2015 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

April 2016

Prepared for:

Naval Facilities Engineering Command Mid-Atlantic
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Norfolk, VA 23511

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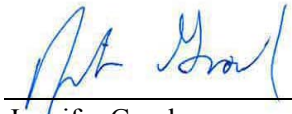
Patrick Schauble
Program Manager

Date



4/26/16

Jennifer Good
Project Manager

Date

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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
H&S	H&S Environmental, Inc.
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 has prepared this 2015 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 2015 Annual Operations Report summarizes activities that occurred during 2015 and also further details activities that occurred during the Fourth Quarter 2015 (October 2015 through December 2015). 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 2015 Annual Operations Report:

- *Quarterly Operations Report, First Quarter 2015, Soil Vapor Extraction Containment System Site 1, Former Drum Marshalling Yard, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by H&S Environmental, Inc. (H&S) in October 2015.
- *Quarterly Operations Report, Second Quarter 2015, Soil Vapor Extraction Containment System Site 1, Former Drum Marshalling Yard, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by H&S in November 2015.
- *Quarterly Operations Report, Third Quarter 2015, Soil Vapor Extraction Containment System Site 1, Former Drum Marshalling Yard, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by H&S in February 2016.

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 11th 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 $\mu g/m^3$ (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 subslab 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 $\mu g/m^3$ of TCE, 381 $\mu g/m^3$ of PCE, and 20,634 $\mu g/m^3$ of 1,1,1-TCA. The maximum concentrations of VOCs in the soil gas samples were 180,000 $\mu g/m^3$ of TCE, 1,200 $\mu g/m^3$ of PCE, and 90,000 $\mu g/m^3$ of 1,1,1-TC2A (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 $\mu g/m^3$. A secondary objective of this project is to address soil vapor with a TCE concentration greater than 5 $\mu g/m^3$. 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-11D) 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 if needed, cleaning of filters, switching of lead/lag blower assignments, and preventive maintenance of system equipment.

2.2 Non-routine Maintenance / Site Activities

No non-routine activities or repair items of note were performed at the SVECS in 2015.

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 SVPMs to monitor the SVECS vacuum field, and soil gas sampling at SVPMs 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 third annual sampling event was conducted in the winter 2014-2015; samples were collected from the 18 SVPMs in January 2015, as discussed in Section 3.4 below.

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 2015 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 2015 are included in previously submitted quarterly operations reports as indicated in Section 1.0.

3.1.2 2015 Annual Summary

Emissions

Table 4 summarizes annual air emissions based on monthly emissions during the 12-month period. During 2015, approximately 10.89 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 2015, approximately 22.01 lbs of VOCs were removed by the SVECS, for an average monthly mass recovery rate of approximately 1.83 lbs per month. Monthly mass recovery calculations for each month of 2015, as well as the 2015 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 2015 Summary

Quarterly vapor samples were collected on 29 October 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 2015 Annual Summary

Results of quarterly vapor samples collected from the 12 SVEWs in 2015 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 2015 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 2015 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 29 October. 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 (-) 3.4 i.w.to (-) 18.5 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. The slight positive pressure of (+) 0.01 noted in several SVPMs during the Fourth Quarter monitoring event is within the margin of error for the gauge and / or could be a result of a low pressure weather system moving through the area which can cause a temporary reversal of the pressure gradients.

3.3.2 2015 Annual Summary

Results of quarterly vapor monitoring performed in 2015 are presented in **Table 8**, along with historical results beginning in October 2012. Pressure readings collected from the 18 SVPMs in 2015 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.

3.4.1 2015 Vapor Quality Results

Annual vapor samples were collected on 13-14 January from the 18 SVPM locations, results of which were presented in the *Quarterly Operations Report, First Quarter 2015* (H&S 2015). Validated analytical results of samples collected in January 2015 are summarized in **Table 9**.

As indicated, 1,1,1-TCA was not detected at any location. PCE was detected at three of the 18 locations, with concentrations ranging from 1.7 J µg/m^3 at SVPM-2006D to 7.1 µg/m^3 at SVPM-2004D. TCE was detected at two of the 18 locations, with concentrations ranging from 1.5 J µg/m^3 at SVPM-2004D to 30 µg/m3 at SVPM-2006D. All detected concentrations were well below the NYSDOH sub-slab screening values of 1,000 µg/m^3 for 1,1,1-TCA, 1,000 µg/m^3 for PCE, and 250 µg/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 2015 sampling event are presented in the *Quarterly Operations Report, First Quarter 2015* (H&S 2015).

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 2015. As indicated, concentrations observed in January 2015 have dropped substantially from initial concentrations observed in October 2008, and were generally similar to those observed in January 2014.

In 2008, TCE was detected at all 18 locations, with concentrations ranging from 1.0 µg/m^3 (SVPM-2004S) to 89,000 µg/m^3 (SVPM-2002I); concentrations exceeded the NYSDOH sub-slab screening value of 250 µg/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 µg/m^3 (SVPM-2006I), and no locations exceeded the NYSDOH sub-slab screening value of 250 µg/m^3. In 2014, TCE was detected at nine of the 18 locations, with concentrations ranging from 0.73 J µg/m^3 at SVPM-2003I to 3.7 J µg/m^3 at SVPM-2004I and no locations exceeded the NYSDOH sub-slab screening value of 250 µg/m^3. In 2015, TCE was

detected at two of the 18 locations, with concentrations ranging from 1.5 J µg/m^3 at SVPM-2004D to 30 µg/m3 at SVPM-2006D, and no locations exceeded the NYSDOH sub-slab screening value of 250 µg/m^3.

In 2008, PCE was detected at all 18 locations, with concentrations ranging from 1.8 µg/m^3 (SVPM-2004S) to 5,000 µg/m^3 (SVPM-2001I); concentrations exceeded the NYSDOH sub-slab screening value of 1,000 µg/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 µg/m^3 (SVPM-2004D), and no locations exceeded the NYSDOH sub-slab screening value of 1,000 µg/m^3. In 2014, PCE was detected at 15 of the 18 locations, with concentrations ranging from 0.53 J µg/m^3 at SVPM-2001D to 2.9 J µg/m^3 at SVPM-2004I, and no locations exceeded the NYSDOH sub-slab screening value of 1,000 µg/m^3. In 2015, PCE was detected at three of the 18 locations, with concentrations ranging from 1.7 J µg/m^3 at SVPM-2006D to 7.1 µg/m^3 at SVPM-2004D, and no locations exceeded the NYSDOH sub-slab screening value of 1,000 µg/m^3.

In 2008, 1,1,1-TCA was detected at all 18 locations, with concentrations ranging from 1.4 µg/m^3 (SVPM-2004S) to 52,000 µg/m^3 (SVPM-2002I); concentrations exceeded the NYSDOH sub-slab screening value of 1,000 µg/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 µg/m^3, well below the NYSDOH sub-slab screening value of 1,000 µg/m^3. In 2014 and 2015, 1,1,1-TCA was not detected at any location.

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 2015 are discussed below.

- Combined Influent: Overall VOC concentrations in the combined influent increased throughout the Fourth Quarter, with total VOC concentrations of 3,147 µg/m^3, 3,371 µg/m^3, and 3,983 µg/m^3 in October, November, and December, respectively. Overall concentrations remain below baseline concentrations observed in December 2009 when a total VOC concentration of 63,650 µg/m^3 was observed.

- SV-101I: Concentrations observed at this location increased in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 7,600 µg/m^3 TCE, 74 µg/m^3 PCE, and 2,200 µg/m^3 1,1,1-TCA. All concentrations remain below baseline concentrations observed in December 2009 (180,000 µg/m^3 TCE, 1,700 µg/m^3 PCE, and 51,000 µg/m^3 1,1,1-TCA).

