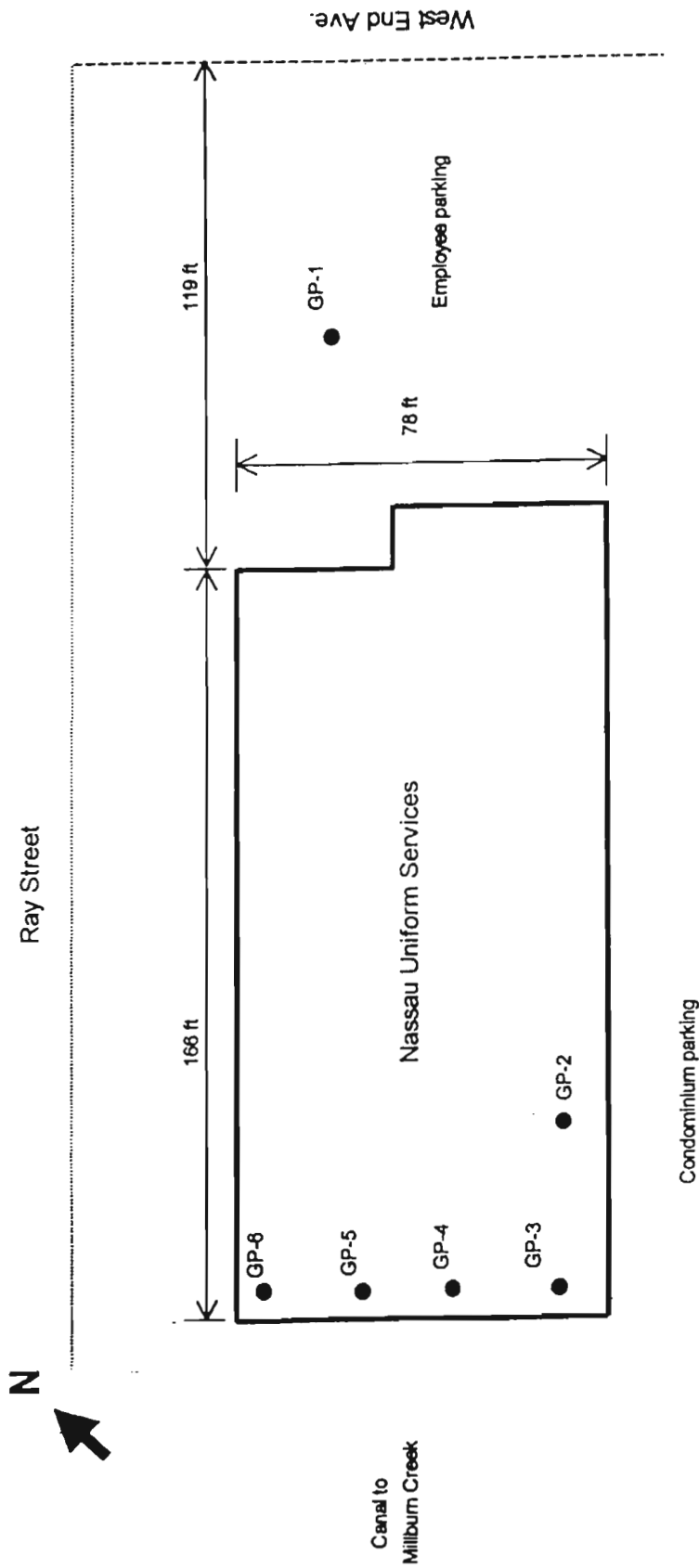
Laboratory analysis of groundwater samples taken the same day downgradient of the former tank location also reported contaminant concentrations as follows:

tetrachloroethylene	20,000 ppb
1, 1,2-trichloroethene	3,600 ppb
1,2-dichloroethylene	10,000 ppb
vinyl chloride	1, 200 ppb

1994

On September 23, 1994, Groundwater Technology, Inc. (GTI) supervised the installation of six Geoprobe points designated GP-1, GP-2, GP-3, GP-4, GP-5 and GP-6. These Geoprobe points were installed for the collection of soil and groundwater samples. Figure 3 is a site map showing the locations of the six Geoprobe points.

Laboratory analysis of the soil samples collected at 2 to 4-feet DBG at GP-2 and GP-3 reported concentrations of contaminants that exceeded NYDEC recommended Soil Cleanup Objectives for 1,2-dichloroethene, trichloroethene, tetrachloroethylene, and for total



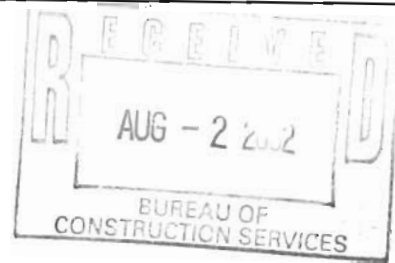
Soil Sampling Locations  
 Sample Date: 9/23/94  
 Nassau Uniform Services  
 525 Ray Street  
 Freeport, NY 11520

Scale = none  
 Dimensions are approximate  
 ● Geoprobe locations

Figure 3

July 31, 2002

Mr. Gerard Burke  
NYS Department of Environmental Conservation  
625 Broadway – 12<sup>th</sup> Floor  
Albany, New York 12233-7013



Subject: Final Design Work Plan for Soil Vapor Extraction System at Nassau Uniform Services, Site No. 130063, Revised July 23, 2002

Dear Mr. Burke:

Anson Environmental Ltd. (AEL) recently submitted the subject document to Mr. Robert Stewart, NYSDEC for review and comment. Subsequently, Mr. Stewart directed AEL to send you a copy of the same document for your review and comment.

If you have any questions about this matter, please direct them to Mr. Stewart.

Very truly yours,

*John M. Tegins*  
John M. Tegins

VOCS. Laboratory analysis of the soil samples collected from GP-5 also reported elevated levels of trichloroethene that exceeded NYSDEC Recommended Soil Cleanup Objectives.

Laboratory analysis of groundwater samples collected on the same day reported concentrations above NYSDEC Class GA Standards for the following compounds:

- tetrachloroethylene
- vinyl chloride
- 1,2-dichloroethene
- chlorobenzene
- 1,1-dichloroethene
- 1,1,1-trichloroethane

Laboratory analysis of groundwater samples collected upgradient of Nassau Uniform Services reported no elevated concentrations of chemical compounds.

1996

February 1, 1996, representatives from NYSDEC and Anson Environmental Ltd. performed a site reconnaissance at Nassau Uniform Services. The purpose of the site reconnaissance was to observe the Nassau Uniform Services plant operations, the physical constraints of the property and to determine future sampling locations.

Currently, Nassau Uniform Services plant operations include the washing and dry cleaning of commercial uniforms and industrial cleaning rags. Wastewater from the plant operations flows into open troughs that are located in the plant floor and into an oil/water separator. The oil/water separator discharges into the Nassau County sewer system. In plant dry cleaning is performed in two machines manufactured by Spencer (Model GT 165) and Bowe, respectively. Safety Kleen, a permitted waste disposal company, collects lint and sludge waste that is contaminated with tetrachloroethylene for disposal off-site. Safety Kleen also supplies Nassau Uniform Services with raw materials for cleaning, including tetrachloroethylene.

The major portion of the cleaning performed at Nassau Uniform Services involves the machine-washing of industrial uniforms and rags. A smaller amount of the cleaning operations require dry cleaning.

On December 4, 1996 Freedom of Information requests were submitted to Nassau County Department of Health. Access to these records was performed on January 22, 1997.

1997

On July 22, 1997, Anson Environmental Ltd. (AEL) collected soil samples from 22 boring locations on the Nassau Uniform Services property. The collected soil samples were delivered to Accredited Laboratories, Inc., Cateret, New Jersey where they were analyzed for concentrations of VOCs using EPA Method 8240. Copies of the laboratory analytical reports for the collected soil samples are contained in Appendix 3, Section 3 of the Draft Final Focused Remedial Investigation (FRI) Report prepared for NYSDEC by AEL, dated October 15, 1998 and revised January 27, 1999.

1997

On August 28, 1997, AEL collected a wastewater sample from the floor trough inside the Nassau Uniform Services building. The collected wastewater sample was delivered to Accredited Laboratories, Inc., Cateret, New Jersey where it was analyzed for concentrations of VOCs using EPA Method 8240. A copy of the laboratory analytical report for the collected wastewater sample is contained in Appendix 3, Section 4 of the Draft Final Focused Remedial Investigation (FRI) Report prepared for NYSDEC by AEL, dated October 15, 1998 and revised January 27, 1999.

On December 30, 1997, AEL collected a wastewater sample from the floor trough inside the Nassau Uniform Services building. The collected wastewater sample was delivered to EcoTest Laboratories, Inc., North Babylon, New York where it was analyzed for concentrations of VOCs using EPA Method 624. A copy of the laboratory analytical report for the collected wastewater sample is contained in Appendix 3, Section 4 of the Draft Final Focused Remedial Investigation (FRI) Report prepared for NYSDEC by AEL, dated October 15, 1998 and revised January 27, 1999.

On April 21, 1998, AEL collected soil samples from 20 borings at the Nassau Uniform Services property. The collected soil samples were delivered to Environmental Testing Laboratories, Inc. Farmingdale, New York where they were analyzed for concentrations of VOCs using EPA Method 8010 and RCRA metals.

On April 22, 1998, AEL collected groundwater samples from two monitoring wells and eight piezometers at the Nassau Uniform Services property. The collected groundwater samples were

delivered to Environmental Testing Laboratories, Inc. Farmingdale, New York where they were analyzed for concentrations of VOCs using EPA Method 601.

On April 23, 1998, AEL collected a groundwater sample from Piezometer No. 6 (P #6) at the Nassau Uniform Services property. The collected groundwater sample was delivered to Environmental Testing Laboratories, Inc., Farmingdale, New York where it was analyzed for concentrations of RCRA metals.

Copies of the complete laboratory analytical reports for the groundwater and soil samples collected in 1998 and noted above are contained in Appendix 4 of the Draft Final Focused Remedial Investigation (FRI) Report prepared for NYSDEC by AEL, dated October 15, 1998 and revised January 27, 1999.

1999

On November 23, 1999, AEL excavated approximately 50-tons of contaminated soil from a location at the northwest corner of the property at 525 Ray Street. Horwith Trucks, Inc. transported the contaminated soil to Michigan Disposal, Inc., Bellville, Michigan for disposal in the landfill at that location.

Laboratory analysis of the six end-point samples collected from the excavation indicated that four of the samples contained elevated concentrations of VOCs and Semi-VOCs that exceed NYSDEC soil cleanup objectives. The aforementioned VOCs and their detected concentrations are as follows:

acetone	920 ppb
methylene chloride	700 ppb
trans-1, 2-dichloroethene	370 ppb
cis-1, 2-dichloroethene	52,000 ppb
trichloroethene	4,800 ppb
tetrachloroethene	30,000 ppb

The full TCL analysis of the collected soil samples indicated that the soil remaining at the excavation site is also contaminated with elevated concentrations of semi-VOCs and metals.

A description of the work performed during the excavation of the contaminated soil is found in the Project Report letter to NYSDEC dated February 3, 2000. The letter report summarizes soil excavation and disposal activities at Nassau Uniform Services, Inc.

2000

On March 16, 2000, AEL collected soil-gas samples from three soil borings that were installed using a Geoprobe unit. One boring was installed at the northeast corner of the Nassau Uniform Services property. The other two borings were installed off-site along the northern boundary of the condominium property located south of the Nassau Uniform Services building. On May 2, 2000, three additional soil gas samples were collected from Geoprobe borings installed on the condominium property. All six soil-gas samples were collected from approximately 4-feet below grade surface (bgs). The soil-gas samples were delivered to a State certified laboratory and analyzed for concentrations of VOCs. The results of that analysis were included in AEL letter report to NYSDEC dated May 24, 2000. The laboratory detected no concentrations of VOCs above their method detection limit (MDL).

On September 27, 2000, AEL collected groundwater samples from three on-site monitoring wells and eight on-site piezometers. The groundwater samples were delivered to a state certified laboratory and analyzed for concentrations of VOCs. A report summarizing the results of that analysis is being prepared and will be submitted to NYSDEC in the immediate future.

On October 16, 2000, in accordance with a work plan approved by NYSDEC, AEL began the installation of a Pilot Test SVES. The SVES test system was installed to provide information needed to complete the final design of a SVES for the site.

2001

On January 10, 2001, the pilot test SVES system began 24-hour operation. On February 1, 2001, the operation of the pilot test SVES was terminated. The SVES pilot test findings are summarized in Section 4.3 of this report.

During July 2001, the on-site dry cleaning machine was taken out of service. The dry cleaning machine was removed from the premises in 2002.

**3.0 Conclusions Based on Groundwater and Soil Sampling at Site**

The Draft Final Focused Remedial Investigation (FRI) Report prepared for NYSDEC by AEL, dated October 15, 1998 and revised January 27, 1999, Section 7.0 Summary, describes the primary source areas of contamination at Nassau Uniform Services Property; namely:



- The former waste PCE tank
- The soils in the vicinity of the garbage container
- Former hole in the compressor floor
- Former supply well dry cleaning machines
- Sample 19-1 Location. Location 19-1 is near the center of the building adjacent to the washing machines.

#### **4.0 Proposed Soil Vapor Extraction System**

To remediate the elevated concentrations of VOCs present in the subsurface soils exterior to the building and below the building floor at 525 Ray Street, AEL proposes to install a SVES on-site (Figure 2). The proposed SVES will consist of two independent soil vapor extraction (SVE) subsystems. Each subsystem will use a 3-horsepower regenerative blower to create a negative pressure in the associated manifold and extraction wells. One subsystem blower will be connected through manifolds to 8 extraction wells and the second subsystem blower will be connected through manifolds to 9 extraction wells.

Under the influence of a negative pressure created by each subsystem blower, the contaminated soil vapors from the extraction wells will move through a specific blower, and subsequently, under a slight positive pressure created at the blower output, the soil vapors will be processed through air purification canisters before being exhausted to the atmosphere. Each SVE subsystem will be equipped with a dedicated exhaust stack to the atmosphere.

Each soil vapor extraction blower will exhaust contaminated vapor into four air purification canisters connected in series. The first two canisters will be filled with granular activated carbon and the third and fourth will be filled with potassium permanganate. Control valves will be installed in the SVE subsystems to enable cross feeding of contaminated vapors in several ways to minimize downtime in the event of a SVES component failure or air purification canister breakthrough. With the two SVE subsystem configurations the contaminated soil vapors can be remediated at a maximum rate when desired. Later when the soil contamination decreases, the two-subsystem configuration can be altered using control valves so that only one subsystem is operating. This will conserve energy and equipment replacement costs.

Significant concentrations of at least four VOCs, namely: tetrachloroethene, trichloroethene, cis-1, 2-dichloroethene and vinyl chloride were detected in soil samples collected from borings outside the building and below its floor. The later three compounds are breakdown products of tetrachloroethene.

