

## **2016 Annual Operations Report**

### **Soil Vapor Extraction Containment System Site 1, Former Drum Marshalling Yard Naval Weapons Industrial Reserve Plant Bethpage, New York**

**Contract No. N40085-10-D-9409  
Contract Task Order No. 0005**

May 2017

Prepared for:



Naval Facilities Engineering Command Mid-Atlantic  
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Norfolk, VA 23511

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## Acronyms and Abbreviations

bgs	below ground surface
CTO	Contract Task Order
DAR	Division of Air Resources
DCA	dichloroethane
DCE	dichloroethene
DoD	Department of Defense
ELAP	Environmental Laboratory Accreditation Program
FMS	Flow Monitoring Station
GOCO	Government Owned Contractor Operated
i.w.	inches of water column
KGS	KOMAN Government Solutions, LLC
NAVFAC	Naval Facilities Engineering Command Mid-Atlantic
Navy	U.S. Department of the Navy
NELAC	National Environmental Accreditation Conference
NG	Northrop Grumman
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation and Maintenance
PCB	polychlorinated biphenyls
PCE	tetrachloroethene
PID	photoionization detector
QA	quality assurance
QC	quality control
scfm	standard cubic feet per minute
SVECS	soil vapor extraction containment system
SVEW	soil vapor extraction well
SVOC	semi-volatile organic compound
SVPM	soil vapor pressure monitor
TCA	trichloroethane
TCE	trichloroethene
TCL	target compound list

TtEC	Tetra Tech EC, Inc.
TtNUS	Tetra Tech NUS, Inc.
VC	vinyl chloride
VGAC	vapor-phase granular activated carbon
VOC	volatile organic compound

## 1.0 INTRODUCTION

KOMAN Government Solutions, LLC (KGS) has prepared this 2016 Annual Operations Report for the Soil Vapor Extraction Containment System (SVECS) at Site 1, Former Drum Marshalling Area, at the Naval Weapons Industrial Reserve Plant (NWIRP) in Bethpage, New York. This report has been prepared for the U.S. Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC), Mid-Atlantic, under Contract N40085-10-D-9409, Contract Task Order (CTO) No. 0005. This 2016 Annual Operations Report summarizes activities that occurred during 2016 and also further details activities that occurred during the Fourth Quarter 2016 (October 2016 through December 2016). Data was collected and operational activities were performed by KGS in accordance with the following documents:

- *Final Operation & Maintenance Plan for Soil Vapor Extraction Containment System Site 1, Former Drum Marshalling Yard at Naval Weapons Industrial Reserve Plant Bethpage, New York* prepared by Tetra Tech EC, Inc. (TtEC) in 2010, hereafter referred to as the “O&M Manual.”
- *Final Supplemental Offsite Soil Vapor Intrusion Monitoring Plan for the Soil Vapor Extraction Containment System, Site 1, Former Drum Marshalling Yard at Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by Tetra Tech NUS, Inc. (TtNUS) in 2012.

The following quarterly reports, along with data collected during the Fourth Quarter (October through December), are used as a basis for this 2016 Annual Operations Report:

- *Quarterly Operations Report, First Quarter 2016, Soil Vapor Extraction Containment System Site 1, Former Drum Marshalling Yard, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by KGS in June 2016.
- *Quarterly Operations Report, Second Quarter 2016, Soil Vapor Extraction Containment System Site 1, Former Drum Marshalling Yard, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by KGS in October 2016.
- *Quarterly Operations Report, Third Quarter 2016, Soil Vapor Extraction Containment System Site 1, Former Drum Marshalling Yard, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by KGS in January 2017.

### 1.1 Site Location

NWIRP Bethpage is located in east central Nassau County, Long Island, New York, approximately 30 miles east of New York City. In the late 1990s, the Navy's property totaled approximately 109.5 acres and was formerly a Government Owned Contractor-Operated (GOCO) facility that was operated by Northrop Grumman (NG) until September 1998. NWIRP Bethpage was bordered on the north, west, and south by property owned, or formerly owned, by NG that covered approximately 550 acres, and on the east by a residential neighborhood. The Navy currently retains approximately nine acres of the former NWIRP, including Site 1, which lies within the fenced area of NWIRP Bethpage and is located east of Plant No. 3, west of 11<sup>th</sup> Street, and north of Plant 17 South (**Figures 1 and 2**).

## 1.2 Background

NWIRP Bethpage was established in 1941. Since inception, the primary mission of the facility has been the research, prototyping, testing, design engineering, fabrication, and primary assembly of military aircraft. Historical operations that resulted in hazardous material generation at the facility included metal finishing processes, maintenance operations, painting of aircraft and components, and other activities that involve aircraft manufacturing. Wastes generated by plant operations were disposed of directly into drainage sumps, dry wells, and/or on the ground surface, resulting in the disposal of a number of hazardous wastes, including volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and inorganic analytes (chromium and cadmium) at the site. Some of these contaminants have migrated from the source area to surrounding areas, including the soils at these sites and the groundwater beneath and downgradient of the NWIRP Bethpage property. NWIRP Bethpage is currently listed by the New York State Department of Environmental Conservation (NYSDEC) as an “inactive hazardous waste site” (#1-30-003B).

Soils at Site 1 consist mainly of unconsolidated sediments that overlie crystalline bedrock. A clay unit is present near the groundwater table (50 feet below ground surface [bgs]) at the southeast corner of the site. This clay unit is suspected to be a source of chlorinated solvents that are migrating into the overlying soil gas and the source of off-site VOCs in soil vapor (TtEC 2010).

Chlorinated solvents including trichloroethene (TCE), tetrachloroethene (PCE), and 1,1,1-trichloroethane (TCA) have been identified as the VOCs of interest in soil gas at the site. Concentrations greater than 1,000  $\mu\text{g}/\text{m}^3$  (micrograms per cubic meter) of soil vapor have been directly associated with Site 1 activities and historical environmental data, and based on preliminary screening, exceed guidelines established by the New York State Department of Health (NYSDOH) for slab soil vapor concentrations. Of these compounds, TCE is the primary VOC of concern. Mitigation of TCE contamination in accordance with NYDOH guidance is expected to remediate other VOCs associated with the site. PCBs, cadmium, and chromium have also been identified in site soils at concentrations requiring remediation. The majority of these chemicals has been detected in the central portion of Site 1 and will be addressed via a separate remediation (TtEC 2010).

Prior to implementation of the SVECS, the mean concentrations of VOCs in soil gas samples collected along the eastern fence-line were 41,128  $\mu\text{g}/\text{m}^3$  of TCE, 381  $\mu\text{g}/\text{m}^3$  of PCE, and 20,634  $\mu\text{g}/\text{m}^3$  of 1,1,1-TCA. The maximum concentrations of VOCs in the soil gas samples were 180,000  $\mu\text{g}/\text{m}^3$  of TCE, 1,200  $\mu\text{g}/\text{m}^3$  of PCE, and 90,000  $\mu\text{g}/\text{m}^3$  of 1,1,1-TCA (TtEC 2010).

## 1.3 Project Overview and Objective

The remedial objective for this project is to use an on-site soil vapor extraction system to prevent further off-site migration of VOC contaminated soil vapor and to the extent practical, capture contaminated soil vapor with a TCE concentration greater than 250  $\mu\text{g}/\text{m}^3$ . A secondary objective of this project is to address soil vapor with a TCE concentration greater than 5  $\mu\text{g}/\text{m}^3$ . The SVECS is an interim action intended to address migration of VOCs in contaminated soil vapors. It is expected to operate



continuously 24 hours/day, seven days/week, with the exception of maintenance and adjustment periods until the remedial objectives are met (TtEC 2010).

#### 1.4 SVECS Overview

The SVECS consists of soil vapor extraction, soil vapor monitoring, and soil vapor treatment. Twelve SVE wells (SVEWs) are located along the eastern boundary of Site 1 in six clusters, each consisting of one intermediate well and one deep well. Intermediate wells SVE-101I, SVE-102I, SVE-103I, SVE-104I, SVE-105I, and SVE-106I have a screened interval between 25 and 35 ft bgs. Deep wells SVE-101D, SVE-102D, SVE-103D, SVE-104D, SVE-105D, and SVE-106D have a screened interval between 40 and 60 ft bgs. The groundwater table fluctuates between approximately 50 and 55 feet bgs. Each SVEW is operated at a flow rate such that the combined total flow rate is approximately 300-400 standard cubic feet per minute (scfm) of soil vapor. Each intermediate depth SVEW requires an approximate vacuum of 4 inches of water column (i.w.) and each deep SVEW requires an approximate vacuum of 10 to 20 i.w. in order to extract the targeted flow rates. These twelve SVEWs have been piped below the ground to the Flow Monitoring Station (FMS), where flow, vacuum, and vapor quality are monitored. Within the FMS, the discharges from the individual SVEWs have been equipped with a 2-inch flow control butterfly valve, a vacuum gauge, and a sampling port. The sampling port is utilized to measure the flow rate from an individual well using a portable velocity meter and to collect vapor samples. All the SVE lines collect into a single manifold within the FMS and from this location a single underground pipeline has been routed approximately 1,400 linear feet to the Treatment Building (Building 03-35). Five additional SVEWs (SV-107D, SV-108D, SV-109D, SV-110D, and SV-111D) were installed in October 2011 to address potential VOCs under Plant No. 3 and the South Warehouse. A site plan depicting well locations is included as **Figure 3**.

The SVECS is housed within the Treatment Building, an existing and unoccupied building also known as Building 03-35. The treatment system consists of a moisture separator, two SVE blowers, and a 5,000-lb vapor-phase granular activated carbon (VGAC) unit for removal of chlorinated VOCs from the off-gas. Soil vapor that enters the Treatment Building first passes through the moisture separator tank where any condensate is separated. To date, no condensate has formed in this tank. The vapor is then passed through an air filter and SVE blower and then treated in the VGAC unit. The treated vapor is discharged from the VGAC via an exhaust stack. The SVECS has a control panel comprised of mechanical interlocks and relays for local operation. A System Layout Plan is presented in **Figure 4**, which also illustrates the design flow rates through the soil vapor extraction and treatment process.

The off-gas from the SVECS is monitored for chlorinated VOCs as identified in the NYSDEC Division of Air Resources (DAR) permit equivalent effluent limitations and updated approval documentation (**Appendix A**) and monitoring requirements (TtEC 2010). Samples are submitted to a National Environmental Laboratory Accreditation Conference (NELAC)-accredited, Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)-certified laboratory, Air Toxics, Inc. located in Folsom, CA, for analysis of VOCs by modified method TO-15. Prior to January 2014, samples were analyzed for target compound list (TCL) VOCs. As of January 2014, upon approval by NYSDEC and NYSDOH, samples are analyzed for site-specific VOCs. The site-specific VOCs are: 1,1,1-TCA,

1,1-dichloroethane (DCA), 1,1-dichloroethene (DCE), 1,2-DCA, cis-1,2-DCE, PCE, trans-1,2-DCE, TCE, and vinyl chloride (VC).

A total of 18 soil vapor pressure monitor (SVPM) / soil gas monitoring points have been installed in the neighborhood east of Site 1 at NWIRP Bethpage (**Figure 3**). These off-site monitoring points consist of eight previously existing SVPMs as well as 10 SVPMs installed in September 2012. Pressure readings from the SVPMs are collected quarterly and used to evaluate the SVECS vacuum field. In addition, analytical results of vapor samples collected annually from these locations and the pressure readings are used to further evaluate the SVECS operation and the potential for vapor intrusion.

## **2.0 SVECS OPERATION AND MAINTENANCE**

While designed to run autonomously, the SVECS requires regular visits by an operator to record and adjust operational parameters and to perform scheduled maintenance. The SVECS is equipped with telemetry that will alert an on-call operator in the event of a plant shutdown.

### **2.1 Routine Maintenance Activities**

Routine maintenance activities at the SVECS were performed during the operator's weekly visits during this reporting period. These activities include general site inspections (of the grounds, buildings, doors and locks), collection of operational data (vapor flowrates, pressures, vacuums, temperature and photoionization detector [PID] readings), adjustment of system valves, collection of vapor samples (on a monthly and quarterly basis), collection/disposal of condensate, cleaning of filters, switching of lead/lag blower assignments, and preventive maintenance of system equipment.

### **2.2 Non-routine Maintenance / Site Activities**

The following non-routine activities / repair activities occurred at the SVECS in 2016:

- On 3 March, the roll-up door to the blower building was repaired.
- On 7 July, the air conditioner unit for the block building was replaced.
- On 19 July, the vacuum gauge for SV-106D was replaced.

### 3.0 SVECS MONITORING

Several process vapor samples are collected on a monthly basis to monitor the SVECS operation. These samples consist of an influent sample (as well as a duplicate sample), located immediately prior to the VGAC unit, and an effluent sample, located after the VGAC unit and before the exhaust stack. Vapor samples are also collected from the 12 original SVEWs on a quarterly basis to monitor the capture of the contaminated soil vapor by the SVEWs. In addition, quarterly pressure measurements are collected from the SVEWs and SVPs to monitor the SVECS vacuum field, and soil gas sampling at SVPs is conducted annually (generally in the winter time-frame) to evaluate the effectiveness of the SVECS. The first annual soil gas sampling event was conducted in the winter 2012-2013. The fourth annual sampling event was conducted in the winter 2015-2016; samples were collected from the 18 SVPs in January 2016. An additional sampling event was performed in September 2016. Both events are discussed in Section 3.4.

#### 3.1 Monthly Air Quality Monitoring

Analysis of influent and effluent vapor sample locations is performed to evaluate VOC mass removal and the effectiveness of the VGAC adsorption unit. Time-integrated vapor samples are collected using 6-L summa canisters with 30-minute flow regulators.

Treated off-gas discharged at the exhaust stack is subject to emissions limitations. Initially, discharge goals were derived from calculations submitted by the Navy and approved by the NYSDEC DAR in February 2010. In September 2011, the Navy submitted an evaluation proposing revised discharge goals (TtNUS 2011), which NYSDEC approved in October 2011. A copy of this documentation is included as **Appendix A**.

##### 3.1.1 Fourth Quarter 2016 Summary

A summary of monthly vapor sampling results collected in October, November, and December (Fourth Quarter) is presented in **Tables 1, 2, and 3**, respectively. Emission rate calculations for both the influent stream (prior to VGAC treatment) and effluent stream (following VGAC treatment) and estimated monthly mass recoveries are also presented. Emission rates of the influent stream are calculated to monitor progress and determine when influent concentrations have reached levels at which vapor treatment via carbon adsorption is no longer required. The data presented in **Tables 1, 2, and 3** demonstrate that all constituents were within the effluent emission rate guidelines (**Appendix A**). Raw analytical data is provided under a separate cover.

Monthly emission rate calculations for January – September 2016 are included in previously submitted quarterly operations reports as indicated in Section 1.0.

##### 3.1.2 2016 Annual Summary

###### Emissions

**Table 4** summarizes annual air emissions based on monthly emissions during the 12-month period. During 2016, approximately 0.81 lbs of total VOCs were emitted. Annual emissions of reported

constituents were within the discharge guidelines as indicated on **Table 4**.

### Mass Recovery

Contaminant mass recovery was calculated based on monthly influent concentrations combined with monthly influent flow totals. During 2016, approximately 28.79 lbs of VOCs were removed by the SVECS, for an average monthly mass recovery rate of approximately 2.40 lbs per month. Monthly mass recovery calculations for each month of 2016, as well as the 2016 total, are summarized in **Table 4**.

## **3.2 Quarterly Air Quality Monitoring of SVEWs**

Time-integrated vapor samples are collected quarterly using 6-L summa canisters with 30-minute flow regulators at six intermediate and six deep SVE wells. The samples are collected for the purpose of tracking and documenting the performance of the SVECS (TtEC 2010).

### **3.2.1 Fourth Quarter 2016 Summary**

Quarterly vapor samples were collected on 16 November from the 12 SVEWs. A summary of detected compounds is included as **Table 5**. Raw analytical data is provided under a separate cover.

### **3.2.2 2016 Annual Summary**

Results of quarterly vapor samples collected from the 12 SVEWs in 2016 are presented in **Table 6**, along with historical results beginning in December 2009. Analytical data associated with these results are presented in previously submitted quarterly operations reports as indicated in Section 1.0.

In addition, a geographical depiction of quarterly analytical results of select VOCs (1,1,1-TCA, PCE, and TCE) detected at the 12 SVEWs in 2016 is included as **Figure 5**. Concentration trends are discussed below in Section 3.5.

## **3.3 Quarterly Soil Vapor Pressure Monitoring of SVEWs and Off-site SVPMs**

### **3.3.1 Fourth Quarter 2016 Summary**

Pressure readings are collected quarterly from the 12 SVEWs and 18 SVPMs in order to monitor the SVECS vacuum field. Valve positions of the SVEWs are also recorded at this time. Pressure readings from the 18 SVPMs were collected on 16 November. Results of the Fourth Quarter vapor monitoring are presented in **Table 7**.

Negative pressure readings for the individual SVEWs provide an indication that a vacuum is being established along the fence line. During the Fourth Quarter, the recorded measurements from the SVEWs were (-) 2.7 i.w.to (-) 13.5 i.w.

As indicated in **Table 7**, soil vapor pressure measurements of the SVPMs ranged from (+) 0.01 to (-) 0.12 i.w. during the Fourth Quarter monitoring event. These measurements indicate that a vacuum field continues to be maintained in the residential neighborhood adjacent to Site 1. Although, five SVPMs recorded 0.00 i.w (SVPM2001D, SVPM2006I, SVPM2006D, SVPM2007S, and SVPM2007I) during the Fourth Quarter monitoring event, this is within the margin of error for the gauge.

### 3.3.2 2016 Annual Summary

Results of quarterly vapor monitoring performed in 2016 are presented in **Table 8**, along with historical results beginning in October 2012. Pressure readings collected from the 18 SVPMs in 2016 are presented graphically as **Figure 6**. As indicated, the greatest vacuum readings are typically observed at the SVPM-2001 and SVPM-2002 well clusters. Geographically, these two well clusters are located closest to the row of 12 SVEWs and the FMS.

### 3.4 Annual Vapor Quality Monitoring of Off-site SVPMs

Time-integrated vapor samples are collected annually using 6-L summa canisters with 30-minute flow regulators at 18 SVPM locations.

SVPM data collected during the January 2016 annual sampling event indicated increasing contaminant concentration trends at SVPM-2006I and SVPM-2006D. An additional round of SVPM sampling was performed in September 2016 to further evaluate these recent trend increases. SVPM-2006I and SVPM-2006D are located along 10<sup>th</sup> Street, between Sycamore Avenue and Maple Avenue, to the east of the site. Similar trends were not observed in other nearby SVPMs. Results of both sampling events are discussed in Section 3.4.1.

#### 3.4.1 2016 Vapor Quality Results

Annual vapor samples were collected on 14 January from the 18 SVPM locations, results of which were presented in the *Quarterly Operations Report, First Quarter 2016* (KGS 2016). Validated analytical results of samples collected in January and September 2016 are summarized in **Table 9a** and **Table 9b**, respectively.

As shown on **Table 9a**, 1,1,1-TCA was only detected at SVPM2007D at an estimated concentration of 0.87 J  $\mu\text{g}/\text{m}^3$ . PCE was detected at 10 of the 18 locations, with concentrations ranging from 0.89 J  $\mu\text{g}/\text{m}^3$  at SVPM-2003I to 10  $\mu\text{g}/\text{m}^3$  at SVPM-2001D. TCE was detected at 6 of the 18 locations, with concentrations ranging from 1.6 J  $\mu\text{g}/\text{m}^3$  at SVPM-2006S to 48  $\mu\text{g}/\text{m}^3$  at SVPM-2006I. All detected concentrations were well below the NYSDOH sub-slab screening values of 1,000  $\mu\text{g}/\text{m}^3$  for 1,1,1-TCA, 1,000  $\mu\text{g}/\text{m}^3$  for PCE, and 250  $\mu\text{g}/\text{m}^3$  for TCE, as outlined in the *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (NYSDOH 2006).

As shown on **Table 9b**, 1,1,1-TCA was only detected at SVPM2006D duplicate at an estimated concentration of 0.59 J  $\mu\text{g}/\text{m}^3$ . PCE was detected at 15 of the 18 locations, with concentrations ranging from 0.94 J  $\mu\text{g}/\text{m}^3$  at SVPM-2002S to 6.8  $\mu\text{g}/\text{m}^3$  at SVPM-2007S. TCE was detected at 17 of 18 locations, with concentrations ranging from 1.8 J  $\mu\text{g}/\text{m}^3$  at SVPM-2001S to 61 J  $\mu\text{g}/\text{m}^3$  at SVPM-2006D. All detected concentrations were well below the NYSDOH sub-slab screening values of 1,000  $\mu\text{g}/\text{m}^3$  for 1,1,1-TCA, 1,000  $\mu\text{g}/\text{m}^3$  for PCE, and 250  $\mu\text{g}/\text{m}^3$  for TCE, as outlined in the *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (NYSDOH 2006).

Results of quality assurance /quality control (QA/QC) samples, data validation reports, and a validated analytical data summary from the January and September 2016 sampling events are presented in the *Quarterly Operations Report, First Quarter 2016* (KGS 2016), and *Quarterly Operations Report, Third Quarter 2016* (KGS 2017).

### 3.4.2 Historical Vapor Quality Results

**Table 10** presents historical vapor quality analytical results collected from the 18 SVPM locations, beginning in October 2008 and including the most recent results obtained in January and September 2016. As indicated, concentrations observed in January 2016 have dropped substantially from initial concentrations observed in October 2008, and were generally similar to those observed in January 2015 with the following exceptions:

- Concentrations of cis-1,2-DCE at SVPM2006I and SVPM2006D were significantly higher than those reported in January 2015 and those observed in October 2008. PCE also appeared to be increasing at these locations.
- TCE and/or PCE increased to detectable concentrations at several locations.

In 2008, TCE was detected at all 18 locations, with concentrations ranging from 1.0  $\mu\text{g}/\text{m}^3$  (SVPM-2004S) to 89,000  $\mu\text{g}/\text{m}^3$  (SVPM-2002I); concentrations exceeded the NYSDOH sub-slab screening value of 250  $\mu\text{g}/\text{m}^3$  at nine locations (SVPM-2001S, SVPM-2001I, SVPM-2001D, SVPM-2002S, SVPM-2002I, SVPM-2002D, SVPM-2003D, SVPM-2004I, and SVPM-2004D). In 2013, TCE concentrations ranged from non-detectable levels at 12 locations to 47  $\mu\text{g}/\text{m}^3$  (SVPM-2006I), and no locations exceeded the NYSDOH sub-slab screening value of 250  $\mu\text{g}/\text{m}^3$ . In 2014, TCE was detected at nine of the 18 locations, with concentrations ranging from 0.73 J  $\mu\text{g}/\text{m}^3$  at SVPM-2003I to 3.7 J  $\mu\text{g}/\text{m}^3$  at SVPM-2004I and no locations exceeded the NYSDOH sub-slab screening value of 250  $\mu\text{g}/\text{m}^3$ . In 2015, TCE was detected at two of the 18 locations, with concentrations ranging from 1.5 J  $\mu\text{g}/\text{m}^3$  at SVPM-2004D to 30  $\mu\text{g}/\text{m}^3$  at SVPM-2006D, and no locations exceeded the NYSDOH sub-slab screening value of 250  $\mu\text{g}/\text{m}^3$ . In 2016, TCE was detected at 17 of the 18 locations, with concentrations ranging from 1.8 J  $\mu\text{g}/\text{m}^3$  at SVPM-2001S to 61 J  $\mu\text{g}/\text{m}^3$  at SVPM-2006D, and no locations exceeded the NYSDOH sub-slab screening value of 250  $\mu\text{g}/\text{m}^3$ .

In 2008, PCE was detected at all 18 locations, with concentrations ranging from 1.8  $\mu\text{g}/\text{m}^3$  (SVPM-2004S) to 5,000  $\mu\text{g}/\text{m}^3$  (SVPM-2001I); concentrations exceeded the NYSDOH sub-slab screening value of 1,000  $\mu\text{g}/\text{m}^3$  at two locations (SVPM-2001S and SVPM-2001I). In 2013, PCE concentrations ranged from non-detectable levels at seven locations to 2.3 J  $\mu\text{g}/\text{m}^3$  (SVPM-2004D), and no locations exceeded the NYSDOH sub-slab screening value of 1,000  $\mu\text{g}/\text{m}^3$ . In 2014, PCE was detected at 15 of the 18 locations, with concentrations ranging from 0.53 J  $\mu\text{g}/\text{m}^3$  at SVPM-2001D to 2.9 J  $\mu\text{g}/\text{m}^3$  at SVPM-2004I, and no locations exceeded the NYSDOH sub-slab screening value of 1,000  $\mu\text{g}/\text{m}^3$ . In 2015, PCE was detected at three of the 18 locations, with concentrations ranging from 1.7 J  $\mu\text{g}/\text{m}^3$  at SVPM-2006D to 7.1  $\mu\text{g}/\text{m}^3$  at SVPM-2004D, and no locations exceeded the NYSDOH sub-slab screening value of 1,000  $\mu\text{g}/\text{m}^3$ . In 2016, PCE was detected at 15 of the 18 locations, with concentrations ranging from 0.94 J  $\mu\text{g}/\text{m}^3$  at SVPM-2002S to 6.8  $\mu\text{g}/\text{m}^3$  at SVPM-2007S, and no locations exceeded the NYSDOH sub-slab screening value of 1,000  $\mu\text{g}/\text{m}^3$ .

In 2008, 1,1,1-TCA was detected at all 18 locations, with concentrations ranging from 1.4  $\mu\text{g}/\text{m}^3$  (SVPM-2004S) to 52,000  $\mu\text{g}/\text{m}^3$  (SVPM-2002I); concentrations exceeded the NYSDOH sub-slab screening value of 1,000  $\mu\text{g}/\text{m}^3$  at six locations (SVPM-2001S, SVPM-2001I, SVPM-2001D, SVPM-2002S, SVPM-2002I, SVPM-2002D). In 2013, 1,1,1-TCA was detected at only one location, SVPM-2007D, at a concentration of 1.3 J  $\mu\text{g}/\text{m}^3$ , well below the NYSDOH sub-slab screening value of 1,000  $\mu\text{g}/\text{m}^3$ . In 2014 and 2015, 1,1,1-TCA was not detected at any location. In 2016, 1,1,1-TCA was only present in SVPM-2006D at a low concentration of 0.59 J  $\mu\text{g}/\text{m}^3$ .