- SV-101D: Concentrations observed at this location increased or remained similar in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 1,000 µg/m^3 TCE, 250 µg/m^3 PCE, and 22 µg/m^3 1,1,1-TCA. All concentrations remain below baseline concentrations observed in December 2009 (100,000 µg/m^3 TCE, 3,200 µg/m^3 PCE, and 26,000 µg/m^3 1,1,1-TCA).

- SV-102I: Concentrations observed at this location decreased in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 40 µg/m^3 TCE, 6.6 µg/m^3 PCE, and 2.8 J µg/m^3 1,1,1-TCA. The Fourth Quarter concentrations are above baseline concentrations observed in December 2009 (5.6 µg/m^3 TCE, 2.4 µg/m^3 PCE, and non-detectable 1,1,1-TCA); however, the concentrations are below the peak concentrations observed in June 2010 (300 µg/m^3 TCE, 17 µg/m^3 PCE, and 13 µg/m^3 1,1,1-TCA).

- SV-102D: Concentrations observed at this location increased slightly or remained similar in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 180 µg/m^3 TCE, 41 µg/m^3 PCE, and 4.9 µg/m^3 of 1,1,1-TCA. Concentrations remain below baseline concentrations observed in December 2009 for TCE and 1,1,1,-TCA (440 µg/m^3 TCE and 130 µg/m^3 1,1,1-TCA), and also below the peak concentration observed in October 2011 for PCE (39 µg/m^3).

- SV-103I: Concentrations observed at this location decreased in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 74 µg/m^3 TCE, 210 µg/m^3 PCE, and 3.6 J µg/m^3 1,1,1-TCA. Concentrations remain below baseline concentrations observed in December 2009 (900 µg/m^3 TCE, 580 µg/m^3 PCE, and 900 µg/m^3 1,1,1-TCA).

- SV-103D: Concentrations observed at this location increased or remained similar in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 1,200 µg/m^3 TCE, 17,000 µg/m^3 PCE, and 30 J µg/m^3 1,1,1-TCA. Concentrations remain below baseline concentrations observed in December 2009 (3,100 µg/m^3 TCE, 20,000 µg/m^3 PCE, and 3,000 µg/m^3 1,1,1-TCA).

- SV-104I: Concentrations observed at this location decreased in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 54 µg/m^3 TCE, 66 µg/m^3 PCE, and 4.0 J µg/m^3 1,1,1-TCA. Concentrations remain below baseline concentrations observed in December 2009 (710 µg/m^3 TCE, 3,100 µg/m^3 PCE, and 730 µg/m^3 1,1,1-TCA).

- SV-104D: Concentrations observed at this location increased in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 2,200 µg/m^3 TCE, 10,000 µg/m^3 PCE, and 790 µg/m^3 1,1,1-TCA. Concentrations remain below baseline concentrations observed in December 2009 (4,600 µg/m^3 TCE, 20,000 µg/m^3 PCE, and 3,600 µg/m^3 1,1,1-TCA).

- SV-105I: Concentrations observed at this location decreased or remained similar in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 240 µg/m^3 TCE, 66 µg/m^3 PCE, and 30 µg/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 µg/m^3 TCE and 9.9 µg/m^3 1,1,1-TCA), they are below or similar to the peak concentrations observed in June 2010 for TCE, PCE, and 1,1,1-TCA (370 µg/m^3 TCE, 240 µg/m^3 PCE, and 29 µg/m^3 1,1,1-TCA).

- SV-105D: Concentrations observed at this location increased in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 400 µg/m^3 TCE, 130 µg/m^3

PCE, and 52 µg/m^3 1,1,1-TCA. These concentrations are below baseline concentrations observed in December 2009 (1,700 µg/m^3 TCE, 2,100 µg/m^3 PCE and 550 µg/m^3 1,1,1-TCA).

- SV-106I: Concentrations observed at this location increased or remained similar in the Fourth Quarter from concentrations observed in the Third Quarter, with concentrations of 660 µg/m^3 TCE, 49 µg/m^3 PCE, and 30 µg/m^3 1,1,1-TCA. These concentrations are below baseline concentrations observed in December 2009 (1,900 µg/m^3 TCE, 390 µg/m^3 PCE, and 220 µg/m^3 1,1,1-TCA).

- SV-106D: Concentrations observed at this location remained similar in the Fourth Quarter to concentrations observed in the Third Quarter, with concentrations of 1.4 J µg/m^3 PCE, and non-detectable levels of TCE and 1,1,1-TCA, suggesting, as with the Third Quarter results, that Fourth Quarter results may not be indicative of actual conditions. The SVEW was subsequently evaluated to check the integrity of the sample port, vacuum gauge, air flow, etc. to ensure future samples collected at this location will be reflective of actual conditions. All concentrations remain below baseline concentrations observed in December 2009 (3,400 µg/m^3 TCE, 720 µg/m^3 PCE, and 340 µg/m^3 1,1,1-TCA).

4.0 CONCLUSIONS AND RECOMMENDATIONS

As stated previously, 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 22.01 lbs of VOCs by the SVECS in 2015 indicates that progress is being made toward these goals. Influent vapor analytical data with concentrations of TCE consistently greater than 250 µg/L indicate that 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.

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 2015

Compound	Concentration (ug/m^3)				Emission Rate [1],[2]				Monthly Mass Recovery [3]
					Prior to Treatment		Following Treatment [4]		
	Influent #1	Influent #2	Average	Effluent	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs)
1,1,1-Trichloroethane	280	280	280	410	0.0003	2.8265	0.0005	4.1388	0.2401
1,1-Dichloroethane	20	18	19	15	0.0000	0.1918	0.0000	0.1514	0.0163
1,1-Dichloroethene	0	2.2 J	1.1 J	3.5	0.0000	0.0111	0.0000	0.0353	0.0009
1,2-Dichloroethane	1.1 J	1.2 J	1.2 J	0	0.0000	0.0116	0.0000	0.0000	0.0010
cis-1,2-Dichloroethene	340	340	340	300	0.0004	3.4321	0.0003	3.0284	0.2915
Tetrachloroethene	1400	1500	1450	0.86 J	0.0017	14.6371	0.0000	0.0087	1.2431
trans-1,2-Dichloroethene	5.4	5.7	5.6	4.4	0.0000	0.0560	0.0000	0.0444	0.0048
Trichloroethene	1000	1100	1050	720	0.0012	10.5993	0.0008	7.2681	0.9002
Vinyl Chloride	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
Total VOCs	3047	3247	3147	1454	0.0036	31.7655	0.0017	14.6750	2.6979

Notes:

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

Average Monthly Vapor Temp (ºF) =	111
Average Monthly Flowrate (cfm) =	333
Average Monthly Flowrate (scfm) =	308
Operational Hours for the month =	744

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

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

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

(4) Based on the proposed modifications and emission discharge goals presented in the *Modification to Existing Soil Vapor Extraction Containment System at Site 1 – Former Drum Marshaling Area, NWIRP Bethpage, Bethpage NY* (Tetra Tech 2011) and NYSDEC's acceptance of the proposed modifications (Appendix A), treatment of emissions is no longer required.