The minimum SVES equipment complement consists of vertical extraction wells, manifold piping, a moisture separator, a particulate filter, a regenerative vapor extraction

blower, an air purification canister filled with granular activated carbon and exhaust piping to the atmosphere.

A pilot test performed on-site during January 2001, initially released elevated concentrations of vinyl chloride ( $24.7 \text{ mg/m}^3$ ). After 18 days of pilot testing and upon pilot test shutdown, the concentration of vinyl chloride diminished considerably ( $0.286 \text{ mg/m}^3$ ). This pilot test demonstrated how inefficiently granular activated carbon performs when used to remove vinyl chloride from the SVES exhaust stream.

Granular activated carbon is often used to remove many chlorinated solvents in SVES air streams. If the isotherm (absorption capacity) is good, this is the best method to remove chlorinated solvents. In the case of low molecular weight chlorinated solvents this isotherm is not very good. In these cases other mechanisms must be used for removal of pollutant gas. The alternative to adsorption/absorption is to have the gas adsorbed into a substrate and have a chemical reaction to neutralize or oxidize the pollutant. This mechanism is understood to be chemisorption.

Potassium permanganate is a very good chemical to perform both the neutralization and oxidation process in air. According to the specifications provided by USFilter, when potassium permanganate is hydrated it will form three compounds. These compounds are potassium hydroxide, manganese tetraoxide, and manganese dioxide. In the case of vinyl chloride, the manganese tetraoxide will oxidize the vinyl chloride into potassium chloride and carbon dioxide. The potassium chloride will remain in the pore structure of the substrate that contains the hydrated potassium permanganate.

The manufacturer impregnates a molecular sieve of zeolite with 6% by weight potassium permanganate. This media is called HS-600. Field applications with this media in vinyl chloride from air streams have proven to be efficient and economically better than that of granular activated carbon. The field studies have shown that approximately two-pounds of vinyl chloride will be removed by 1.0 cubic feet of HS -600 media. In some instances this rate was 2.5-pounds of vinyl chloride per 1.0 cubic feet of HS-600 media. In these field studies the spent media has tested out to not pose a hazardous waste and was disposed of in a land fill.

Air purification canisters filled with granular activated carbon work best on VOCs with molecular weights that are above 100. The molecular weight of vinyl chloride is 62.50 and is removed from the SVES exhaust stream inefficiently.

To remove vinyl chloride from the exhaust stream in the proposed SVES each air purification canister subsystem will consist of four air purification canisters connected in series. The first two canisters will contain coconut shell based granular activated carbon and will be used to clean the SVES exhaust of most VOCs except vinyl chloride. The third and fourth canister, will be filled with 1,000-pounds of potassium permanganate.

The third and fourth canisters use a chemisorption process that neutralizes and oxidizes vinyl chloride in the SVES exhaust stream. The supplier of the canisters for cleaning vinyl chloride from the exhaust stream will be USFilter Westates, Elizabeth, New Jersey.

During the January 2001 SVES pilot test startup, an air bag sample was collected at a sample port just before the air purification canister filled with granular activated carbon. The laboratory analysis of this sample detected an elevated concentration of vinyl chloride ( $38.4 \text{ mg/m}^3$ ) being emitted from the sample point.

Given a vinyl chloride concentration at SVES system startup of  $38.4 \text{ mg/m}^3$  and an estimated flow rate of 160 SCFM, USFilter recommends using two 1,000-pound containers of potassium permanganate, connected in series, to purify the emissions of vinyl chloride (two for each SVES subsystem exhaust).

A total of 17 extraction wells will be installed to remediate the contaminated areas on-site. The approximate locations of the 17 extraction wells are indicated on Figure 1, and they are designated XI through X17. Thirteen extraction wells will be installed inside the building and four extraction wells will be installed at strategic locations outside the northern side of the building. In addition, pressure gauges, vacuum indicators flow meters and flow control valves will be installed at strategic system locations to control and monitor SVES functional operations.

Generally, the extraction wells will be 2-inch diameter slotted PVC pipes installed to a depth below the building floor of approximately 5-feet. The exterior extraction wells will be similarly installed. The extraction wells will be screened from approximately 1 to 4-feet below the floor or exterior grade. The extraction wells will be installed by hand digging and the excavated soils will be placed in drums and transported offsite for disposal.

To meet NYSDEC clean air standards, it is anticipated that the exhaust air from the proposed SVES will be processed through four air purification canisters connected in series. The first two canisters will be charged with granular activated carbon and the third and fourth will be charged with potassium permanganate. Exhaust air samples will be collected periodically in Tedlar air sampling bags and delivered to a New York State certified laboratory for analysis.

During system startup and shakedown the flow control valves of the SVES will be set to activate a limited number of extraction wells for a number of days. A hand held photoionization detector (PID) and gas vapor detector tubes will be used to periodically monitor strategic sampling ports within the SVES. After the system startup and shakedown period is completed, the monitoring schedule described in Section 5.1 will be used to inspect and monitor the SVES operation.

When it is determined that the contaminated gas vapor exhausted from the activated extraction wells has decreased appreciably, more extraction wells will be activated and their exhaust vapors will be added to the gas vapor stream. This cycle will be repeated until all of the extraction wells have been activated. The aforementioned cycle will continue until it is determined that the soils in the area of specific extraction wells are within acceptable concentrations for VOCs in soil.

#### 4.1 Soil Vapor Extraction Effectiveness

On September 27, 1999, AEL used a 2.0-HP regenerative blower to perform a radius of influence (ROI) test below the garage floor of the building at 525 Ray Street. The ROI is defined as the distance from the extraction well to a location where a vacuum of at least 0.10-inches of water column (in. w.c.) is observed. During this test, the blower was connected to existing Piezometer 4 and a vacuum gauge was sequentially attached to each of five newly installed one-inch diameter piezometers. The new piezometers were installed to a depth of 5-feet below the floor surface and at 4-foot increments along a straight line radiating northwest from Piezometer 4. The recorded results of the test are listed in Table 1 and the ROI was determined to be approximately 8-feet.

An examination of the soil boring logs associated with the installation of borings and monitoring wells at 525 Ray Street demonstrated that the soils immediately below the building floor are comprised of course sand to a depth of approximately 3-feet below the floor. At some interior boring locations, bog material was found from 3 to 4-feet below the floor. AEL concluded that soil vapor extraction could be effective in these types of soil.

An examination of the vapor pressure and boiling point for tetrachloroethene and trichloroethene determined that soil vapor extraction could effectively remove these compounds from the soils below the building floor at 525 Ray Street.

<u>Compound</u>	<u>Vapor Pressure</u> (mm Hg)	<u>Boiling Point</u> (Deg. C)
Tetrachloroethene	14	121
Trichloroethene	57	87

According to EPA literature for evaluating SVE effectiveness, vapor pressure is the most important constituent characteristic in evaluating the applicability and potential effectiveness of an SVES. The vapor pressure of a constituent is a measure of its tendency to evaporate. More precisely, it is the pressure that a vapor exerts when in equilibrium with its pure liquid or solid form. Constituents with higher vapor pressures

are more easily extracted by SVE systems. Those with vapor pressures higher than 0.5 mm Hg are generally considered amenable for extraction by SVE.

Because the boiling point of a compound is a measure of its volatility, the applicability of soil vapor extraction to a compound can be estimated from its boiling point. In general compounds with boiling points less than 250 degrees to 300 degrees centigrade are sufficiently volatile to be amenable to removal by SVE.

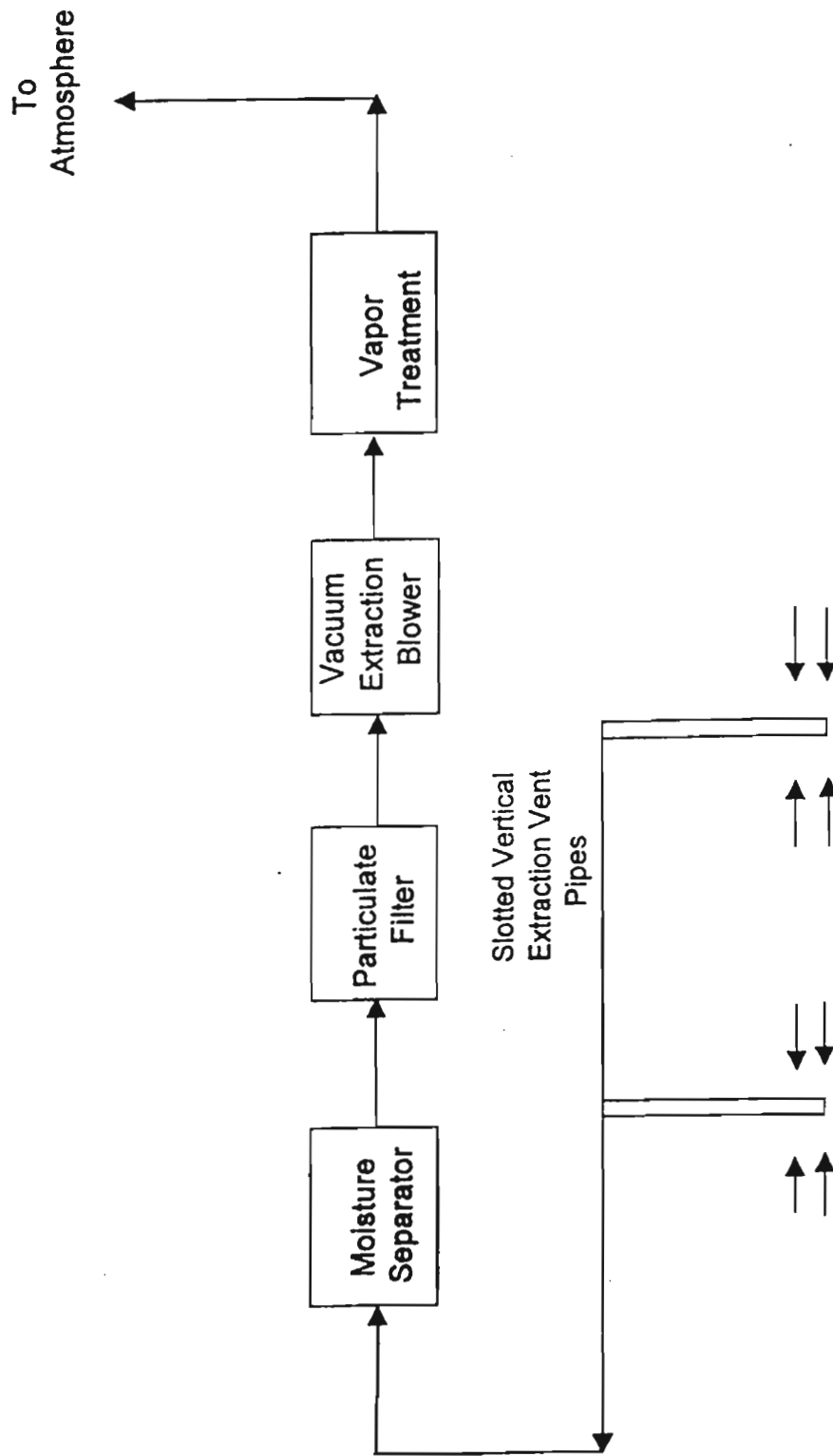
#### **4.2 Soil Vapor Extraction System Design**

The design of the proposed SVES is based on information gathered during tests performed in September 1999 to determine the radius of influence (ROI) for an on-site SVES. The tests determined that the ROI of the proposed SVES at the subject site is typically 8-feet. Given this information, extraction wells could theoretically be spaced 16-feet on center. Ideally, the 16-foot extraction well spacing would cover the entire spill area below the floor of the building. However, the unique building construction characteristics at 525 Ray Street may impact the well locations and theoretical design of the SVES. The design of the SVES and location of extraction wells must consider the thickness of the building's poured concrete floor that ranges from 8-inches to 24-inches at some locations. Additionally, the western portion of the building is supported by numerous poured concrete footings that are supported by wood pilings that extend in excess of 25-feet below grade.

Before finalizing the design of the SVES for remediating the three soil contaminated areas, AEL installed a single scaled back pilot test SVES in the garage of the building at 525 Ray Street. This SVES consisted of a regenerative blower, moisture separator, particulate filter, two extraction wells, air purification canisters and an exhaust stack along the north side of the building (Figure 4). The installation and operation of this SVES served as a valuable test bed for collecting site-specific final design information that was used to estimate the success criteria and efficiency of this remediation method.

The exact locations of the new SVES extraction wells will take into account the unique characteristics of the building construction at 525 Ray Street. It is likely that the theoretical position of certain extraction wells will change to accommodate the actual building details and machinery locations.

The horizontal profile of the soil contamination below the building floor at 525 Ray Street approximates a triangular shape. The base of the triangle measures approximately 85-feet in the northeast/southwest direction and the height of the triangle measures approximately 40-feet in the northwest/southeast direction. Based on this triangular approximation, the horizontal profile of the contaminated area is approximately 1700-square feet. Since the depth to groundwater is approximately 5-feet bgs, the volume of



Block Diagram  
of  
Pilot Test SVES  
for  
Nassau Uniform Services

Figure 4

soil contamination to be remediated by the SVES inside the building is approximately 8,500-cubic feet.

The soil contamination in the subsurface soil outside of the building's northern wall consists of two areas. A 7-foot radius circle can approximate the first area. The second area can be approximated by a rectangle measuring 7-feet in the north/south direction and 50- feet in the east/west direction. Based on the aforementioned approximations the total of the two exterior contaminated areas is 500 square feet. Since the depth to groundwater is approximately 5-feet, the volume of exterior soil contamination to be remediated by the SVES in those two areas is approximately 2,500-cubic feet.

During the ROI test performed in September 1999, AEL determined the most effective SVES wellhead vacuum to be approximately 50-inches of water column. At this vacuum, a flow of approximately 300 feet/min was measured at the exhaust (Table 1).

**TABLE 1**

**Radius of Influence Measurements**

Vacuum Inches of water	Influence 4-ft from extraction well	Influence 8-ft from extraction well	Influence 12-ft from extraction well	Influence 16-ft from extraction well	Influence 20-ft from extraction well	Flow ft/minute
38.25	1.23	0.03	0.01	0.0	0.0	400
40.0	1.40	0.17	0.02	0.005	0.0	350
50	2.21	0.21	0.03	0.0	0.0	300
60	2.63	0.29	0.04	0.0	0.0	250
67	3.14	0.30	0.04	0.0	0.0	200

Given the site ROI, the results of the SVES pilot tests, and the building construction limitations, AEL expects to install 13 extraction wells to address the soil contamination located below the building floor and 4 extraction wells to address the soil contamination along the north side of the building. The surface surrounding the extraction wells will be sealed using a layer of concrete mix. The installed 2-inch DIA extraction wells will be constructed with Schedule 40 PVC screened pipe. The screened portion will measure approximately 4-feet and will be No. 10 slotted PVC pipe. A short length of Schedule 40 PVC riser pipe will complete the well to the surface and beyond.