### 3.5 Soil Vapor Quality Concentration Trends

Concentration trends of select VOCs over time for the SVECS combined influent (1,1,1-TCA, PCE, TCE, and total VOCs) and each of the 12 SVEWs (1,1,1-TCA, PCE, and TCE) are presented in **Appendix B**. Concentration trends observed through the Fourth Quarter 2016 are discussed below.

- Combined Influent: Overall VOC concentrations in the combined influent increased throughout the Fourth Quarter, with total VOC concentrations of 3,264  $\mu\text{g}/\text{m}^3$ , 3,272  $\mu\text{g}/\text{m}^3$ , and 4,203  $\mu\text{g}/\text{m}^3$  in October, November, and December, respectively. Overall concentrations remain well below baseline observed in December 2009 that had a total VOC concentration of 63,650  $\mu\text{g}/\text{m}^3$ .
- SV-101I: Concentrations observed at this location decreased in the Fourth Quarter from concentrations observed in the First and Second Quarters of 2016. Concentrations of TCE, PCE, and 1,1,1-TCA were all non-detect in the Third and Fourth Quarters 2016. All concentrations remain below baseline concentrations observed in December 2009 (180,000  $\mu\text{g}/\text{m}^3$  TCE, 1,700  $\mu\text{g}/\text{m}^3$  PCE, and 51,000  $\mu\text{g}/\text{m}^3$  1,1,1-TCA).
- SV-101D: Concentrations observed at this location remained similar in the Fourth Quarter from concentrations observed in the Third Quarter, with exception of TCE which increased from non-detect in the Third Quarter to a concentration of 970  $\mu\text{g}/\text{m}^3$  TCE. All concentrations (970  $\mu\text{g}/\text{m}^3$  TCE, 300  $\mu\text{g}/\text{m}^3$  PCE, and 20  $\mu\text{g}/\text{m}^3$  1,1,1-TCA) remain below baseline concentrations observed in December 2009 (100,000  $\mu\text{g}/\text{m}^3$  TCE, 3,200  $\mu\text{g}/\text{m}^3$  PCE, and 26,000  $\mu\text{g}/\text{m}^3$  1,1,1-TCA).
- SV-102I: Concentrations observed at this location remained similar in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 24  $\mu\text{g}/\text{m}^3$  TCE, 3.2 J  $\mu\text{g}/\text{m}^3$  PCE, and 1.2 J  $\mu\text{g}/\text{m}^3$  1,1,1-TCA. The Fourth Quarter concentrations are above baseline concentrations observed in December 2009 for TCE and 1,1,1-TCA (5.6  $\mu\text{g}/\text{m}^3$  TCE, 2.4  $\mu\text{g}/\text{m}^3$  PCE, and non-detect 1,1,1-TCA); however, the concentrations are below the peak concentrations observed in June 2010 (300  $\mu\text{g}/\text{m}^3$  TCE, 17  $\mu\text{g}/\text{m}^3$  PCE, and 13  $\mu\text{g}/\text{m}^3$  1,1,1-TCA).
- SV-102D: Concentrations observed at this location decreased slightly or remained similar in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 74  $\mu\text{g}/\text{m}^3$  TCE, 37  $\mu\text{g}/\text{m}^3$  PCE, and 3.8 J  $\mu\text{g}/\text{m}^3$  of 1,1,1-TCA. Concentrations remain below baseline concentrations observed in December 2009 for TCE and 1,1,1-TCA (440  $\mu\text{g}/\text{m}^3$  TCE



and 130  $\mu\text{g}/\text{m}^3$  1,1,1-TCA), and also below the peak concentration observed in October 2011 for PCE (39  $\mu\text{g}/\text{m}^3$ ).

- SV-103I: Concentrations observed at this location decreased slightly in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 34  $\mu\text{g}/\text{m}^3$  TCE, 99  $\mu\text{g}/\text{m}^3$  PCE, and 2.2 J  $\mu\text{g}/\text{m}^3$  1,1,1-TCA. Concentrations remain below baseline concentrations observed in December 2009 (900  $\mu\text{g}/\text{m}^3$  TCE, 580  $\mu\text{g}/\text{m}^3$  PCE, and 900  $\mu\text{g}/\text{m}^3$  1,1,1-TCA).
- SV-103D: Concentrations observed at this location increased in the Fourth Quarter from concentrations observed in the three previous Quarters, with concentrations of 730  $\mu\text{g}/\text{m}^3$  TCE, 12,000  $\mu\text{g}/\text{m}^3$  PCE, and 16 J  $\mu\text{g}/\text{m}^3$  1,1,1-TCA. Concentrations remain below baseline concentrations observed in December 2009 (3,100  $\mu\text{g}/\text{m}^3$  TCE, 20,000  $\mu\text{g}/\text{m}^3$  PCE, and 3,000  $\mu\text{g}/\text{m}^3$  1,1,1-TCA).
- SV-104I: Concentrations observed at this location increased in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 110  $\mu\text{g}/\text{m}^3$  TCE, 530  $\mu\text{g}/\text{m}^3$  PCE, and 6.5  $\mu\text{g}/\text{m}^3$  1,1,1-TCA. Concentrations remain below baseline concentrations observed in December 2009 (710  $\mu\text{g}/\text{m}^3$  TCE, 3,100  $\mu\text{g}/\text{m}^3$  PCE, and 730  $\mu\text{g}/\text{m}^3$  1,1,1-TCA).
- SV-104D: Concentrations observed at this location increased significantly in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 2,200  $\mu\text{g}/\text{m}^3$  TCE, 15,000  $\mu\text{g}/\text{m}^3$  PCE, and 710  $\mu\text{g}/\text{m}^3$  1,1,1-TCA. Concentrations remain below baseline concentrations observed in December 2009 (4,600  $\mu\text{g}/\text{m}^3$  TCE, 20,000  $\mu\text{g}/\text{m}^3$  PCE, and 3,600  $\mu\text{g}/\text{m}^3$  1,1,1-TCA).
- SV-105I: Concentrations observed at this location decreased slightly in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 160  $\mu\text{g}/\text{m}^3$  TCE, 46  $\mu\text{g}/\text{m}^3$  PCE, and 11  $\mu\text{g}/\text{m}^3$  1,1,1-TCA. Though these concentrations are above baseline concentrations observed in December 2009 for TCE and 1,1,1-TCA (76  $\mu\text{g}/\text{m}^3$  TCE and 9.9  $\mu\text{g}/\text{m}^3$  1,1,1-TCA), they are below the peak concentrations observed in June 2010 for TCE, PCE, and 1,1,1-TCA (370  $\mu\text{g}/\text{m}^3$  TCE, 240  $\mu\text{g}/\text{m}^3$  PCE, and 29  $\mu\text{g}/\text{m}^3$  1,1,1-TCA).
- SV-105D: Concentrations observed at this location decreased or remained similar in the Fourth Quarter from concentrations observed in the Third Quarter (210  $\mu\text{g}/\text{m}^3$  TCE, 110  $\mu\text{g}/\text{m}^3$  PCE, and 29  $\mu\text{g}/\text{m}^3$  1,1,1-TCA). These concentrations are below baseline concentrations observed in December 2009 (1,700  $\mu\text{g}/\text{m}^3$  TCE, 2,100  $\mu\text{g}/\text{m}^3$  PCE and 550  $\mu\text{g}/\text{m}^3$  1,1,1-TCA).
- SV-106I: Concentrations observed at this location decreased in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 71  $\mu\text{g}/\text{m}^3$  TCE, 6.7  $\mu\text{g}/\text{m}^3$  PCE, and 7.5  $\mu\text{g}/\text{m}^3$  1,1,1-TCA. These concentrations are below baseline concentrations observed in December 2009 (1,900  $\mu\text{g}/\text{m}^3$  TCE, 390  $\mu\text{g}/\text{m}^3$  PCE, and 220  $\mu\text{g}/\text{m}^3$  1,1,1-TCA).
- SV-106D: Concentrations observed at this location decreased slightly in the Fourth Quarter to concentrations observed in the Third Quarter, with concentrations of 210  $\mu\text{g}/\text{m}^3$  TCE, 33  $\mu\text{g}/\text{m}^3$

PCE, and  $14 \mu\text{g}/\text{m}^3$  1,1,1-TCA. These concentrations remain below baseline concentrations observed in December 2009 ( $3,400 \mu\text{g}/\text{m}^3$  TCE,  $720 \mu\text{g}/\text{m}^3$  PCE, and  $340 \mu\text{g}/\text{m}^3$  1,1,1-TCA).

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

The intent of the Site 1 SVECS is to prevent further off-site migration of VOC contaminated soil vapor and to the extent practical, capture soil vapor with elevated TCE concentrations. Based on the presence of a vacuum field and the reduction of VOC concentrations to less than the screening values in the off-property area, the SVECS is functioning as designed, and the removal of 28.79 lbs of VOCs by the SVECS in 2016 indicates that progress is being made toward these goals.

Increasing concentrations of cis-1,2-dichloroethene (cis-1,2-DCE) and trichloroethene (TCE) were noted in soil vapor pressure monitors (SVPMs) SVPM-2006I and -2006D. These results were confirmed during the 2016 sampling events. However, SVPM points located near Site 1 were significantly lower. Based on increasing concentrations at SVPM-2006I and -2006D, an additional investigation will be conducted by the Navy this summer.

The SVECS should continue to be operated on a full-time basis to achieve continued capture of contaminated soil vapor. Monthly monitoring of the combined influent and effluent as well as quarterly monitoring of individual SVEWs should continue. Quarterly and annual monitoring of the SVPMs should also continue in order to ensure that a measurable vacuum field is being established and that the area is being effectively treated. Periodic adjustment of the SVECS system should be performed to ensure proper distribution of the applied vacuum.

## 5.0 REFERENCES

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## **TABLES**

**Table 1**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Vapor Monitoring Results**  
**October 2016**

Compound	Concentration (ug/m <sup>3</sup> )				Emission Rate <sup>(1),(2)</sup>				Monthly Mass Recovery <sup>(3)</sup> (lbs)
	Influent #1	Influent #2	Average	Effluent	Prior to Treatment		Following Treatment		
					(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
1,1,1-Trichloroethane	350	340	345	0	0.0004	3.5746	0.0000	0.0000	0.3036
1,1-Dichloroethane	17	16	17	0.75 J	0.0000	0.1710	0.0000	0.0078	0.0145
1,1-Dichloroethene	2.2 J	1.9 J	2.1 J	0	0.0000	0.0212	0.0000	0.0000	0.0018
1,2-Dichloroethane	1.2 J	0.92 J	1.1 J	0	0.0000	0.0110	0.0000	0.0000	0.0009
cis-1,2-Dichloroethene	290	300	295	7.7	0.0003	3.0566	0.0000	0.0798	0.2596
Tetrachloroethene	1400	1400	1400	0	0.0017	14.5058	0.0000	0.0000	1.2320
trans-1,2-Dichloroethene	4.1	4.7	4.4	0	0.0000	0.0456	0.0000	0.0000	0.0039
Trichloroethene	1200	1200	1200	0	0.0014	12.4335	0.0000	0.0000	1.0560
Vinyl Chloride	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
Total VOCs	3265	3264	3264	8.5	0.0039	33.8193	0.0000	0.0876	2.8723

**Notes:**

All samples were analyzed for site-specific VOCs by modified method TO-15.

Average Monthly Vapor Temp (°F) = 111  
Average Monthly Flowrate (cfm) = 342  
Average Monthly Flowrate (scfm) = 316  
Operational Hours for the month = 744

(1) Emissions (lbs/hr) = Concentration (ug/m<sup>3</sup>) \* (lb/454000000ug) \* (0.3048^3m<sup>3</sup>/ft<sup>3</sup>) \* exhaust flow (scfm) \* (60min/hour)

(2) Emissions (lbs/yr) = Emissions (lbs/hour) \* (8760hours/yr)

(3) Monthly Mass Removal = AVERAGE FLOWRATE (scfm) \* 0.3048^3m<sup>3</sup>/ft<sup>3</sup> \* INF AVG CONC (ug/m<sup>3</sup>) \* (lb/454000000ug) \* 60 min/hr \* OPERATIONAL TIME (hr)

**Table 2**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Vapor Monitoring Results**  
**November 2016**

Compound	Concentration (ug/m <sup>3</sup> )				Emission Rate <sup>(1),(2)</sup>				Monthly Mass Recovery <sup>(3)</sup> (lbs)
	Influent #1	Influent #2	Average	Effluent	Prior to Treatment		Following Treatment		
					(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
1,1,1-Trichloroethane	280	280	280	0	0.0003	2.9801	0.0000	0.0000	0.2330
1,1-Dichloroethane	16	16	16	0.97 J	0.0000	0.1703	0.0000	0.0103	0.0133
1,1-Dichloroethene	1.4 J	1.0 J	1.2 J	0.62 J	0.0000	0.0128	0.0000	0.0066	0.0010
1,2-Dichloroethane	0.64 J	0.57 J	0.61 J	0	0.0000	0.0064	0.0000	0.0000	0.0005
cis-1,2-Dichloroethene	270	270	270	9.3	0.0003	2.8737	0.0000	0.0990	0.2247
Tetrachloroethene	1600	1600	1600	0	0.0019	17.0291	0.0000	0.0000	1.3316
trans-1,2-Dichloroethene	4.5	4.0	4.3	0	0.0000	0.0452	0.0000	0.0000	0.0035
Trichloroethene	1100	1100	1100	0	0.0013	11.7075	0.0000	0.0000	0.9155
Vinyl Chloride	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
Total VOCs	3273	3272	3272	10.9	0.0040	34.8251	0.0000	0.1159	2.7232

**Notes:**

All samples were analyzed for site-specific VOCs by modified method TO-15.

Average Monthly Vapor Temp (°F) = 104  
Average Monthly Flowrate (cfm) = 347  
Average Monthly Flowrate (scfm) = 325  
Operational Hours for the month = 685

(1) Emissions (lbs/hr) = Concentration (ug/m<sup>3</sup>)\*(lb/454000000ug)\*(0.3048^3m<sup>3</sup>/ft<sup>3</sup>)\*exhaust flow (scfm)\*(60min/hour)

(2) Emissions (lbs/yr) = Emissions (lbs/hour)\*(8760hours/yr)

(3) Monthly Mass Removal = AVERAGE FLOWRATE (scfm) \* 0.3048^3m<sup>3</sup>/ft<sup>3</sup> \* INF AVG CONC (ug/m<sup>3</sup>) \* (lb/454000000ug) \* 60 min/hr \* OPERATIONAL TIME (hr)

**Table 3**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Vapor Monitoring Results**  
**December 2016**

Compound	Concentration (ug/m <sup>3</sup> )				Emission Rate <sup>(1),(2)</sup>				Monthly Mass Recovery <sup>(3)</sup> (lbs)
	Influent #1	Influent #2	Average	Effluent	Prior to Treatment		Following Treatment		
					(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
1,1,1-Trichloroethane	360	370	365	0	0.0004	3.8073	0.0000	0.0000	0.3225
1,1-Dichloroethane	20	20	20	0	0.0000	0.2086	0.0000	0.0000	0.0177
1,1-Dichloroethene	1.4 J	1.7 J	1.6 J	0	0.0000	0.0162	0.0000	0.0000	0.0014
1,2-Dichloroethane	1.1 J	0.95 J	1.0 J	0	0.0000	0.0107	0.0000	0.0000	0.0009
cis-1,2-Dichloroethene	310	310	310	5.8	0.0004	3.2336	0.0000	0.0605	0.2739
Tetrachloroethene	2100	2100	2100	0	0.0025	21.9050	0.0000	0.0000	1.8554
trans-1,2-Dichloroethene	5.3	5.3	5.3	0	0.0000	0.0553	0.0000	0.0000	0.0047
Trichloroethene	1400	1400	1400	0	0.0017	14.6033	0.0000	0.0000	1.2369
Vinyl Chloride	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
Total VOCs	4198	4208	4203	5.8 J	0.0050	43.8399	0.0000	0.0605	3.7134

**Notes:**

All samples were analyzed for site-specific VOCs by modified method TO-15.

Average Monthly Vapor Temp (°F) = 93  
Average Monthly Flowrate (cfm) = 333  
Average Monthly Flowrate (scfm) = 318  
Operational Hours for the month = 742

(1) Emissions (lbs/hr) = Concentration (ug/m<sup>3</sup>)\*(lb/454000000ug)\*(0.3048^3m<sup>3</sup>/ft<sup>3</sup>)\*exhaust flow (scfm)\*(60min/hour)

(2) Emissions (lbs/yr) = Emissions (lbs/hour)\*(8760hours/yr)

(3) Monthly Mass Removal = AVERAGE FLOWRATE (scfm) \* 0.3048^3m<sup>3</sup>/ft<sup>3</sup> \* INF AVG CONC (ug/m<sup>3</sup>) \* (lb/454000000ug) \* 60 min/hr \* OPERATIONAL TIME (hr)



**Table 4**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**2016 Air Emission and Mass Recovery Summary**

Month	1,1-DCA Effluent Emission Rate		1,1-DCE Effluent Emission Rate		cis-1,2-DCE Effluent Emission Rate		PCE Effluent Emission Rate		1,1,1-TCA Effluent Emission Rate		TCE Effluent Emission Rate		Total VOCs Effluent Emission Rate		Mass Recovery (Total VOCs)
	lb/hr	lb/mo	lb/hr	lb/mo	lb/hr	lb/mo	lb/hr	lb/mo	lb/hr	lb/mo	lb/hr	lb/mo	lb/hr	lb/mo	lb/mo
Jan-16	0.0000	0.0065	0.0000	0.0000	0.0002	0.1399	0.0000	0.0000	0.0002	0.1224	0.0002	0.1136	0.0005	0.3841	3.1987
Feb-16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0000	0.0011	2.1213
Mar-16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.9423
Apr-16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.3981	1.6446
May-16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.9644
Jun-16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.4001	0.0000	0.0000	1.8597
Jul-16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.1480
Aug-16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.8911
Sep-16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	2.7078
Oct-16	0.0000	0.0007	0.0000	0.0000	0.0000	0.0068	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0074	2.8723
Nov-16	0.0000	0.0008	0.0000	0.0005	0.0000	0.0081	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0095	2.7232
Dec-16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0051	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0051	3.7134

	<u>1,1-DCA</u>	<u>1,1-DCE</u>	<u>cis-1,2-DCE</u>	<u>PCE</u>	<u>1,1,1-TCA</u>	<u>TCE</u>	<u>Total VOCs</u>	
Discharge Goal (lb/hr) <sup>(1)</sup>	NA	NA	NA	0.04	225	0.02		
Discharge Goal (lb/yr) <sup>(2)</sup>	NA	NA	NA	350	1,971,000	175	---	
<b>2016 Totals (lb/yr)</b>	<b>0.01</b>	<b>0.00</b>	<b>0.16</b>	<b>0.00</b>	<b>0.12</b>	<b>0.51</b>	<b>0.81</b>	<b>28.79</b>

Notes:

lb/hr = pounds per hour  
 lb/mo = pounds per month  
 lb/yr = pounds per year  
 PCE = tetrachloroethene  
 TCA = trichloroethane  
 TCE = trichloroethene  
 NA = Not Applicable

Emission Rate (per hr) = average flowrate (scfm) \* (0.3048^3)m<sup>3</sup>/ft<sup>3</sup> \* Eff conc (ug/m3) \* (lb/45400000ug) \* 60 min/hr \* operational time (hrs)

Monthly Mass Recovery = average flowrate (scfm) \* (0.3048^3)m<sup>3</sup>/ft<sup>3</sup> \* Inf avg conc (ug/m<sup>3</sup>) \* (lb/45400000ug) \* 60 min/hr \* operational time (hrs)

(1) Discharge Goal (lb/hr) as presented in the *Modification to Existing Soil Vapor Extraction Containment System at Site 1 - Former Drum Marshalling Area, Installation of Soil Vapor Extraction Wells SVE-107D to -11D, NWIRP Bethpage, Bethpage, NY* (Tetra Tech NUS, 2011) and approved via email by NYDEC on 6 October 2011.

(2) Discharge Goal (lb/yr) = Discharge Goal (lb/hr) x 8760 hr/yr.

**Table 5**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Fourth Quarter 2016 Vapor Analytical Results Summary of SVE Wells**

Sample ID	SVE 101I	SVE 101D	SVE 102I	SVE 102D	SVE 103I	SVE 103D	SVE 104I	SVE 104D	SVE 105I	SVE 105D	SVE 106I	SVE 106D
Sample Date	11/16/16	11/16/16	11/16/16	11/16/16	11/16/16	11/16/16	11/16/16	11/16/16	11/16/16	11/16/16	11/16/16	11/16/16
Analysis by TO-15 ( $\mu\text{g}/\text{m}^3$ )												
1,1,1-Trichloroethane	ND	20	1.2 J	3.8 J	2.2 J	16 J	6.5	710	11	29	7.5	14
1,1-Dichloroethane	ND	3.1	ND	0.95 J	1.1 J	6.2 J	3.6	110	3.4	23	1.3 J	21
1,1-Dichloroethene	ND	0.76 J	ND	ND	ND	ND	ND	7.6 J	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	31	ND	10	2.2 J	340	110	3800	5.0	19	3.1 J	22
Tetrachloroethene	ND	300	3.2 J	37	99	12000	530	15000	46	110	6.7	33
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	1.2 J	67	ND	2.0 J	ND	1.3 J
Trichloroethene	ND	970	24	74	34	730	110	2200	160	210	71	210
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**

All samples were analyzed for site-specific VOCs by modified method TO-15.

$\mu\text{g}/\text{m}^3$  = micrograms per cubic meter

ND = Not detected above method detection limit

Table 6  
 Soil Vapor Extraction Containment System  
 Site 1, Former Drum Marshalling Yard  
 Naval Weapons Industrial Reserve Plant - Bethpage, NY  
 Quarterly Vapor Monitoring Results of SVE Wells  
 Through Fourth Quarter 2016

Sample ID	SVE 101I																												
Sample Date	12/21/09	03/31/10	06/09/10	09/16/10	12/08/10	03/30/11	06/28/11	09/06/11	10/14/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	01/30/14	04/10/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16
Analysis by TO-15 (µg/m <sup>3</sup> )																													
1,1,1-Trichloroethane	51000	3900	2600	450	850	300	1	0.7 J	0.7 J	1500	1500	3200	4400	3400	1900	2200	2900	2600	1200	1600	2500	2000	720	520	2200	2700	3000	ND	ND
1,1-Dichloroethane	1200	65	34	14	31	5	0.8 J	0.4 J	0.4 J	28	28	61	76	62	35	36	57	50	22	29	51	39	15	10	42	45	38	ND	ND
1,1-Dichloroethene	250	ND	ND	4	8	ND	0.7 J	0.4 J	0.5 J	7.6 J	10	ND	15 J	ND	12 J	8.9 J	16 J	11 J	7.9 J	6.2 J	21	11 J	ND	ND	ND	ND	6.9 J	ND	ND
1,2-Dichloroethane	NR	30	ND	4	8	ND	0.9	0.5 J	0.5 J	6.9 J	6.4 J	11 J	14 J	12 J	10 J	8.6 J	9.2 J	7.5 J	4.4 J	9.2 J	12 J	9.8 J	5.2 J	3.8	15	9.0 J	ND	ND	ND
cis-1,2-Dichloroethene	480	59	ND	9	15	3	0.7 J	ND	0.4 J	7.1 J	7.4 J	20 J	22 J	14 J	6.2 J	11 J	22 J	12 J	4.2 J	8.8 J	24	9.4 J	4.6 J	3.8	9.2 J	6.0 J	ND	ND	ND
Tetrachloroethene	1700	410	260	36	63	10	1	ND	2	48	46	93	120	80	49	79	100	80	34	67	83	54	31	31	74	83	82	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	0.7 J	0.4 J	0.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	180000	18000	14000	1200	2400	560	1	0.6 J	0.6 J	4200	4300	7200	12000	8100	5200	5400	8900	7100	3300	4400	6900	5300	2500	1600	7600	8200	7100	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	0.5 J	0.3 J	0.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**  
 µg/m<sup>3</sup> = micrograms per cubic meter  
 NR = Not Recorded  
 NA = Data not available  
 ND = Not detected above method  
 detection limit

Table 6  
 Soil Vapor Extraction Containment System  
 Site 1, Former Drum Marshalling Yard  
 Naval Weapons Industrial Reserve Plant - Bethpage, NY  
 Quarterly Vapor Monitoring Results of SVE Wells  
 Through Fourth Quarter 2016

Sample ID	SVE 101D																												
	12/21/09	03/31/10	06/09/10	09/16/10	12/22/10	03/30/11	06/28/11	09/06/11	10/14/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	01/30/14	04/10/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16
Analysis by TO-15 (µg/m <sup>3</sup> )																													
1,1,1-Trichloroethane	26000	130	53	ND	ND	ND	3	8	0.8 J	ND	3.1 J	9.9	11	ND	ND	5.6	16	14	12	20	19	12	ND	22	22	27	22	ND	20
1,1-Dichloroethane	660	3.9	ND	ND	ND	ND	2	0.9 J	0.5 J	ND	ND	1.0 J	1.1 J	1.1 J	ND	ND	1.5 J	1.4 J	1.2 J	0.89 J	1.4 J	ND	ND	2.5 J	2.8 J	2.3 J	1.7 J	ND	3.1
1,1-Dichloroethene	180	2	ND	ND	ND	ND	ND	0.7 J	0.4 J	ND	ND	ND	ND	ND	ND	ND	1.0 J	0.75 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.76 J
1,2-Dichloroethane	NR	0.5	ND	ND	ND	ND	2	0.5 J	0.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	220	8.5	7.5	ND	3	ND	2	2	0.5 J	ND	ND	2.1 J	3.2	ND	ND	ND	3.0 J	4.5	3.5	1.5 J	4.1	2.3 J	ND	3.3	5.9	5.8	6.4	ND	31
Tetrachloroethene	3200	1200	1200	ND	4	ND	26	210	2	ND	79	150	170	130	0.92 J	73	330	340	270	240	260	200	1.0 J	230	250	310	220	ND	300
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	2	0.6 J	0.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	100000	1600	310	3	1	ND	3	120	1 J	ND	200	400	350	120	ND	56	540	680	330	180	410	190	1.7 J	450	1000	2200	990	ND	970
Vinyl Chloride	ND	ND	ND	ND	ND	ND	1	0.4 J	0.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**  
 µg/m<sup>3</sup>= micrograms per cubic meter  
 NR = Not Recorded  
 NA = Data not available  
 ND = Not detected above method  
 detection limit