Table 2
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Vapor Monitoring Results
November 2015

Compound	Concentration (ug/m^3)				Emission Rate [1],[2]				Monthly Mass Recovery [3]
					Prior to Treatment		Following Treatment [4]		
	Influent #1	Influent #2	Average	Effluent	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs)
1,1,1-Trichloroethane	300	330	315	320	0.0004	3.0958	0.0004	3.1449	0.2537
1,1-Dichloroethane	19	20	20	15	0.0000	0.1916	0.0000	0.1474	0.0157
1,1-Dichloroethene	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
1,2-Dichloroethane	1.8 J	1.5 J	1.7 J	0	0.0000	0.0162	0.0000	0.0000	0.0013
cis-1,2-Dichloroethene	260	300	280	220	0.0003	2.7518	0.0002	2.1621	0.2255
Tetrachloroethene	1400	1600	1500	1.7 J	0.0017	14.7418	0.0000	0.0167	1.2083
trans-1,2-Dichloroethene	4.3	5.0	4.7	2.9 J	0.0000	0.0457	0.0000	0.0285	0.0037
Trichloroethene	1200	1300	1250	670	0.0014	12.2848	0.0008	6.5847	1.0069
Vinyl Chloride	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
Total VOCs	3185	3557	3371	1230	0.0038	33.1278	0.0014	12.0844	2.7153

Notes:

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

Average Monthly Vapor Temp (ºF) =	108
Average Monthly Flowrate (cfm) =	323
Average Monthly Flowrate (scfm) =	300
Operational Hours for the month =	718

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

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

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

(4) Based on the proposed modifications and emission discharge goals presented in the *Modification to Existing Soil Vapor Extraction Containment System at Site 1 – Former Drum Marshaling Area, NWIRP Bethpage, Bethpage NY* (Tetra Tech 2011) and NYSDEC's acceptance of the proposed modifications (Appendix A), treatment of emissions is no longer required.

Table 3
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Vapor Monitoring Results
December 2015

Compound	Concentration (ug/m^3)				Emission Rate [1],[2]				Monthly Mass Recovery [3]
					Prior to Treatment		Following Treatment [4]		
	Influent #1	Influent #2	Average	Effluent	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs)
1,1,1-Trichloroethane	320	300	310	230	0.0004	3.0850	0.0003	2.2889	0.2613
1,1-Dichloroethane	14	14	14	9.6	0.0000	0.1393	0.0000	0.0955	0.0118
1,1-Dichloroethene	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
1,2-Dichloroethane	1.3 J	1.1 J	1.2 J	0	0.0000	0.0119	0.0000	0.0000	0.0010
cis-1,2-Dichloroethene	260	250	255	190	0.0003	2.5377	0.0002	1.8908	0.2149
Tetrachloroethene	2000	2000	2000	1.2 J	0.0023	19.9033	0.0000	0.0119	1.6859
trans-1,2-Dichloroethene	3.1	3.2	3.2	2.2 J	0.0000	0.0313	0.0000	0.0219	0.0027
Trichloroethene	1400	1400	1400	430	0.0016	13.9323	0.0005	4.2792	1.1801
Vinyl Chloride	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
Total VOCs	3998	3968	3983	863	0.0045	39.6409	0.0010	8.5883	3.3577

Notes:

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

Average Monthly Vapor Temp (ºF) =	104
Average Monthly Flowrate (cfm) =	324
Average Monthly Flowrate (scfm) =	304
Operational Hours for the month =	742

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

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

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

(4) Based on the proposed modifications and emission discharge goals presented in the *Modification to Existing Soil Vapor Extraction Containment System at Site 1 – Former Drum Marshaling Area, NWIRP Bethpage, Bethpage NY* (Tetra Tech 2011) and NYSDEC's acceptance of the proposed modifications (Appendix A), treatment of emissions is no longer required.

Table 4
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
2015 Air Emission and Mass Recovery Summary

	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)
Month	**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-15	0.0000	0.0075	0.0000	0.0016	0.0002	0.1359	0.0000	0.0000	0.0002	0.1359	0.0002	0.1262	0.0005	0.4084	1.9642
Feb-15	0.0000	0.0060	0.0000	0.0015	0.0001	0.1003	0.0000	0.0000	0.0001	0.0919	0.0001	0.0919	0.0004	0.2927	1.1755
Mar-15	0.0000	0.0079	0.0000	0.0000	0.0002	0.1119	0.0000	0.0000	0.0002	0.1377	0.0002	0.1549	0.0006	0.4143	1.2814
Apr-15	0.0000	0.0075	0.0000	0.0011	0.0002	0.1394	0.0000	0.0008	0.0002	0.1239	0.0002	0.1239	0.0006	0.3981	0.9395
May-15	0.0000	0.0160	0.0000	0.0026	0.0003	0.2407	0.0000	0.0038	0.0002	0.1605	0.0002	0.1694	0.0008	0.5975	1.0387
Jun-15	0.0000	0.0219	0.0000	0.0031	0.0004	0.3095	0.0000	0.0000	0.0004	0.3171	0.0006	0.4001	0.0015	1.0571	1.2298
Jul-15	0.0000	0.0255	0.0000	0.0059	0.0006	0.4507	0.0000	0.0000	0.0007	0.5272	0.0010	0.7313	0.0024	1.7486	1.7363
Aug-15	0.0000	0.0221	0.0000	0.0061	0.0006	0.4423	0.0000	0.0010	0.0007	0.4915	0.0010	0.7290	0.0023	1.6981	1.7704
Sep-15	0.0000	0.0144	0.0000	0.0039	0.0004	0.2879	0.0000	0.0010	0.0005	0.3839	0.0009	0.6159	0.0018	1.3105	2.1004
Oct-15	0.0000	0.0129	0.0000	0.0030	0.0003	0.2572	0.0000	0.0007	0.0005	0.3515	0.0008	0.6173	0.0017	1.2464	2.6979
Nov-15	0.0000	0.0121	0.0000	0.0000	0.0002	0.1777	0.0000	0.0014	0.0004	0.2585	0.0008	0.5412	0.0014	0.9932	2.7153
Dec-15	0.0000	0.0081	0.0000	0.0000	0.0002	0.1606	0.0000	0.0010	0.0003	0.1944	0.0005	0.3634	0.0010	0.7294	3.3577

	1,1-DCA	1,1-DCE	cis-1,2-DCE	PCE	1,1,1-TCA	TCE	Total VOCs	
Discharge Goal (lb/hr) [1]	**NA**	**NA**	**NA**	**0.04**	**225**	**0.02**		
Discharge Goal (lb/yr) [2]	**NA**	**NA**	**NA**	**350**	**1,971,000**	**175**	**---**	
2015 Totals (lb/yr)	**0.16**	**0.03**	**2.81**	**0.01**	**3.17**	**4.66**	**10.89**	**22.01**

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^3/ft^3 * Eff conc (ug/m3) * (lb/454000000ug) * 60 min/hr * operational time (hrs)

Monthly Mass Recovery = average flowrate (scfm) * (0.3048^3)m^3/ft^3 * Inf avg conc (ug/m^3) * (lb/454000000ug) * 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 2015 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	**10/29/15**	**10/29/15**	**10/29/15**	**10/29/15**	**10/29/15**	**10/29/15**	**10/29/15**	**10/29/15**	**10/29/15**	**10/29/15**	**10/29/15**	**10/29/15**
Analysis by TO-15 (µg/m^3)												
1,1,1-Trichloroethane	2200	22	2.8 J	4.9	3.6 J	30 J	4.0 J	790	30	52	30	ND
1,1-Dichloroethane	42	2.8 J	ND	1.0 J	1.4 J	ND	ND	120	28	30	3.4	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	9.2 J	5.9	ND	9.3	7.3	530	6.6	3600	23	22	4.9	ND
Tetrachloroethene	74	250	6.6	41	210	17000	66	10000	66	130	49	1.4 J
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	49	2.3 J	ND	ND	ND
Trichloroethene	7600	1000	40	180	74	1200	54	2200	240	400	660	ND
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.