To install the interior extraction wells, the concrete floor will be broken and the soil below removed with a posthole digger or similar device. The excavated soil will be placed in steel drums for disposal off-site. Once the soil is removed, the extraction well piping will be fitted with a point and manually driven to the desired depth. The slotted section of the pipe will extend from approximately 1-foot below the floor surface (bfs) to approximately 4-foot bfs. The solid riser pipe will be connected to the slotted pipe and extend from 1-foot bfs to the floor surface where it will be connected to a PVC manifold

pipe that will in-turn be connected to a regenerative electrical blower. Depending on the locations of building walls and installed machinery, the manifold piping will consist of 2-inch or 4-inch DIA schedule 40 PVC pipe. The manifold piping coming out of the blower intake port will be metal and will extend for approximately 3-feet to avoid overheating that might occur to PVC piping.

The proposed SVES design for the Nassau Uniform Services Site will consist of two regenerative 3-HP 3-Phase electrical blowers. Initially, each blower unit will be used to power a separate SVE subsystem. Each SVE subsystem will consist of extraction wells, a moisture separator, a replaceable in-line particulate filter, an ambient air dilution valve, and air purification canisters. Each SVE subsystem will also be equipped with pressure gages, vacuum gages, in-line flow valves and meters, and flow control valves that will be installed at strategic locations to monitor and control system performance.

AEL's experience with the on-site pilot testing in January 2001 indicates that the air purification canisters to be used in the proposed SVES must be better than the Carbtrol Corporation Model G-2 that was used in that test. Initially, AEL plans to use four air purification canisters connected in series in each SVE subsystem. The first two canisters will be charged with granular activated carbon and the third and fourth will be charged with potassium permanganate.

The inspection and monitoring procedures described in Section 5.0 will provide emissions information at startup that can be used to ensure that no unacceptable emissions emanate from the SVES. However, if any odors complaints are received from local residents or employees or unacceptable emissions are detected the SVES will be shut down immediately and the air purification canister design will be modified or replaced. When odor complaints or unacceptable emissions result in an SVES shutdown, AEL will immediately notify NYSDEC.

The two blowers for the SVES will be supplied by Ametak Rotron TMD Industrial Products, Saugerties, New York and have the following general electrical characteristics:

Model No.	Rotron EN606M72ML, Explosion-Proof
Horsepower	3.0
Phase-Frequency	Three-60Hz
Voltage	208-230
Maximum blower amps	7.6
Inrush Amps (time zero)	60-54 (lasts for less than one second)
Maximum flow rate	200 SCFM
Maximum vacuum	75-inches of water gauge
Flow rate at 30 i.w.c.	160 SCFM (estimated operating condition)



Each blower will have an on/off power control switch equipped with thermal overload protection. Input power to each blower is approximately 3,000 watts.

A licensed electrician will install electrical power to each SVE subsystem blower unit. Later, when on-site soil conditions improve, one of the two subsystem blowers may be powered off, and, using installed flow control valves, all of the 17 extraction wells could be exhausted through the other SVE subsystem.

#### 4.3 SVES Pilot Test Results

On October 16, 2000 in accordance with an approved work plan, AEL began the installation of a Pilot Test SVES. The installed test SVES consisted of two 2-inch DIA PVC extraction wells, a moisture separator, a particulate filter, a 2-HP regenerative blower, air purification canisters, vapor flow meters, control valves and PVC piping to interconnect these components (Figure 4).

One extraction well is installed in the compressor room of the building. The second extraction well is installed in the garage area approximately 9-feet from the first well. These two extraction wells are located in an area known to have high concentrations of VOCs.

Each extraction well was installed to approximately 4.5-feet below the floor surface. The screened portion of each extraction well measures 48-inches and is No. 10 slot.

On January 10, 2001, the pilot test SVES was powered up and began continuous operation. Two Carbtrol G-2 Air Purification Canisters were installed in series with the SVES exhaust emission to the atmosphere.

On January 12<sup>th</sup> and 16<sup>th</sup>, the following pilot test SVES parameters were recorded:

<u>SVES Parameter</u>	<u>1/12/01</u>	<u>1/16/01</u>
Vapor flow at exhaust stack:	100 CFM	90 CFM
Pressure at input to air purification canisters:	24 psi	23 psi
Vacuum at garage extraction well head:	14 in. w.c.	12 in. w.c.
Vacuum at compressor room well head:	17 in. w.c.	18 in. w.c.
Vacuum at moisture separator:	20 in. w.c.	18 in. w.c.
PCE gas detector tube reading at canisters input:	110 ppm	22 ppm
PCE gas detector tube reading at exhaust:	3 ppm	16 ppm
Amount of liquid in moisture separator:	none	none

On January 12 and February 1, 2001, the vapor input to the air purification canisters was sampled using Tedlar air bags. Tedlar air bags were also used to collect vapor samples of

the SVES emission to the atmosphere. The sample bags were delivered to a state certified laboratory where they were analyzed for concentrations of VOCs using EPA Method 8260. Table 2 below lists the concentrations of VOCs in the samples that the laboratory detected above the protocol MDL.

The concentration units listed in the laboratory analytical reports for the samples collected on January 12<sup>th</sup> and February 1<sup>st</sup> are milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) and micrograms per cubic meter ( $\text{ug}/\text{m}^3$ ), respectively. For ease of comparison, the units for the VOC concentrations listed in Table 2 have been converted to  $\text{mg}/\text{m}^3$ . The Laboratory report for the samples collected on January 12<sup>th</sup> was available at AEL on January 25<sup>th</sup>. The laboratory report for the samples collected on February 1<sup>st</sup> was available at AEL on February 12<sup>th</sup>. The complete laboratory analytical reports for the collected air bag samples are in Appendix 2.

Laboratory analysis of collected exhaust emissions indicated that elevated concentrations of VOCs were present in the emissions to the atmosphere. Consequently, electrical power to the Pilot Test SVES was turned off and the pilot test was terminated.

**Table 2**

**Concentrations of Detected VOCs *Before* Air Purification Canisters**

<u>Compound</u>	<u>Sample Date</u> 1/12/01 ( $\text{mg}/\text{m}^3$ )	<u>Sample Date</u> 2/01/01 ( $\text{mg}/\text{m}^3$ )
Vinyl Chloride	38.4	0.318
t-1,2-Dichloroethene	8.4	0.094
c-1,2-Dichloroethene	373	6.14
Trichloroethene	537	4.49
Tetrachloroethene	10,200	127
m & p Xylene	nd	0.0485
1,2,4-Trimethylbenzene	nd	0.029

nd = not detected

**Table 2 (cont.)**  
**Concentrations of Detected VOCs After Air Purification Canisters**

<u>Compound</u>	<u>Sample Date</u> 1/12/01 (mg/m <sup>3</sup> )	<u>Sample Date</u> 2/01/01 (mg/m <sup>3</sup> )
Vinyl Chloride	24.7	0.286
t-1,2-Dichloroethene	nd	0.087
c-1,2-Dichloroethene	1.96	5.59
Trichloroethene	0.90	4.29
Tetrachloroethene	2.90	160

nd = not detected

On January 31<sup>st</sup>, to measure the ROI of the pilot test SVES, two temporary piezometers were installed in the vicinity of the pilot test SVES extraction wells. One piezometer was installed approximately 10-feet from the compressor room extraction well and the second piezometer was installed approximately 5-feet from the garage extraction well. Each of the 1-inch DIA PVC temporary piezometers was installed to approximately 4-feet below the floor surface. The screened portions of the two piezometers are No. 10 slot.

The individual extraction well vapor flow control valves were used to turn off the vacuum pressure to each of the wells. The following Table 3 lists the results of the ROI measurements.

**Table 3**

**SVES Pilot Test ROI Results**

<u>Extraction Well</u> <u>Location</u>	<u>Piezometer</u> <u>at 5-feet</u> (in. w.c.)	<u>Piezometer</u> <u>at 10-feet</u> (in. w.c.)
Compressor Room and Garage ON	0.40	0.03
Compressor Room OFF Garage ON	0.40	0.09
Compressor Room ON Garage OFF	0.40	0.09

Based on the above listed pilot test SVES measurements and similar measurements performed in 1999, AEL estimates that the ROI for the pilot test SVES is 8-feet.

**4.4 Trade Study for Removing Vinyl Chloride From the SVES Exhaust Stream**  
 An SVES pilot test was performed on-site in January 2001. Laboratory analysis of a system startup air bag sample collected at a sampling point located before the granular

activated carbon canister detected elevated concentrations of vinyl chloride ( $38.4 \text{ mg/m}^3$ ). Laboratory analysis of system startup air bag sample collected after the canister detected a concentration of vinyl chloride that was  $24.7 \text{ mg/m}^3$ . These laboratory results illustrate that granular activated carbon does not efficiently remove vinyl chloride from the SVES exhaust air stream.

Eighteen days later the laboratory analysis of the air samples collected before and after the granular activated carbon canister indicated that the concentration of vinyl chloride before and after the canister had decreased considerably to  $0.318 \text{ mg/m}^3$  at the input and  $0.286 \text{ mg/m}^3$  at the canister output.

A review of the aforementioned data illustrated that the granular activated carbon used to filter the SVES emissions did a poor job at adsorbing vinyl chloride emissions. In order to address this issue, AEL investigated the use of the following methods for removing vinyl chloride from the SVES exhaust stream:

- Granular Activated Carbon Canister
- Catalytic Oxidation
- Thermal Oxidation
- Potassium Permanganate Canister

#### **4.4.1 Granular Activated Carbon Canister**

Adding additional in series canisters filled with granular activated carbon was considered to remove vinyl chloride from the SVES exhaust air stream. However, vinyl chloride has a low molecular weight compared to other chlorinated volatile organic compounds and is adsorbed poorly by granular activated carbon. This was clearly demonstrated by the laboratory analytic results of the pilot tests on-site in January 2001. It was determined that the vinyl chloride concentration at startup could be too high for granular activated carbon canisters to have any appreciable impact on SVES emissions.

Therefore, this method for removing vinyl chloride from the SVES exhaust air stream was judged to be ineffective.

#### **4.4.2 Catalytic Oxidation**

Catalytic oxidation was also considered in the cost/benefit analysis trade study. Falmouth Products, Inc. was contacted for information regarding their Falco 300 Catalytic Oxidizer that treats air streams contaminated with VOCs including vinyl chloride. According to the Falco 300 specifications, the unit is portable and provides VOCs destruction efficiencies of up to 99% provided that the VOCs concentrations do not exceed approximately 2,000 ppm (parts per million). The unit destroys the VOCs by heat destruction with temperatures ranging from 300 to 600°C. The cost for the unit is

approximately \$40,000. As a byproduct of the oxidation process, hydrochloric acid is produced which needs to be treated separately with an air scrubber which costs an additional \$30,000.

Since the concentrations of VOCs at the Nassau Uniform Services site will likely exceed 2,000 ppm, this method for removing vinyl chloride from the SVES exhaust air stream would be insufficient at startup and its installation cost is judged very expensive.

#### **4.4.3 Thermal Oxidation**

Alzeta Corporation was contacted for information regarding their Edge QR™ which is a flameless thermal oxidizer for chlorinated VOCs. Based on the specifications provided by Alzeta, it appears that their equipment could effectively remediate VOC emissions of all kinds without producing hydrochloric acid by products. By products that are produced from their system include nitrous oxide and carbon monoxide emissions at 10 ppm or less. The cost for such a unit would be approximately \$100,000 to \$150,000.

This method for removing vinyl chloride from the SVES exhaust air stream was judged to be very expensive when compared with a potassium permanganate canister.

#### **4.4.4 Potassium Permanganate Canister**

A description of how potassium permanganate removes vinyl chloride from the SVES gas vapor air stream is contained in Section 4.0. The supplier of the proposed canister filled with potassium permanganate is USFilter Westates, Elizabeth, New Jersey. According to the supplier, if the SVES gas vapor exhaust contains a vinyl chloride concentration of 38.4 mg/m<sup>3</sup> for an indefinite period and the flow rate of the exhaust is 160 SCFM the 1,000-pound canister of potassium permanganate should last over 70-days before breakthrough is observed.

The initial cost for each 1,000-pound unit of potassium permanganate is approximately \$5,000. Since four of these units will be required (two for each SVES subsystem) the total cost is \$20,000.

Each proposed SVE subsystem will be installed with two coconut shell based granular activated carbon canisters preceding the two potassium permanganate canisters. The 1,000-pound granular activated carbon canisters also will be supplied by USFilter Westate at a cost of \$4,000 each.

The use of a granular activated carbon canisters followed by a potassium permanganate canisters is the method of choice because initial costs are much less than other methods considered for removing vinyl chloride from the SVES gas vapor exhaust.

#### 4.4.5 Cost Analysis Summary

A summary of the equipment installation costs associated with the trade study for the three methods considered for removing vinyl chloride from the SVES air stream exhaust are listed below.

- |   |                        |
|---|------------------------|
| • Coconut shell based granular activated carbon canister<br>plus potassium permanganate canister at startup | \$36, 000              |
| • Catalytic Oxidation   | \$70,000               |
| • Thermal Oxidation   | \$100,000 to \$150,000 |

### 5.0 Soil Vapor Extraction System Operation and Monitoring

This section presents an overview of the SVES operation and monitoring program and describes the monitoring schedule for the startup and following near term periods.

#### 5.1 Overview of SVES Operation and Monitoring Program

During the initial startup of the SVES, electrical power will be supplied to the blowers of the two subsystems. The flow control valve associated with each extraction well will be manually adjusted to approximately 25 percent of full open position to limit the volume of contaminated vapor being exhausted from each well. Simultaneously, the exhaust emission from the air purification canisters will be monitored with both Gastec gas detection tubes and a calibrated photoionization detector (PID) instrument. Separate gas detection tubes will be used for tetrachloroethene and vinyl chloride. If a gas detector tube or the PID indicates that contaminated gas vapor emissions are emanating from the air purification canisters, the power to the associated subsystem will be immediately turned off.

The following Gastec gas vapor detection tubes will be used to determine if tetrachloroethene or vinyl chloride is being emitted from the air purification canisters and into the exhaust stream:

- |                     |                       |                |
|---------------------|-----------------------|----------------|
| • Tetrachloroethene | Range: 0.1 to 9 ppm   | Part No. 133LL |
| • Vinyl Chloride    | Range: 0.25 to 70 ppm | Part No: 131LB |

Adjustments will then be made to the subsystem to determine which extraction well or wells are exhausting the contaminated vapors that are causing breakthrough in the air purification canister. The extraction well flow control valves will be adjusted so that no contaminated gas emissions emanate from the air purification canisters. The ambient air dilution valves may also be used to reduce the concentrations of gas vapors entering the input to the canisters. This monitoring and adjusting will continue until the subsystems of the SVES are stable and exhaust gas emissions are undetectable.