Table 6  
 Soil Vapor Extraction Containment System  
 Site 1, Former Drum Marshalling Yard  
 Naval Weapons Industrial Reserve Plant - Bethpage, NY  
 Quarterly Vapor Monitoring Results of SVE Wells  
 Through Fourth Quarter 2016

Sample ID	SVE 102I																													
	12/21/09	03/31/10	06/09/10	09/16/10	12/22/10	03/30/11	06/28/11	09/06/11	10/14/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	02/05/14	04/10/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16	
Analysis by TO-15 (µg/m <sup>3</sup> )																														
1,1,1-Trichloroethane	ND	ND	13	3	ND	NA	2	3	2	ND	0.60 J	3.3 J	ND	ND	ND	1.6 J	ND	ND	0.95 J	10	4.0 J	0.82 J	1.6 J	12	2.8 J	0.87 J	ND	1.3 J	1.2 J	
1,1-Dichloroethane	ND	ND	ND	ND	ND	NA	0.8 J	0.5 J	0.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	NA	0.7 J	0.4 J	0.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,2-Dichloroethane	NR	ND	ND	ND	ND	NA	0.8	0.4 J	0.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	NA	0.7 J	0.5 J	0.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Tetrachloroethene	2.4	1.4	17	6	NR	NA	3	6	6	ND	1.6 J	6.4	1.5 J	2.4 J	1.4 J	3.3 J	2.6 J	ND	ND	10	4.8 J	1.5 J	2.5 J	13	6.6	2.4 J	ND	2.9 J	3.2 J	
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	NA	0.7 J	0.4 J	0.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloroethene	5.6	3.8	300	88	3	NA	34	76	52	10	26	99	10	10	15	49	21	7.6	8.0	84	39	8.0	22	120	40	12	ND	21	24	
Vinyl Chloride	ND	ND	ND	ND	ND	NA	0.5 J	0.4 J	0.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

**Notes:**

µg/m<sup>3</sup>= micrograms per cubic meter

NR = Not Recorded

NA = Data not available

ND = Not detected above method  
 detection limit

Table 6  
 Soil Vapor Extraction Containment System  
 Site 1, Former Drum Marshalling Yard  
 Naval Weapons Industrial Reserve Plant - Bethpage, NY  
 Quarterly Vapor Monitoring Results of SVE Wells  
 Through Fourth Quarter 2016

Sample ID	SVE 102D																												
	12/21/09	03/31/10	06/09/10	09/16/10	12/08/10	03/30/11	06/28/11	09/06/11	10/14/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	01/30/14	04/24/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16
Analysis by TO-15 (µg/m <sup>3</sup> )																													
1,1,1-Trichloroethane	130	53	14	7	2	2	6	4	5	1.4 J	1.2 J	3.9 J	ND	ND	ND	2.3 J	3.1 J	ND	1.6 J	4.5	5.1	2.6 J	ND	5.2	4.9	3.5 J	1.1 J	6.6	3.8 J
1,1-Dichloroethane	ND	2.7	ND	ND	ND	ND	1	0.6 J	0.7 J	ND	ND	0.51 J	0.95 J	ND	ND	ND	0.69 J	ND	0.44 J	ND	ND	ND	ND	ND	1.0 J	0.81 J	ND	0.93 J	0.95 J
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	1	0.6 J	0.6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	NR	ND	ND	ND	ND	ND	0.9	0.5 J	0.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.38 J	ND	ND	ND	ND	ND	ND	ND	ND	
cis-1,2-Dichloroethene	ND	1.4	ND	ND	0.9	ND	1	0.5 J	0.9	ND	ND	1.1 J	4.1	ND	ND	ND	3.4	ND	2.8 J	0.89 J	3.6	1.6 J	ND	4.2	9.3	8.9	4.4	13	10
Tetrachloroethene	10	31	31	19	3	9	25	23	39	5.9	6.5	24	25	0.96 J	1.4 J	14	28	2.6 J	9.6	16	20	11	3.8 J	22	41	42	18	51	37
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	1	0.5 J	0.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	440	390	190	110	17	21	89	81	87	34	58	170	140	6.5	ND	88	160	3.9 J	39	79	92	36	20	160	180	120	38	150	74
Vinyl Chloride	ND	ND	ND	ND	ND	ND	0.6	0.4 J	0.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**

µg/m<sup>3</sup>= micrograms per cubic meter

NR = Not Recorded

NA = Data not available

ND = Not detected above method  
 detection limit

Table 6  
Soil Vapor Extraction Containment System  
Site 1, Former Drum Marshalling Yard  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Quarterly Vapor Monitoring Results of SVE Wells  
Through Fourth Quarter 2016

Sample ID	SVE 103I																												
	12/21/09	03/31/10	06/09/10	09/16/10	12/08/10	03/30/11	06/28/11	09/06/11	10/14/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	01/30/14	04/10/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16
Analysis by TO-15 (µg/m <sup>3</sup> )																													
1,1,1-Trichloroethane	900	ND	ND	ND	ND	ND	0.9 J	6	6	ND	1.6 J	9.2	ND	ND	1.4 J	4.7 J	2.8 J	0.92 J	ND	4.6	4.9	ND	1.3 J	6.6	3.6 J	1.2 J	0.76 J	6.0	2.2 J
1,1-Dichloroethane	26	ND	ND	ND	ND	ND	0.6 J	2	2	ND	0.75 J	1.5 J	0.77 J	ND	ND	1.5 J	1.3 J	ND	ND	0.89 J	2.0 J	ND	0.68 J	ND	1.4 J	ND	ND	1.9 J	1.1 J
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	0.6 J	0.6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	NR	ND	ND	ND	ND	ND	0.7 J	0.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	58	ND	ND	1	ND	1	0.5 J	16	12	18	16	19	6.0	2.4 J	5.0	11	15	6.9	3.4	4.2	6.1	ND	11	9.3	7.3	13	2.7 J	5.2	2.2 J
Tetrachloroethene	580	ND	ND	ND	ND	2	1 J	420	590	140	200	430	120	40	78	220	200	97	40	150	130	8.6	130	290	210	450	71	200	99
trans-1,2-Dichloroethene	580	ND	ND	ND	ND	ND	0.6 J	1	1	ND	ND	ND	ND	ND	ND	ND	0.85 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3 J	ND
Trichloroethene	900	0.9	ND	ND	ND	ND	0.9 J	100	97	29	47	130	48	16	35	95	78	46	20	47	50	4.9 J	37	92	74	70	17	67	34
Vinyl Chloride	ND	ND	ND	ND	ND	ND	0.4 J	0.4 J	0.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**  
µg/m<sup>3</sup>= micrograms per cubic meter  
NR = Not Recorded  
NA = Data not available  
ND = Not detected above method  
detection limit

**Table 6**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Quarterly Vapor Monitoring Results of SVE Wells**  
**Through Fourth Quarter 2016**

Sample ID	SVE 103D																												
	12/21/09	03/31/10	06/09/10	09/16/10	12/08/10	03/30/11	06/28/11	09/06/11	10/14/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	01/30/14	04/10/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16
Analysis by TO-15 (µg/m <sup>3</sup> )																													
1,1,1-Trichloroethane	3000	1100	230	ND	13	ND	2 J	20	31	7.4 J	6.9 J	22	190	ND	150	170	200	550	400	25	38	ND	310	26	30 J	ND	38	ND	16 J
1,1-Dichloroethane	82	69	ND	ND	2	2	1 J	4	9	1.6 J	1.5 J	1.9 J	10 J	ND	10	10 J	20 J	50	48	ND	7.8 J	ND	24	ND	ND	ND	ND	ND	6.2 J
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	1 J	2	6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	NR	ND	ND	ND	ND	ND	1 J	1 J	6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	420	1500	370	ND	92	ND	1 J	360	160	290	230	300	750	ND	550	700	2600	2100	1800	280	490	ND	930	310	530	ND	310	ND	340
Tetrachloroethene	20000	28000	16000	9	1500	ND	3	1600	6700	3800	3200	4700	4600	1.6 J	3300	4900	17000	15000	8600	6600	8900	ND	5800	8900	17000	ND	7500	ND	12000
trans-1,2-Dichloroethene	ND	24	ND	ND	1	ND	1 J	3	7 J	ND	ND	ND	8.8 J	ND	5.7 J	8.8 J	18 J	32	18	ND	ND	ND	17	ND	ND	ND	ND	ND	ND
Trichloroethene	3100	1600	640	7	92	ND	2 J	290	240	180	200	480	440	6.0	360	660	2100	1400	900	530	680	ND	580	640	1200	ND	300	ND	730
Vinyl Chloride	ND	5.9	ND	ND	2	ND	0.8 J	4	5 J	ND	ND	ND	ND	ND	1.9 J	ND	14 J	ND	2.6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**  
 µg/m<sup>3</sup>= micrograms per cubic meter  
 NR = Not Recorded  
 NA = Data not available  
 ND = Not detected above method  
     detection limit



Table 6  
 Soil Vapor Extraction Containment System  
 Site 1, Former Drum Marshalling Yard  
 Naval Weapons Industrial Reserve Plant - Bethpage, NY  
 Quarterly Vapor Monitoring Results of SVE Wells  
 Through Fourth Quarter 2016

Sample ID	SVE 104I																												
	12/21/09	03/31/10	06/09/10	09/16/10	12/08/10	03/30/11	06/28/11	09/06/11	10/14/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	01/30/14	04/24/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16
Analysis by TO-15 (µg/m <sup>3</sup> )																													
1,1,1-Trichloroethane	730	4.2	ND	4	NR	NA	1 J	4	2	ND	ND	8.3	ND	ND	ND	3.1 J	2.6 J	ND	9.6	17	15	7.0	1.5 J	8.3	4.0 J	4.6	0.48 J	6.9	6.5
1,1-Dichloroethane	24	0.54	ND	ND	ND	NA	1 J	0.6 J	0.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.4	8.7	7.7	6.6	ND	ND	ND	2.9 J	ND	ND	3.6
1,1-Dichloroethene	ND	ND	ND	ND	ND	NA	1 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	NR	ND	ND	ND	ND	NA	1 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	110	14	ND	2	0.8	NA	0.9 J	2	3	0.90 J	ND	5.0	ND	2.7 J	ND	3.3	5.3	ND	94	160	160	130	7.3	4.2	6.6	54	0.92 J	2.1 J	110
Tetrachloroethene	3100	210	68	96	16	NA	2 J	54	33	12	ND	86	1.6 J	4.8 J	2.3 J	30	36	ND	69	210	190	91	13	82	66	79	10	80	530
trans-1,2-Dichloroethene	15	ND	ND	ND	ND	NA	1 J	0.5 J	0.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8 J	2.1 J	1.4 J	ND	ND	ND	ND	ND	ND	1.2 J
Trichloroethene	710	44	60	72	12	NA	2 J	44	25	9.6	ND	73	ND	3.1 J	ND	30	31	ND	39	110	120	43	17	85	54	35	7.6	83	110
Vinyl Chloride	ND	0.47	ND	ND	ND	NA	0.7 J	0.3 J	0.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**  
 µg/m<sup>3</sup>= micrograms per cubic meter  
 NR = Not Recorded  
 NA = Data not available  
 ND = Not detected above method  
 detection limit

Table 6  
 Soil Vapor Extraction Containment System  
 Site 1, Former Drum Marshalling Yard  
 Naval Weapons Industrial Reserve Plant - Bethpage, NY  
 Quarterly Vapor Monitoring Results of SVE Wells  
 Through Fourth Quarter 2016

Sample ID	SVE 104D																												
Sample Date	12/21/09	03/31/10	06/09/10	09/16/10	12/22/10	03/30/11	06/28/11	09/06/11	10/14/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	01/30/14	04/10/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16
Analysis by TO-15 (µg/m <sup>3</sup> )																													
1,1,1-Trichloroethane	3600	3000	860	ND	270	ND	370	620	440	520	580	620	920	820	0.89 J	500	600	340	84	930	880	1.7 J	350	480	790	760	460	460	710
1,1-Dichloroethane	290	350	140	ND	66	ND	56	110	77	87	95	100	190	160	ND	95	130	56	22	120	130	ND	72	77	120	91	54	73	110
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	3	7 J	7 J	3.0 J	5.0 J	ND	11 J	ND	ND	ND	4.3 J	1.0 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.6 J
1,2-Dichloroethane	NR	ND	ND	ND	ND	ND	1 J	5 J	5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	2400	6600	3500	ND	1200	ND	1000	3600	2100	2200	2800 J	2200	4200	3700	8.6	2000	3200	1600	460	3300	4400	21	1500	2500	3600	3200	1900	2400	3800
Tetrachloroethene	20000	39000	21000	ND	2400	ND	1400	5800	6300	3800	4300	4600	4500	4200	69	2600	3900	2500	780	8200	8000	120	2200	5100	10000	7700	4500	9400	15000
trans-1,2-Dichloroethene	130	70	30	ND	13	ND	14	25	22	26	31	27	55	40	ND	24	40	15	3.5	34	53	ND	18	39	49	38	30	38	67
Trichloroethene	4600	6000	2400	ND	470	ND	420	1600	1300	1400	1400	1700	2300	2100	14	1200	1600	1100	430	2000	2100	19	1100	1200	2200	1600	750	1400	2200
Vinyl Chloride	ND	12	ND	ND	ND	ND	2	5	5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**  
 µg/m<sup>3</sup> = micrograms per cubic meter  
 NR = Not Recorded  
 NA = Data not available  
 ND = Not detected above method  
 detection limit

**Table 6**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Quarterly Vapor Monitoring Results of SVE Wells**  
**Through Fourth Quarter 2016**

Sample ID	SVE 105I																												
	12/21/09	03/31/10	06/09/10	09/16/10	12/08/10	03/30/11	06/28/11	09/06/11	10/14/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	01/30/14	04/10/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16
Analysis by TO-15 (µg/m <sup>3</sup> )																													
1,1,1-Trichloroethane	9.9	11	29	ND	24	1	1 J	21	31	11	13	26	22	22	11	24	18	32	26	17	20	20	25	29	30	12	5.0	16	11
1,1-Dichloroethane	ND	5.7	13	ND	6	ND	0.6 J	5	7	4.2	5.6	5.6	10	12	8.8	8.0	7.4	24	6.8	7.0	8.2	8.6	22	15	28	17	1.5 J	2.8	3.4
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	0.6 J	0.6 J	0.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	NR	ND	ND	ND	ND	ND	0.7 J	0.6 J	0.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	6.6	20	ND	ND	ND	1	10	16	8.1	9.7	13	16	13	14	14	7.4	17	6.2	9.5	12	7.5	31	28	23	17	1.8 J	7.9	5.0
Tetrachloroethene	70	9.1	240	ND	55	5	2	95	100	31	43	100	77	66	38	91	57	77	48	73	85	51	43	87	66	44	27	64	46
trans-1,2-Dichloroethene	ND	ND	1.6	ND	ND	ND	0.5 J	1	1	ND	ND	1.5 J	ND	ND	ND	ND	1.0 J	1.6 J	ND	ND	2.8 J	ND	ND	ND	2.3 J	ND	ND	0.83 J	ND
Trichloroethene	76	6.3	370	ND	120	7	1	170	200	110	140	260	180	160	94	220	140	180	190	140	200	130	160	290	240	84	39	250	160
Vinyl Chloride	ND	ND	ND	ND	ND	ND	0.4 J	0.4 J	0.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**

µg/m<sup>3</sup>= micrograms per cubic meter

NR = Not Recorded

NA = Data not available

ND = Not detected above method  
detection limit

Table 6  
 Soil Vapor Extraction Containment System  
 Site 1, Former Drum Marshalling Yard  
 Naval Weapons Industrial Reserve Plant - Bethpage, NY  
 Quarterly Vapor Monitoring Results of SVE Wells  
 Through Fourth Quarter 2016

Sample ID	SVE 105D																												
	12/21/09	03/31/10	06/09/10	09/16/10	12/08/10	03/30/11	06/28/11	09/06/11	12/02/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	01/30/14	04/10/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16
Analysis by TO-15 (µg/m <sup>3</sup> )																													
1,1,1-Trichloroethane	550	47	320	1000	590	ND	1 J	490	930	350	320	270	380	430	160	110	120	190	ND	92	79	4.3 J	16	35	52	62	68	47	29
1,1-Dichloroethane	300	28	270	250	ND	ND	0.6 J	74	150	69	78	72	110	110	46	45	70	46	ND	36	28	ND	4.7	12	30	21	15	22	23
1,1-Dichloroethene	3.9	ND	ND	2	4	4	0.6 J	6 J	ND	ND	ND	ND	ND	ND	ND	ND	1.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	NR	ND	ND	ND	ND	ND	4	5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	61	36	85	300	ND	ND	0.7 J	150	380	190	220	150	210	200	73	76	85	46	ND	50	36	ND	3.6	16	22	18	26	31	19
Tetrachloroethene	2100	1.1	650	270	420	ND	2	240	330	140	220	270	350	330	100	140	260	300	ND	140	120	2.1 J	18	76	130	140	130	150	110
trans-1,2-Dichloroethene	19	1.1	3.1	3	ND	ND	0.6 J	7 J	3 J	ND	ND	ND	ND	ND	1.4 J	2.4 J	3.6	1.3 J	ND	1.3 J	1.9 J	ND	ND	ND	ND	ND	ND	1.8 J	2.0 J
Trichloroethene	1700	68	200	1100	1400	1	2	3000	7000	3600	4500	2200	3800	3800	1400	900	1200	1900	8.5	650	520	15	75	250	400	410	350	360	210
Vinyl Chloride	ND	ND	ND	ND	ND	ND	0.4 J	4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**

µg/m<sup>3</sup>= micrograms per cubic meter

NR = Not Recorded

NA = Data not available

ND = Not detected above method  
 detection limit

Table 6  
 Soil Vapor Extraction Containment System  
 Site 1, Former Drum Marshalling Yard  
 Naval Weapons Industrial Reserve Plant - Bethpage, NY  
 Quarterly Vapor Monitoring Results of SVE Wells  
 Through Fourth Quarter 2016

Sample ID	SVE 106I																												
	12/21/09	03/31/10	06/09/10	09/16/10	12/08/10	03/30/11	06/28/11	09/06/11	10/14/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	01/30/14	04/10/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16
Analysis by TO-15 (µg/m <sup>3</sup> )																													
1,1,1-Trichloroethane	220	8.6	ND	4	ND	NA	6	3	7	1.0 J	2.2 J	11	ND	ND	ND	ND	18	1.4 J	3.8 J	8.9	2.2 J	ND	8.0	29	30	2.8 J	1.5 J	12	7.5
1,1-Dichloroethane	120	ND	ND	1	ND	NA	1	0.5 J	1	0.62 J	0.70 J	1.6 J	2.5 J	1.9 J	ND	ND	3.8	ND	17	3.9	1.1 J	ND	18	2.6 J	3.4	1.2 J	ND	ND	1.3 J
1,1-Dichloroethene	ND	ND	ND	ND	ND	NA	0.6 J	2	0.6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	NR	ND	ND	0.8	ND	NA	0.6 J	0.5 J	0.6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3 J	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	46	ND	ND	4	ND	NA	6	0.5 J	4	1.6 J	2.3 J	7.5	5.4	3.7	ND	ND	8.3	ND	23	11	3.1 J	ND	23	6.6	4.9	3.2	0.84 J	3.8	3.1 J
Tetrachloroethene	390	35	ND	15	ND	NA	15	7	19	4.3 J	7.2	27	14	7.0	0.73 J	ND	19	4.2 J	6.2	11	2.9 J	ND	14	39	49	11	5.1 J	20	6.7
trans-1,2-Dichloroethene	7.9	ND	3.1	0.9	ND	NA	0.8	0.5 J	0.7 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	1900	41	ND	140	10	NA	210	92	190	69	110	260	180	110	5.5	ND	210	28	70	110	16	0.87 J	130	560	660	200	40	190	71
Vinyl Chloride	ND	ND	ND	0.5	ND	NA	0.4 J	0.3 J	0.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**

µg/m<sup>3</sup>= micrograms per cubic meter

NR = Not Recorded

NA = Data not available

ND = Not detected above method  
 detection limit

Table 6  
 Soil Vapor Extraction Containment System  
 Site 1, Former Drum Marshalling Yard  
 Naval Weapons Industrial Reserve Plant - Bethpage, NY  
 Quarterly Vapor Monitoring Results of SVE Wells  
 Through Fourth Quarter 2016

Sample ID	SVE 106D																												
	12/21/09	03/31/10	06/09/10	09/16/10	12/08/10	03/30/11	06/28/11	09/06/11	10/14/11	02/10/12	05/11/12	09/11/12	12/05/12	01/15/13	05/16/13	08/27/13	11/08/13	01/30/14	04/10/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15	01/13/16	04/21/16	09/13/16	11/16/16
Analysis by TO-15 (µg/m <sup>3</sup> )																													
1,1,1-Trichloroethane	340	32	30	20	12	9	20	23	29	ND	11	26	18	ND	ND	27	25	5.8	6.3	14	28	ND	26	ND	ND	11	7.2	30	14
1,1-Dichloroethane	250	6.3	ND	5	2	5	4	3	3	ND	3.0	4.3	5.8	ND	ND	4.9	11	3.7	3.3	5.1	8.9	ND	2.6 J	ND	ND	2.7 J	13	6.8	21
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	0.5 J	0.7 J	0.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	NR	ND	ND	ND	ND	ND	ND	0.6 J	0.7 J	ND	ND	ND	ND	ND	ND	2.5 J	ND	ND	ND	1.1 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	79	13	11	13	2	11	11	5	4	ND	4.1	7.1	8.2	ND	ND	10	15	2.8 J	3.9	8.4	15	ND	36	ND	ND	3.2	24	14	22
Tetrachloroethene	720	65	70	ND	13	19	41	8	66	ND	28	62	48	ND	1.3 J	50	58	16	17	22	60	ND	110	ND	1.4 J	33	27	57	33
trans-1,2-Dichloroethene	15	ND	ND	ND	ND	ND	0.6 J	0.8	0.9	ND	ND	ND	ND	ND	ND	1.1 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.63 J	1.3 J
Trichloroethene	3400	600	900	230	130	170	210	260	320	ND	180	380	300	ND	ND	460	440	160	84	170	370	0.56 J	71	1.6 J	ND	280	170	450	210
Vinyl Chloride	ND	1.6	ND	ND	ND	ND	ND	0.4 J	0.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**  
 µg/m<sup>3</sup>= micrograms per cubic meter  
 NR = Not Recorded  
 NA = Data not available  
 ND = Not detected above method  
 detection limit

**Table 7**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Fourth Quarter 2016 Off-site Soil Vapor Monitoring of SVPMs**

SVPM/ SVEW Location	Vacuum Reading (i.w.)	Valve Position (% open)
<b>Monitoring Date:</b>	<b>11/16/16</b>	<b>11/16/16</b>
BPS1-SVPM2001S	0.06	--
BPS1-SVPM2001I	0.10	--
BPS1-SVPM2001D	0.00	--
BPS1-SVPM2002S	0.06	--
BPS1-SVPM2002I	0.10	--
BPS1-SVPM2002D	0.12	--
BPS1-SVPM2003S	0.04	--
BPS1-SVPM2003I	0.00	--
BPS1-SVPM2003D	0.06	--
BPS1-SVPM2004S	0.01	--
BPS1-SVPM2004I	0.02	--
BPS1-SVPM2004D	0.04	--
BPS1-SVPM2006S	0.01	--
BPS1-SVPM2006I	0.00	--
BPS1-SVPM2006D	0.00	--
BPS1-SVPM2007S	0.00	--
BPS1-SVPM2007I	0.00	--
BPS1-SVPM2007D	+ 0.01	--
SV-101I	4.5	50
SV-101D	12.2	40
SV-102I	4.1	40
SV-102D	8.5	50
SV-103I	2.0	40
SV-103D	12.0	40
SV-104I	8.1	40
SV-104D	8.5	40
SV-105I	1.8	40
SV-105D	7.0	40
SV-106I	2.7	40
SV-106D	13.5	50

**Notes:**

i.w. = inches of water column

SVEW = soil vapor extraction well

SVPM = soil vapor pressure monitor

\* Indicates a positive pressure reading was measured as opposed to a negative pressure (vacuum) reading.

Vacuum readings for the SVPMs were measured using a portable Magnehelic® Differential Pressure Gauge 2000-0, with a range of 0-0.50 i.w. Vacuum readings for SVEWs were recorded from dedicated in-line pressure gauges.