µg/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 2015

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
Analysis by TO-15 (µg/m^3)																									
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
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
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
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
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
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
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
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
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

Notes:

µg/m^3 = 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 2015

Sample ID	SVE 101D																								
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
Analysis by TO-15 (µg/m^3)																									
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
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
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
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
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
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
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
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
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

Notes:

µg/m^3 = 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 2015

Sample ID	SVE 102I																								
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	02/05/14	04/10/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15
Analysis by TO-15 (µg/m^3)																									
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
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
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
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
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
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
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
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
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

Notes:

µg/m^3 = 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 2015

Sample ID	SVE 102D																								
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	04/24/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15
Analysis by TO-15 (µg/m^3)																									
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
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
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
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	ND	0.38 J	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
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
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
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
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

Notes:

µg/m^3 = 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 2015

Sample ID	SVE 103I																								
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
Analysis by TO-15 (µg/m^3)																									
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
1,1-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
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
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
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
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
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
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
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

Notes:

µg/m^3 = 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 2015

Sample ID	SVE 103D																								
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
Analysis by TO-15 (µg/m^3)																									
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
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
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
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
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
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
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
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
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

Notes:

µg/m^3 = 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 2015

Sample ID	SVE 104I																								
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	04/24/14	07/29/14	10/02/14	01/12/15	05/07/15	08/12/15	10/29/15
Analysis by TO-15 (µg/m^3)																									
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
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
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
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
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
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
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
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
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

Notes:

µg/m^3 = 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 2015

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
Analysis by TO-15 (µg/m^3)																									
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
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
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	ND	4.3 J	1.0 J	ND	ND	ND	ND	ND	ND
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
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
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
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
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
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

Notes:

µg/m^3 = 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 2015

Sample ID	SVE 105I																								
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
Analysis by TO-15 (µg/m^3)																									
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
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
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
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
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
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
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
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
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

Notes:

µg/m^3 = 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 2015

Sample ID	SVE 105D																								
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	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
Analysis by TO-15 (µg/m^3)																									
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
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
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
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
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
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
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
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
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

Notes:

µg/m^3 = 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 2015

Sample ID	SVE 106I																								
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
Analysis by TO-15 (µg/m^3)																									
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
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
1,1-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
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
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
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
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
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
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

Notes:

µg/m^3 = 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 2015

Sample ID	SVE 106D																								
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
Analysis by TO-15 (µg/m^3)																									
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
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
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
1,2-Dichloroethane	NR	ND	ND	ND	ND	ND	ND	0.6 J	0.7 J	ND	ND	ND	ND	ND	ND	ND	2.5 J	ND	ND	ND	1.1 J	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
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
trans-1,2-Dichloroethene	15	ND	ND	ND	ND	ND	0.6 J	0.8	0.9	ND	ND	ND	ND	ND	ND	ND	1.1 J	ND	ND	ND	ND	ND	ND	ND	ND
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
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

Notes:

µg/m^3 = 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 2015 Off-site Soil Vapor Monitoring of SVPMs

SVPM/ SVEW Location	Vacuum Reading (i.w.)	Valve Position (% open)
Monitoring Date:	***10/29/15***	***10/29/15***
BPS1-SVPM2001S	0.07	--
BPS1-SVPM2001I	0.08	--
BPS1-SVPM2001D	0.01*	--
BPS1-SVPM2002S	0.06	--
BPS1-SVPM2002I	0.12	--
BPS1-SVPM2002D	0.13	--
BPS1-SVPM2003S	0.04	--
BPS1-SVPM2003I	0.04	--
BPS1-SVPM2003D	0.04	--
BPS1-SVPM2004S	0.04	--
BPS1-SVPM2004I	0.06	--
BPS1-SVPM2004D	0.05	--
BPS1-SVPM2006S	0.02	--
BPS1-SVPM2006I	0.02	--
BPS1-SVPM2006D	0.02	--
BPS1-SVPM2007S	0.02	--
BPS1-SVPM2007I	0.01	--
BPS1-SVPM2007D	0.00	--
SV-101I	3.6	40
SV-101D	13.0	50
SV-102I	3.4	40
SV-102D	10.5	50
SV-103I	3.7	40
SV-103D	12.8	40
SV-104I	4.6	40
SV-104D	8.9	40
SV-105I	3.8	40
SV-105D	12.0	50
SV-106I	3.7	40
SV-106D	18.5	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 (i.e. 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 2015

	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*
SVPM/ SVEW Location	**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.) Pre-Vapor Sample Collection**	**Vacuum Reading (i.w.) Post-Vapor Sample Collection**	**Vacuum Reading (i.w.)**	**Vacuum Reading (i.w.)**	**Vacuum Reading (i.w.)**
Monitoring Date:	***10/10/2012***	***12/6/2012***	***1/15/13***	***1/16/13***	***5/29/13***	***8/27/13***	***11/8/13***	***1/29/14***	***1/30/14***	***4/10/14***	***7/29/14***	***8/1/14***	***10/2/14***	***1/13/15***	***1/14/15***	***5/6/15***	***8/12/15***	***10/29/15***
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
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
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*
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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

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 (i.e. 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 9
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 2015

Sample ID	Screening Value [1]	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		01/13/15	01/13/15	01/13/15	1/13/15 - Duplicate	01/13/15	01/13/15	01/13/15	01/13/15	01/13/15	01/13/15	01/13/15	01/13/15	01/13/15	01/13/15	01/13/15	01/13/15	01/14/15	1/14/15 - Duplicate	01/14/15	01/14/15
Analysis by TO-15 (µg/m^3)																					
1,1,1-Trichloroethane	**1,000**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	ND	ND	**180**	ND	ND	ND	ND
Tetrachloroethene	**1,000**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**7.1**	ND	ND	**1.7 J**	ND	ND	**2.3 J**	ND
trans-1,2-Dichloroethene	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2.0 J**	ND	ND	ND	ND
Trichloroethene	**250**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.5 J**	ND	ND	**30**	ND	ND	ND	ND
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^3 = 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 January 2015

Sample ID	Screening Value [2]	SVPM 2001S				SVPM 2001I				SVPM 2001D						SVPM 2002S				SVPM 2002I				
Sample Date		Oct 2008	01/15/13	01/29/14	01/13/15	Oct 2008	01/15/13	01/29/14	01/13/15	Oct 2008	01/15/13	1/15/13 - Duplicate	01/29/14	01/13/15	1/13/15 - Duplicate	Oct 2008	01/15/13	01/29/14	01/13/15	Oct 2008	01/15/13	01/29/14	1/29/14 - Duplicate	01/13/15
Analysis by TO-15 (µg/m^3)																								
1,1,1-Trichloroethane [1]	**1,000**	**1,300**	ND	ND	ND	**1,700**	ND	ND	ND	**1,400**	ND	ND	ND	ND	ND	**21,000**	ND	ND	ND	**52,000**	ND	ND	ND	ND
1,1-Dichloroethane [1]	--	**11**	ND	ND	ND	**29**	ND	ND	ND	**26**	ND	ND	ND	ND	ND	170	ND	ND	ND	**680**	ND	ND	ND	ND
1,1-Dichloroethene [1]	--	**9.2 J**	ND	ND	ND	**16**	ND	ND	ND	**17**	ND	ND	ND	ND	ND	220	ND	ND	ND	**890**	ND	ND	ND	ND
1,2-Dichloroethane [1]	--	ND	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 [1]	--	**20**	ND	ND	ND	**94**	ND	ND	ND	**73**	ND	ND	ND	ND	ND	**49 J**	ND	ND	ND	**170**	ND	ND	ND	ND
Tetrachloroethene [1]	**1,000**	**4,000**	ND	**1.3 J**	ND	**5,000**	ND	**1.9 J**	ND	**720**	ND	ND	**0.53 J**	ND	ND	**420**	ND	**2.2 J**	ND	**740**	ND	**1.8 J**	ND	ND
trans-1,2-Dichloroethene [1]	--	**7.9 J**	ND	ND	ND	**16**	ND	ND	ND	**11**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene [1]	**250**	**1,700**	ND	ND	ND	**2,700**	ND	ND	ND	**1,500**	ND	ND	ND	ND	ND	**34,000**	ND	**1.1 J**	ND	**89,000**	**12**	**1.8 J**	**1.4 J**	ND
Vinyl Chloride [1]	--	NS	ND	ND	ND	NS	ND	ND	ND	NS	ND	ND	ND	ND	ND	NS	ND	ND	ND	NS	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 January 2015