The aforementioned SVES startup technique has been successfully used by AEL at numerous other sites that were contaminated with tetrachloroethylene. Generally, this approach determines which extraction wells are contributing most of the contaminated gas vapors and their exhaust output volume is reduced until the system is stabilized. Very often the exhaust gas from several extraction wells in a subsystem must be closed off for a period of time until it is determined that more wells can be added to the exhaust stream.

If the startup phase results in a one or more exhaust wells being kept off line, the first seven days of Inspection and Monitoring will be repeated whenever a new well is added into the system operation.

One of the SVES subsystems at the Nassau Uniform Services site will be designed to service eight extraction wells. The other subsystem will service nine extraction wells. Initially, it is anticipated that not all of these wells will be exhausted at once. However, in time it is expected that all of the extraction wells will be exhausted simultaneously by the subsystems.

Three different methods will be used to monitor the operation of the SVES and its two subsystems at strategic sampling points. One method will use Tedlar air bags to collect gas vapor samples at specific sampling ports for laboratory analysis. The second method, a field screening test, utilizes individual Gastec precision gas detector tubes to sample for concentrations of tetrachloroethylene (PCE) and vinyl chloride (VC) gas vapors at particular sampling ports. The third method, also a field screening test, uses a calibrated Thermo Environmental Instruments, Inc. Organic Vapor Meter, Model 580B, a photoionization detector (PID), to measure the concentration of total VOCs in the gas vapor at specific sampling ports.

Since the PID works by moving a fixed flow rate of air past an ionization lamp, the monitoring of SVES gas vapors at the inputs and outputs of the air purification canisters will be performed using a clean Tedlar air bag. First the air bag will be filled with gas vapor from the sampling port and then the PID will be used to sample the gas vapor in the air bag. Placing the PID sampling probe directly into an air stream emanating from the SVES may result in inaccurate measurements.

The laboratory analysis of the Tedlar air bag samples will be analyzed for concentrations of VOCs using EPA Method 8260 with ASP Category B Deliverables. The reported concentrations will be compatible with the specified analytical test method detection limit (MDL).

Unless otherwise specified, the Gastec tetrachloroethylene gas detector tubes will have a detection range of 0.1 to 9 ppm. The Gastec vinyl chloride gas detector tubes will have a detection range of 0.25 to 70 ppm.

The OVM Model 580B uses a PID to detect concentrations of total organic vapors with an operating range of 0 to 2,000 ppm and has a minimum detectable concentration of 0.1 ppm.

During the first three days of the startup phase of operating the SVES and its subsystems, the SVES will be monitored at least twice each day using gas detector tubes and the 580B PID instrument.

On Day 4 through Day 7 the gas detector tubes and the 580B PID instrument will be used to monitor the SVES operation at least once each day.

If the daily monitoring of the SVES for the first seven days of operation indicates acceptable emissions emanating from the output of the air purification canisters and the SVES is operating properly, the frequency of SVES monitoring with detector tubes will be reduced.

On Day 8 through Day 30 the SVES inspection and monitoring will be performed on a twice per week schedule. Table 4 lists the days when SVES inspection and sampling are scheduled during the first 30 days of SVES operation.

On Day 31 the SVES inspection and monitoring will be performed. The PID and gas detector tubes will be used for field measurements and air bag samples will be collected for laboratory analysis. The air bag samples will be collected from the sampling ports located at the input and output of the air purification canisters. The air bag samples will be delivered to an ELAP laboratory where they will be analyzed for VOC concentrations using EPA Method 8260 with ASP Category B deliverables.

On Day 32 through Day 60 the SVES inspection and monitoring will be performed at least once per week. Monitoring will be performed on-site using the PID and gas detector tubes. During this period the predicted life of the SVES air purification canisters must exceed 14 days.

If the SVES is operating properly after the first 60 days and the estimated life of the air purification canisters is more than 30 days, a further reduction in the frequency of inspection and monitoring will be scheduled with approval of the NYSDEC. Under the aforementioned conditions the inspection and monitoring will be scheduled every 30 days.



After day 60 the SVES inspection and monitoring will be performed at least once per month. During the once per month inspection air bag samples will be collected be collected from the sampling ports located at the input and output of the air purification canisters. During this period the predicted life of the SVES air purification canisters must exceed 30 days.

The concentrations of VOCs in the vapor stream and the flow rate will be used to predict the approximate time before breakthrough occurs in the air purification canisters that contain granular activated carbon. AEL and the air purification canister manufacturer will determine the predicated breakthrough time based on measured concentrations of VOCs, and airflow. A similar prediction will be performed for the potassium permanganate canisters. Spare canisters will be stored on-site and AEL will change the air purification canisters before the predicted breakthrough time occurs.

Air samples will be collected in Tedlar air bags and submitted to an ELAP certified laboratory for analysis to determine the concentrations of VOCs and methane using EPA Method 8260 with ASP Category B Deliverables and gas chromatograph (GC) techniques, respectively. These samples will be collected from the exhaust side of the SVES system at the sampling ports located before, in-between and after the air purification canisters. The laboratory analyses will detect individual contaminants and methane in the effluent of the SVES. The concentrations of the individual contaminants detected by laboratory analyses will be used to calculate the quantity of individual compounds that have been removed from the soils on-site. These calculations will be performed on a monthly and cumulative basis.

The PID recorded readings will be used to estimate the concentration of total VOCs being removed from the soils on a monthly basis. The total VOCs being removed from each extraction well will be estimated by using a sampling vacuum pump at a sampling port associated with each extraction well. PID readings will then be used to measure the concentration of total VOCs being removed from the soil at the sampled extraction well.

## **5.2 SVES Monitoring Schedule**

The operation of the SVES will be periodically monitored to measure its effectiveness for removing contamination from the soil, and to ensure that the operation of system is in compliance with applicable rules and regulations. Table 4 below lists the SVES inspection and monitoring schedule for Day 1 through Day 60 and beyond.

Table 4

### Inspection and Monitoring Schedule

Day No.	Time of Day	Visual Inspection	PID	Detector Tube	Air Bags	Notes:
1	am + pm	yes	yes	yes	yes -am	twice per day
2	am + pm	yes	yes	yes		twice per day
3	am + pm	yes	yes	yes		twice per day
4	am	yes	yes	yes		once per day
5	am	yes	yes	yes		once per day
6	am	yes	yes	yes		once per day
7	am	yes	yes	yes		once per day
8 to 30	am	yes	yes	yes		twice per week
31	am	yes	yes	yes	yes -am	
32-60	am	yes	yes	yes		once per week canisters must last more than 14 days
61 plus		yes	yes	yes	yes -am	once per month canisters must last more than 30 days

The results of PID readings, gas detector tube readings, and other field measurements will be recorded on SVES System Status log sheets. The log sheets will list the active extraction wells, vacuum and pressure readings, and air flow meter readings at specific sample and monitoring points in the SVES. The log sheets will be returned to AEL each day and will be stored chronologically in a ringed binder. The actual system status sheet will be designed after SVES installation. However, a typical status sheet for an SVES with up to eight installed extraction wells (EW) is in Appendix 3.

The following subsections describe the periodic schedules, measurements, and sampling that will be recorded during the operation of SVES.

#### 5.3 SVES Inspection and Monitoring Day 1 through Day 3

The following items shall be performed twice per day; once in the morning and once in the late afternoon:

1. Record flow rate and vacuum reading for each extraction well.
2. Record flow rate at input and output of each blower.
3. Record flow rate at input and output of air purification canisters.
4. Record the vacuum reading and flow rate at the input to the blowers.
5. Record pressure and flow rate at the output of the blowers
6. Record flow rate at the SVES exhaust stack.

7. Record vacuum reading at the output to the moisture separator.
8. Record temperature, PID, PCE and VC gas detector tubes readings from the blower exhaust
9. Record temperature, PID, PCE and VC gas detector tubes readings from the air sampling port located at the output of first air purification canister.
10. Record temperature, PID, PCE and VC gas detector tubes readings from the air sampling port located at the system exhaust stack.
11. Record the Moisture Separator water level and drain if necessary.
12. Collect air bag samples for laboratory analysis once on Day 1.

#### **5.4 SVES Inspection and Monitoring Day 4 through Day 7**

The following items shall be performed once per day:

1. Record flow rate and vacuum reading for each extraction well.
2. Record flow rate at input and output of each blower.
3. Record flow rate at input and output of air purification canisters.
4. Record the vacuum reading and flow rate at the input to the blowers.
5. Record pressure and flow rate at the output of the blowers
6. Record flow rate at the SVES exhaust stack.
7. Record vacuum reading at the output to the moisture separator.
8. Record temperature, PID, PCE and VC gas detector tubes readings from the blower exhaust
9. Record temperature, PID, PCE and VC gas detector tubes readings from the air sampling port located at the output of first air purification canister.
10. Record temperature, PID, PCE and VC gas detector tubes readings from the air sampling port located at the system exhaust stack.
11. Record the Moisture Separator water level and drain if necessary.

#### **5.5 SVES Inspection and Monitoring Day 8 through Day 30**

The following items shall be performed twice each week:

1. Record flow rate and vacuum reading for each extraction well.
2. Record flow rate at input and output of each blower.
3. Record flow rate at input and output of air purification canisters.
4. Record the vacuum reading and flow rate at the input to the blowers.
5. Record pressure and flow rate at the output of the blowers
6. Record flow rate at the SVES exhaust stack.
7. Record vacuum reading at the output to the moisture separator.
8. Record temperature, PID, PCE and VC gas detector tubes readings from the blower exhaust
9. Record temperature, PID, PCE and VC gas detector tubes readings from the air sampling port located at the output of first air purification canister.

10. Record temperature, PID, PCE and VC gas detector tubes readings from the air sampling port located at the system exhaust stack.
11. Record the Moisture Separator water level and drain if necessary.

### **5.6 SVES Inspection and Monitoring Day 31**

The following items shall be performed on Day 31 of SVES operation:

1. Record flow rate and vacuum reading for each extraction well.
2. Record flow rate at input and output of each blower.
3. Record flow rate at input and output of air purification canisters.
4. Record the vacuum reading and flow rate at the input to the blowers.
5. Record pressure and flow rate at the output of the blowers
6. Record flow rate at the SVES exhaust stack.
7. Record vacuum reading at the output to the moisture separator.
8. Record temperature, PID, PCE and VC gas detector tubes readings from the blower exhaust
9. Record temperature, PID, PCE and VC gas detector tubes readings from the air sampling port located at the output of first air purification canister.
10. Record temperature, PID, PCE and VC gas detector tubes readings from the air sampling port located at the system exhaust stack.
11. Record the Moisture Separator water level and drain if necessary.
12. Collect air bag samples for laboratory analysis.
13. Confirm that estimated life of the air purification canisters exceeds 14 days.

When sufficient laboratory analytical data is available compare the results of field measurements using PID and gas detector tubes with the laboratory results.

### **5.7 SVES Inspection and Monitoring After Day 60**

The following items shall be performed once each month:

1. Record flow rate and vacuum reading for each extraction well.
2. Record flow rate at input and output of each blower.
3. Record flow rate at input and output of air purification canisters.
4. Record the vacuum reading and flow rate at the input to the blowers.
5. Record pressure and flow rate at the output of the blowers
6. Record flow rate at the SVES exhaust stack.
7. Record vacuum reading at the output to the moisture separator.
8. Record temperature, PID, PCE and VC gas detector tubes readings from the blower exhaust
9. Record temperature, PID, PCE and VC gas detector tubes readings from the air sampling port located at the output of first air purification canister.
10. Record temperature, PID, PCE and VC gas detector tubes readings from the air sampling port located at the system exhaust stack.

11. Record the Moisture Separator water level and drain if necessary.
12. Collect air bag samples for laboratory analysis.
13. Confirm that estimated life of the air purification canisters exceeds 30 days.

Tedlar air bag samples will be submitted to an ELAP certified laboratory for analysis using EPA Method 8260 with ASP Category B Deliverables and methane gas analysis using gas chromatograph methods.

To minimize system downtime, AEL will ensure that an adequate supply of air purification canisters is stored on-site. If it is determined that possible breakthrough of the canisters is being approached, AEL will immediately replace the canisters.

To monitor the usable life of the air purification canisters, daily air sampling for VOCs will be performed before, between and after the carbon filtering units using a PID and gas detector tubes that measure PCE and VC concentrations. Following the system's startup/shutdown period, the frequency of the sampling will be changed to the schedule stated above.

### **5.8 SVES Shutdown Criteria**

At SVES startup and during normal system operation, AEL will use Division of Air Resources (DAR) Short-Term One Hour Guideline Concentration (SGC) contaminant level for vinyl chloride as shutdown criteria for turning the SVES system off. According to DAR-1 dated July 12, 2000, the SGC level for tetrachloroethene is 1,000 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) and for vinyl chloride is 180,000  $\mu\text{g}/\text{m}^3$ . This equates to a concentration level of approximately 1 ppm (parts per million) for tetrachloroethene and 70 ppm for vinyl chloride. Gas detector tubes and air bag samples will be used to monitor the exhaust emissions periodically.

The SVES will be shut down immediately if any emission odor complaints are received from employees or neighbors.

AEL will notify NYSDEC whenever the SVES is turned off because exhaust levels exceed the SGC, complaints are received regarding air quality, or the laboratory analysis of air bag samples of the exhaust stream report that SGC levels of tetrachloroethene or vinyl chloride have been exceeded.

### **6.0 Soil Sampling**

When laboratory analysis of air samples from each of the extraction wells indicates that the vapor emissions from the wells are no longer achieving significant contaminant mass removal rates, then soil and soil vapor samples will be collected to determine the effectiveness of the SVES for removing VOC contamination from the soils on-site. The

soil samples will be collected within the radius of influence of the extraction wells to determine if the soils have been cleaned to levels that would allow that extraction well to be removed from service. The soil samples will be collected and submitted to an ELAP certified laboratory and analyzed using EPA Method 8260 with ASP Category B Deliverables to determine the residual concentrations of VOCs in the soil.

To determine the concentration of VOC vapors within the radius of influence of the extraction wells, soil vapors will be collected in the vadose zone of the contaminated area. The soil vapor will be field screened with a PID and collected in a Tedlar bag and submitted to an ELAP certified laboratory for analysis using EPA Method 8260 with ASP Category B Deliverables for concentrations of VOCs. Since the state or local agencies have not published guidelines for allowable soil gas vapors, the laboratory results will be submitted to NYSDEC for review and comment.

## **7.0 Maintenance Procedure**

This section describes the procedure for applying and disengaging electrical power to SVES blowers and maintenance of the SVES moisture separators, particulate filters and air purification canisters. The SVES operational checks are specified in Section 5 and are part of the system inspection and monitoring.