**Table 8**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Historical Quarterly Off-site Soil Vapor Monitoring of SVPMS**  
**Through Fourth Quarter 2016**

SVPMS/ SVEW Location	Third Quarter 2012	Fourth Quarter 2012	First Quarter 2013		Second Quarter 2013	Third Quarter 2013	Fourth Quarter 2013	First Quarter 2014		Second Quarter 2014	Third Quarter 2014		Fourth Quarter 2014	First Quarter 2015		Second Quarter 2015	Third Quarter 2015	Fourth Quarter 2015	First Quarter 2016		Second Quarter 2016	Third Quarter 2016		Fourth Quarter 2016
	Vacuum Reading (i.w.)	Vacuum Reading (i.w.)	Vacuum Reading (i.w.) Pre-Vapor Sample Collection	Vacuum Reading (i.w.) Post-Vapor Sample Collection	Vacuum Reading (i.w.)	Vacuum Reading (i.w.)	Vacuum Reading (i.w.)	Vacuum Reading (i.w.) Pre-Vapor Sample Collection	Vacuum Reading (i.w.) Post-Vapor Sample Collection	Vacuum Reading (i.w.)	Vacuum Reading (i.w.)	Vacuum Reading (i.w.)	Vacuum Reading (i.w.)	Vacuum Reading (i.w.)	Vacuum Reading (i.w.) Pre-Vapor Sample Collection	Vacuum Reading (i.w.) Post-Vapor Sample Collection	Vacuum Reading (i.w.)	Vacuum Reading (i.w.)	Vacuum Reading (i.w.)	Vacuum Reading (i.w.) Pre-Vapor Sample Collection	Vacuum Reading (i.w.) Post-Vapor Sample Collection	Vacuum Reading (i.w.)	Vacuum Reading (i.w.) Pre-Vapor Sample Collection	Vacuum Reading (i.w.) Post-Vapor Sample Collection
<b>Monitoring Date:</b>	<b>10/10/2012</b>	<b>12/6/2012</b>	<b>1/15/13</b>	<b>1/16/13</b>	<b>5/29/13</b>	<b>8/27/13</b>	<b>11/8/13</b>	<b>1/29/14</b>	<b>1/30/14</b>	<b>4/10/14</b>	<b>7/29/14</b>	<b>8/1/14</b>	<b>10/2/14</b>	<b>1/13/15</b>	<b>1/14/15</b>	<b>5/6/15</b>	<b>8/12/15</b>	<b>10/29/15</b>	<b>1/13/16</b>	<b>1/14/16</b>	<b>4/21/16</b>	<b>9/12/16</b>	<b>9/13/16</b>	<b>11/16/16</b>
BPS1-SVPM2001S	0.01	0.02	0.01	0.01	0.02	0.08	0.06	0.01	0.02	*0.02	*0.02	*0.02	0.09	0.01	0.08	0.02	0.08	0.07	0.03	0.08	0.06	0.04	0.04	0.06
BPS1-SVPM2001I	0.01	0.02	0.02	0.01	0.10	0.12	0.10	0.04	0.04	0.12	*0.01	0.01	0.14	0.05	0.11	0.04	0.11	0.08	0.04	0.12	0.08	0.06	0.08	0.10
BPS1-SVPM2001D	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	*0.01	*0.01	*0.01	*0.01	0.10	*0.01	*0.01	0.03	0.01*	0.01*	0.04	0.02	0.02	0.00	0.00	0.00
BPS1-SVPM2002S	0.02	0.01	0.02	0.02	0.06	0.12	0.10	0.08	0.03	0.10	*0.01	0.01	0.09	*0.01	0.11	0.15	0.06	0.06	0.05	0.09	0.06	0.06	0.06	0.06
BPS1-SVPM2002I	0.11	0.10	0.01	0.02	0.10	0.18	0.16	0.06	0.08	0.18	0.14	0.14	0.18	0.21	0.13	0.13	0.10	0.12	0.04	0.04	0.10	0.10	0.10	0.10
BPS1-SVPM2002D	0.12	0.10	0.01	0.01	0.10	0.18	0.16	0.01	*0.01	*0.02	0.00	0.00	0.06	*0.01	0.14	0.13	0.14	0.13	0.13	0.18	0.06	0.12	0.14	0.12
BPS1-SVPM2003S	0.01	0.01	0.03	0.02	0.04	*0.02	0.02	0.06	*0.01	*0.01	0.02	0.04	*0.01	*0.01	0.02	0.03	*0.01	0.04	0.04	0.04	0.02	0.04	0.02	0.04
BPS1-SVPM2003I	0.04	0.02	0.03	0.04	0.10	0.04	0.04	0.02	0.02	0.04	0.02	0.04	*0.02	0.06	0.02	0.05	0.04	0.04	0.03	0.04	0.04	0.04	0.04	0.00
BPS1-SVPM2003D	0.04	0.02	0.01	0.04	0.05	0.04	0.04	0.02	*0.01	0.04	0.04	*0.01	0.03	*0.01	0.02	0.04	0.05	0.04	0.04	0.05	0.04	0.04	0.06	0.06
BPS1-SVPM2004S	0.04	0.04	0.03	0.02	0.03	0.04	0.02	0.04	0.00	0.04	*0.02	*0.01	*0.01	0.04	0.05	0.03	0.03	0.04	0.04	0.05	0.04	0.02	0.02	0.01
BPS1-SVPM2004I	0.04	0.04	0.02	0.01	0.04	0.04	0.02	0.02	*0.01	0.04	*0.01	0.02	*0.01	0.10	0.05	0.05	*0.01	0.06	0.05	0.09	0.01	0.04	0.04	0.02
BPS1-SVPM2004D	0.06	0.04	0.03	0.01	0.04	0.04	0.04	0.02	0.04	0.02	*0.01	0.02	0.08	0.04	0.06	0.02	0.05	0.05	0.04	0.12	0.04	0.06	0.04	0.04
BPS1-SVPM2006S	0.01	0.01	0.01	0.01	0.02	0.00	0.00	0.00	*0.01	0.02	0.02	0.01	*0.03	0.01	0.01	0.02	0.01	0.02	0.01	0.04	0.02	0.01	0.01	0.01
BPS1-SVPM2006I	0.01	0.01	0.01	0.01	0.01	*0.01	*0.01	0.00	*0.01	0.01	0.01	0.01	0.00	0.02	0.01	0.02	0.01	0.02	0.03	0.05	0.02	0.01	0.01	0.00
BPS1-SVPM2006D	0.02	0.02	0.01	0.01	0.02	*0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.01	0.02	0.02	0.04	0.04	0.01	0.01	0.00
BPS1-SVPM2007S	0.01	0.01	0.01	0.01	0.04	0.00	*0.01	0.01	0.02	0.00	0.02	0.02	0.00	*0.01	0.02	0.01	0.02	0.02	0.04	0.04	0.04	0.02	0.02	0.00
BPS1-SVPM2007I	0.01	0.01	0.01	0.01	0.04	*0.01	*0.02	0.02	0.01	*0.01	0.02	0.02	0.00	0.01	0.02	0.00	0.02	0.01	0.06	0.05	0.04	0.01	0.02	0.00
BPS1-SVPM2007D	0.01	0.01	0.01	0.01	0.02	*0.01	0.04	0.02	0.02	*0.01	0.01	0.01	0.00	0.01	0.01	0.02	0.02	0.00	0.05	0.05	0.02	0.00	0.02	0.01
SV-101I	5	7	10	--	6.0	5.1	4.8	5.0	--	7.1	8.0	--	4.5	6.0	--	7.0	4.8	3.6	7.5	7.0	2.9	2.4	2.4	4.5
SV-101D	10	16	16	--	16.0	23.5	24.5	17.0	--	22.5	16.0	--	16.0	14.0	--	13.0	11.0	13.0	17.0	16.0	15.2	10.5	10.5	12.2
SV-102I	5	3	16	--	3.0	6.9	6.5	4.4	--	8.7	5.0	--	6.0	6.5	--	2.0	2.4	3.4	4.5	5.0	4.4	4.6	4.6	4.1
SV-102D	10	18	10	--	22.0	26.6	22.3	15.0	--	26.0	15.0	--	17.0	17.5	--	13.5	10.5	10.5	8.0	6.0	9.3	10.5	10.5	8.5
SV-103I	5	2	20	--	4.0	3.5	3.1	6.6	--	5.6	2.0	--	3.0	4.5	--	6.1	4.0	3.7	6.5	6.5	2.5	2.2	2.2	2.0
SV-103D	8	24	10	--	24.2	27.7	20.8	15.0	--	24.5	16.0	--	16.0	19.0	--	24.0	14.5	12.8	11.0	11.0	11.0	8.0	8.0	12.0
SV-104I	8	6	20	--	4.0	3.5	3.1	10.0+	--	10.0+	10.0	--	10.0	10.0+	--	4.0	3.0	4.6	9.0	9.5	3.4	2.8	3.4	8.1
SV-104D	11	10	10	--	10.0	9.0	8.0	10.0	--	11.5	6.0	--	6.0	10.5	--	16.0	14.0	8.9	10.0	10.3	12.0	14.0	14.0	8.5
SV-105I	5	9	16	--	7.5	4.3	3.6	5.0	--	8.2	3.0	--	2.5	7.0	--	7.5	4.5	3.8	3.0	2.5	4.1	1.4	1.8	1.8
SV-105D	8	7	8	--	8.0	5.0	4.0	15.5	--	30	6.0	--	3.0	23.5	--	28.5	11.5	12.0	5.5	5.5	13.0	10.0	10.0	7.0
SV-106I	5	8	16	--	8.0	4.0	3.6	10.0+	--	10.0+	6.0	--	7.5	10.0+	--	6.2	2.4	3.7	1.5	5.5	5.4	3.2	3.2	2.7
SV-106D	8	12	10	--	11.0	7.0	6.0	6.5	--	16.0	6.0	--	5.0	10.0	--	17.0	25.5	18.5	26.0	26.5	11.8	13.5	13.5	13.5

**Notes:**

i.w. = inches of water column

SVEW = soil vapor extraction well

SVPM = soil vapor pressure monitor

\* Indicates a positive pressure reading was measured as opposed to a negative pressure (vacuum) reading.

Vacuum readings for the SVPMS were measured using a portable Magnehelic® Differential Pressure Gauge 2000-0, with a range of 0-0.50 i.w. Vacuum readings for SVEWs were recorded from dedicated in-line vacuum gauges.



**Table 9a**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Annual Off-site Vapor Analytical Results Summary of SVPMs**  
**January 2016**

Sample ID	Screening Value <sup>(1)</sup>	SVPM 2001S	SVPM 2001I	SVPM 2001D	SVPM 2002S		SVPM 2002I	SVPM 2002D	SVPM 2003S	SVPM 2003I	SVPM 2003D	SVPM 2004S	SVPM 2004I	SVPM 2004D	SVPM 2006S	SVPM 2006I		SVPM 2006D	SVPM 2007S	SVPM 2007IR	SVPM 2007D
Sample Date		01/14/16	01/14/16	01/14/16	01/14/16	01/14/16 - Duplicate	01/14/16	01/14/16	01/14/16	01/14/16	01/14/16	01/14/16	01/14/16	01/14/16	01/14/16	01/14/16	01/14/16 - Duplicate	01/14/16	01/14/16	01/14/16	01/14/16
<b>Analysis by TO-15 (µg/m<sup>3</sup>)</b>																					
1,1,1-Trichloroethane	<b>1,000</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>0.87 J</b>
1,1-Dichloroethane	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	--	ND	ND	<b>6.3</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>3.4</b>	<b>260</b>	<b>280</b>	<b>320</b>	ND	<b>4.4 J</b>	<b>3.1</b>
Tetrachloroethene	<b>1,000</b>	ND	<b>1.2 J</b>	<b>10</b>	ND	ND	ND	ND	ND	<b>0.89 J</b>	ND	ND	<b>0.83 J</b>	<b>3.6 J</b>	ND	<b>2.2 J</b>	<b>2.1 J</b>	<b>1.9 J</b>	<b>0.89 J</b>	<b>2.3 J</b>	<b>2.0 J</b>
trans-1,2-Dichloroethene	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>3.4</b>	<b>3.6</b>	<b>3.3</b>	ND	ND	ND
Trichloroethene	<b>250</b>	ND	ND	<b>3.9 J</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>1.6 J</b>	<b>48</b>	<b>61</b>	<b>47</b>	ND	<b>1.9 J</b>	<b>2.7 J</b>
Vinyl Chloride	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**

µg/m<sup>3</sup> = micrograms per cubic meter

J = Estimated value

ND = Not detected above laboratory method detection limit (MDL)

SVPM = soil vapor pressure monitor

Bolded value indicates detected analyte.

All samples were analyzed for site-specific VOCs by modified method TO-15. Site specific compound specified in the *Final Supplemental Offsite Soil Vapor Intrusion Monitoring Plan for the Soil Vapor Extraction Containment System Site 1 – Former Drum Marshalling Area, NWIRP Bethpage, New York* (Tetra Tech 2012).

(1) Screening Value is the New York State Department of Health (NYSDOH) air guideline value for subslab.

**Table 9b**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Annual Off-site Vapor Analytical Results Summary of SVPMs**  
**September 2016**

Sample ID	Screening Value <sup>(1)</sup>	SVPM 2001S	SVPM 2001I	SVPM 2001D		SVPM 2002S	SVPM 2002I	SVPM 2002D	SVPM 2003S	SVPM 2003I	SVPM 2003D	SVPM 2004S	SVPM 2004I	SVPM 2004D	SVPM 2006S	SVPM 2006I	SVPM 2006D		SVPM 2007S	SVPM 2007IR	SVPM 2007D
		09/12/16	09/12/16	09/12/16	9/12/16 - Duplicate	09/12/16	09/12/16	09/12/16	09/12/16	09/12/16	09/12/16	09/12/16	09/12/16	09/12/16	09/12/16	09/12/16	09/12/16	09/12/16	9/12/16 - Duplicate	09/12/16	09/13/16
<b>Analysis by TO-15 (µg/m<sup>3</sup>)</b>																					
1,1,1-Trichloroethane	<b>1,000</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>0.59 J</b>	ND	ND	ND
1,1-Dichloroethane	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>3.4</b>	<b>260</b>	<b>320</b>	<b>390</b>	ND	ND	ND
Tetrachloroethene	<b>1,000</b>	<b>1.1 J</b>	<b>3.6 J</b>	ND	<b>2.3 J</b>	<b>0.94 J</b>	ND	<b>2.8 J</b>	<b>2.7 J</b>	<b>5.5</b>	<b>5.3</b>	<b>2.2 J</b>	<b>2.0 J</b>	<b>3.0 J</b>	<b>3.8 J</b>	<b>5.1</b>	<b>3.9 J</b>	<b>5.3 J</b>	<b>6.8</b>	ND	ND
trans-1,2-Dichloroethene	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>4.0</b>	<b>3.5</b>	<b>4.4</b>	ND	ND	ND
Trichloroethene	<b>250</b>	<b>1.8 J</b>	<b>5.0</b>	ND	<b>4.0 J</b>	<b>2.5 J</b>	ND	<b>28</b>	<b>4.7</b>	<b>10</b>	<b>10</b>	<b>2.5 J</b>	<b>6.8</b>	<b>6.5</b>	<b>8.2</b>	<b>57</b>	<b>61 J</b>	<b>84 J</b>	<b>3.9 J</b>	<b>9.8</b>	<b>8.2</b>
Vinyl Chloride	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Notes:**

µg/m<sup>3</sup> = micrograms per cubic meter

J = Estimated value

ND = Not detected above laboratory method detection limit (MDL)

SVPM = soil vapor pressure monitor

Bolded value indicates detected analyte.

All samples were analyzed for site-specific VOCs by modified method TO-15. Site specific compound specified in the *Final Supplemental Offsite Soil Vapor Intrusion Monitoring Plan for the Soil Vapor Extraction Containment System Site 1 – Former Drum Marshalling Area, NWIRP Bethpage, New York* (Tetra Tech 2012).

(1) Screening Value is the New York State Department of Health (NYSDOH) air guideline value for subslab.

**Table 10**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Historical Off-site Vapor Analytical Results Summary of SVPMs**  
**Through September 2016**

Sample ID	Screening Value <sup>(2)</sup>	SVPM 2001S						SVPM 2001I						SVPM 2001D								
		Oct 2008	01/15/13	01/29/14	01/13/15	01/14/16	09/12/16	Oct 2008	01/15/13	01/29/14	01/13/15	01/14/16	09/12/16	Oct 2008	01/15/13	1/15/13 - Duplicate	01/29/14	01/13/15	1/13/15 - Duplicate	01/14/16	09/12/16	9/12/16 - Duplicate
<b>Analysis by TO-15 (µg/m<sup>3</sup>)</b>																						
1,1,1-Trichloroethane <sup>(1)</sup>	1,000	1,300	ND	ND	ND	ND	ND	1,700	ND	ND	ND	ND	ND	1,400	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane <sup>(1)</sup>	--	11	ND	ND	ND	ND	ND	29	ND	ND	ND	ND	ND	26	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene <sup>(1)</sup>	--	9.2 J	ND	ND	ND	ND	ND	16	ND	ND	ND	ND	ND	17	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene <sup>(1)</sup>	--	20	ND	ND	ND	ND	ND	94	ND	ND	ND	ND	ND	73	ND	ND	ND	ND	ND	6.3	ND	ND
Tetrachloroethene <sup>(1)</sup>	1,000	4,000	ND	1.3 J	ND	ND	1.1 J	5,000	ND	1.9 J	ND	1.2 J	3.6 J	720	ND	ND	0.53 J	ND	ND	10	ND	2.3 J
trans-1,2-Dichloroethene <sup>(1)</sup>	--	7.9 J	ND	ND	ND	ND	ND	16	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene <sup>(1)</sup>	250	1,700	ND	ND	ND	ND	1.8 J	2,700	ND	ND	ND	ND	5.0	1,500	ND	ND	ND	ND	ND	3.9 J	ND	4.0 J
Vinyl Chloride <sup>(1)</sup>	--	NS	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND

**Table 10**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Historical Off-site Vapor Analytical Results Summary of SVPMs**  
**Through September 2016**

Sample ID	Screening Value <sup>(2)</sup>	SVPM 2002S							SVPM 2002I						SVPM 2002D						
		Oct 2008	01/15/13	01/29/14	01/13/15	01/14/16	1/14/16 - Duplicate	09/12/16	Oct 2008	01/15/13	01/29/14	1/29/14 - Duplicate	01/13/15	01/14/16	09/12/16	Oct 2008	01/15/13	01/29/14	01/13/15	01/14/16	09/12/16
Analysis by TO-15 (µg/m <sup>3</sup> )																					
1,1,1-Trichloroethane <sup>(1)</sup>	1,000	21,000	ND	ND	ND	ND	ND	ND	52,000	ND	ND	ND	ND	ND	ND	27,000	ND	ND	ND	ND	ND
1,1-Dichloroethane <sup>(1)</sup>	--	170	ND	ND	ND	ND	ND	ND	680	ND	ND	ND	ND	ND	ND	490	ND	ND	ND	ND	ND
1,1-Dichloroethene <sup>(1)</sup>	--	220	ND	ND	ND	ND	ND	ND	890	ND	ND	ND	ND	ND	ND	480	ND	ND	ND	ND	ND
1,2-Dichloroethane <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene <sup>(1)</sup>	--	49 J	ND	ND	ND	ND	ND	ND	170	ND	ND	ND	ND	ND	ND	130	ND	ND	ND	ND	ND
Tetrachloroethene <sup>(1)</sup>	1,000	420	ND	2.2 J	ND	ND	ND	0.94 J	740	ND	1.8 J	ND	ND	ND	ND	48 J	ND	1.8 J	ND	ND	2.8 J
trans-1,2-Dichloroethene <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene <sup>(1)</sup>	250	34,000	ND	1.1 J	ND	ND	ND	2.5 J	89,000	12	1.8 J	1.4 J	ND	ND	ND	26,000	ND	ND	ND	ND	28
Vinyl Chloride <sup>(1)</sup>	--	NS	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND

**Table 10**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Historical Off-site Vapor Analytical Results Summary of SVPMs**  
**Through September 2016**

Sample ID	Screening Value <sup>(2)</sup>	SVPM 2003S						SVPM 2003I						SVPM 2003D					
		Oct 2008	01/16/13	01/29/14	01/13/15	01/14/16	09/12/16	Oct 2008	01/16/13	01/29/14	01/13/15	01/14/16	09/12/16	Oct 2008	01/16/13	01/29/14	01/13/15	01/14/16	09/12/16
<b>Analysis by TO-15 (µg/m<sup>3</sup>)</b>																			
1,1,1-Trichloroethane <sup>(1)</sup>	<b>1,000</b>	<b>66</b>	ND	ND	ND	ND	ND	<b>170 J</b>	ND	ND	ND	ND	ND	<b>720 J</b>	ND	ND	ND	ND	ND
1,1-Dichloroethane <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	<b>0.49 J</b>	ND	ND	ND	ND	ND	<b>8.6</b>	ND	ND	ND	ND	ND
1,1-Dichloroethene <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	<b>2</b>	ND	ND	ND	ND	ND	<b>23</b>	ND	ND	ND	ND	ND
1,2-Dichloroethane <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>1.6</b>	ND	ND	ND	ND	ND
Tetrachloroethene <sup>(1)</sup>	<b>1,000</b>	<b>19</b>	<b>1.6 J</b>	ND	ND	ND	<b>2.7 J</b>	<b>14</b>	<b>0.97 J</b>	<b>1.5 J</b>	ND	<b>0.89 J</b>	<b>5.5</b>	<b>8.9</b>	ND	<b>2.4 J</b>	ND	ND	<b>5.3</b>
trans-1,2-Dichloroethene <sup>(1)</sup>	--	ND	<b>2.3 J</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene <sup>(1)</sup>	<b>250</b>	<b>20</b>	<b>4.9</b>	ND	ND	ND	<b>4.7</b>	<b>82</b>	ND	<b>0.73 J</b>	ND	ND	<b>10</b>	<b>710</b>	ND	ND	ND	ND	<b>10</b>
Vinyl Chloride <sup>(1)</sup>	--	NS	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND

**Table 10**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Historical Off-site Vapor Analytical Results Summary of SVPMs**  
**Through September 2016**

Sample ID	Screening Value <sup>(2)</sup>	SVPM 2004S						SVPM 2004I						SVPM 2004D					
		Oct 2008	01/16/13	01/29/14	01/13/15	01/14/16	09/12/16	Oct 2008	01/16/13	01/29/14	01/13/15	01/14/16	09/12/16	Oct 2008	01/16/13	01/29/14	01/13/15	01/14/16	09/12/16
<b>Analysis by TO-15 (µg/m<sup>3</sup>)</b>																			
1,1,1-Trichloroethane <sup>(1)</sup>	1,000	1.4	ND	ND	ND	ND	ND	460	ND	ND	ND	ND	ND	480	ND	ND	ND	ND	ND
1,1-Dichloroethane <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	44	ND	ND	ND	ND	ND	74	ND	ND	ND	ND	ND
1,1-Dichloroethene <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	7.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane <sup>(1)</sup>	--	0.25 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	4.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene <sup>(1)</sup>	1,000	1.8	1.0 J	1.3 J	ND	ND	2.2 J	1,000	0.68 J	2.9 J	ND	0.83 J	2.0 J	580	2.3 J	1.5 J	7.1	3.6 J	3.0 J
trans-1,2-Dichloroethene <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	3.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene <sup>(1)</sup>	250	1.0	ND	ND	ND	ND	2.5 J	550	ND	3.7 J	ND	ND	6.8	600	ND	0.80 J	1.5 J	ND	6.5
Vinyl Chloride <sup>(1)</sup>	--	NS	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND

**Table 10**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Historical Off-site Vapor Analytical Results Summary of SVPMs**  
**Through September 2016**

Sample ID	Screening Value <sup>(2)</sup>	SVPM 2006S						SVPM 2006I						SVPM 2006D							
		Oct 2008	01/16/13	01/30/14	01/13/15	01/14/16	09/12/16	Oct 2008	01/16/13	01/30/14	01/13/15	01/14/16	1/14/16 - Duplicate	09/12/16	Oct 2008	01/16/13	01/30/14	01/13/15	01/14/16	09/12/16	9/12/16 - Duplicate
<b>Analysis by TO-15 (µg/m<sup>3</sup>)</b>																					
1,1,1-Trichloroethane <sup>(1)</sup>	<b>1,000</b>	<b>12</b>	ND	ND	ND	ND	ND	<b>22</b>	ND	ND	ND	ND	ND	ND	<b>35</b>	ND	ND	ND	ND	ND	<b>0.59 J</b>
1,1-Dichloroethane <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	<b>0.62</b>	ND	ND	ND	ND	ND	ND	<b>1.2</b>	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene <sup>(1)</sup>	--	<b>4.1</b>	<b>5.4</b>	ND	ND	<b>3.4</b>	<b>3.4</b>	<b>45</b>	<b>340</b>	<b>10</b>	ND	<b>260</b>	<b>280</b>	<b>260</b>	<b>89</b>	<b>190</b>	<b>22</b>	<b>180</b>	<b>320</b>	<b>320</b>	<b>390</b>
Tetrachloroethene <sup>(1)</sup>	<b>1,000</b>	<b>14</b>	<b>1.0 J</b>	<b>1.4 J</b>	ND	ND	<b>3.8 J</b>	<b>29</b>	<b>1.9 J</b>	<b>1.5 J</b>	ND	<b>2.2 J</b>	<b>2.1 J</b>	<b>5.1</b>	<b>11</b>	<b>1.4 J</b>	ND	<b>1.7 J</b>	<b>1.9 J</b>	<b>3.9 J</b>	<b>5.3 J</b>
trans-1,2-Dichloroethene <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	<b>1.4 J</b>	<b>4.6</b>	ND	ND	<b>3.4</b>	<b>3.6</b>	<b>4.0</b>	<b>2.7</b>	<b>2.2 J</b>	ND	<b>2.0 J</b>	<b>3.3</b>	<b>3.5</b>	<b>4.4</b>
Trichloroethene <sup>(1)</sup>	<b>250</b>	<b>32</b>	ND	<b>0.80 J</b>	ND	<b>1.6 J</b>	<b>8.2</b>	<b>71</b>	<b>47</b>	<b>2.9 J</b>	ND	<b>48</b>	<b>61</b>	<b>57</b>	<b>61</b>	<b>17</b>	<b>2.1 J</b>	<b>30</b>	<b>47</b>	<b>61 J</b>	<b>84 J</b>
Vinyl Chloride <sup>(1)</sup>	--	NS	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND

**Table 10**  
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Historical Off-site Vapor Analytical Results Summary of SVPMs**  
**Through September 2016**

Sample ID	Screening Value <sup>(2)</sup>	SVPM 2007S							SVPM 2007I/IR						SVPM 2007D							
		Oct 2008	01/16/13	01/30/14	01/14/15	1/14/15 - Duplicate	01/14/16	09/12/16	Oct 2008	01/16/13	01/30/14	01/14/15	01/14/16	09/13/16	Oct 2008	01/16/13	1/16/13 - Duplicate	01/30/14	1/30/14 - Duplicate	01/14/15	01/14/16	09/13/16
<b>Analysis by TO-15 (µg/m<sup>3</sup>)</b>																						
1,1,1-Trichloroethane <sup>(1)</sup>	<b>1,000</b>	<b>150</b>	ND	ND	ND	ND	ND	ND	<b>260</b>	ND	ND	ND	ND	ND	<b>870</b>	<b>1.3 J</b>	<b>1.1 J</b>	ND	ND	ND	<b>0.87 J</b>	ND
1,1-Dichloroethane <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>3.0 J</b>	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene <sup>(1)</sup>	--	<b>0.26 J</b>	ND	ND	ND	ND	ND	ND	<b>0.69 J</b>	ND	ND	ND	ND	ND	<b>13</b>	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene <sup>(1)</sup>	--	ND	<b>13</b>	<b>2.0 J</b>	ND	ND	ND	ND	ND	ND	ND	<b>4.4 J</b>	ND	ND	<b>9.8</b>	<b>11</b>	<b>2.0 J</b>	ND	ND	ND	<b>3.1</b>	ND
Tetrachloroethene <sup>(1)</sup>	<b>1,000</b>	<b>13</b>	<b>1.1 J</b>	<b>1.4 J</b>	ND	ND	<b>0.89 J</b>	<b>6.8</b>	<b>25</b>	<b>1.8 J</b>	ND	<b>2.3 J</b>	<b>2.3 J</b>	ND	<b>5.3 J</b>	<b>2.2 J</b>	<b>1.8 J</b>	<b>1.2 J</b>	ND	ND	<b>2.0 J</b>	ND
trans-1,2-Dichloroethene <sup>(1)</sup>	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>1.3 J</b>	ND	ND	ND	ND	ND	ND
Trichloroethene <sup>(1)</sup>	<b>250</b>	<b>29</b>	<b>5.0</b>	<b>2.5 J</b>	ND	ND	ND	<b>3.9 J</b>	<b>87</b>	ND	ND	ND	<b>1.9 J</b>	<b>9.8</b>	<b>400</b>	<b>5.5 J</b>	<b>2.9 J</b>	ND	ND	ND	<b>2.7 J</b>	<b>8.2</b>
Vinyl Chloride <sup>(1)</sup>	--	NS	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND

**Notes:**

µg/m<sup>3</sup> = micrograms per cubic meter

J = Estimated value

ND = Not detected above laboratory method detection limit (MDL)

NS = Not sampled

SVPM = soil vapor pressure monitor

Bolded value indicates detected analyte.