Sample ID	Screening Value [2]	SVPM 2002D				SVPM 2003S				SVPM 2003I				SVPM 2003D				SVPM 2004S				SVPM 2004I				SVPM 2004D			
Sample Date		**Oct 2008**	**01/15/13**	**01/29/14**	**01/13/15**	**Oct 2008**	**01/16/13**	**01/29/14**	**01/13/15**	**Oct 2008**	**01/16/13**	**01/29/14**	**01/13/15**	**Oct 2008**	**01/16/13**	**01/29/14**	**01/13/15**	**Oct 2008**	**01/16/13**	**01/29/14**	**01/13/15**	**Oct 2008**	**01/16/13**	**01/29/14**	**01/13/15**	**Oct 2008**	**01/16/13**	**01/29/14**	**01/13/15**
Analysis by TO-15 (µg/m^3)																													
1,1,1-Trichloroethane [1]	**1,000**	**27,000**	ND	ND	ND	**66**	ND	ND	ND	**170 J**	ND	ND	ND	**720 J**	ND	ND	ND	**1.4**	ND	ND	ND	**460**	ND	ND	ND	**480**	ND	ND	ND
1,1-Dichloroethane [1]	--	**490**	ND	ND	ND	ND	ND	ND	ND	**0.49 J**	ND	ND	ND	**8.6**	ND	ND	ND	ND	ND	ND	ND	**44**	ND	ND	ND	**74**	ND	ND	ND
1,1-Dichloroethene [1]	--	**480**	ND	ND	ND	ND	ND	ND	ND	**2**	ND	ND	ND	**23**	ND	ND	ND	ND	ND	ND	ND	**7.1**	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.25 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene [1]	--	**130**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.6**	ND	ND	ND	ND	ND	ND	ND	**4.6**	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene [1]	**1,000**	**48 J**	ND	**1.8 J**	ND	**19**	**1.6 J**	ND	ND	**14**	**0.97 J**	**1.5 J**	ND	**8.9**	ND	**2.4 J**	ND	**1.8**	**1.0 J**	**1.3 J**	ND	**1,000**	**0.68 J**	**2.9 J**	ND	**580**	**2.3 J**	**1.5 J**	**7.1**
trans-1,2-Dichloroethene [1]	--	ND	ND	ND	ND	ND	**2.3 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**3.9**	ND	ND	ND	ND	ND	ND	ND
Trichloroethene [1]	**250**	**26,000**	ND	ND	ND	**20**	**4.9**	ND	ND	**82**	ND	**0.73 J**	ND	**710**	ND	ND	ND	**1.0**	ND	ND	ND	**550**	ND	**3.7 J**	ND	**600**	ND	**0.80 J**	**1.5 J**
Vinyl Chloride [1]	--	NS	ND	ND	ND	NS	ND	ND	ND	NS	ND	ND	ND	NS	ND	ND	ND	NS	ND	ND	ND	NS	ND	ND	ND	NS	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 January 2015

Sample ID	Screening Value (2)	SVPM 2006S				SVPM 2006I				SVPM 2006D				SVPM 2007S					SVPM 2007I/IR				SVPM 2007D					
Sample Date		Oct 2008	01/16/13	01/30/14	01/13/15	Oct 2008	01/16/13	01/30/14	01/13/15	Oct 2008	01/16/13	01/30/14	01/13/15	Oct 2008	01/16/13	01/30/14	01/14/15	1/14/15 - Duplicate	Oct 2008	01/16/13	01/30/14	01/14/15	Oct 2008	01/16/13	1/16/13 - Duplicate	01/30/14	1/30/14 - Duplicate	01/14/15
Analysis by TO-15 (µg/m^3)																												
1,1,1-Trichloroethane (1)	**1,000**	**12**	ND	ND	ND	**22**	ND	ND	ND	**35**	ND	ND	ND	**150**	ND	ND	ND	ND	**260**	ND	ND	ND	**870**	**1.3 J**	**1.1 J**	ND	ND	ND
1,1-Dichloroethane (1)	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**3.0 J**	ND	ND	ND	ND	ND
1,1-Dichloroethene (1)	--	ND	ND	ND	ND	**0.62**	ND	ND	ND	**1.2**	ND	ND	ND	**0.26 J**	ND	ND	ND	ND	**0.69 J**	ND	ND	ND	**13**	ND	ND	ND	ND	ND
1,2-Dichloroethane (1)	--	ND	ND	ND	ND	ND	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 (1)	--	**4.1**	**5.4**	ND	ND	**45**	**340**	**10**	ND	**89**	**190**	**22**	**180**	ND	**13**	**2.0 J**	ND	ND	ND	ND	ND	ND	ND	**9.8**	**11**	**2.0 J**	ND	ND
Tetrachloroethene (1)	**1,000**	**14**	**1.0 J**	**1.4 J**	ND	**29**	**1.9 J**	**1.5 J**	ND	**11**	**1.4 J**	ND	**1.7 J**	**13**	**1.1 J**	**1.4 J**	ND	ND	**25**	**1.8 J**	ND	**2.3 J**	**5.3 J**	**2.2 J**	**1.8 J**	**1.2 J**	ND	ND
trans-1,2-Dichloroethene (1)	--	ND	ND	ND	ND	**1.4 J**	**4.6**	ND	ND	**2.7**	**2.2 J**	ND	**2.0 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.3 J**	ND	ND	ND	ND
Trichloroethene (1)	**250**	**32**	ND	**0.80 J**	ND	**71**	**47**	**2.9 J**	ND	**61**	**17**	**2.1 J**	**30**	**29**	**5.0**	**2.5 J**	ND	ND	**87**	ND	ND	ND	**400**	**5.5 J**	**2.9 J**	ND	ND	ND
Vinyl Chloride (1)	--	NS	ND	ND	ND	NS	ND	ND	ND	NS	ND	ND	ND	NS	ND	ND	ND	ND	NS	ND	ND	ND	NS	ND	ND	ND	ND	ND

Notes:

µg/m^3 = micrograms per cubic meter

J = Estimated value

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

NS = Not sampled

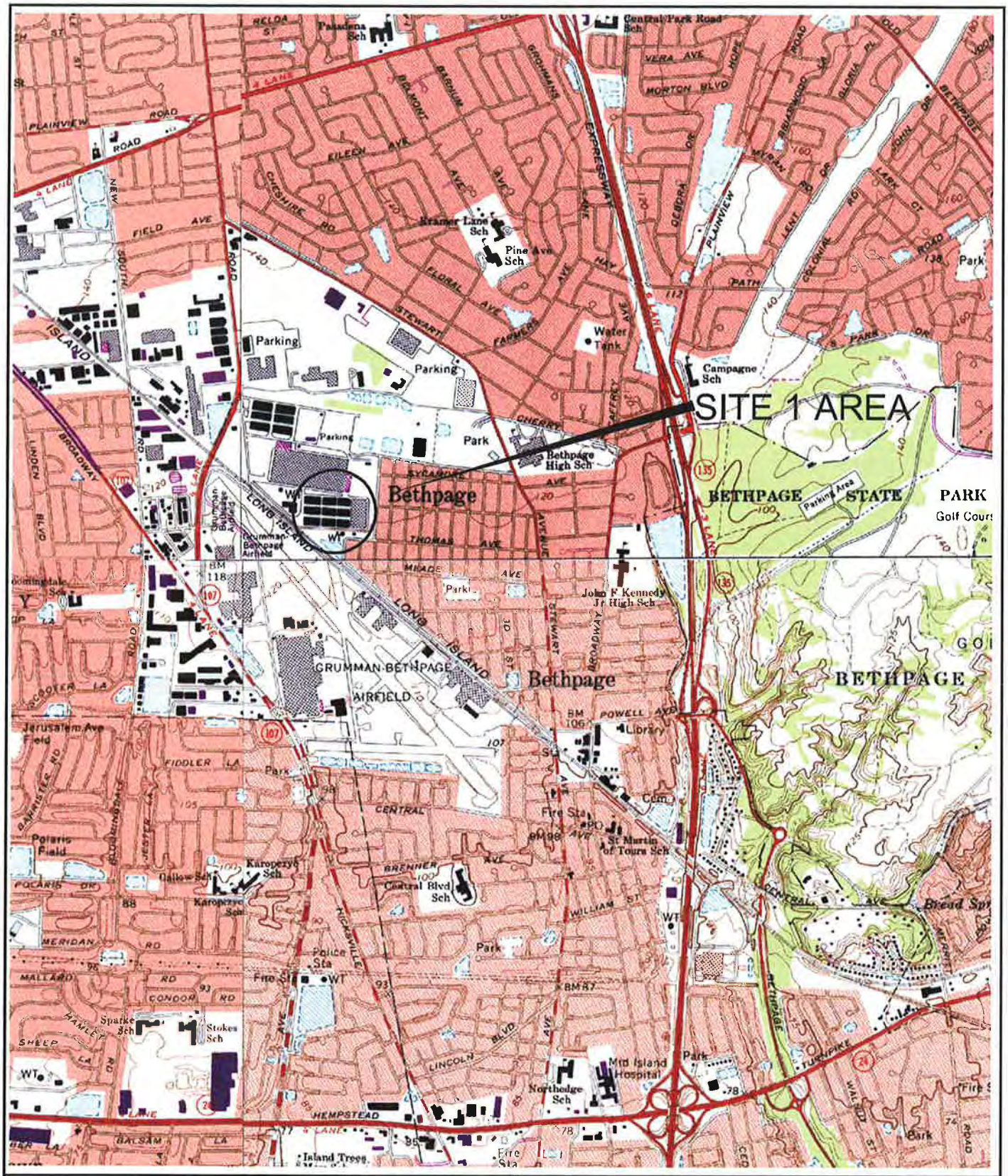
SVPM = soil vapor pressure monitor

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.

FIGURES



Quadrangle Location Map

0 2000 4000 Feet

N

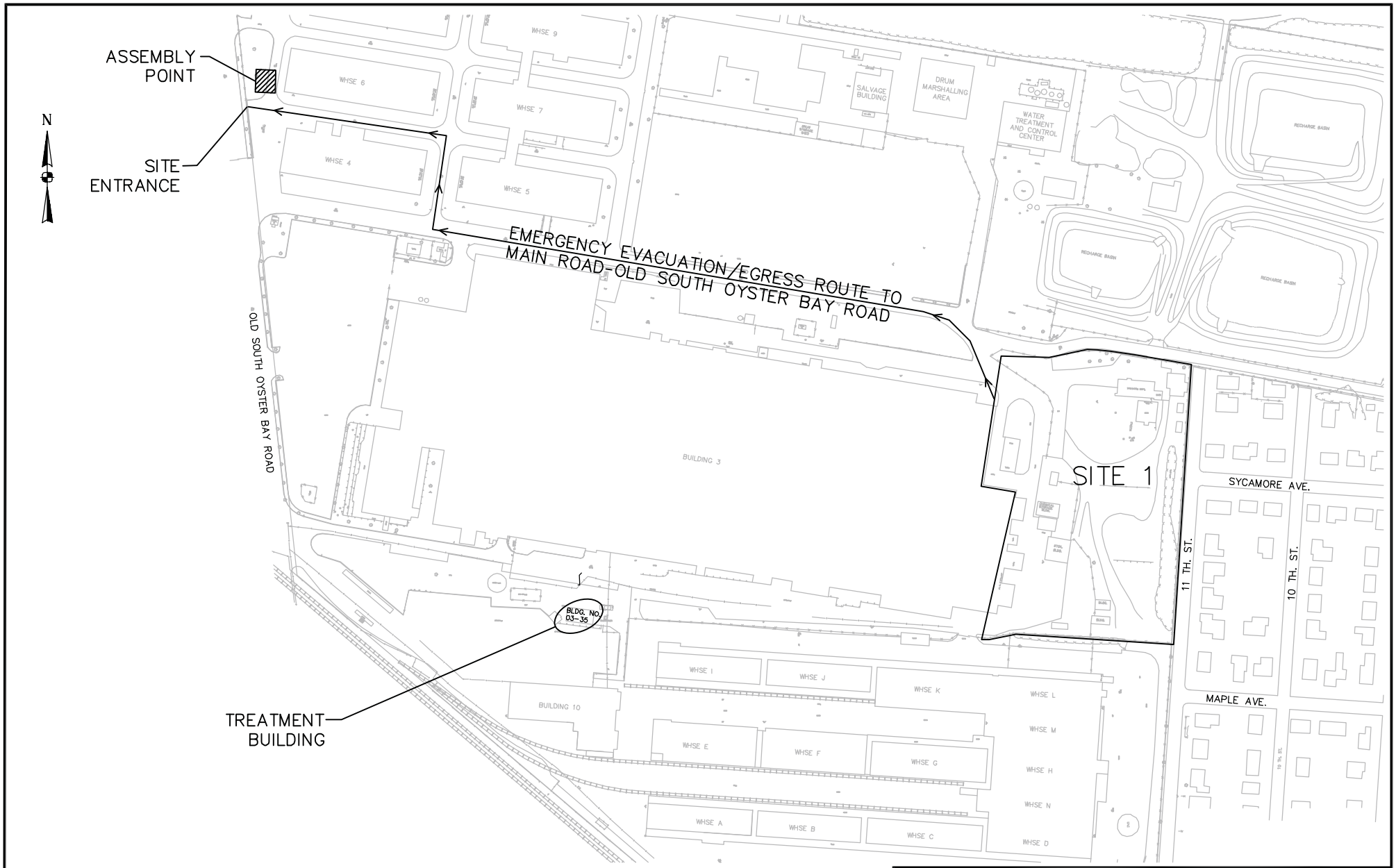
Source: U.S.G.S. Topographic Maps (7.5 Minute)
Amityville, Freeport, Hicksville, Huntington, NY Quadrangles

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

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

Figure 1: Site Location Map

KOMAN Government Solutions, LLC.