### **7.1 Electrical Power On/Off Control**

A dedicated electrical starter switch for the SVES blowers will be mounted on the wall of the Nassau Uniform Services garage. The starter switch will be magnetically operated and will have a START control pushbutton and a STOP control pushbutton. The starter switch front panel also contains a reset pushbutton that is used to reset the internal controls of the starter switch. Depressing the START pushbutton connects electrical power to the SVES blower that immediately begins to rotate and attains full rotational speed within a few seconds. Depressing the STOP pushbutton disconnects electrical power from the blower and it stops rotating within a few seconds.

### **7.2 Moisture Separator**

Before checking the amount of liquid in the SVES moisture separator, turn off the electrical power to the blower. To remove liquid from the moisture separator drum, connect a hose to the valve fitting at the bottom of the drum. Then open the valve and drain the drum into a 5-gallon plastic bucket. Empty the bucket into a 55-gallon drum located on-site. The 55-gallon drum has a watertight cover and its contents are stored on-site for appropriate disposal at a later date. After emptying the moisture separator drum, close the drain valve and restart the SVES blower.

### **7.3 Particulate Filter**

In accordance with the schedule listed in Table 4, inspect the particulate filter located in the line between the moisture separator and the SVES blower. After turning off the electrical power to the SVES blower, remove the cover of the particulate filter and inspect the internal filter element for dust and moisture content. The filter element should be either cleaned or replaced depending on its condition.

### **7.4 Air Purification Canisters**

The air purification canisters manufacturer recommends no periodic maintenance procedure for those units.

### **8.0 Air Modeling**

The exhaust emissions air modeling is being prepared by NYSDEC. When available the air modeling will be included as an addendum to this work plan.

### **9.0 Waste Manifests**

Copies of waste manifests for hazardous and non-hazardous waste material removed from the site will be forwarded to the NYSDEC as they become available. These manifests will include those associated with the disposal of drill cuttings, carbon from air filters, and condensate collected from the SVES moisture separator.

### **10.0 Reports**

Progress reports will be submitted to NYSDEC each month to demonstrate that the SVES is operating in compliance with this work plan.

The monthly progress report will include the results of air monitoring and system performance. The report will include discussions of any required system repairs including air purification canister changes. The quantity of condensate water removed from the system moisture separators will also be reported. Copies of the appropriate disposal documentation for soil, carbon and condensate water shall be submitted as part of the monthly report. The report will also describe the units of the system that were operating during the report period.

The first monthly report shall include as-built diagrams of the SVES.

The first monthly report shall include an evaluation of the SVES performance and include proposed modifications to the system design and monitoring schedule, if

warranted. If the SVES ambient air dilution valves are used at start-up to reduce exhaust concentrations, this condition shall be reported in the monthly report.

The results of the SVES daily, weekly, and monthly checks/tests will be summarized in quarterly reports that will be submitted to NYSDEC. The reports will include tables and/or graphs presenting the baseline concentrations measured before the startup of the SVES system and the monthly results acquired thereafter. The quarterly report will discuss the results of any soil and/or soil gas sampling. In addition, estimates will be made of the mass of contaminants that have been removed by the system.

#### **11.0 Quality Assurance/Quality Control Plan**

The Work Plan for the installation and operation of the SVES will comply with the existing Quality Assurance/Quality Control Plan for the Nassau Uniform Services property as described in the Focused Remedial Investigation Work Plan filed with NYSDEC and dated March 25, 1997.

#### **12.0 Health and Safety Plan**

The Work Plan for the installation and operation of the SVES will comply with the existing health and Safety Plan for the Nassau Uniform Services property as described in the Focused Remedial Investigation Work Plan filed with NYSDEC and dated March 25, 1997.



**13.0 Project Schedule**

The proposed SVES project schedule is planned in two phases. In Phase 1 the SVES components will be installed at the Nassau Uniform Services site and preliminary startup testing will be completed. After the preliminary SVES testing is completed, AEL will demonstrate the operation of the system to the NYSDEC project manager.

In Phase 2, the SVES will be inspected and monitoring in accordance with the schedule described in Section 5.0 of this plan.

The following is a list of the Phase 1 SVES project installation and startup events and the schedule to complete each event (weather and tide permitting). The schedule indicates that the start of SVES preliminary testing begins nine weeks after NYSDEC approves the SVES Work Plan. After two weeks of preliminary testing by AEL, the operation of the SVES will be demonstrated to NYSDEC. With NYSDEC approval, continuous operation of the SVES will begin 12 weeks after approval of the Work Plan.

Monthly project status reports will be submitted to NYSDEC on a monthly basis after Nassau Uniform Services, Inc. receives approval of the SVES Work Plan from the State. The schedule does not provide for delays caused by inclement weather or conflicting tides.

**Work Schedule for Installation and Operation of the SVES  
at  
Nassau Uniform Services Property**

ARA = after receipt of Work Plan approval from NYSDEC

**Phase 1: Installation Phase**

<u>Project Events</u>	<u>Elapsed Time ARA + weeks</u>
NYSDEC approves Work Plan	0
AEL begins SVES installation	1
Extraction wells installation complete	4
Piping from wells to SVES blower location installed	6
Exhaust stack to building roof installed	6
Install SVES mechanical/electrical components	9
Install electrical service to SVES	9

<u>Project Events (cont.)</u>	<u>Elapsed Time ARA + weeks</u>
Complete SVES preliminary testing	11
Demonstrate SVES operation to NYSDEC	12
Begin SVES continuous operation	12
Total elapsed time to complete installation phase = 12 weeks	

**Phase 2: Operational Phase**

The SVES Operational Schedule includes the inspection and monitoring of system performance. The inspection and monitoring of SVES performance will be in accordance with Section 5.0 of this work plan.

**14.0 Certification**

The undersigned certifies that the attached Final Design Work Plan for a Soil Vapor Extraction System at Nassau Uniform Services revised and dated July 23, 2002, has been prepared under his supervision. The undersigned also certifies that all work described in this plan will be witnessed by the Project Engineer or by a person working under his supervision. The Project Engineer is a registered engineer as established under the regulations of the State of New York.



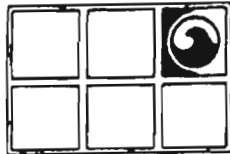
Date: 7/24/02



**Appendix 1**

**Groundwater Technologies, Inc.**

**1994 Sampling Data**



## GROUNDWATER TECHNOLOGY ®

# DRAFT

Groundwater Technol

101-1 Colin Drive, Holbrook, NY 117  
Tel: (516) 472-4000 Fax: (516) 47

October 14, 1994

Mr. Michael E. White  
Jaspan, Ginsberg, Schlesinger, et al  
300 Garden City Plaza  
Garden City, New York 11530-3324

Re: Summary Report for Additional Soil and Groundwater Investigation  
Nassau Uniform Service, Inc.

Dear Michael:

On September 23, 1994, Groundwater Technology, Inc. supervised the installation of six geoprobe points for the collection of soil and groundwater samples. A site map illustrating the locations of the points is presented as Figure 1.

Initially, a core drill was utilized to drill through the concrete floor in the building warehouse. The concrete ranged from approximately 4" - 6" in thickness. A quad mounted geoprobe unit then set up at each location and sampling procedures began. A total of three samples, each consisting of a 4-foot length core of soil, were extracted from each location. The samples were collected from depths of 0-4', 4-8', and 8-12' below grade. An open borehole to 12 feet below grade was thus created. Each core sample was field screened with a flame ionization detector (FID) for the detection of volatile organic compounds (VOCs). A summary of the FID results and lithologic descriptions is presented as Table 1. One soil sample with the highest FID results from each boring was submitted to EcoTest Laboratories of North Babylon, New York for analysis of VOCs by EPA Method 8010. A summary of the soil analytical results is presented as Table 2.

Upon coring to a depth of 12 feet below grade, groundwater samples were then collected. A drill rod fitted with a two foot length of stainless steel screen was fitted within each borehole from a depth of 10'-12' below grade. New polyethylene tubing fitted with a ball check valve was installed inside the drilling rods and screen and oscillated up and down to push a column of water to the top of the tubing. Approximately one standing water well volume was purged from each location prior to collecting the groundwater sample. The samples were submitted to EcoTest Laboratories for analysis of VOCs by EPA Method 601, chloride and sodium. A summary of the groundwater analytical results is presented in Table 3.

### Conclusions

The soil deposits at the site consist mainly of fine to medium sands with some clay and gravel, and marsh deposits located from five to eight feet below grade. Fill material was noted in GP-2 from grade to four feet. Groundwater was encountered at approximately seven feet below grade.

**DRAFT**

Mr. Michael E. White  
Jaspan, Ginsberg, Schlisinger, et al

October 14, 1994  
Page 2

As specified in the Division Technical and Administrative Guidance Memorandum (TAGM: #HWR-94-4046) Determination of Soil Cleanup Objectives and Cleanup Levels dated January 24, 1994, a total of two locations (GP-2 and GP-3) exceeded the cleanup objective for 1,2-Dichloroethene, three locations (GP-2, GP-3, and GP-5) exceeded the cleanup objectives for trichloroethylene, two locations (GP-2 and GP-3) exceeded the cleanup objective for tetrachloroethene, and two locations (GP-2 and GP-3) exceeded the cleanup objective for total volatile organic compounds.

Groundwater samples GP-2 through GP-6 exceeded the Class GA standards for those volatile organic compounds listed in Table 3. Specifically, GP-2 exceeded the class GA standard for tetrachloroethene, GP-3 exceeded the Class GA standard for vinyl chloride, 1,2-Dichloroethene, trichloroethylene, and tetrachloroethene, GP-4 exceeded the Class GA standard for vinyl chloride, 1,2-Dichloroethene, trichloroethylene, tetrachloroethene, and chlorobenzene, GP-5 exceeded the Class GA standard for 1,1-Dichloroethane, 1,2-Dichloroethene, trichloroethylene, and tetrachloroethene, and GP-6 exceeded the Class GA standard for 1,2-Dichloroethene, 1,1,1-Trichloroethane, trichloroethylene, and tetrachloroethene. GP-1 did not exceed any Class GA standard for volatile organic compounds. The Class GA standard for chloride was exceeded in GP-5 and sodium was exceeded in GP-1 through GP-6.

The results of the laboratory analysis indicates that VOC contamination in groundwater extends to the perimeter of the garage area. There were no VOCs detected in the apparent upgradient groundwater sample. Results of the sodium analysis were above the Class GA standards in all water samples and chloride concentrations were above Class GA standards in one sample, GP-5. These results could be used to argue with the NYSDEC for a different classification, and therefore less stringent cleanup requirements.

Please contact this office if you have any questions or comments regarding this report.

Sincerely,

GROUNDWATER TECHNOLOGY, INC.

Albert M. Tonn  
Project Manager

Enclosures

NassauUniform/sumrpt1.094

**TABLE 1**  
**SUMMARY OF SOIL BORING LOGS**  
**NASSAU UNIFORM SERVICES**  
**525 RAY STREET**  
**FREEPORT, NEW YORK**

**DRAFT**

**SEPTEMBER 23, 1994**

BORING ID	DEPTH (ft)	WATER TABLE (ft)	LITHOLOGIC DESCRIPTION
GP-1	0-4	0	Brown sand, fine grained, poorly sorted, some gravel clayey sand at 2-4'.
	4-8	0	Orange brown sand, fine to medium grain, wet at 7', fairly well sorted.
	8-12	3	Same as above, trace coarse sand.
GP-2	0-4	90	Brown sand, poorly sorted, some concrete and brick
	4-8	400	Black marsh deposits, wet.
	8-12	400	Black sand, then gray, then brown, fine to medium grained, fairly well sorted.
GP-3	0-4	15	Brown sand, fine to medium grained, trace small gravel fairly well sorted.
	4-8	100	Brown clayey sand to 4.5', then black marsh deposits, then grey sand, fine grained, fairly well sorted.
	8-12	>1000	Grey sand, fine grained, fairly well sorted, then sand becomes brown at 10', sheen detected on water.
GP-4	0-4	0	Brown sand, fine to medium grain, fairly well sorted, trace gravel, dark brown clayey sand at 3.7'.
	4-8	4	Brown sand with black marsh deposits and some brown and grey clay, wet.
	8-12	400	Grey sand, fine to medium grained, trace coarse sand and gravel, trace black marsh deposits.
GP-5	0-4	0	Tan, brown and dark brown sand, fine to medium grained, fairly well sorted, trace gravel.
	4-8	90	Brown sand to 5', then black organic marsh, then brown sand, fine to medium grained, fairly well sorted, trace coarse sand, wet.
	8-12	90	Brown sand, fine to medium grained, fairly well sorted, trace coarse sand and gravel, becomes orange at 10'.
GP-6	0-4	30	Brown sand, fine to medium grained, fairly well sorted, then black clayey sand deposits, marsh.
	4-8	>1000	Black organic marsh deposits to 7', then grey sand, to medium grain, fairly well sorted, trace gravel.
	8-12	200	Grey sand, fine to medium grained, fairly well sorted, to 10', then sand becomes orange.



**TABLE 2**  
**SOIL ANALYTICAL RESULTS**  
**NASSAU UNIFORM SERVICES**  
**525 RAY STREET**  
**FREEPORT, NEW YORK**

**DRAFT**

**SEPTEMBER 23, 1994**

Sample ID	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Parameter 5
GP-1 (0'-4')	ND	ND	160	ND	160
GP-2 (0'-4')	7,400	12,000	11,000	280	30,680
GP-3 (0'-4')	800	7,400	2,200	70	10,470
GP-4 (0'-4')	55	400	1,000	ND	1,455
GP-5 (0'-4')	230	1,400	1,400	ND	3,030
GP-6 (4'-8')	5	5	ND	ND	10
<b>RECOMMENDED CLEANUP OBJECTIVE*</b>	<b>300</b>	<b>700</b>	<b>1,400</b>	<b>7,800</b>	<b>10,000</b>

Results reported in ug/kg (ppb)  
 Samples analyzed by EPA Method 8010

\* - Based upon NYSDEC TAGM#HWR-94-4046, January 24, 1994, Determination of Soil Cleanup Objectives and Cleanup Levels

Nassau Uniform/soilana.wk3

**DRAFT**

**TABLE 3  
GROUNDWATER ANALYTICAL RESULTS  
NASSAU UNIFORM SERVICES  
525 RAY STREET  
FREEPORT, NEW YORK**

**SEPTEMBER 23, 1994**

COMPOUNDS	CONCENTRATIONS						STANDARD
	10/28/94	10/28/94	10/28/94	10/28/94	10/28/94	10/28/94	
Vinyl Chloride	ND	ND	280	180	ND	ND	2
1,1 Dichloroethane	ND	ND	ND	ND	10	ND	5
1,2 Dichloroethane	ND	ND	150	4,100	5,600	24	5
1,1,1 Trichloroethane	ND	ND	ND	ND	ND	28	5
Trichloroethylene	ND	10	34	2,300	630	39	5
Tetrachloroethene	ND	8,400	1,100	91,000	2,800	600	5
Chlorobenzene	ND	ND	ND	150	ND	ND	5
Total VOCs	NA	8,410	334	97,730	9,030	689	NA
Chloride	77,000	250,000	210,000	140,000	610,000	190,000	250,000
Sodium	120,000	190,000	150,000	140,000	380,000	140,000	20,000

All results reported in ug/l (ppb)

Samples analyzed for Volatile Organic Compounds by EPA Method 601, Chlorides by 4500CL-B and Sodium by EPA Method 3500 NA-C.