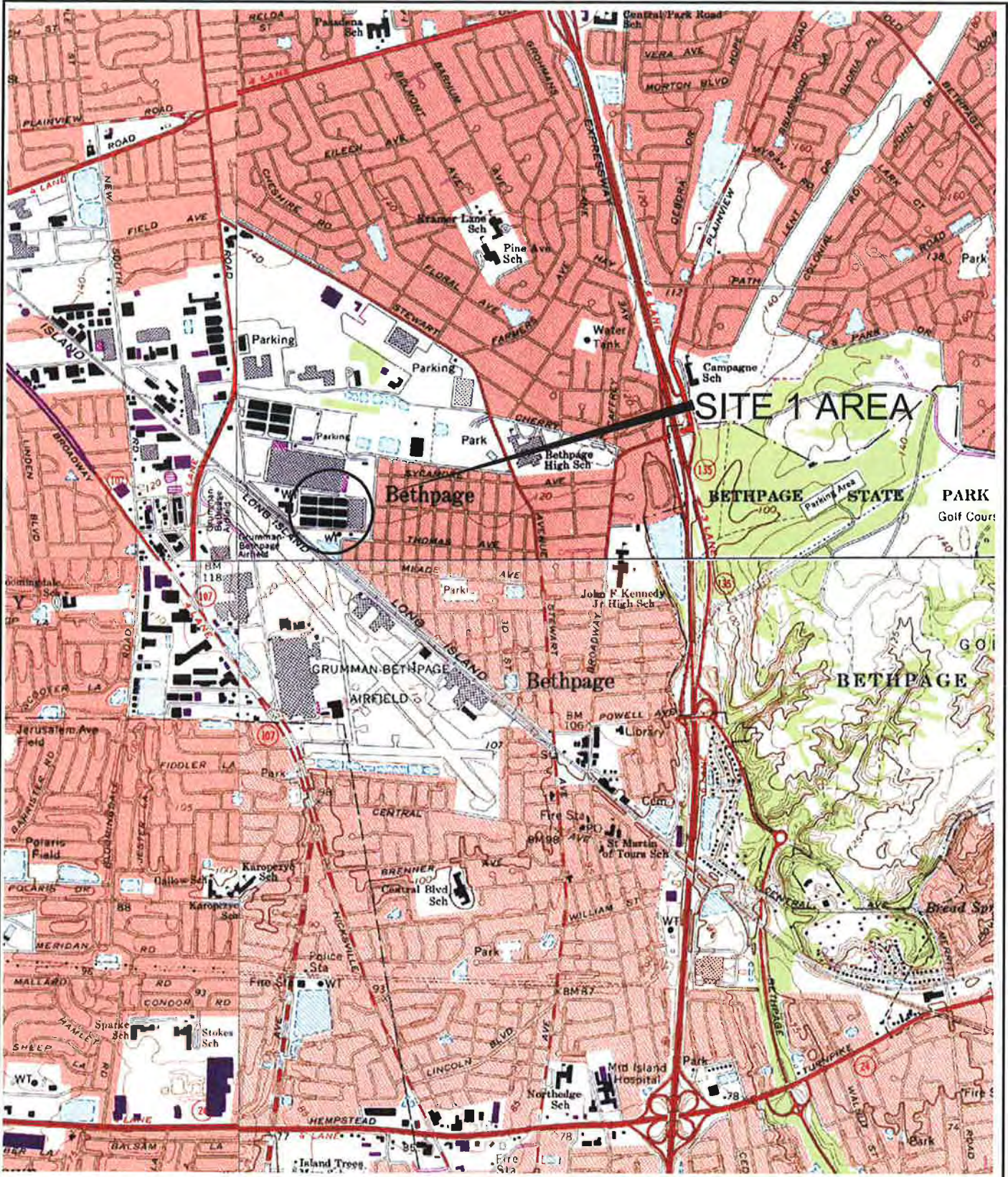
(1) Site specific compound specified in the *Final Supplemental Offsite Soil Vapor Intrusion Monitoring Plan for the Soil Vapor Extraction Containment System Site 1 – Former Drum Marshalling Area, NWIRP Bethpage, New York* (Tetra Tech 2012).

(2) Screening Value is the New York State Department of Health (NYSDOH) air guideline value for subslab.

(3) October 2008 data taken from *Site 1 Phase II Soil Vapor Report* (Tetra Tech 2009).



## **FIGURES**



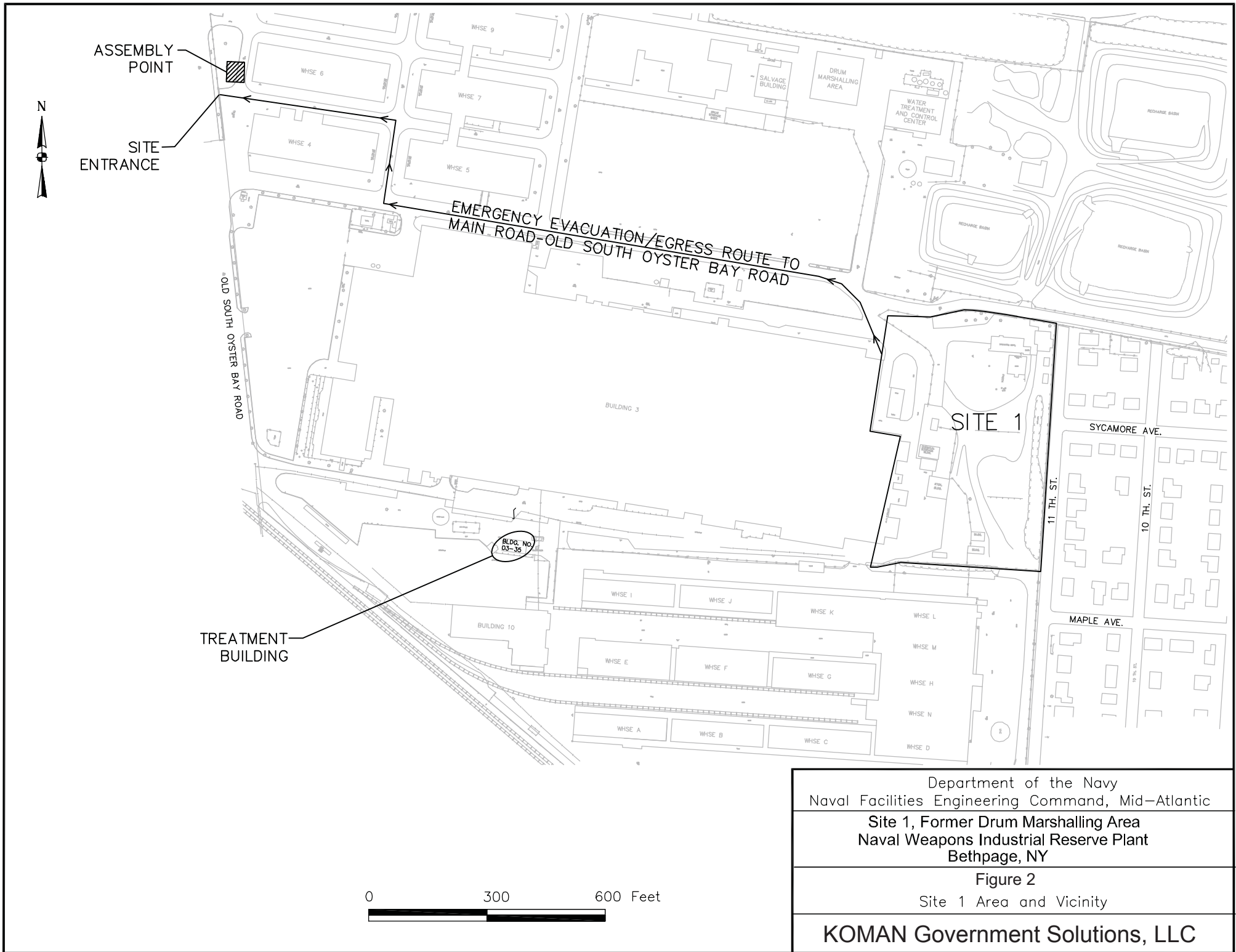
Department of the Navy  
 Naval Facilities Engineering Command, Mid-Atlantic

Site 1, Former Drum Marshalling Area  
 Naval Weapons Industrial Reserve Plant  
 Bethpage, NY

Figure 1: Site Location Map

KOMAN Government Solutions, LLC

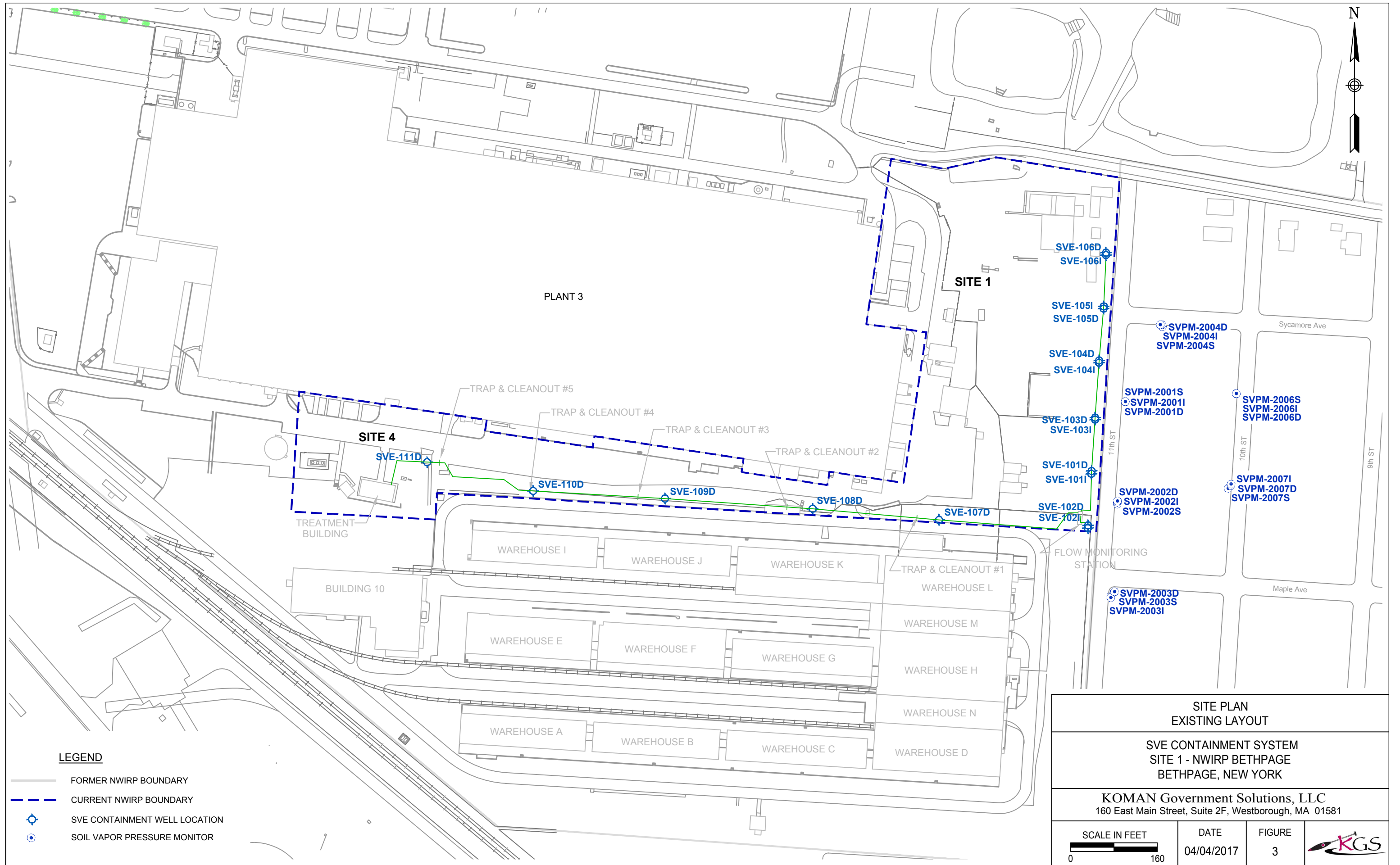
Source: U.S.G.S. Topographic Maps (7.5 Minute)  
 Amityville, Freeport, Hicksville, Huntington, NY Quadrangles



Department of the Navy  
 Naval Facilities Engineering Command, Mid-Atlantic  
 Site 1, Former Drum Marshalling Area  
 Naval Weapons Industrial Reserve Plant  
 Bethpage, NY

Figure 2  
 Site 1 Area and Vicinity

**KOMAN Government Solutions, LLC**

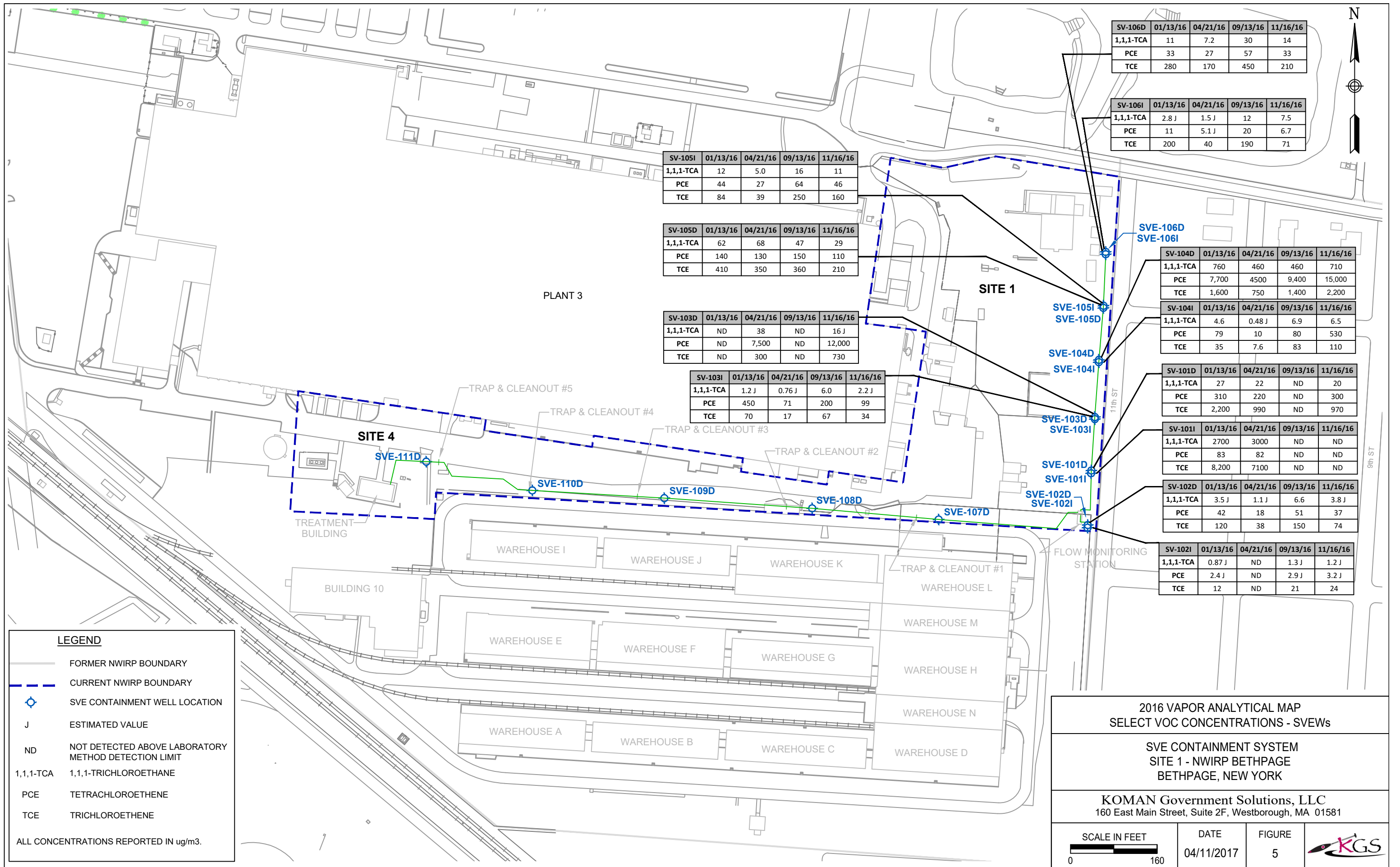


**LEGEND**

- FORMER NWIRP BOUNDARY
- - - CURRENT NWIRP BOUNDARY
- ⊕ SVE CONTAINMENT WELL LOCATION
- ⊙ SOIL VAPOR PRESSURE MONITOR

<p><b>SITE PLAN EXISTING LAYOUT</b></p>			
<p><b>SVE CONTAINMENT SYSTEM SITE 1 - NWIRP BETHPAGE BETHPAGE, NEW YORK</b></p>			
<p><b>KOMAN Government Solutions, LLC</b> 160 East Main Street, Suite 2F, Westborough, MA 01581</p>			
<p>SCALE IN FEET</p>	<p>DATE</p> <p>04/04/2017</p>	<p>FIGURE</p> <p>3</p>	





SV-106D	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	11	7.2	30	14
PCE	33	27	57	33
TCE	280	170	450	210

SV-106I	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	2.8 J	1.5 J	12	7.5
PCE	11	5.1 J	20	6.7
TCE	200	40	190	71

SV-105I	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	12	5.0	16	11
PCE	44	27	64	46
TCE	84	39	250	160

SV-105D	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	62	68	47	29
PCE	140	130	150	110
TCE	410	350	360	210

SV-103D	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	ND	38	ND	16 J
PCE	ND	7,500	ND	12,000
TCE	ND	300	ND	730

SV-103I	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	1.2 J	0.76 J	6.0	2.2 J
PCE	450	71	200	99
TCE	70	17	67	34

SV-104D	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	760	460	460	710
PCE	7,700	4500	9,400	15,000
TCE	1,600	750	1,400	2,200

SV-104I	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	4.6	0.48 J	6.9	6.5
PCE	79	10	80	530
TCE	35	7.6	83	110

SV-101D	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	27	22	ND	20
PCE	310	220	ND	300
TCE	2,200	990	ND	970

SV-101I	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	2700	3000	ND	ND
PCE	83	82	ND	ND
TCE	8,200	7100	ND	ND

SV-102D	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	3.5 J	1.1 J	6.6	3.8 J
PCE	42	18	51	37
TCE	120	38	150	74

SV-102I	01/13/16	04/21/16	09/13/16	11/16/16
1,1,1-TCA	0.87 J	ND	1.3 J	1.2 J
PCE	2.4 J	ND	2.9 J	3.2 J
TCE	12	ND	21	24

**LEGEND**

- FORMER NWIRP BOUNDARY
- - - CURRENT NWIRP BOUNDARY
- ⊕ SVE CONTAINMENT WELL LOCATION
- J ESTIMATED VALUE
- ND NOT DETECTED ABOVE LABORATORY METHOD DETECTION LIMIT
- 1,1,1-TCA 1,1,1-TRICHLOROETHANE
- PCE TETRACHLOROETHENE
- TCE TRICHLOROETHENE

ALL CONCENTRATIONS REPORTED IN ug/m3.

**2016 VAPOR ANALYTICAL MAP  
SELECT VOC CONCENTRATIONS - SVEWs**

**SVE CONTAINMENT SYSTEM  
SITE 1 - NWIRP BETHPAGE  
BETHPAGE, NEW YORK**

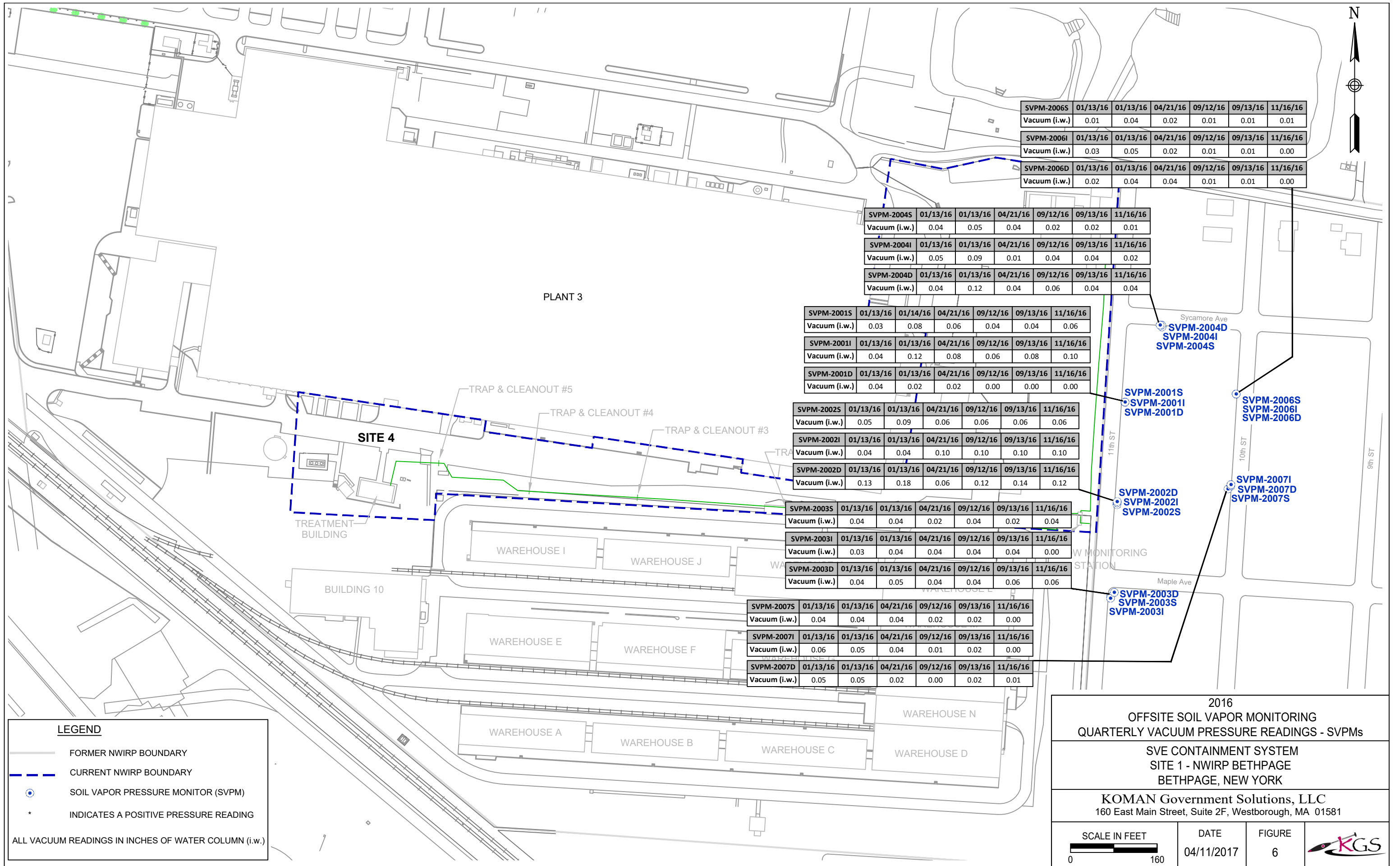
**KOMAN Government Solutions, LLC**  
160 East Main Street, Suite 2F, Westborough, MA 01581



DATE  
04/11/2017

FIGURE  
5





2016  
OFFSITE SOIL VAPOR MONITORING  
QUARTERLY VACUUM PRESSURE READINGS - SVPMs

SVE CONTAINMENT SYSTEM  
SITE 1 - NWIRP BETHPAGE  
BETHPAGE, NEW YORK

KOMAN Government Solutions, LLC  
160 East Main Street, Suite 2F, Westborough, MA 01581

SCALE IN FEET  
0 160

DATE  
04/11/2017

FIGURE  
6

**APPENDIX A**

**NYSDEC AIR DISCHARGE LIMIT  
DOCUMENTATION**



From: Steven Scharf [<mailto:sxscharf@gw.dec.state.ny.us>]  
Sent: Thursday, October 06, 2011 11:57 AM  
To: Fly, Lora B CIV NAVFAC MIDLANT, IPTNE  
Cc: John Swartwout; Walter Parish; Steven Karpinski; John cofman; [klumpe@steelequities.com](mailto:klumpe@steelequities.com);  
[David.Brayack@tnus.com](mailto:David.Brayack@tnus.com)  
Subject: NWIRP Plant 3 Site 1 SVE Modification Plan

Lora,

The New York State Department of Environmental Conservation (NYSDEC), in conjunction with the New York State Department of Health (NYSDOH), have reviewed the Navy Submittal entitled:

" Modification to existing Soil vapor Extraction (SVE) Containment System At Site 1-Former Drum Marshaling Area, Installation of Soil Vapor Extraction Wells SVE-107D to 111D, NWIRP Bethpage, September 2011."