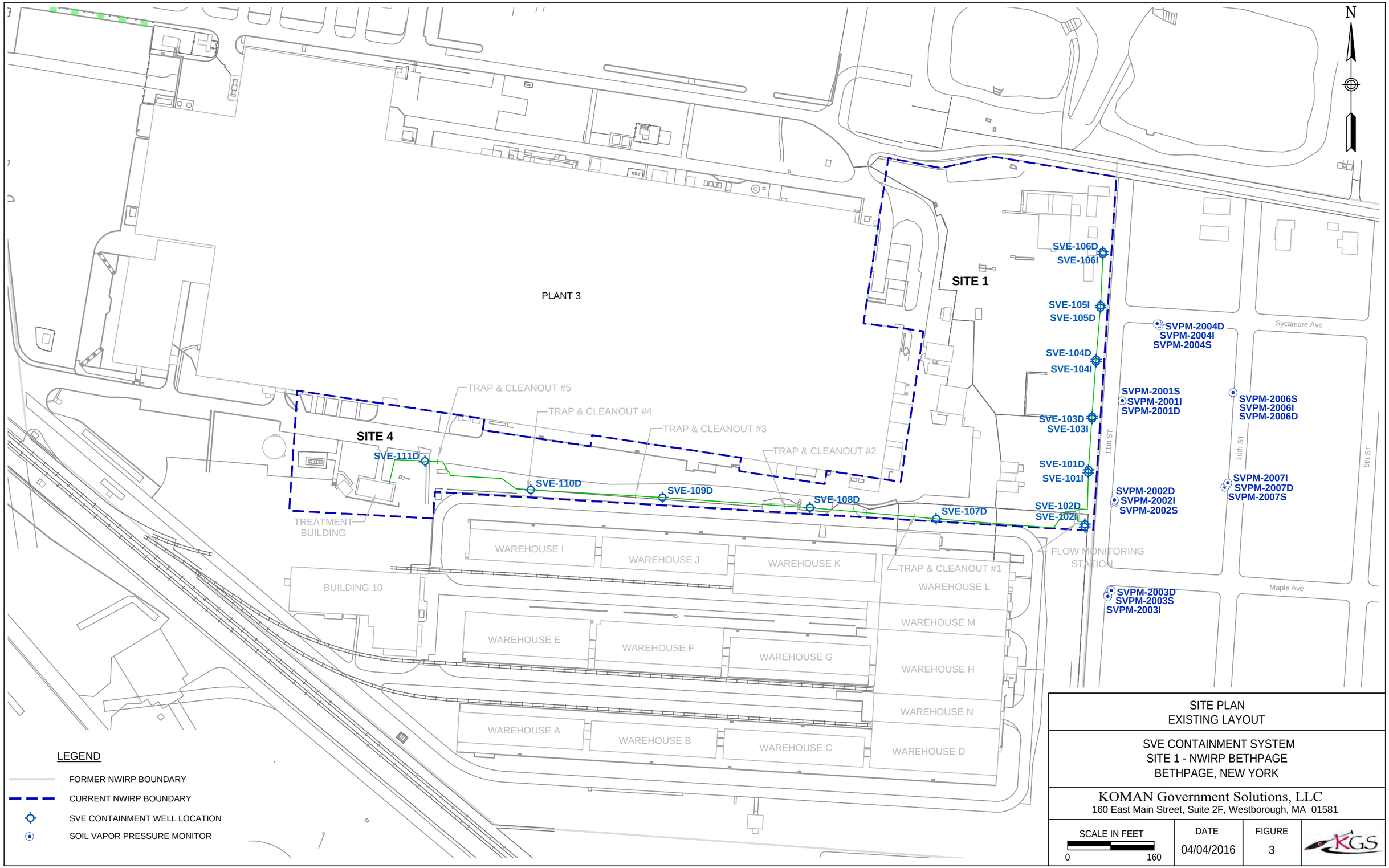


Department of the Navy
Naval Facilities Engineering Command, Mid–Atlantic

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

Figure 2
Site 1 Area and Vicinity

KOMAN Government Solutions, LLC.



SITE PLAN
EXISTING LAYOUT

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

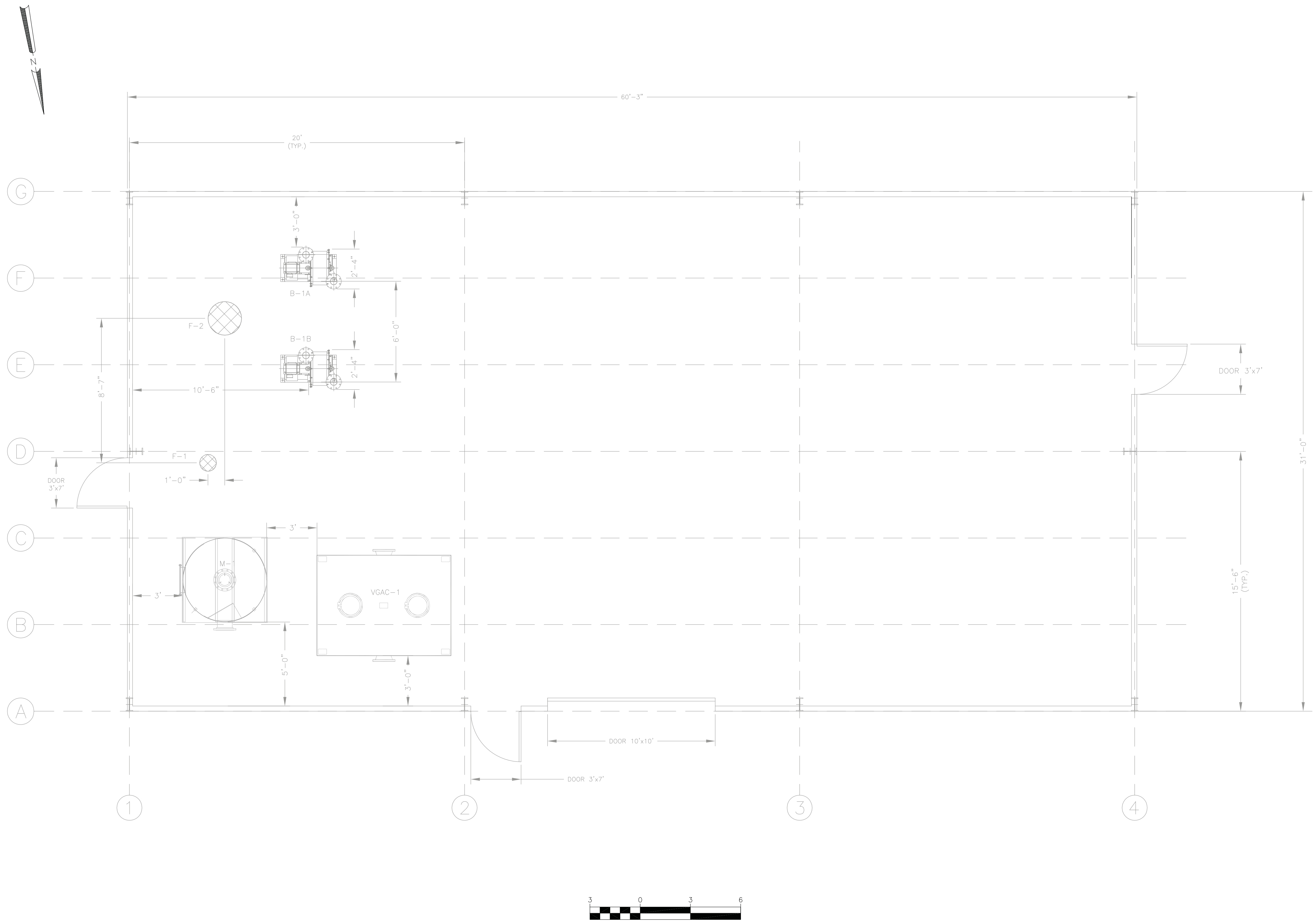
KOMAN Government Solutions, LLC
160 East Main Street, Suite 2F, Westborough, MA 01581

SCALE IN FEET	DATE	FIGURE
0 160	04/04/2016	3

BETHPAGE_SitePlan_Fig3.dwg

NOTES:

1. ALL MAN DOORS AND OVERHEAD DOORS ARE EXISTING. MAN DOORS ARE APPROXIMATELY 7'X3'. OVERHEAD DOOR IS APPROXIMATELY 10'X10'.