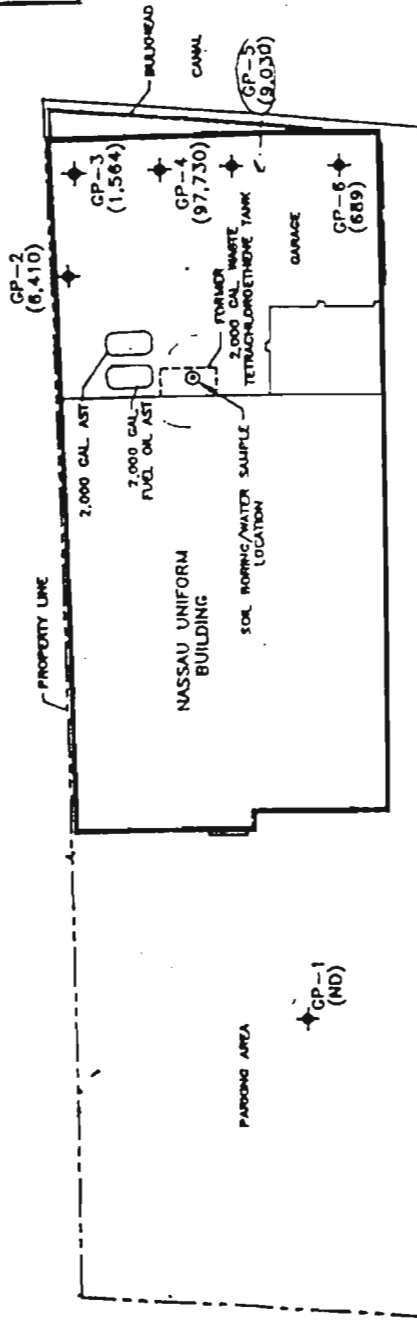
ND - Not Detected

NA - Not Applicable

nassau uniform/gwans

WEST END AVENUE

RAY STREET



LEGEND

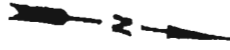
- ⊙ SOIL BORING
- AST ABOVE GROUND STORAGE TANK
- ✦ GEOPROBE POINT
- (889) TOTAL VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER (ppb)

NOTES

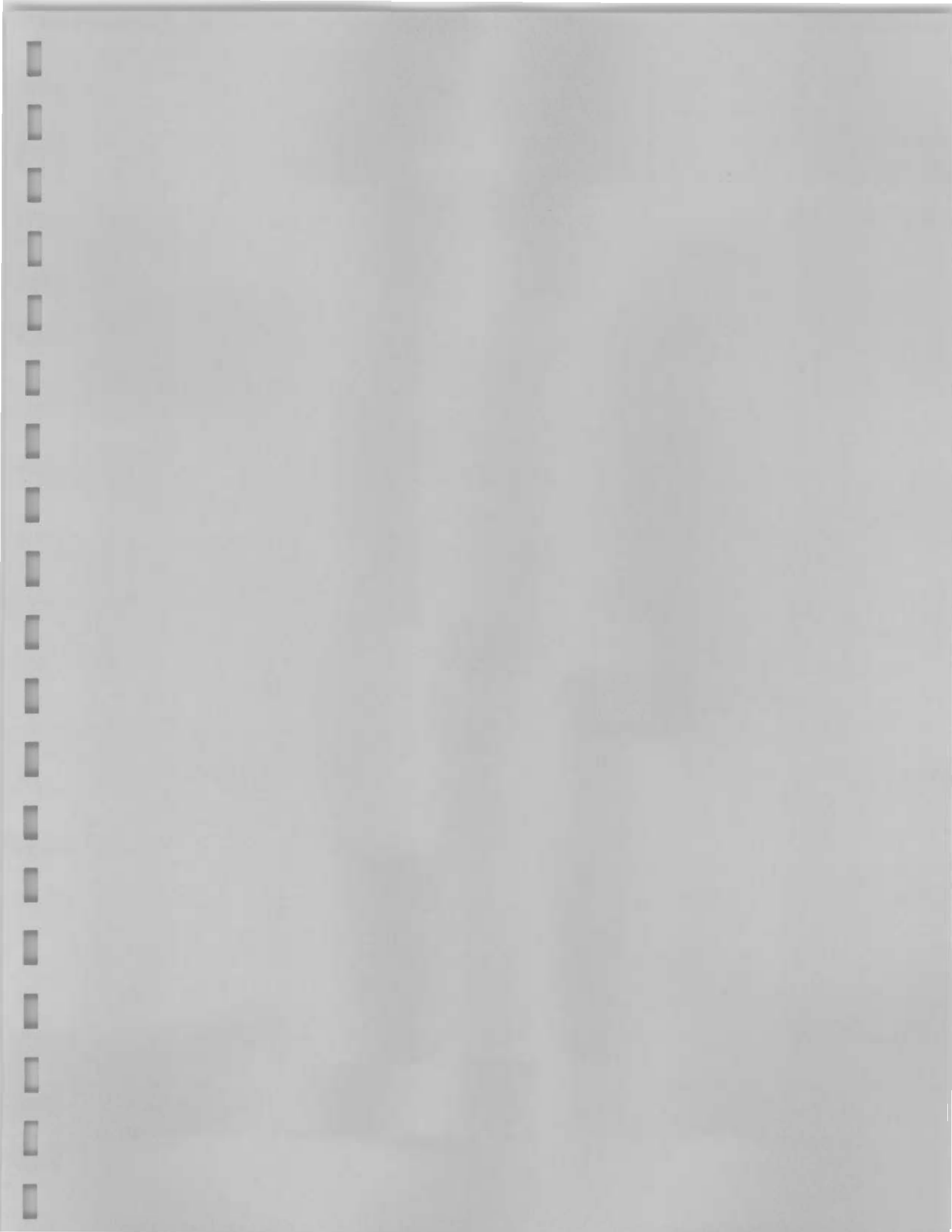
SOURCE: NASSAU UNIFORM SERVICES  
 525 RAY ST. FREEPORT N.Y.  
 ENVIRONMENT OF LONG ISLAND, N.Y.  
 DATE: JAN. 24, 1981



DRAFT



GROUNDWATER TECHNOLOGY	10/2/84	1000 N.Y. BOILING
TOTAL VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER (ppb)		
25 SEPTEMBER 1984		
CLIENT	NASSAU UNIFORM SERVICES	
LOCATION	525 RAY STREET FREEPORT, NEW YORK	
PROJECT NO.	CB	TS
PROJECT NO.	01113-0011	
SCALE	1" = 1'	



## **Appendix 2**

### **Laboratory Reports for SVES Pilot Test Emissions**

Sample Dates:

January 12, 2001

February 1, 2001

# Environmental Testing Laboratories, Inc.

208 Route 109, Farmingdale NY 11735

Phone - 631-249-1456 Fax - 631-249-8344

01/25/2001

**Custody Document: L3716**

Received: 01/12/2001 14:10

Sampled by: Matt Lamersa

**Client: Anson Environmental Inc**

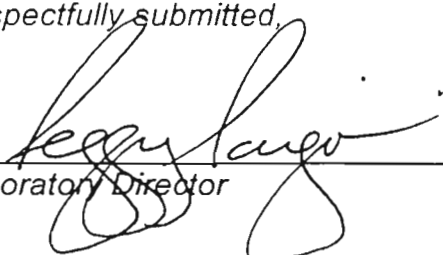
771 New York Avenue  
Huntington,  
NY 11743

**Project:**

Area: Nassau Uniform

**Manager: Dean Anson**

Respectfully submitted,

  
\_\_\_\_\_  
Laboratory Director

NYS Lab ID # 10969  
NJ Cert. # 73812  
CT Cert. # PH0645  
MA Cert. # NY061  
PA Cert. # 68-535  
VA Cert. # 108  
NH Cert. # 252592-BA  
RI Cert. # 161

# Environmental Testing Laboratories, Inc.

208 Route 109, Farmingdale NY 11735  
Phone - 631-249-1456 Fax - 631-249-8344

01/25/2001

## EPA 8260 in AIR

**Sample:** L3716-1

Client Sample ID: Post Carbon

Collected: 01/12/2001 13:30

Matrix: Air

Type: Grab

Remarks:

Analyzed Date: 01/19/2001

Cas No	Analyte	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	0.011	0.011	mg/M3	U
74-87-3	Chloromethane	0.019	0.019	mg/M3	U
75-01-4	Vinyl Chloride	0.021	<b>24.7</b>	mg/M3	
74-83-9	Bromomethane	0.019	0.019	mg/M3	U
75-00-3	Chloroethane	0.020	0.020	mg/M3	U
75-69-4	Trichlorofluoromethane	0.030	0.030	mg/M3	U
75-35-4	1,1-Dichloroethene	0.024	0.024	mg/M3	U
75-09-2	Methylene Chloride	0.021	0.021	mg/M3	U
156-60-5	t-1,2-Dichloroethene	0.017	0.017	mg/M3	U
75-34-3	1,1-Dichloroethane	0.021	0.021	mg/M3	U
590-20-7	2,2-Dichloropropane	0.016	0.016	mg/M3	U
156-59-2	c-1,2-Dichloroethene	0.019	<b>1.96</b>	mg/M3	
67-66-3	Chloroform	0.019	0.019	mg/M3	U
74-97-5	Bromochloromethane	0.024	0.024	mg/M3	U
71-55-6	1,1,1-Trichloroethane	0.021	0.021	mg/M3	U
563-58-6	1,1-Dichloropropene	0.027	0.027	mg/M3	U
56-23-5	Carbon Tetrachloride	0.019	0.019	mg/M3	U
107-06-2	1,2 Dichloroethane	0.019	0.019	mg/M3	U
71-43-2	Benzene	0.019	0.019	mg/M3	U
79-01-6	Trichloroethene	0.023	<b>0.90</b>	mg/M3	
78-87-5	1,2-Dichloropropane	0.018	0.018	mg/M3	U
75-27-4	Bromodichloromethane	0.018	0.018	mg/M3	U
74-95-3	Dibromomethane	0.024	0.024	mg/M3	U
10061-01-5	c-1,3-Dichloropropene	0.018	0.018	mg/M3	U
108-88-3	Toluene	0.018	0.018	mg/M3	U
10061-02-6	t-1,3-Dichloropropene	0.013	0.013	mg/M3	U
79-00-5	1,1,2-Trichloroethane	0.022	0.022	mg/M3	U
142-28-9	1,3-Dichloropropane	0.024	0.024	mg/M3	U
127-18-4	Tetrachloroethene	0.014	<b>2.90</b>	mg/M3	
124-48-1	Dibromochloromethane	0.020	0.020	mg/M3	U
106-93-4	1,2-Dibromoethane	0.019	0.019	mg/M3	U
108-90-7	Chlorobenzene	0.020	0.020	mg/M3	U
630-20-6	1,1,1,2-Tetrachloroethane	0.018	0.018	mg/M3	U
100-41-4	Ethylbenzene	0.020	0.020	mg/M3	U
108-38-3	m,p-xylene	0.044	0.044	mg/M3	U

# Environmental Testing Laboratories, Inc.

208 Route 109, Farmingdale NY 11735  
Phone - 631-249-1456 Fax - 631-249-8344

01/25/2001

## EPA 8260 in AIR

**Sample:** L3716-1...continue

Client Sample ID: Post Carbon

Collected: 01/12/2001 13:30

Matrix: Air

Type: Grab

Remarks:

Analyzed Date: 01/19/2001

Cas No	Analyte	MDL	Concentration	Units	Q
95-47-6	o-xylene	0.018	0.018	mg/M3	U
100-42-5	Styrene	0.020	0.020	mg/M3	U
98-82-8	Isopropylbenzene	0.016	0.016	mg/M3	U
75-25-2	Bromoform	0.014	0.014	mg/M3	U
79-34-5	1,1,2,2-Tetrachloroethane	0.018	0.018	mg/M3	U
96-18-4	1,2,3-Trichloropropane	0.030	0.030	mg/M3	U
103-65-1	n-Propylbenzene	0.017	0.017	mg/M3	U
108-86-1	Bromobenzene	0.018	0.018	mg/M3	U
108-67-8	1,3,5-Trimethylbenzene	0.014	0.014	mg/M3	U
95-49-8	2-Chlorotoluene	0.020	0.020	mg/M3	U
106-43-4	4-Chlorotoluene	0.024	0.024	mg/M3	U
99-87-6	4-Isopropyltoluene	0.021	0.021	mg/M3	U
95-63-6	1,2,4-trimethylbenzene	0.020	0.020	mg/M3	U
135-98-8	sec-Butylbenzene	0.019	0.019	mg/M3	U
98-06-6	tert-Butylbenzene	0.028	0.028	mg/M3	U
541-73-1	1,3-Dichlorobenzene	0.023	0.023	mg/M3	U
106-46-7	1,4-Dichlorobenzene	0.019	0.019	mg/M3	U
104-51-8	n-Butylbenzene	0.023	0.023	mg/M3	U
95-50-1	1,2-Dichlorobenzene	0.021	0.021	mg/M3	U
96-12-8	1,2-Dibromo-3-chloropropane	0.036	0.036	mg/M3	U
120-82-1	1,2,4-Trichlorobenzene	0.023	0.023	mg/M3	U
87-68-3	Hexachlorobutadiene	0.047	0.047	mg/M3	U
91-20-3	Naphthalene	0.038	0.038	mg/M3	U
87-61-6	1,2,3-Trichlorobenzene	0.049	0.049	mg/M3	U
1634-04-4	MTBE	0.038	0.038	mg/M3	U



# Environmental Testing Laboratories, Inc.

208 Route 109, Farmingdale NY 11735  
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01/25/2001

## EPA 8260 in AIR

**Sample: L3716-2**

Client Sample ID: Pre-Carbon

Collected: 01/12/2001 13:45

Matrix: Air

Type: Grab

Remarks:

Analyzed Date: 01/19/2001

Cas No	Analyte	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	0.032	0.032	mg/M3	U
74-87-3	Chloromethane	0.021	0.021	mg/M3	U
75-01-4	Vinyl Chloride	0.021	<b>38.4</b>	mg/M3	
74-83-9	Bromomethane	0.031	0.031	mg/M3	U
75-00-3	Chloroethane	0.035	0.035	mg/M3	U
75-69-4	Trichlorofluoromethane	0.0095	0.0095	mg/M3	U
75-35-4	1,1-Dichloroethene	0.014	0.014	mg/M3	U
75-09-2	Methylene Chloride	0.069	0.069	mg/M3	U
156-60-5	t-1,2-Dichloroethene	0.021	<b>8.40</b>	mg/M3	
75-34-3	1,1-Dichloroethane	0.022	0.022	mg/M3	U
590-20-7	2,2-Dichloropropane	0.015	0.015	mg/M3	U
156-59-2	c-1,2-Dichloroethene	3.80	<b>373</b>	mg/M3	
67-66-3	Chloroform	0.013	0.013	mg/M3	U
74-97-5	Bromochloromethane	0.028	0.028	mg/M3	U
71-55-6	1,1,1-Trichloroethane	0.015	0.015	mg/M3	U
563-58-6	1,1-Dichloropropene	0.055	0.055	mg/M3	U
56-23-5	Carbon Tetrachloride	0.015	0.015	mg/M3	U
107-06-2	1,2 Dichloroethane	0.023	0.023	mg/M3	U
71-43-2	Benzene	0.011	0.011	mg/M3	U
79-01-6	Trichloroethene	4.70	<b>537</b>	mg/M3	
78-87-5	1,2-Dichloropropane	0.014	0.014	mg/M3	U
75-27-4	Bromodichloromethane	0.0080	0.0080	mg/M3	U
74-95-3	Dibromomethane	0.012	0.012	mg/M3	U
10061-01-5	c-1,3-Dichloropropene	0.040	0.040	mg/M3	U
108-88-3	Toluene	0.010	0.010	mg/M3	U
10061-02-6	t-1,3-Dichloropropene	0.040	0.040	mg/M3	U
79-00-5	1,1,2-Trichloroethane	0.0085	0.0085	mg/M3	U
142-28-9	1,3-Dichloropropane	0.015	0.015	mg/M3	U
127-18-4	Tetrachloroethene	2.80	<b>10200</b>	mg/M3	E
124-48-1	Dibromochloromethane	0.0090	0.0090	mg/M3	U
106-93-4	1,2-Dibromoethane	0.0085	0.0085	mg/M3	U
108-90-7	Chlorobenzene	0.0080	0.0080	mg/M3	U
630-20-6	1,1,1,2-Tetrachloroethane	0.0095	0.0095	mg/M3	U
100-41-4	Ethylbenzene	0.0085	0.0085	mg/M3	U
108-38-3	m,p-xylene	0.013	0.013	mg/M3	U

# Environmental Testing Laboratories, Inc.

208 Route 109, Farmingdale NY 11735

Phone - 631-249-1456 Fax - 631-249-8344

01/25/2001

## EPA 8260 in AIR

**Sample:** L3716-2...continue

Client Sample ID: Pre-Carbon

Collected: 01/12/2001 13:45

Matrix: Air

Type: Grab

Remarks:

Analyzed Date: 01/19/2001

Cas No	Analyte	MDL	Concentration	Units	Q
95-47-6	o-xylene	0.010	0.010	mg/M3	U
100-42-5	Styrene	0.0060	0.0060	mg/M3	U
98-82-8	Isopropylbenzene	0.0050	0.0050	mg/M3	U
75-25-2	Bromoform	0.011	0.011	mg/M3	U
79-34-5	1,1,2,2-Tetrachloroethane	0.016	0.016	mg/M3	U
96-18-4	1,2,3-Trichloropropane	0.036	0.036	mg/M3	U
103-65-1	n-Propylbenzene	0.011	0.011	mg/M3	U
108-86-1	Bromobenzene	0.015	0.015	mg/M3	U
108-67-8	1,3,5-Trimethylbenzene	0.0085	0.0085	mg/M3	U
95-49-8	2-Chlorotoluene	0.010	0.010	mg/M3	U
106-43-4	4-Chlorotoluene	0.016	0.016	mg/M3	U
99-87-6	4-Isopropyltoluene	0.0075	0.0075	mg/M3	U
95-63-6	1,2,4-trimethylbenzene	0.0080	0.0080	mg/M3	U
135-98-8	sec-Butylbenzene	0.010	0.010	mg/M3	U
98-06-6	tert-Butylbenzene	0.0075	0.0075	mg/M3	U
541-73-1	1,3 Dichlorobenzene	0.0095	0.0095	mg/M3	U
106-46-7	1,4-Dichlorobenzene	0.012	0.012	mg/M3	U
104-51-8	n-Butylbenzene	0.011	0.011	mg/M3	U
95-50-1	1,2-Dichlorobenzene	0.0055	0.0055	mg/M3	U
96-12-8	1,2-Dibromo-3-chloropropane	0.012	0.012	mg/M3	U
120-82-1	1,2,4-Trichlorobenzene	0.012	0.012	mg/M3	U
87-68-3	Hexachlorobutadiene	0.0060	0.0060	mg/M3	U
91-20-3	Naphthalene	0.010	0.010	mg/M3	U
87-61-6	1,2,3-Trichlorobenzene	0.042	0.042	mg/M3	U
1634-04-4	MTBE	0.031	0.031	mg/M3	U



# Environmental Testing Laboratories, Inc.

208 Route 109, Farmingdale NY 11735

Phone - 631-249-1456 Fax - 631-249-8344

01/25/2001

## CASE NARRATIVE

8260

The following compounds were calibrated at 25, 50, 100, 150 and 200 ppb levels in the initial calibration curve:

Acetone  
2-Butanone  
4-Methyl,2-pentanone  
2-Hexanone

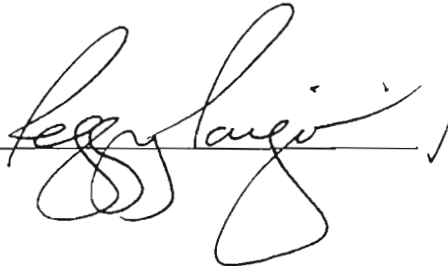
M&P-Xylenes were calibrated at 10, 40, 100, 200 and 300 ppb levels.

All other compounds were calibrated at 5, 20, 50, 100 and 150 ppb levels.

Samples were quantitated using the continuing calibration standard response factor as opposed to the initial calibration average response factor.

Sample L3716-2 was analyzed twice. In the second analysis Tetrachloroethene exceeded the calibration curve by 5 ppb.

Reviewed by: \_\_\_\_\_



# Environmental Testing Laboratories, Inc.

208 Route 109, Farmingdale NY 11735

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01/25/2001

## ORGANIC METHOD QUALIFIERS

Q - Qualifier - specified entries and their meanings are as follows:

- U - The analytical result is a non-detect.
- J - Indicates an estimated value. The concentration reported was detected below the Method Detection Limit.
- B - The analyte was found in the associated method blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- E - The concentration of the analyte exceeded the calibration range of the instrument.
- D - This flag identifies all compounds identified in an analysis at a secondary dilution.

## INORGANIC METHOD QUALIFIERS

C - (Concentration) qualifiers are as follows:

- B - Entered if the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).
- U - Entered when the analyte was analyzed for, but not detected.
- J - Indicates an estimated value. The concentration reported was detected below the Method Detection Limit.

Q - Qualifier specific entries and their meanings are as follows:

- E - Reported value is estimated because of the presence of interferences.

M - (Method) qualifiers are as follows:

- A - Flame AA
- AS - Semi-automated Spectrophotometric
- AV - Automated Cold Vapor AA
- C - Manual Spectrophotometric
- F - Furnace AA
- NR - when the analyte is not required to be analyzed.
- P - ICP
- T - Titrimetric



# ETL

Environmental Testing Laboratories, Inc.  
 208 Route 109 • Farmingdale • New York 11735  
 631-249-1456 • Fax: 631-249-8344

## CHAIN OF CUSTODY DOCUMENT

L 3716

Project Name: WASSAQUON Project Manager: DEAN PASCAN Sampler (Signature): [Signature] (Print): MATT LAMERSON

Project Address: \_\_\_\_\_ Client: \_\_\_\_\_ J/N: \_\_\_\_\_  Rush by \_\_\_\_\_

Client: \_\_\_\_\_ Type: SS = Spill Spoon; G = Grab; C = Composite; B = Blank \*Air - Vol (Liters) include: Flow (CFM)  
 Matrix: L = Liquid; S = Soil; SL = Sludge; A = Air; W = Wipe

ID	Date	Time	Type	Matrix	Sample Location	Total # Cont.
1	1/26/01	13:00	Air		Post Carbon	1
2	1/26/01	14:15	Air		Pre-Carbon	1
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

601/602  
 BTX/BTEX  
 6248260/8021  
 PCB/Pesticides  
 Pa. Prods./B100M  
 RCRA Metals  
 pH/Flash/React  
 418-1 - TRPH

Relinquished by (Signature): [Signature] Date: 1/26/01 Printed Name & Agent: MATT LAMERSON  
 Relinquished by (Signature): \_\_\_\_\_ Date: \_\_\_\_\_ Printed Name & Agent: \_\_\_\_\_  
 Received by (Signature): [Signature] Date: 1/27/01 Printed Name & Agent: \_\_\_\_\_  
 Received for Lab by (Signature): [Signature] Date: 1/27/01 Printed Name: [Signature]

# CHAIN OF CUSTODY DOCUMENT

L 7816

**ETL**  
 Environmental Testing Laboratories, Inc.  
 08 Route 109 • Farmingdale • New York 11735  
 516-331-249-1456 • Fax: 631-249-8344

Project Name: 95100 Project Manager: *Jane* (Print): *Ellen Martin*  
 Project Address: *Nassau Unifarm*  
 Client: *AMSUN SV. J/N:*  Rush by / /

**SAMPLE INFO**  
 Type: 88 = Split Spoon, G = Grab, C = Composite, B = Blank  
 Matrix: L = Liquid, S = Soil, SL = Sludge, A = Air, W = Wipe  
 \*Air - Vol (Liters) include Flow (CFM)

ID	Date	Time	Type	Matrix	Sample Location	Total # Cont.
1	2/1/01	1215	G	Air	Pre-carbon	1
2	2/1/01	1215	G	Air	Post-carbon	1
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Relinquished by (Signature): *Ellen Martin* Date: 2/1/01 Time: 1315  
 Received by (Signature): *Ellen Martin* Date: 2/1/01 Time: 1315

Relinquished by (Signature): *Ellen Martin* Date: 2/1/01 Time: 1315  
 Received by (Signature): *Ellen Martin* Date: 2/1/01 Time: 1315

Comments: Social Instructions: Number & Type of Containers: 11

# Environmental Testing Laboratories, Inc.

208 Route 109, Farmingdale NY 11735

Phone - 631-249-1456 Fax - 631-249-8344

02/13/2001

Custody Document: L7816

Received: 02/01/2001 13:15

Sampled by: Ellen Martin

Client: Anson Environmental Inc

771 New York Avenue

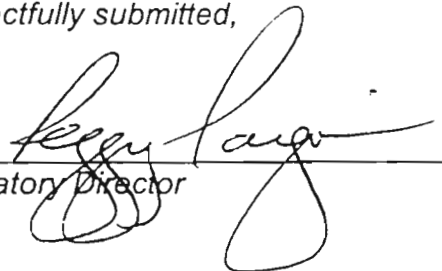
Huntington,

NY 11743

Project: Nassau Uniform

Manager: Dean Anson

Respectfully submitted,

  
Laboratory Director

NYS Lab ID # 10969  
NJ Cert. # 73812  
CT Cert. # PH0645  
MA Cert. # NY061  
PA Cert. # 68-535  
VA Cert. # 108  
NH Cert. # 252592-BA  
RI Cert. # 161

# Environmental Testing Laboratories, Inc.

208 Route 109, Farmingdale NY 11735  
Phone - 631-249-1456 Fax - 631-249-8344

02/12/2001

## EPA 8260 in AIR

**Sample:** L7816-1

Client Sample ID: Pre-carbon

Collected: 02/01/2001 12:15

Matrix: Air

Type: Grab

Remarks: See Case Narrative

Analyzed Date: 02/05/2001

Cas No	Analyte	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	31.5	31.5	ug/m3	U
74-87-3	Chloromethane	20.5	20.5	ug/m3	U
75-01-4	Vinyl Chloride	20.5	318	ug/m3	
74-83-9	Bromomethane	31.0	31.0	ug/m3	U
75-00-3	Chloroethane	35.0	35.0	ug/m3	U
75-69-4	Trichlorofluoromethane	9.50	9.50	ug/m3	U
75-35-4	1,1-Dichloroethene	14.0	14.0	ug/m3	U
75-09-2	Methylene Chloride	69.5	69.5	ug/m3	U
156-60-5	t-1,2-Dichloroethene	20.5	94.0	ug/m3	
75-34-3	1,1-Dichloroethane	21.5	21.5	ug/m3	U
590-20-7	2,2-Dichloropropane	15.0	15.0	ug/m3	U
156-59-2	c-1,2-Dichloroethene	21.0	6140	ug/m3	
67-66-3	Chloroform	13.0	13.0	ug/m3	U
74-97-5	Bromochloromethane	28.0	28.0	ug/m3	U
71-55-6	1,1,1-Trichloroethane	15.5	15.5	ug/m3	U
563-58-6	1,1-Dichloropropene	55.0	55.0	ug/m3	U
56-23-5	Carbon Tetrachloride	15.0	15.0	ug/m3	U
107-06-2	1,2 Dichloroethane	23.5	23.5	ug/m3	U
71-43-2	Benzene	11.0	11.0	ug/m3	U
79-01-6	Trichloroethene	17.0	4490	ug/m3	
78-87-5	1,2-Dichloropropane	13.5	13.5	ug/m3	U
75-27-4	Bromodichloromethane	8.00	8.00	ug/m3	U
74-95-3	Dibromomethane	11.5	11.5	ug/m3	U
10061-01-5	c-1,3-Dichloropropene	40.0	40.0	ug/m3	U
108-88-3	Toluene	10.5	10.5	ug/m3	U
10061-02-6	t-1,3-Dichloropropene	39.5	39.5	ug/m3	U
79-00-5	1,1,2-Trichloroethane	8.50	8.50	ug/m3	U
142-28-9	1,3-Dichloropropane	15.5	15.5	ug/m3	U
127-18-4	Tetrachloroethene	850	127000	ug/m3	
124-48-1	Dibromochloromethane	9.00	9.00	ug/m3	U
106-93-4	1,2-Dibromoethane	8.50	8.50	ug/m3	U
108-90-7	Chlorobenzene	8.00	8.00	ug/m3	U
630-20-6	1,1,1,2-Tetrachloroethane	9.50	9.50	ug/m3	U
100-41-4	Ethylbenzene	8.50	8.50	ug/m3	U
108-38-3	m,p-xylene	13.0	48.5	ug/m3	