Based on this Departmental review, and the follow up October 6, 2011 tele-conference, this modification work plan is acceptable and can be used for immediate implementation. The NWIRP Site 1 SVE system has redundant blowers and overcapacity, even with the additional SVE wells being added. should the Navy and the new property owner, Steel Equities Inc., for the former Plant 3 complex come to agreement to add SVE piping from the former Plant 3, this would be acceptable. Appropriate plans, consistent with the covenants and restrictions to the deed, should be submitted accordingly.

A letter will not follow this e-mail. If you have any questions, please contact me directly.

Electronic Documentation Information  
NWIRP Bethpage  
130003B-OU1-OMM  
FOIable  
Region 1, Nassau (C), Oyster Bay (T)

Thanks,

Steven M. Scharf, P.E.  
Project Engineer  
New York State Department of  
Environmental Conservation  
Division of Environmental Remediation  
Remedial Action, Bureau A  
625 Broadway  
Albany, NY 12233-7015  
(518)402-9620  
Fax: (518)402-9022

#### 4.0 PROPOSED REVISIONS TO VAPOR DISCHARGE GOALS

To determine the continued need for off gas treatment, the quality of the influent vapor stream was initially estimated based on soil gas results and compared to discharge goals. Vapor phase treatment was initially installed for the system based on projected relatively high concentrations of several chemicals including 1,1,1-trichloroethane (TCA), trichloroethene (TCE), and tetrachloroethene (PCE). Since the December 2009 startup, VOC concentrations in the extracted vapors have decreased by approximately 98.3 percent and it is uncertain as to whether vapor phase treatment is still required. Presented below are the December 2009 and March 2011 influent (untreated) VOC concentrations and loadings and current discharge goals.

Parameter	December 2009 Influent VOCs		March 2011 Influent VOCs ( $\mu\text{g}/\text{m}^3$ )		Current Discharge Goal (pound/hour) <sup>(3)</sup>
	Concentration ( $\mu\text{g}/\text{m}^3$ ) <sup>1</sup>	Loading (pound/hour) <sup>1</sup>	Concentration ( $\mu\text{g}/\text{m}^3$ )	Loading (pound/hour) <sup>(2)</sup>	
TCA	13,000	0.074	150	0.00023	0.13
TCE	42,000	0.26	460	0.00069	0.07
PCE	7,900	0.029	440	0.00066	0.0009

<sup>(1)</sup> Initial VOC Loading Rates are from baseline data taken in December 2009. The flow meter was not yet installed when this data was taken, so a value of 385 CFM (flow rate in January 2010) was used to estimate system loading.

<sup>(2)</sup> Calculated using a flow rate of 400 CFM.

<sup>(3)</sup> Current discharge goals were based on calculated VOC concentrations using soil gas data from the fence line investigation, a flow rate of 600 CFM, and an assumed treatment efficiency for each VOC of 80 to 90 percent. Based on this evaluation, the existing treatment is no longer required to meet discharge goals.

A DAR-1 Model Analysis was then conducted using the August 2010 influent vapor concentrations of TCA, TCE, and PCE at a flow rate of 500 CFM. The calculated results were then used to back calculate proposed discharge goals based on an allowance of 100% of the annual guideline concentrations (see Appendix E). The following table provides a summary of the proposed discharge goals.

Parameter	August 2010 Influent VOCs (370 CFM – Actual)		Percent AGC Using August 2010 Data	Proposed Discharge Goals	
	Concentration ( $\mu\text{g}/\text{m}^3$ )	Loading (pounds/ hour)		Concentration at 500 CFM ( $\mu\text{g}/\text{m}^3$ )	Loading (pounds/ hour)
TCA	868	0.0009	0.0004	None <sup>1</sup>	225
TCE	4,170	0.0039	19.4	11,000	0.02
PCE	5,780	0.0057	14.2	22,000	0.04

<sup>(1)</sup> Greater than 100,000  $\mu\text{g}/\text{m}^3$ .

AGC - Annual Guideline Concentration

**New York State Department of Environmental Conservation**  
**Division of Environmental Remediation**  
**Bureau of Remedial Action A**  
**625 Broadway, 11<sup>th</sup> Floor**  
**Albany, New York 12233-7015**  
**Phone: (518) 402-9625 • Fax: (518) 402-9022**



**Website:** [www.dec.state.ny.us](http://www.dec.state.ny.us)

February 5, 2010

Lora Fly, Project Manager  
Naval Facilities Engineering Command-Midlant  
9742 Maryland Avenue  
Norfolk, VA 23511-3095

RE: Naval Weapons Industrial Research Plant( NWIRP)  
Site-Bethpage, NYSDEC No. 1-30-003B.

Dear Ms. Fly:

Tetra Tech FW, on behalf of the Department of the Navy (Navy), has submitted the enclosed New York State Department of Environmental Conservation (NYSDEC) Division of Air Resources (DAR) Air Permit Application as a permit equivalent. This DAR Air permit equivalent is for the soil vapor extraction system at Site 1 of Plant 3 of the former Naval Weapons Industrial Reserve Plant (NWIRP) site in Bethpage, NY. The NYSDEC Division of Environmental Remediation (DER) has reviewed the permit equivalent and, by means of this letter approves the Site 1 remedy air discharge for immediate operation.

The NWIRP Site 1 SVE system utilizes the reasonably available control technology (RACT) with activated carbon. The air discharge will be periodically monitored at start up and will be added for routine monitoring in the operation, maintenance and monitoring (OMM) plan, to be submitted shortly for Departmental review.

If you have any questions, please contact me at your earliest convenience at (518)402-9620.

Sincerely,

Steven M. Scharf, P.E.  
Project Engineer  
Division of Environmental Remediation  
Bureau of Remedial Action A

Enclosure

cc/w/enc: J. Swartwout/S. Scharf/File  
W. Parish, Region 1 NYSDEC  
A. J. Shah, Region 1 NYSDEC  
S. Patselos, Tetra Tech FW  
J. Cofman, Northrop Grumman

E docs: Region 1, Nassau, Oyster Bay (T): NWIRP Bethpage 130003B-OUI-OMM

# New York State Department of Environmental Conservation Air Permit Application



DEC ID									
-	-	-	-	-	-	-	-	-	-

APPLICATION ID									
-	-	-	-	-	-	-	-	-	-

OFFICE USE ONLY									
/	/	/	/	/	/	/	/	/	/

## Section I - Certification

Title V Certification	
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information [required pursuant to 6 NYCRR 201-6.3(d)] I believe the information is, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.	
Responsible Official	Title
Signature	Date <u>    /    /    </u>

State Facility Certification	
I certify that this facility will be operated in conformance with all provisions of existing regulations.	
Responsible Official	Title
Signature	Date <u>    /    /    </u>

## Section II - Identification Information

Title V Facility Permit <u>N/A</u> <input type="checkbox"/> New <input type="checkbox"/> Significant Modification <input type="checkbox"/> Administrative Amendment <input type="checkbox"/> Renewal <input type="checkbox"/> Minor Modification    General Permit Title: _____	State Facility Permit <u>N/A</u> <input type="checkbox"/> New <input type="checkbox"/> Modification General Permit Title: _____
<input checked="" type="checkbox"/> Application involves construction of new facility <input type="checkbox"/> Application involves construction of new emission unit(s)	

Owner/Firm			
Name <u>US Navy / NAVFAC Midlant</u>			
Street Address <u>9742 Maryland Ave, Bldg Z-144</u>			
City <u>Norfolk</u>	State <u>VA</u>	Country <u>US</u>	Zip <u>23511-3095</u>
Owner Classification <input checked="" type="checkbox"/> Federal <input type="checkbox"/> Corporation/Partnership	<input type="checkbox"/> State <input type="checkbox"/> Individual	<input type="checkbox"/> Municipal	Taxpayer ID
Facility			<input type="checkbox"/> Confidential
Name <u>Naval Weapons Industrial Reserve Plant (NWIRP) Site 1</u>			
Location Address <u>Bethpage</u>			
<input type="checkbox"/> City / <input checked="" type="checkbox"/> Town / <input type="checkbox"/> Village <u>Oyster Bay, New York</u>			Zip <u>11714</u>
Project Description			<input type="checkbox"/> Continuation Sheet(s)
<u>Vapor phase granular activated carbon to remove VOCs from soil gas</u>			

Owner/Firm Contact Mailing Address			
Name (Last, First, Middle Initial) <u>Fly, Lora</u>		Phone No. <u>(757) 444-0781</u>	
Affiliation <u>Department of the Navy</u>		Title <u>Remedial PM</u>	
Street Address <u>9742 Maryland Ave, Bldg Z-144</u>		Fax No. ( )	
City <u>Norfolk</u>	State <u>VA</u>	Country <u>US</u>	Zip <u>23511-3095</u>
Facility Contact Mailing Address			
Name (Last, First, Middle Initial)		Phone No. ( )	
Affiliation		Title	
Street Address		Fax No. ( )	
City	State	Country	Zip

**New York State Department of Environmental Conservation  
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**Section III - Facility Information**

Classification					
<input type="checkbox"/> Hospital	<input type="checkbox"/> Residential	<input type="checkbox"/> Educational/Institutional	<input type="checkbox"/> Commercial	<input checked="" type="checkbox"/> Industrial	<input type="checkbox"/> Utility

Affected States (Title V Only) <i>N/A</i>					
<input type="checkbox"/> Vermont	<input type="checkbox"/> Massachusetts	<input type="checkbox"/> Rhode Island	<input type="checkbox"/> Pennsylvania	Tribal Land: _____	
<input type="checkbox"/> New Hampshire	<input type="checkbox"/> Connecticut	<input type="checkbox"/> New Jersey	<input type="checkbox"/> Ohio	Tribal Land: _____	

SIC Codes									
9999									

Facility Description		<input type="checkbox"/> Continuation Sheet(s)
<i>Soil vapor remediation by SVE followed by vapor phase GAC.</i>		

Compliance Statements (Title V Only) <i>N/A</i>	
<p>I certify that as of the date of this application the facility is in compliance with all applicable requirements: <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>If one or more emission units at the facility are not in compliance with all applicable requirements at the time of signing this application (the 'NO' box must be checked), the noncomplying units must be identified in the "Compliance Plan" block on page 8 of this form along with the compliance plan information required. For all emission units at this facility that are operating <u>in compliance</u> with all applicable requirements complete the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> This facility will continue to be operated and maintained in such a manner as to assure compliance for the duration of the permit, except those units referenced in the compliance plan portion of Section IV of this application.</li> <li><input type="checkbox"/> For all emission units, subject to any applicable requirements that will become effective during the term of the permit, this facility will meet all such requirements on a timely basis.</li> <li><input type="checkbox"/> Compliance certification reports will be submitted at least once a year. Each report will certify compliance status with respect to each requirement, and the method used to determine the status.</li> </ul>	

Facility Applicable Federal Requirements <i>N/A</i>								<input type="checkbox"/> Continuation Sheet(s)	
Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause

Facility State Only Requirements								<input type="checkbox"/> Continuation Sheet(s)	
Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause





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Section IV - Emission Unit Information

Emission Unit Description <span style="float: right;"><input type="checkbox"/> Continuation Sheet(s)</span>										
EMISSION UNIT	1	-	0	0	E	U	1	Effluent from first soil vapor extraction blower (BL-1)		
Vapor Phase Granular Activated Carbon Unit. The emission point is stack 00ST-2										

Building <span style="float: right;"><input type="checkbox"/> Continuation Sheet(s)</span>					
Building	Building Name		Length (ft)	Width (ft)	Orientation
03-35	Treatment Building		60	40	0

Emission Point <span style="float: right;"><input type="checkbox"/> Continuation Sheet(s)</span>						
EMISSION PT.	00ST2					
Ground Elev. (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section	
	36	6	8	70	Length (in)	Width (in)
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line (ft)	Date of Removal
	1,000			03-35	100'	
EMISSION PT.						
Ground Elev. (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section	
					Length (in)	Width (in)
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line (ft)	Date of Removal

Emission Source/Control <span style="float: right;"><input type="checkbox"/> Continuation Sheet(s)</span>							
Emission Source		Date of Construction	Date of Operation	Date of Removal	Control Type		Manufacturer's Name/Model No.
ID	Type				Code	Description	
BL1/2	1				048	Granular Act. Carbon	Tetrasolv Filtration
Design Capacity	Design Capacity Units			Waste Feed		Waste Type	
	Code	Description		Code	Description	Code	Description
Emission Source		Date of Construction	Date of Operation	Date of Removal	Control Type		Manufacturer's Name/Model No.
ID	Type				Code	Description	
Design Capacity	Design Capacity Units			Waste Feed		Waste Type	
	Code	Description		Code	Description	Code	Description



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Section IV - Emission Unit Information (continued)

Process Information										<input type="checkbox"/> Continuation Sheet(s)					
EMISSION UNIT <b>4-00EU1</b>										PROCESS <b>SVE</b>					
Description															
The Soil Vapor Extraction System will consist of 12 SVE wells (6 intermediate and 6 deep), a moisture separator, and 2 soil vapor extraction blowers (BL-1 and BL-2) which both vent to a vapor phase granular activated carbon unit for treatment prior to discharge from stack 00ST2. The VGAC unit will be a 5,000 pound unit filled with Tetrasolv Virgin Carbon. The VGAC unit has been designed to operate nominally at 600 cfm, with a maximum of 1,000 cfm.															
Source Classification Code (SCC)			Total Thruput				Thruput Quantity Units								
			Quantity/Hr		Quantity/Yr		Code		Description						
<input type="checkbox"/> Confidential <input checked="" type="checkbox"/> Operating at Maximum Capacity <input type="checkbox"/> Activity with Insignificant Emissions			Operating Schedule				Building		Floor/Location						
			Hrs/Day		Days/Yr										
			24		365		03-35		Main						
Emission Source/Control Identifier(s)															
BL-1			BL-2												
EMISSION UNIT															
Description															
Source Classification Code (SCC)			Total Thruput				Thruput Quantity Units								
			Quantity/Hr		Quantity/Yr		Code		Description						
<input type="checkbox"/> Confidential <input type="checkbox"/> Operating at Maximum Capacity <input type="checkbox"/> Activity with Insignificant Emissions			Operating Schedule				Building		Floor/Location						
			Hrs/Day		Days/Yr										
Emission Source/Control Identifier(s)															

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Section IV - Emission Unit Information (continued)

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements										<input type="checkbox"/> Continuation Sheet(s)	
				Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause		
-															
-															
-															
-															

Emission Unit	Emission Point	Process	Emission Source	Emission Unit State Only Requirements										<input type="checkbox"/> Continuation Sheet(s)	
				Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause		
-															
-															
-															
-															

Emission Unit Compliance Certification										<input type="checkbox"/> Continuation Sheet(s)
Rule Citation										
Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause	
G	NYCRR	212	-							
<input type="checkbox"/> Applicable Federal Requirement			<input type="checkbox"/> State Only Requirement			<input type="checkbox"/> Capping				
Emission Unit	Emission Point	Process	Emission Source	CAS No.			Contaminant Name			
1-00EU1	00ST3	SVE		00079-01-6			Trichloroethylene			
Monitoring Information										
<input type="checkbox"/> Continuous Emission Monitoring <input checked="" type="checkbox"/> Intermittent Emission Testing <input type="checkbox"/> Ambient Air Monitoring					<input type="checkbox"/> Monitoring of Process or Control Device Parameters as Surrogate <input type="checkbox"/> Work Practice Involving Specific Operations <input type="checkbox"/> Record Keeping/Maintenance Procedures					
Description										
Monthly grab samples analyzed for VOCs from the VGAC unit influent and effluent										
Work Practice		Process Material				Reference Test Method				
Type	Code	Description								
						Manufacturer Name/Model No.				
Code		Description								
23		Concentration								
Limit			Limit Units							
Upper		Lower		Code	Description					
36,000				255	micrograms per cubic meter					
Averaging Method			Monitoring Frequency			Reporting Requirements				
Code	Description		Code	Description		Code	Description			
01	Instantaneous		05	Monthly		10	Upon Request			

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Section IV - Emission Unit Information (continued)

Determination of Non-Applicability (Title V Only) <i>N/A</i>										<input type="checkbox"/> Continuation Sheet(s)	
Rule Citation											
Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause		
Emission Unit		Emission Point		Process	Emission Source		<input type="checkbox"/> Applicable Federal Requirement <input type="checkbox"/> State Only Requirement				
Description											
Rule Citation											
Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause		
Emission Unit		Emission Point		Process	Emission Source		<input type="checkbox"/> Applicable Federal Requirement <input type="checkbox"/> State Only Requirement				
Description											
Process Emissions Summary										<input checked="" type="checkbox"/> Continuation Sheet(s)	
EMISSION UNIT		1-00EU1					PROCESS		SVE		
CAS No.	Contaminant Name			% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined			
00071-55-6	1,1,1-Trichloroethane					80	0.34	02			
PTE			Standard Units	PTE How Determined		Actual					
(lbs/hr)	(lbs/yr)	(standard units)				(lbs/hr)	(lbs/yr)				
0.07	591			02							
EMISSION UNIT		1-00EU1					PROCESS		SVE		
CAS No.	Contaminant Name			% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined			
00127-18-4	Tetrachloroethylene					80	0.00	02			
PTE			Standard Units	PTE How Determined		Actual					
(lbs/hr)	(lbs/yr)	(standard units)				(lbs/hr)	(lbs/yr)				
<del>0.00</del> 0.08 RT	8			02							
EMISSION UNIT		1-00EU1					PROCESS		SVE		
CAS No.	Contaminant Name			% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined			
00079-01-6	Trichloroethylene					80	0.67	02			
PTE			Standard Units	PTE How Determined		Actual					
(lbs/hr)	(lbs/yr)	(standard units)				(lbs/hr)	(lbs/yr)				
0.13	1,181			02							

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Section IV - Emission Unit Information (continued)

EMISSION UNIT		Emission Unit Emissions Summary				<input checked="" type="checkbox"/> Continuation Sheet(s)
i-00EU1						
CAS No.		Contaminant Name				
00075-34-3		1,1-Dichloroethane				
ERP (lbs/yr)	PTE Emissions			Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)		
	BRT	11				
CAS No.		Contaminant Name				
00075-35-4		1,1-Dichloroethylene (Vinylidene Chloride)				
ERP (lbs/yr)	PTE Emissions			Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)		
	BRT	16				
CAS No.		Contaminant Name				
00540-59-0		cis-1,2-Dichloroethane				
ERP (lbs/yr)	PTE Emissions			Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)		
	BRT	5				
CAS No.		Contaminant Name				
00107-06-2		1,2-Dichloroethane				
ERP (lbs/yr)	PTE Emissions			Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)		
	BRT	BRT				

Compliance Plan N/A													<input type="checkbox"/> Continuation Sheet(s)
For any emission units which are <u>not in compliance</u> at the time of permit application, the applicant shall complete the following													
Consent Order		Certified progress reports are to be submitted every 6 months beginning ___ / ___ / ___											
Emission Unit	Process	Emission Source	Applicable Federal Requirement										
			Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause	
Remedial Measure / Intermediate Milestones											R/I	Date Scheduled	

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Section IV - Emission Unit Information

EMISSION UNIT		Emission Unit Emissions Summary (continuation)			
1-00E41					
CAS No.		Contaminant Name			
00156-60-5		trans-1,2-Dichloroethene			
ERP (lbs/yr)	PTE Emissions		Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
BRT		BRT			
CAS No.		Contaminant Name			
00075-01-4		Vinyl Chloride			
ERP (lbs/yr)	PTE Emissions		Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
BRT		BRT			
CAS No.		Contaminant Name			
-					
ERP (lbs/yr)	PTE Emissions		Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
CAS No.		Contaminant Name			
-					
ERP (lbs/yr)	PTE Emissions		Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
CAS No.		Contaminant Name			
-					
ERP (lbs/yr)	PTE Emissions		Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
CAS No.		Contaminant Name			
-					
ERP (lbs/yr)	PTE Emissions		Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
CAS No.		Contaminant Name			
-					
ERP (lbs/yr)	PTE Emissions		Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
CAS No.		Contaminant Name			
-					
ERP (lbs/yr)	PTE Emissions		Actual		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	

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Section IV - Emission Unit Information (continued)

Request for Emission Reduction Credits						<input type="checkbox"/> Continuation Sheet(s)			
EMISSION UNIT									
Emission Reduction Description									
Contaminant Emission Reduction Data									
Baseline Period						Reduction			
/ / to / /						Date		Method	
						/ /			
CAS No.			Contaminant Name			ERC (lbs/yr)			
						Netting		Offset	
-			-						
-			-						
-			-						
Facility to Use Future Reduction									
Name					APPLICATION ID				
					- / - / / / / / / / / /				
Location Address									
<input type="checkbox"/> City / <input type="checkbox"/> Town / <input type="checkbox"/> Village					State			Zip	

Use of Emission Reduction Credits						<input type="checkbox"/> Continuation Sheet(s)			
EMISSION UNIT									
Proposed Project Description									
Contaminant Emissions Increase Data									
CAS No.			Contaminant Name			PEP (lbs/yr)			
-			-						
Statement of Compliance									
<input type="checkbox"/> All facilities under the ownership of this "ownership/firm" are operating in compliance with all applicable requirements and state regulations including any compliance certification requirements under Section 114(a)(3) of the Clean Air Act Amendments of 1990, or are meeting the schedule of a consent order.									
Source of Emission Reduction Credit - Facility									
Name					PERMIT ID				
					- / - / / / / / / / / /				
Location Address									
<input type="checkbox"/> City / <input type="checkbox"/> Town / <input type="checkbox"/> Village					State			Zip	
Emission Unit		CAS No.		Contaminant Name		ERC (lbs/yr)			
						Netting		Offset	
-		-		-					
-		-		-					
-		-		-					



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Supporting Documentation

- P.E. Certification (form attached)
- List of Exempt Activities (form attached)
- Plot Plan
- Methods Used to Determine Compliance (form attached)
- Calculations
- Air Quality Model ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- Confidentiality Justification
- Ambient Air Monitoring Plan ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- Stack Test Protocols/Reports ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- Continuous Emissions Monitoring Plans/QA/QC ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- MACT Demonstration ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- Operational Flexibility: Description of Alternative Operating Scenarios and Protocols
- Title IV: Application/Registration
- ERC Quantification (form attached)
- Use of ERC(s) (form attached)
- Baseline Period Demonstration
- Analysis of Contemporaneous Emission Increase/Decrease
- LAER Demonstration ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- BACT Demonstration ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- Other Document(s): \_\_\_\_\_ ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- \_\_\_\_\_ ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- \_\_\_\_\_ ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
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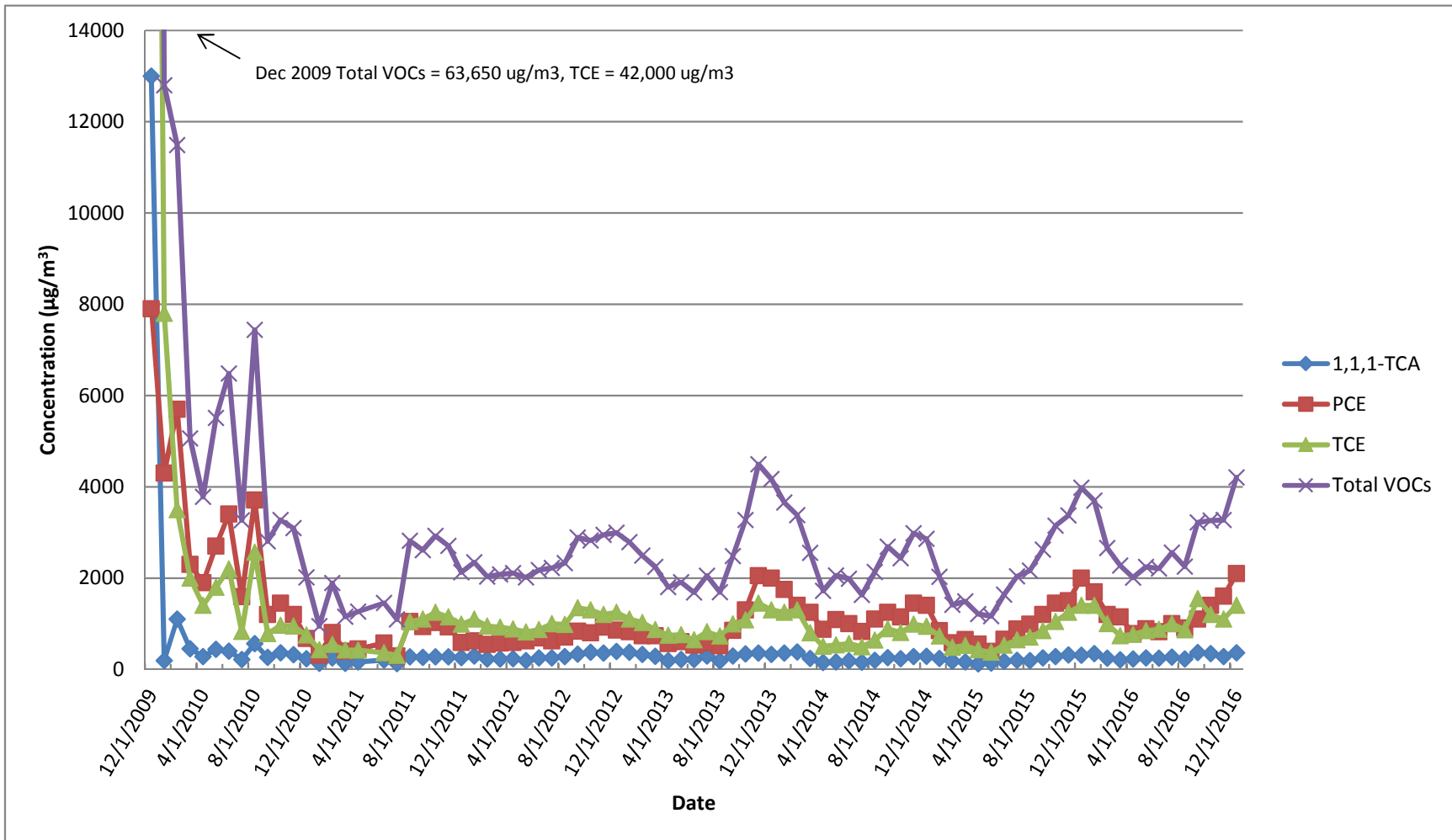
## **APPENDIX B**

### **VAPOR CONCENTRATION TREND GRAPHS**

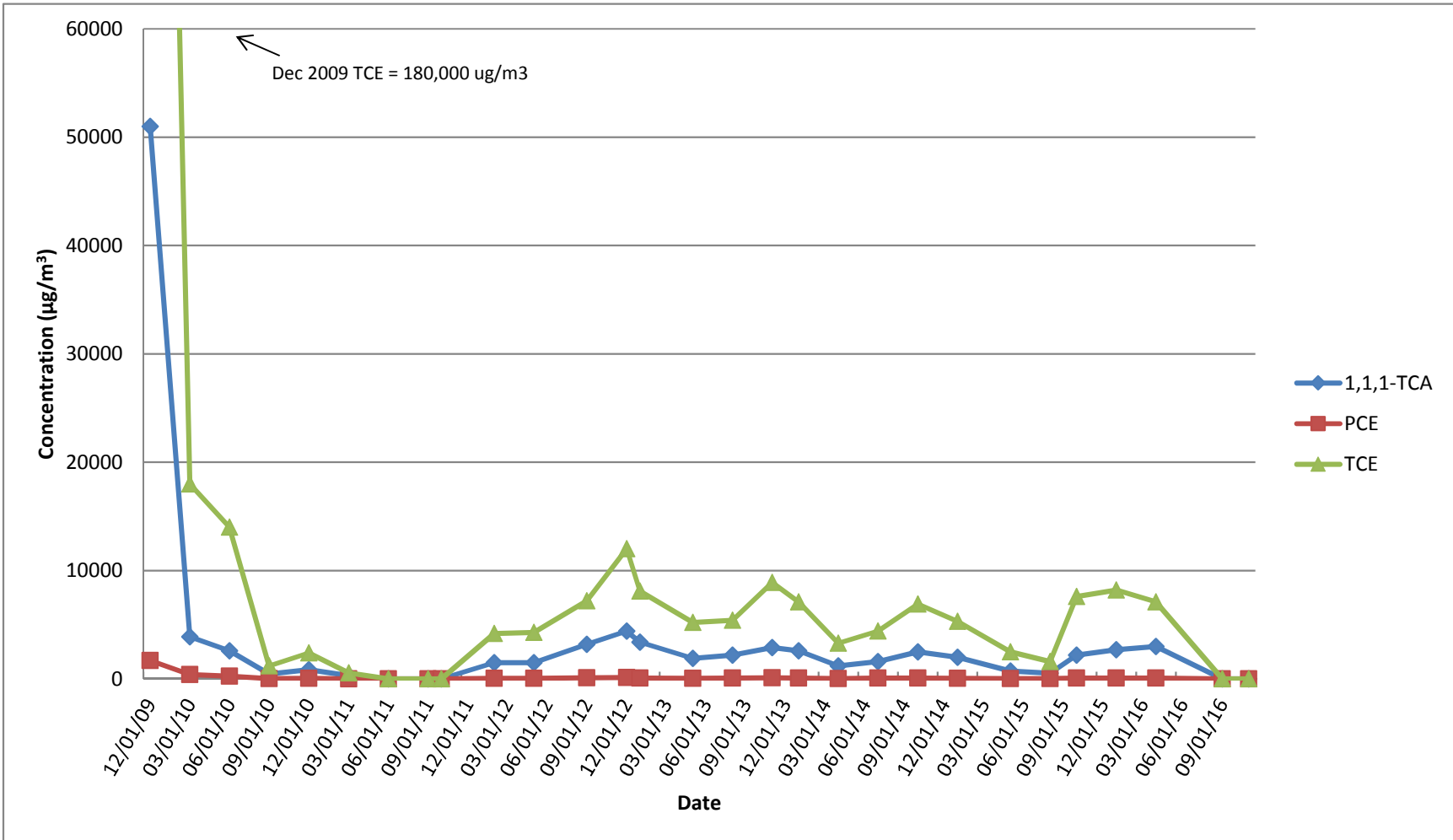


Soil Vapor Extraction Containment System  
Site 1, Former Drum Marshalling Yard  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Vapor Concentration Trends of Select and Total VOCs  
SVEWs

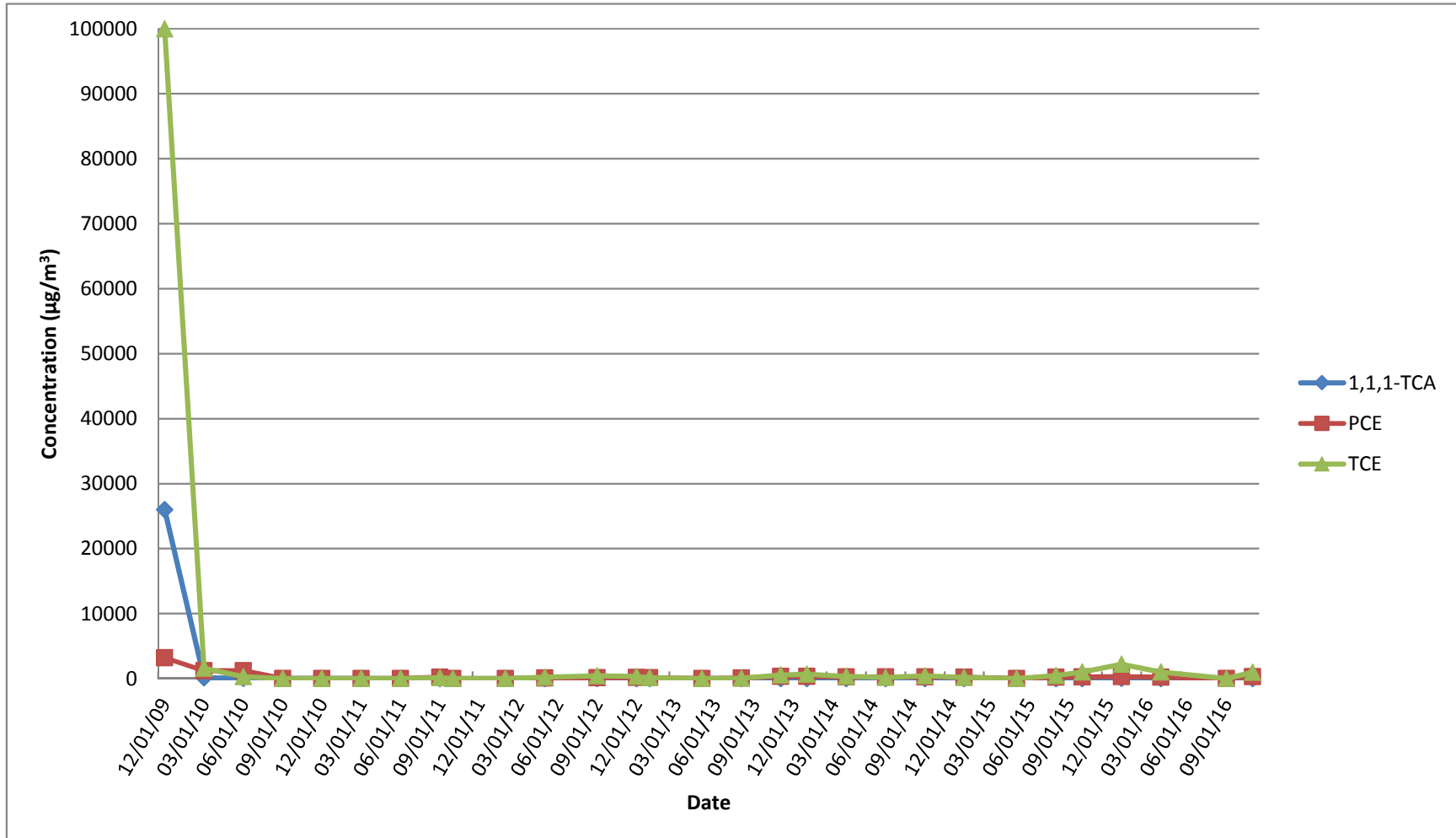
**COMBINED INFLUENT**



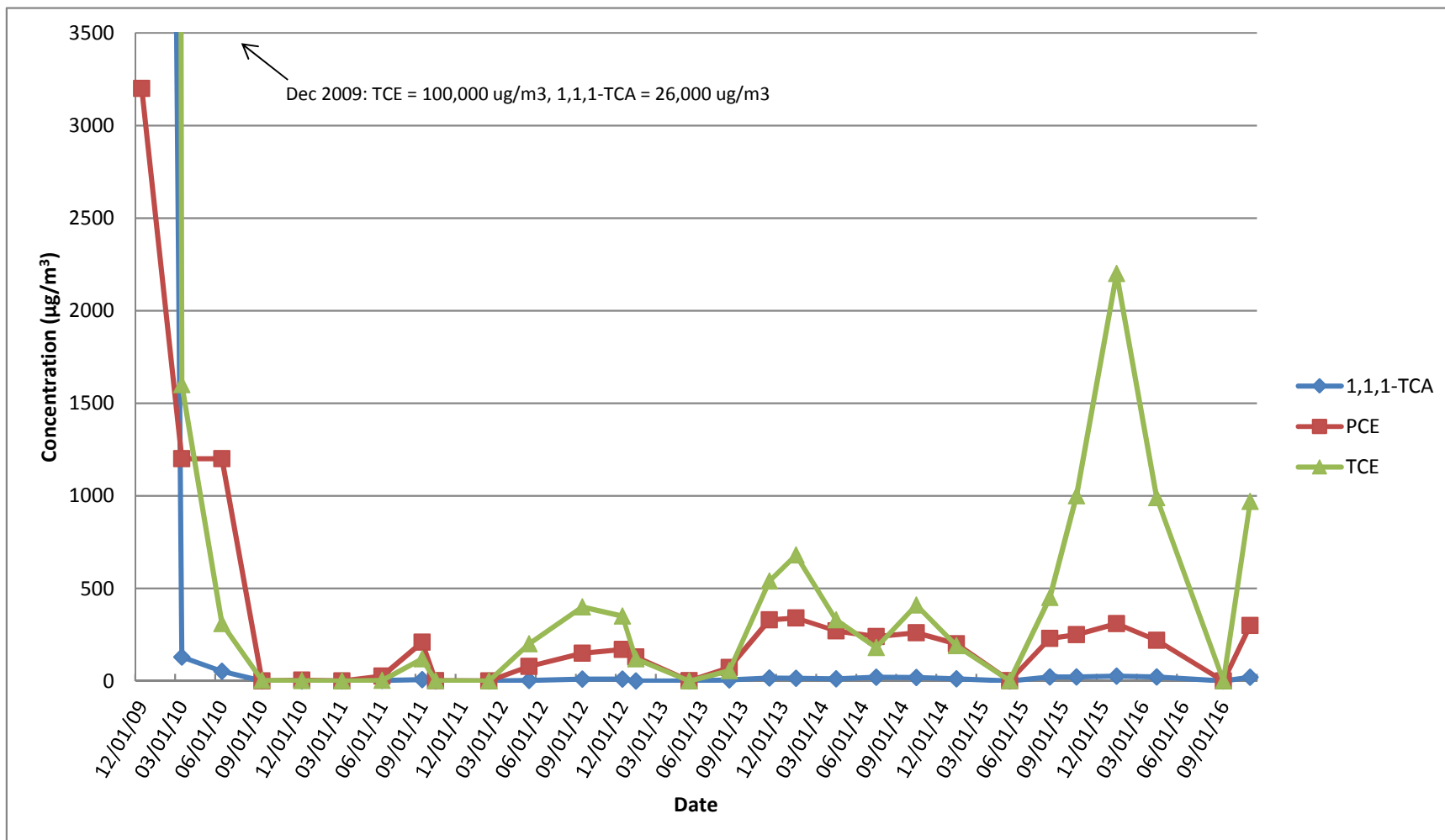
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEWs**  
**SV-101I**



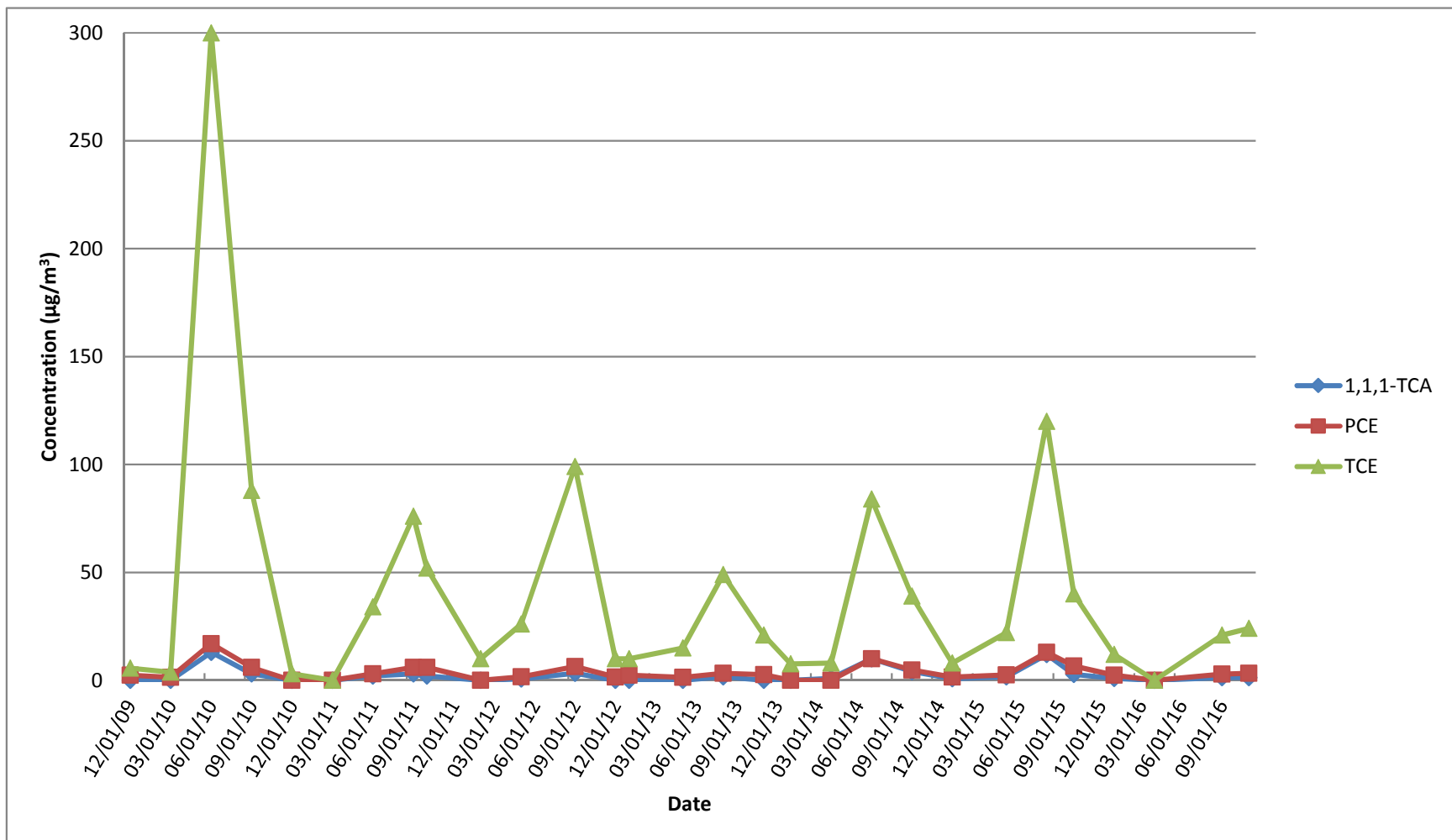
Soil Vapor Extraction Containment System  
Site 1, Former Drum Marshalling Yard  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Concentration Trends of Select VOCs  
SVEs  
SV-101D



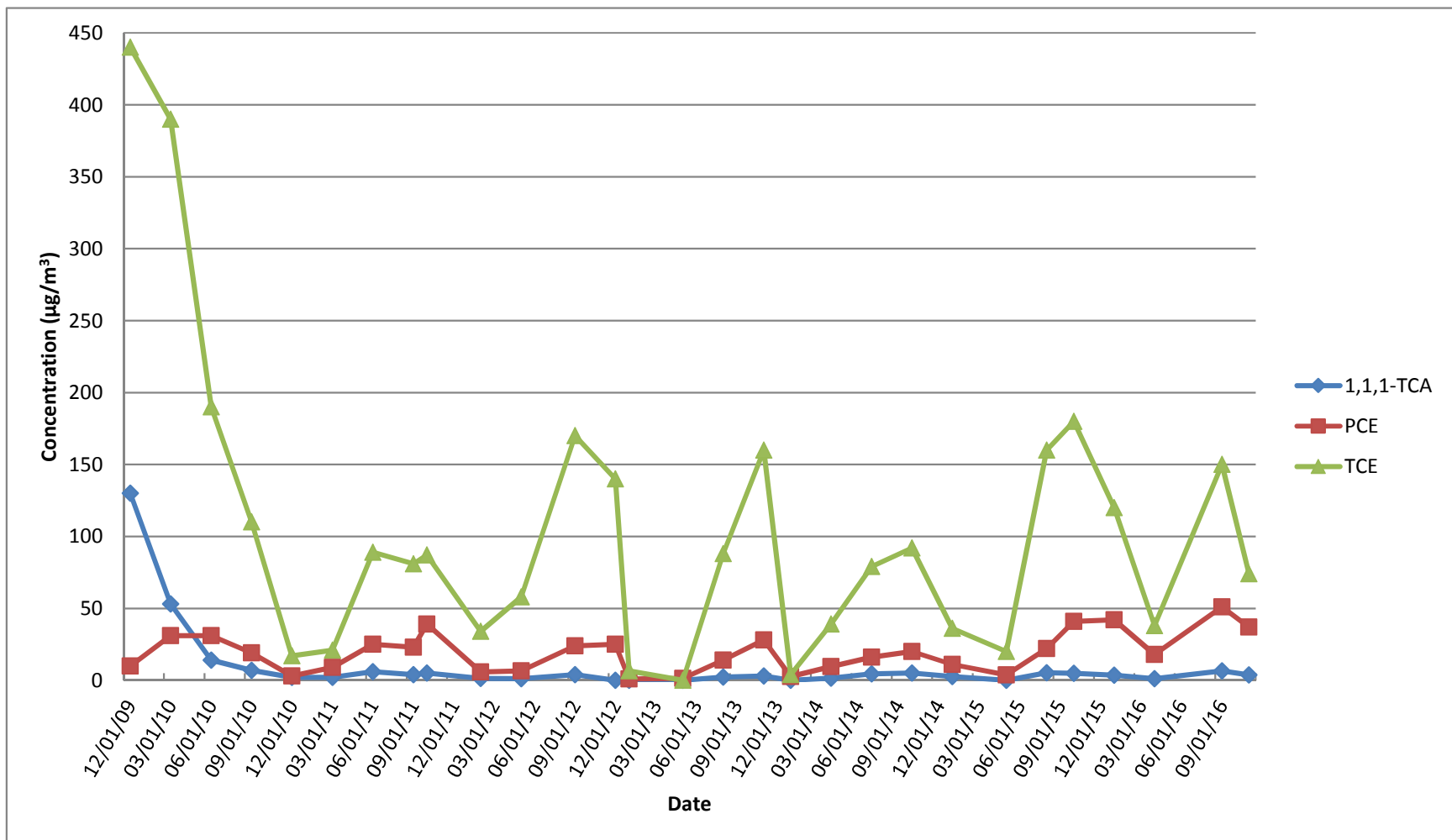
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEWs**  
**SV-101D (smaller scale)**



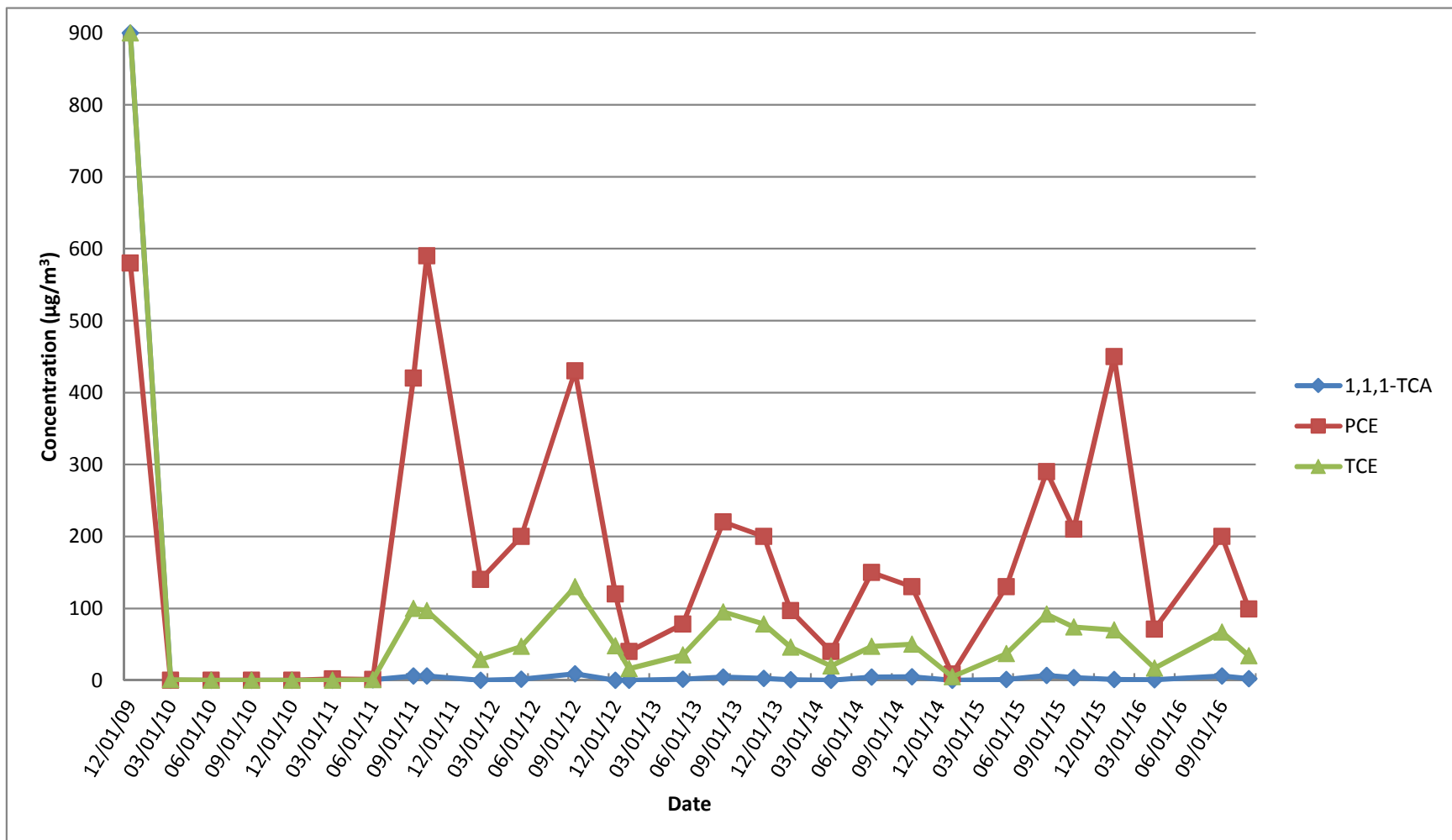
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEWs**  
**SV102I**