# Environmental Testing Laboratories, Inc.

208 Route 109, Farmingdale NY 11735  
Phone - 631-249-1456 Fax - 631-249-8344

02/12/2001

## EPA 8260 in AIR

**Sample:** L7816-1...continue

Client Sample ID: Pre-carbon

Matrix: Air

Remarks: See Case Narrative

Analyzed Date: 02/05/2001

Type: Grab

Collected: 02/01/2001 12:15

Cas No	Analyte	MDL	Concentration	Units	Q
95-47-6	o-xylene	10.5	10.5	ug/m3	U
100-42-5	Styrene	6.00	6.00	ug/m3	U
98-82-8	Isopropylbenzene	5.00	5.00	ug/m3	U
75-25-2	Bromoform	11.0	11.0	ug/m3	U
79-34-5	1,1,2,2-Tetrachloroethane	16.0	16.0	ug/m3	U
96-18-4	1,2,3-Trichloropropane	36.0	36.0	ug/m3	U
103-65-1	n-Propylbenzene	11.0	11.0	ug/m3	U
108-86-1	Bromobenzene	15.0	15.0	ug/m3	U
108-67-8	1,3,5-Trimethylbenzene	8.50	8.50	ug/m3	U
95-49-8	2-Chlorotoluene	10.0	10.0	ug/m3	U
106-43-4	4-Chlorotoluene	16.0	16.0	ug/m3	U
99-87-6	4-Isopropyltoluene	7.50	7.50	ug/m3	U
95-63-6	1,2,4-trimethylbenzene	8.00	29.0	ug/m3	
135-98-8	sec-Butylbenzene	10.0	10.0	ug/m3	U
98-06-6	tert-Butylbenzene	7.50	7.50	ug/m3	U
541-73-1	1,3 Dichlorobenzene	9.50	9.50	ug/m3	U
106-46-7	1,4-Dichlorobenzene	12.0	12.0	ug/m3	U
104-51-8	n-Butylbenzene	11.0	11.0	ug/m3	U
95-50-1	1,2-Dichlorobenzene	5.50	5.50	ug/m3	U
96-12-8	1,2-Dibromo-3-chloropropane	12.0	12.0	ug/m3	U
120-82-1	1,2,4-Trichlorobenzene	12.0	12.0	ug/m3	U
87-68-3	Hexachlorobutadiene	6.00	6.00	ug/m3	U
91-20-3	Naphthalene	10.5	10.5	ug/m3	U
87-61-6	1,2,3-Trichlorobenzene	42.0	42.0	ug/m3	U
1634-04-4	MTBE	31.0	31.0	ug/m3	U

# Environmental Testing Laboratories, Inc.

208 Route 109, Farmingdale NY 11735  
Phone - 631-249-1456 Fax - 631-249-8344

02/12/2001

## EPA 8260 in AIR

**Sample:** L7816-2

Client Sample ID: Post-carbon

Collected: 02/01/2001 12:15

Matrix: Air

Type: Grab

Remarks: See Case Narrative

Analyzed Date: 02/05/2001

Cas No	Analyte	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	31.5	31.5	ug/m3	U
74-87-3	Chloromethane	20.5	20.5	ug/m3	U
75-01-4	Vinyl Chloride	20.5	286	ug/m3	
74-83-9	Bromomethane	31.0	31.0	ug/m3	U
75-00-3	Chloroethane	35.0	35.0	ug/m3	U
75-69-4	Trichlorofluoromethane	9.50	9.50	ug/m3	U
75-35-4	1,1-Dichloroethene	14.0	14.0	ug/m3	U
75-09-2	Methylene Chloride	69.5	69.5	ug/m3	U
156-60-5	t-1,2-Dichloroethene	20.5	87.0	ug/m3	
75-34-3	1,1-Dichloroethane	21.5	21.5	ug/m3	U
590-20-7	2,2-Dichloropropane	15.0	15.0	ug/m3	U
156-59-2	c-1,2-Dichloroethene	21.0	5590	ug/m3	
67-66-3	Chloroform	13.0	13.0	ug/m3	U
74-97-5	Bromochloromethane	28.0	28.0	ug/m3	U
71-55-6	1,1,1-Trichloroethane	15.5	15.5	ug/m3	U
563-58-6	1,1-Dichloropropene	55.0	55.0	ug/m3	U
56-23-5	Carbon Tetrachloride	15.0	15.0	ug/m3	U
107-06-2	1,2 Dichloroethane	23.5	23.5	ug/m3	U
71-43-2	Benzene	11.0	11.0	ug/m3	U
79-01-6	Trichloroethene	17.0	4290	ug/m3	
78-87-5	1,2-Dichloropropane	13.5	13.5	ug/m3	U
75-27-4	Bromodichloromethane	8.00	8.00	ug/m3	U
74-95-3	Dibromomethane	11.5	11.5	ug/m3	U
10061-01-5	c-1,3-Dichloropropene	40.0	40.0	ug/m3	U
108-88-3	Toluene	10.5	10.5	ug/m3	U
10061-02-6	t-1,3-Dichloropropene	39.5	39.5	ug/m3	U
79-00-5	1,1,2-Trichloroethane	8.50	8.50	ug/m3	U
142-28-9	1,3-Dichloropropane	15.5	15.5	ug/m3	U
127-18-4	Tetrachloroethene	850	160000	ug/m3	
124-48-1	Dibromochloromethane	9.00	9.00	ug/m3	U
106-93-4	1,2-Dibromoethane	8.50	8.50	ug/m3	U
108-90-7	Chlorobenzene	8.00	8.00	ug/m3	U
630-20-6	1,1,1,2-Tetrachloroethane	9.50	9.50	ug/m3	U
100-41-4	Ethylbenzene	8.50	8.50	ug/m3	U
108-38-3	m,p-xylene	13.0	13.0	ug/m3	U

# Environmental Testing Laboratories, Inc.

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02/12/2001

## EPA 8260 in AIR

**Sample:** L7816-2...continue

Client Sample ID: Post-carbon

Matrix: Air

Type: Grab

Collected: 02/01/2001 12:15

Remarks: See Case Narrative

Analyzed Date: 02/05/2001

Cas No	Analyte	MDL	Concentration	Units	Q
95-47-6	o-xylene	10.5	10.5	ug/m3	U
100-42-5	Styrene	6.00	6.00	ug/m3	U
98-82-8	Isopropylbenzene	5.00	5.00	ug/m3	U
75-25-2	Bromoform	11.0	11.0	ug/m3	U
79-34-5	1,1,2,2-Tetrachloroethane	16.0	16.0	ug/m3	U
96-18-4	1,2,3-Trichloropropane	36.0	36.0	ug/m3	U
103-65-1	n-Propylbenzene	11.0	11.0	ug/m3	U
108-86-1	Bromobenzene	15.0	15.0	ug/m3	U
108-67-8	1,3,5-Trimethylbenzene	8.50	8.50	ug/m3	U
95-49-8	2-Chlorotoluene	10.0	10.0	ug/m3	U
106-43-4	4-Chlorotoluene	16.0	16.0	ug/m3	U
99-87-6	4-Isopropyltoluene	7.50	7.50	ug/m3	U
95-63-6	1,2,4-trimethylbenzene	8.00	8.00	ug/m3	U
135-98-8	sec-Butylbenzene	10.0	10.0	ug/m3	U
98-06-6	tert-Butylbenzene	7.50	7.50	ug/m3	U
541-73-1	1,3 Dichlorobenzene	9.50	9.50	ug/m3	U
106-46-7	1,4-Dichlorobenzene	12.0	12.0	ug/m3	U
104-51-8	n-Butylbenzene	11.0	11.0	ug/m3	U
95-50-1	1,2-Dichlorobenzene	5.50	5.50	ug/m3	U
96-12-8	1,2-Dibromo-3-chloropropane	12.0	12.0	ug/m3	U
120-82-1	1,2,4-Trichlorobenzene	12.0	12.0	ug/m3	U
87-68-3	Hexachlorobutadiene	6.00	6.00	ug/m3	U
91-20-3	Naphthalene	10.5	10.5	ug/m3	U
87-61-6	1,2,3-Trichlorobenzene	42.0	42.0	ug/m3	U
1634-04-4	MTBE	31.0	31.0	ug/m3	U

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02/12/2001

## CASE NARRATIVE

AIR8260

The following compounds were calibrated at 25, 50, 100, 150 and 200 ppb levels in the initial calibration curve:

Acetone  
2-Butanone  
4-Methyl,2-pentanone  
2-Hexanone

M&P-Xylenes were calibrated at 10, 40, 100, 200 and 300 ppb levels.

All other compounds were calibrated at 5, 20, 50, 100 and 150 ppb levels.

Samples were quantitated using the continuing calibration standard response factor as opposed to the initial calibration average response factor.

Reviewed by: \_\_\_\_\_



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02/12/2001

## ORGANIC METHOD QUALIFIERS

Q - Qualifier - specified entries and their meanings are as follows:

- U - The analytical result is a non-detect.
- J - Indicates an estimated value. The concentration reported was detected below the Method Detection Limit.
- B - The analyte was found in the associated method blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- E - The concentration of the analyte exceeded the calibration range of the instrument.
- D - This flag identifies all compounds identified in an analysis at a secondary dilution.

## INORGANIC METHOD QUALIFIERS

C - (Concentration) qualifiers are as follows:

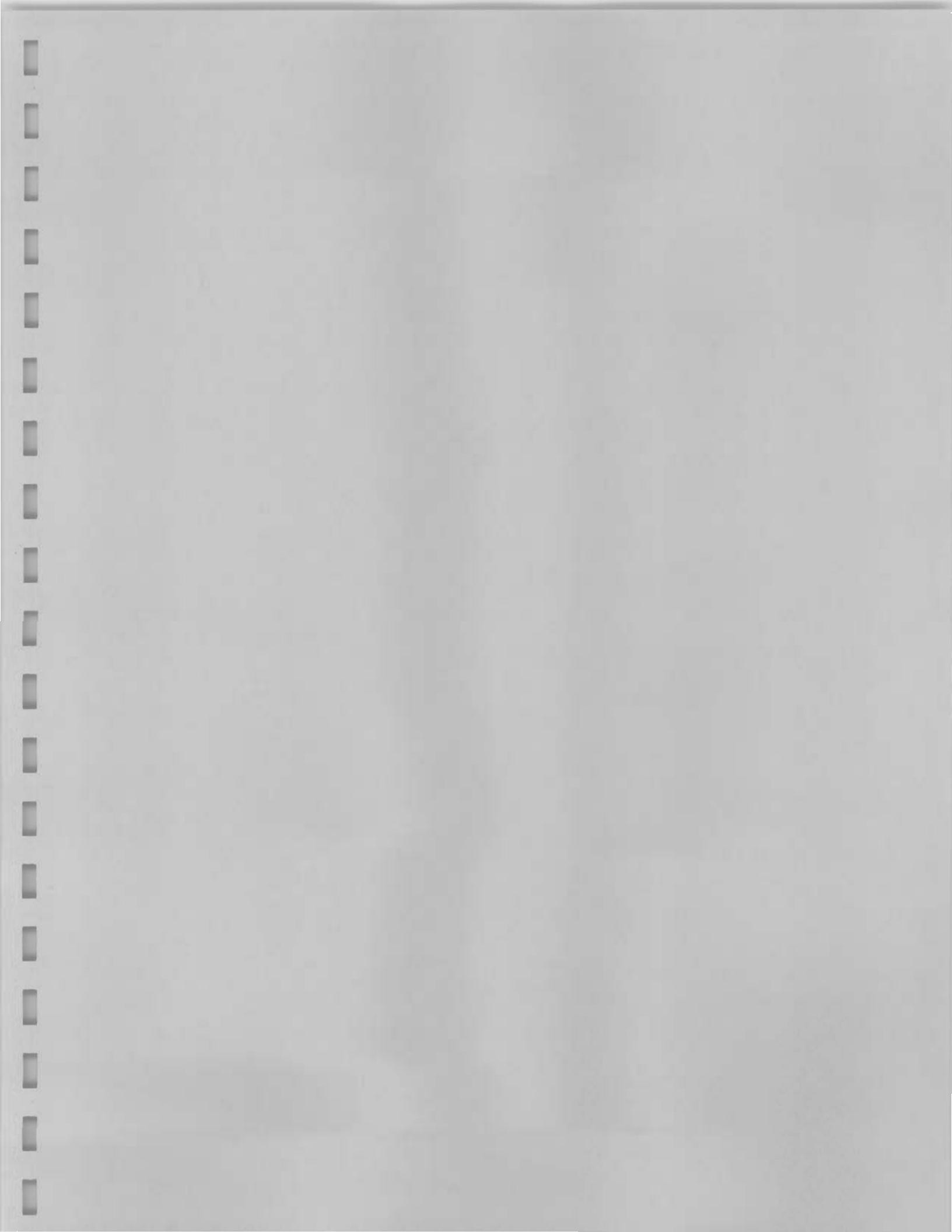
- B - Entered if the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).
- U - Entered when the analyte was analyzed for, but not detected.
- J - Indicates an estimated value. The concentration reported was detected below the Method Detection Limit.

Q - Qualifier specific entries and their meanings are as follows:

- E - Reported value is estimated because of the presence of interferences.

M - (Method) qualifiers are as follows:

- A - Flame AA
- AS - Semi-automated Spectrophotometric
- AV - Automated Cold Vapor AA
- C - Manual Spectrophotometric
- F - Furnace AA
- NR - when the analyte is not required to be analyzed.
- P - ICP
- T - Titrimetric



**Appendix 3**

**Typical SVES System Status Sheet**

**for**

**Up to Eight Extraction wells**

## O&M CHECKLIST FOR SVE

Date \_\_\_\_\_

Inspected By: \_\_\_\_\_

Control Panel	Arrival	Departure
System	On / Off	On / Off

SVE SYSTEM INSIDE TRAILER	
Was Moisture Separator Emptied?	Yes / No
Moisture Disposal Drum	F / 75 / 50 / 25 / E
SVE Relief Valve	Open / Closed

SVE WELL READINGS (INSIDE TRAILER)				
SVE WELL #	Flow	PID Readings	Vacuum	Ball Valve
RW-1S	cfm	ppm	inches of Water	O / 75 / 50 / 25 / C
RW-2S	cfm	ppm	inches of Water	O / 75 / 50 / 25 / C
RW-3S	cfm	ppm	inches of Water	O / 75 / 50 / 25 / C
RW-4S	cfm	ppm	inches of Water	O / 75 / 50 / 25 / C
	cfm	ppm	inches of Water	O / 75 / 50 / 25 / C
	cfm	ppm	inches of Water	O / 75 / 50 / 25 / C
	cfm	ppm	inches of Water	O / 75 / 50 / 25 / C
	cfm	ppm	inches of Water	O / 75 / 50 / 25 / C

SVE SYSTEM FLOW				
	Pre-Blower	Post Blower	Exhaust	Moisture Separ.
Vacuum	inches of water			inch of Water
Pressure		inches of water		
Flow	cfm	cfm	cfm	
CARBON SYSTEM				
	Pre-Carbon	Between Carbon	Post Carbon	Dilution Valve
PID	ppm	ppm	ppm	
Gastec Tube	ppm	ppm	ppm	
Temp	degrees F	degrees F	degrees F	cfm