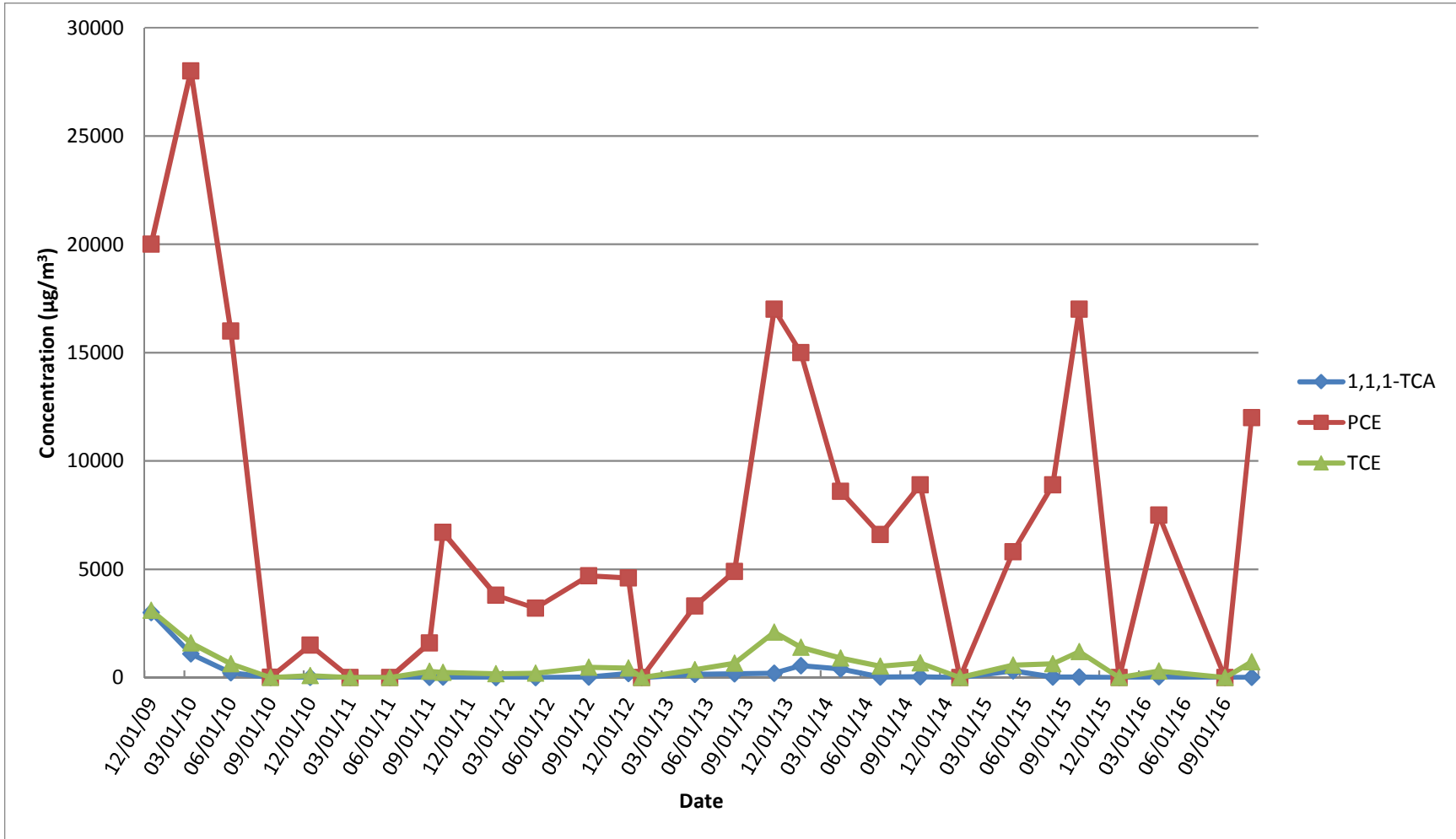
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEWs**  
**SV-102D**



**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEWs**  
**SV-103I**

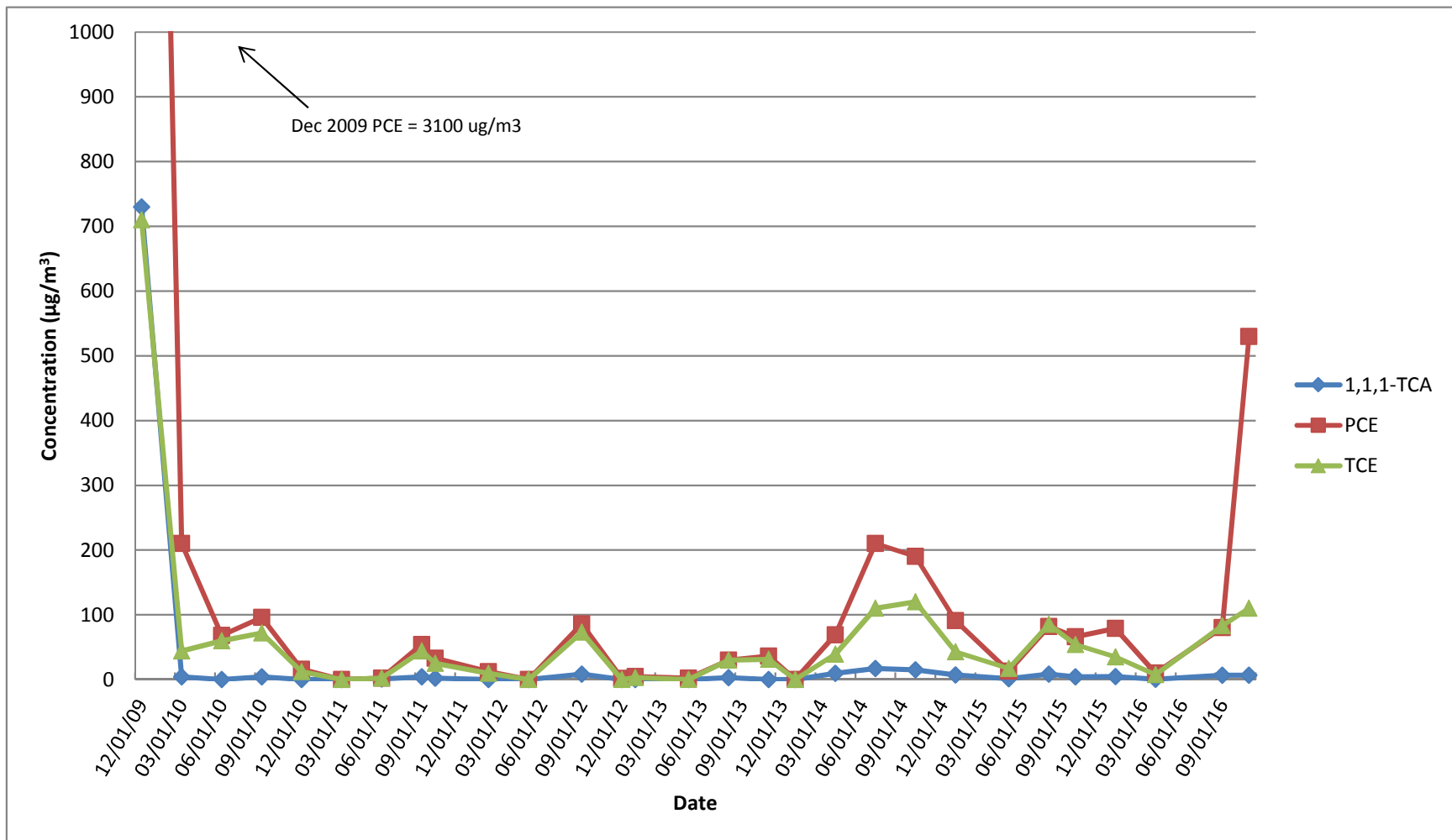


**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEWs**  
**SV103D**

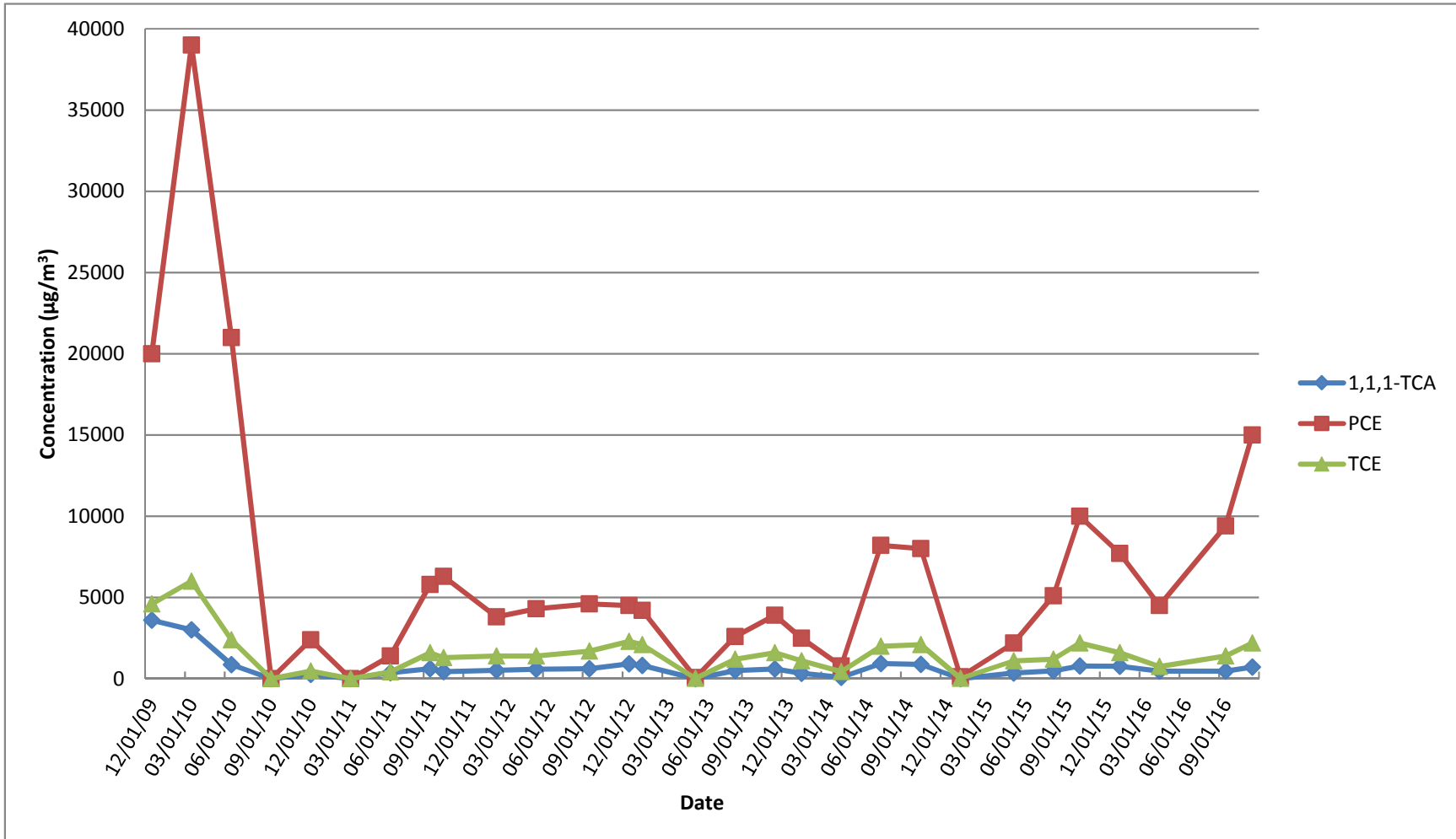




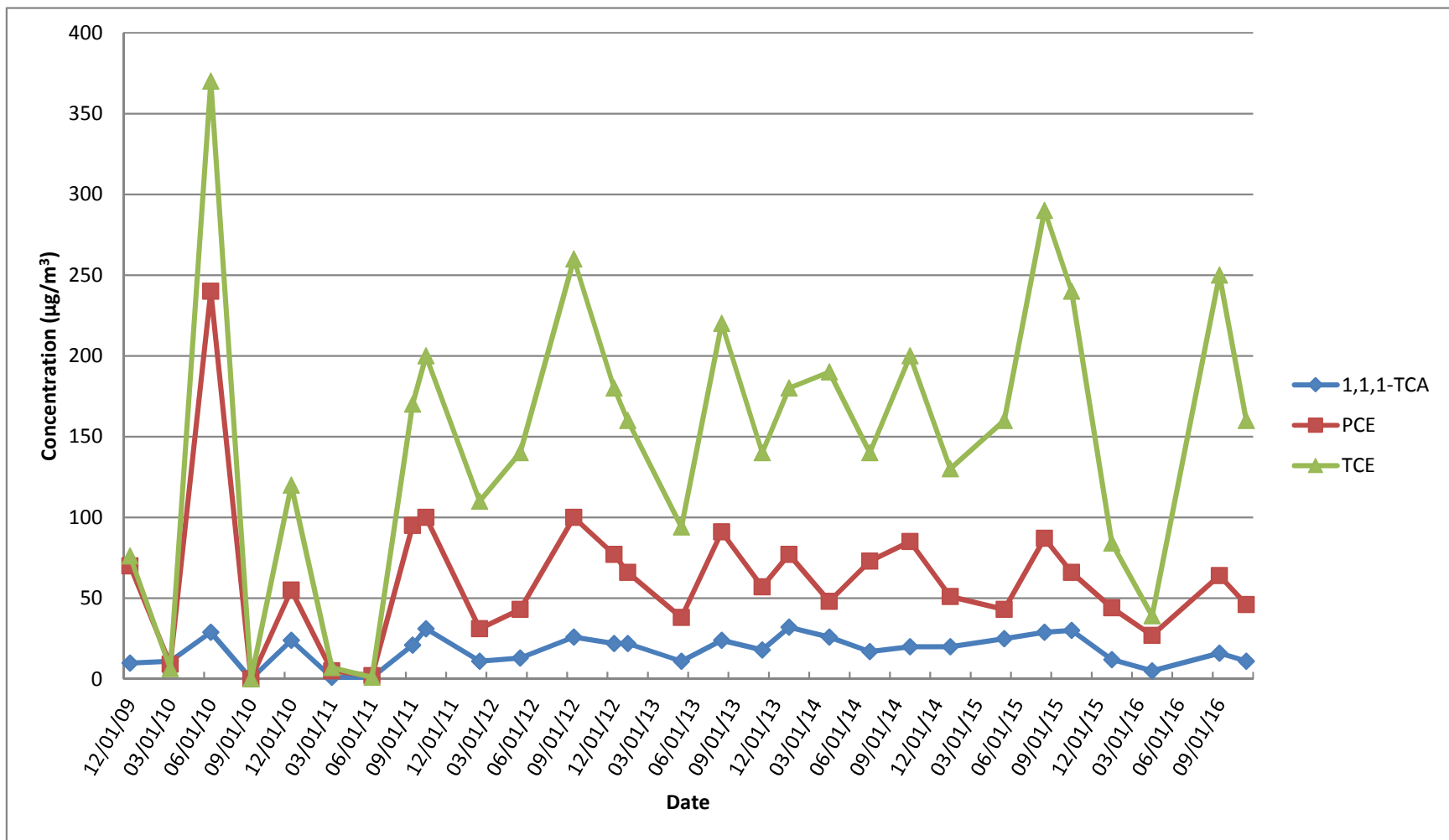
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEWs**  
**SV104I**



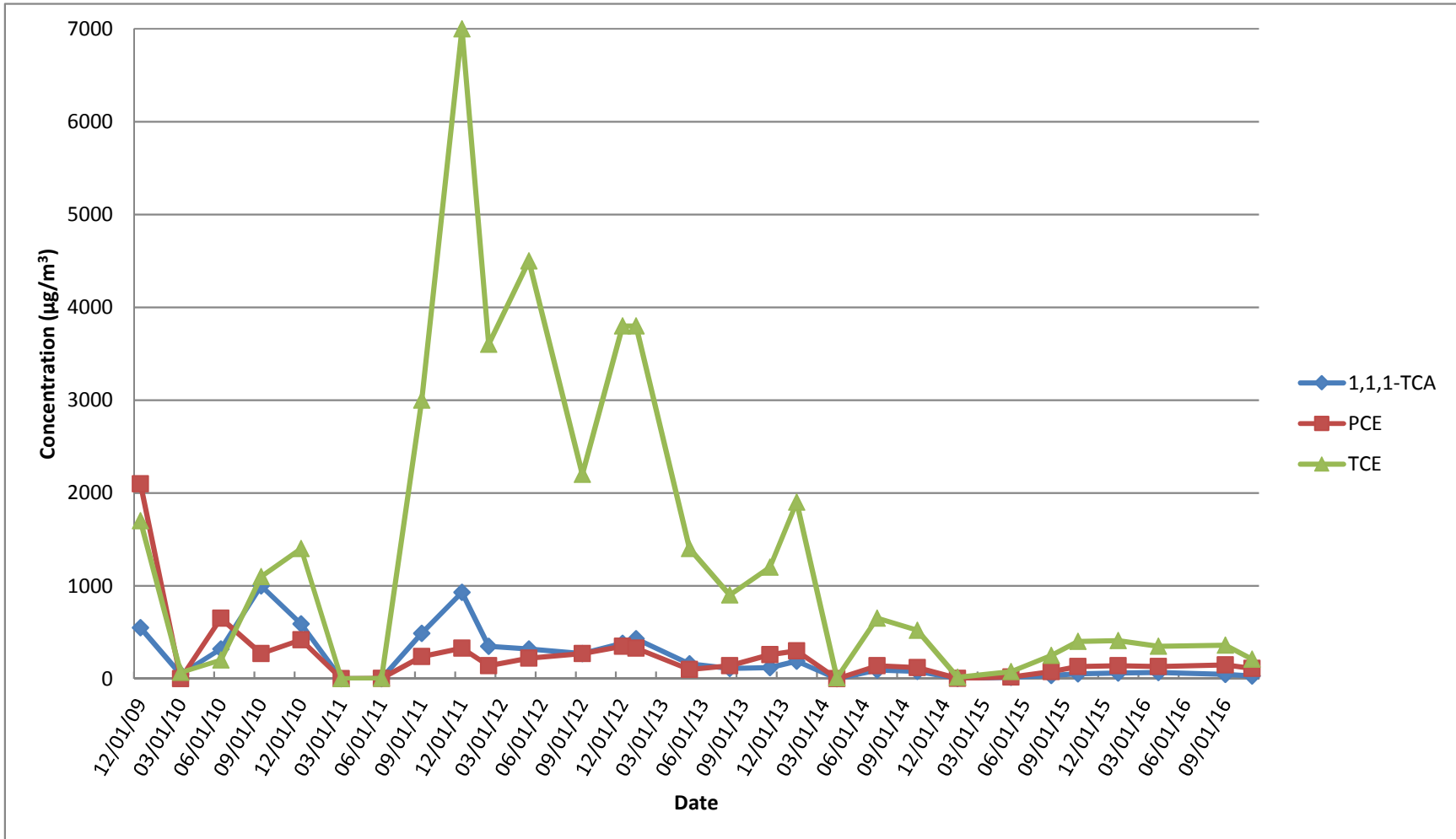
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEWs**  
**SV-104D**



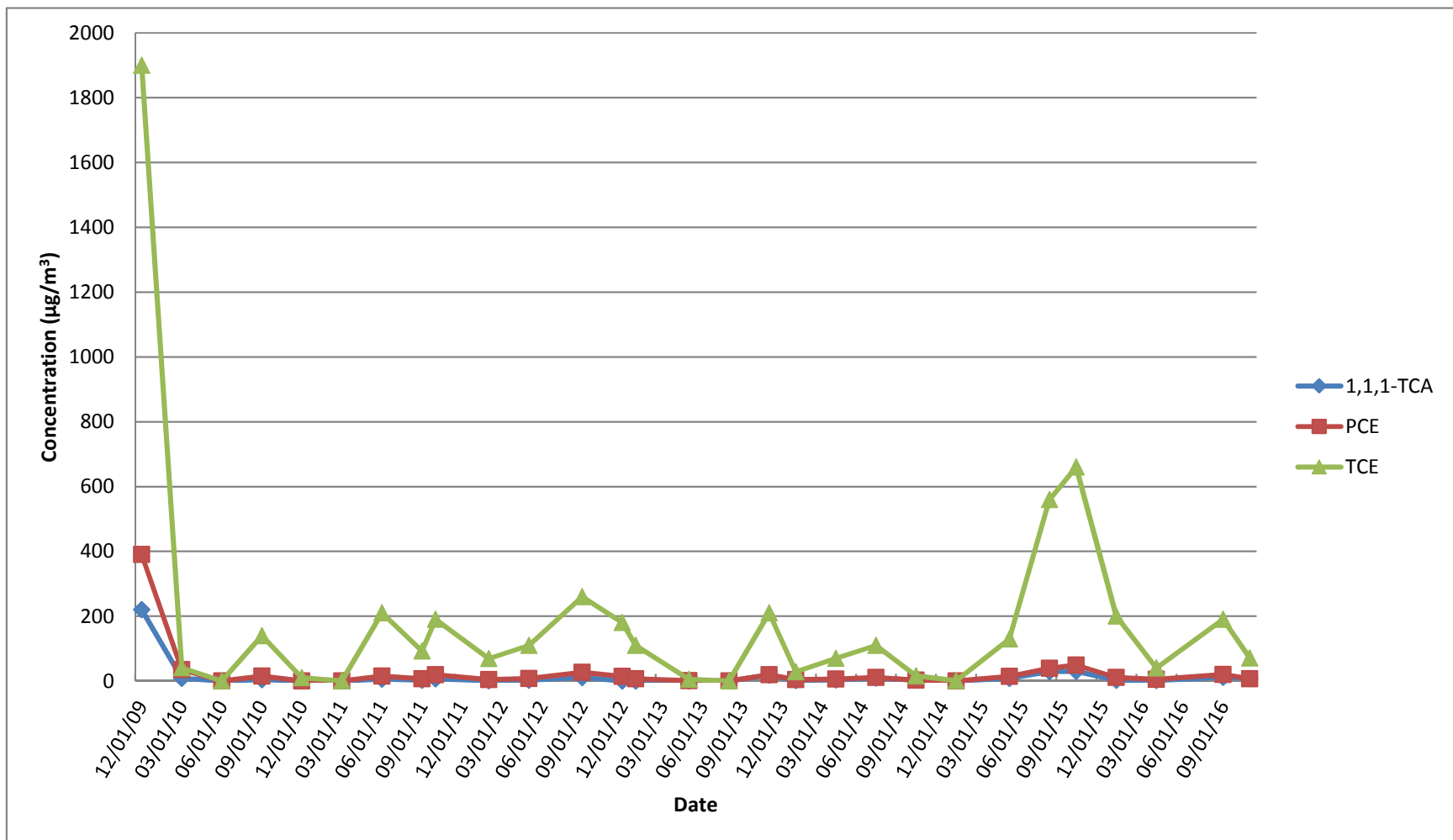
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEs**  
**SV-1051**



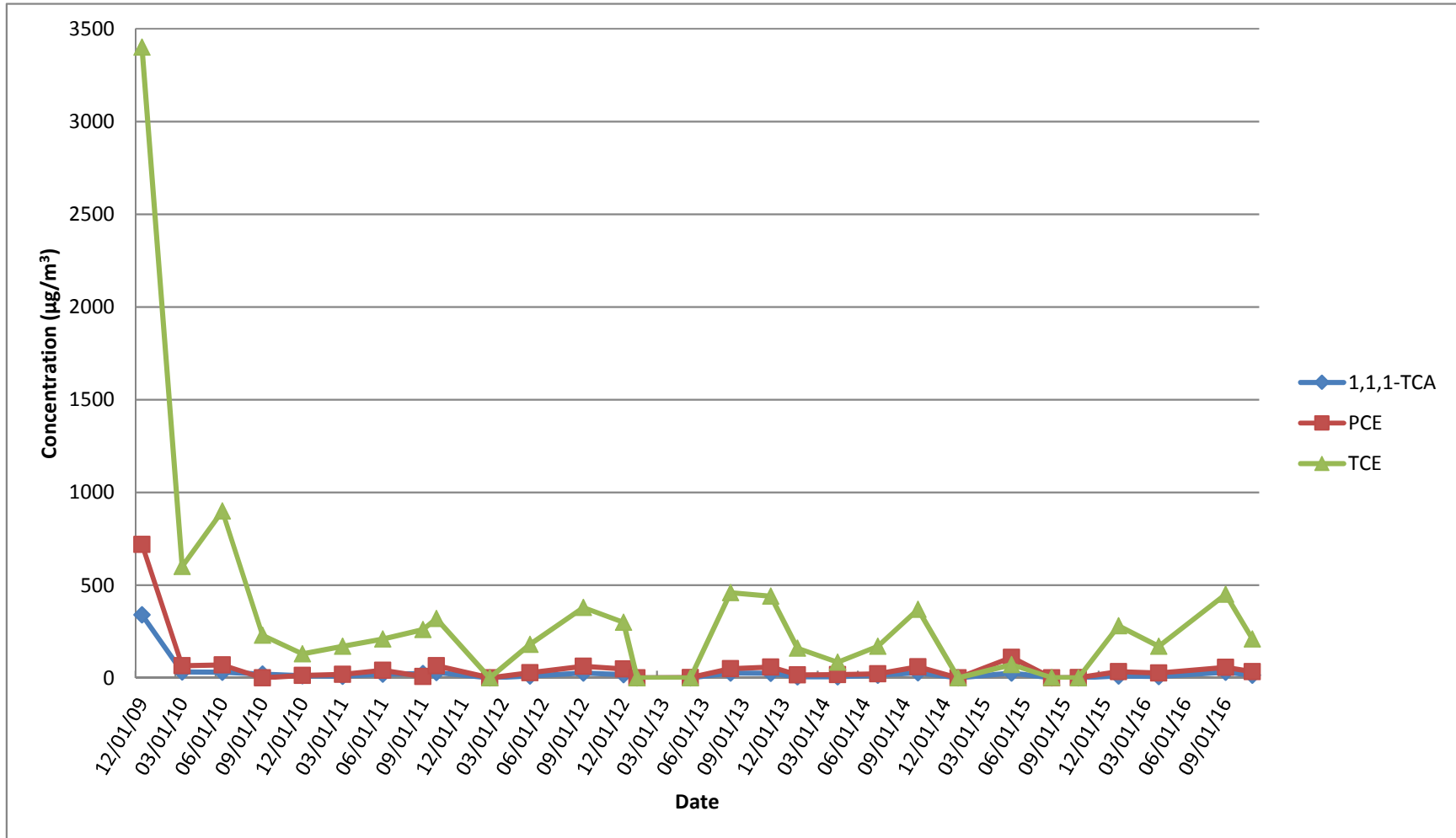
**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEs**  
**SV-105D**



**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEWs**  
**SV-106I**



Soil Vapor Extraction Containment System  
Site 1, Former Drum Marshalling Yard  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Concentration Trends of Select VOCs  
SVEs  
SV-106D



**Soil Vapor Extraction Containment System**  
**Site 1, Former Drum Marshalling Yard**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Concentration Trends of Select VOCs**  
**SVEWs**  
**SV-106D (smaller scale)**