PROCESS EQUIPMENT LIST		
ITEM NUMBER	NUMBER REQUIRED	NAME/DESCRIPTION
M-1	1	MOISTURE SEPARATOR -CONFIGURATION: VERTICAL, CYLINDRICAL -MATERIAL OF CONSTRUCTION: CARBON STEEL, EPOXY INTERIOR COATING, PAINT EXTERIOR COATING -CAPACITY: 400 GALLON CONDENSATE COLLECTION -DIMENSIONS: 5 FT DIA X 6 FEET HT, 718 GALLON
F-1	1	MAKE-UP AIR FILTER -CONFIGURATION: INTAKE FILTER/SILENCER COMBINATION HOUSING -MATERIAL OF CONSTRUCTION: CARBON STEEL, CORROSION RESISTANCE COATING -CAPACITY: 500 CFM AT 20 IW, 4 INCH FLANGED CONNECTION
F-2	1	BLOWER AIR FILTER -CONFIGURATION: INLINE VACUUM SERVICE FILTER -MATERIAL OF CONSTRUCTION: CARBON STEEL, CORROSION RESISTANCE COATING -CAPACITY: 1,200 CFM AT 35 IW, 10 INCH FLANGED CONNECTION
B-1A, B-1B	2	SOIL VAPOR EXTRACTION BLOWER -CONFIGURATION: HORIZONTAL CENTRIFUGAL -RATING: 600 CFM AT 40 IW -MOTOR: 7.5 HP, 460V, 3PH, 60HZ, ODP
VGAC-1	1	VAPOR-PHASE GRANULAR ACTIVATED CARBON -CONFIGURATION: RECTANGULAR TANK -MATERIAL OF CONSTRUCTION: CARBON STEEL, EPOXY INTERIOR COATING, EPOXY EXTERIOR COATING -RATING: 1,600 CFM AT 3 IW, 2,000 CFM AT 6 IW -CAPACITY: 5,000 LBS CARBON -DIMENSIONS: 6' X 8' FOOTPRINT, 6' 8" HT

TETRA TECH ENGINEERING CORPORATION PC

DSGN: BK | DR: BMV | CHK: SP
SUPV: | CH ENG:
SUBMITTED BY: (FIRM MEMBER) (TITLE) (DATE)
SOUTHWESTDIV DM: HD: HD: FPE: DIR:
OFFICER IN CHARGE
APPROVED DATE

REV	DESCRIPTION	PREP BY	DATE	APPRVD
0	ISSUED FOR CONSTRUCTION	DLB	10-14-09	SGP

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND, MID-ATLANTIC
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

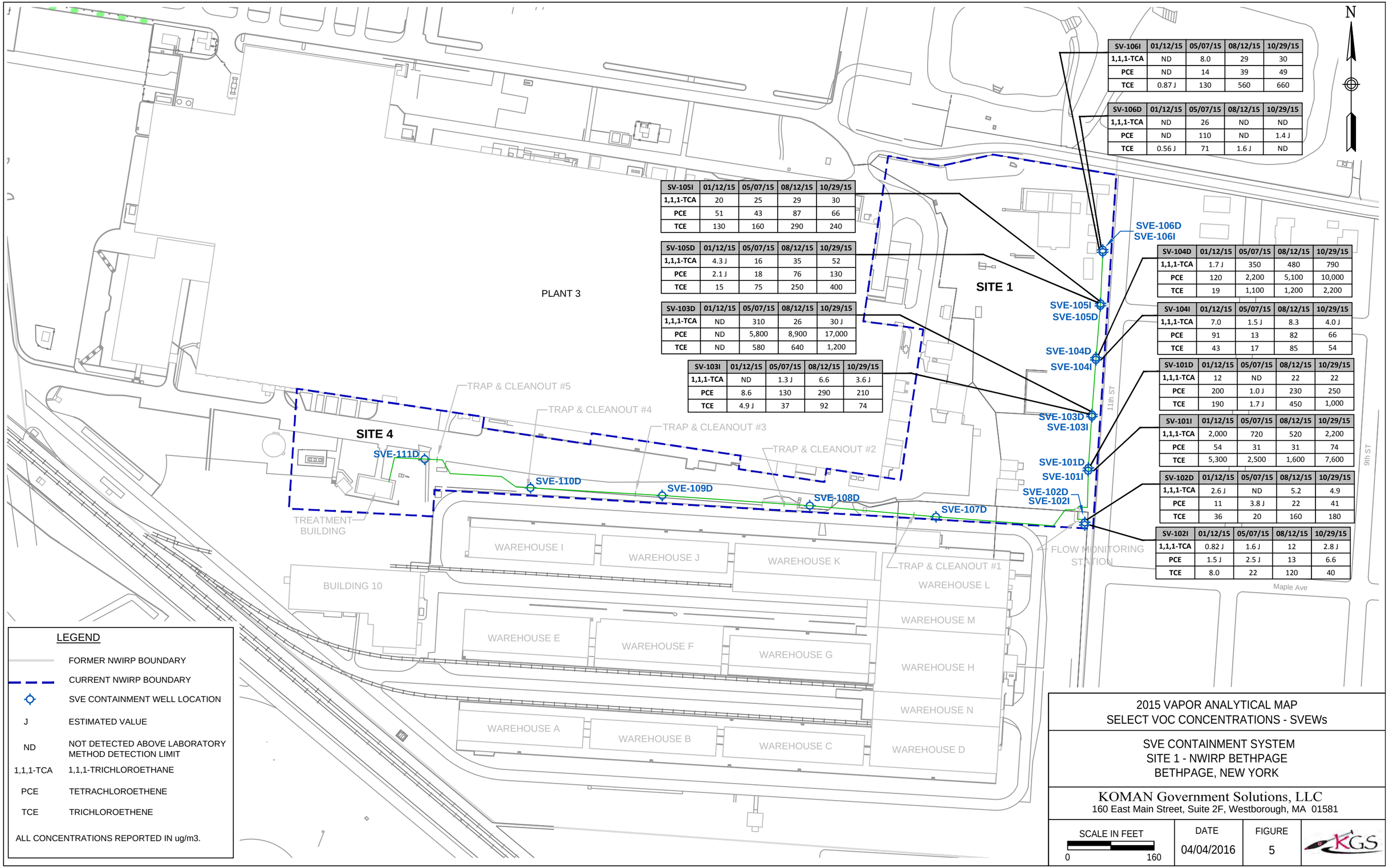
SITE 1, FORMER DRUM MARSHALLING AREA SOIL VAPOR EXTRACTION CONTAINMENT SYSTEM LAYOUT PLAN

APPROVED DATE EFANE FOR COMMANDER, NAVFAC

SEAL AREA

THIS DRAWING PRODUCED ON AUTOCAD DO NOT REVISE MANUALLY

SAT TO DATE
CODE I.D. NO.
SCALE : AS SHOWN
SPEC. NO.
CONSTRN. CONTR. NO. N62473-10-D-3211
NAVFAC DRAWING NO. Figure 4
SHEET OF
SIZE: D
DIS. SH. NO. 1-3



SV-106I	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	ND	8.0	29	30
PCE	ND	14	39	49
TCE	0.87 J	130	560	660

SV-106D	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	ND	26	ND	ND
PCE	ND	110	ND	1.4 J
TCE	0.56 J	71	1.6 J	ND

SV-105I	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	20	25	29	30
PCE	51	43	87	66
TCE	130	160	290	240

SV-105D	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	4.3 J	16	35	52
PCE	2.1 J	18	76	130
TCE	15	75	250	400

SV-103D	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	ND	310	26	30 J
PCE	ND	5,800	8,900	17,000
TCE	ND	580	640	1,200

SV-103I	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	ND	1.3 J	6.6	3.6 J
PCE	8.6	130	290	210
TCE	4.9 J	37	92	74

SV-104D	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	1.7 J	350	480	790
PCE	120	2,200	5,100	10,000
TCE	19	1,100	1,200	2,200

SV-104I	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	7.0	1.5 J	8.3	4.0 J
PCE	91	13	82	66
TCE	43	17	85	54

SV-101D	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	12	ND	22	22
PCE	200	1.0 J	230	250
TCE	190	1.7 J	450	1,000

SV-101I	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	2,000	720	520	2,200
PCE	54	31	31	74
TCE	5,300	2,500	1,600	7,600

SV-102D	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	2.6 J	ND	5.2	4.9
PCE	11	3.8 J	22	41
TCE	36	20	160	180

SV-102I	01/12/15	05/07/15	08/12/15	10/29/15
1,1,1-TCA	0.82 J	1.6 J	12	2.8 J
PCE	1.5 J	2.5 J	13	6.6
TCE	8.0	22	120	40

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.

2015 VAPOR ANALYTICAL MAP
SELECT VOC CONCENTRATIONS - SVEWs

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

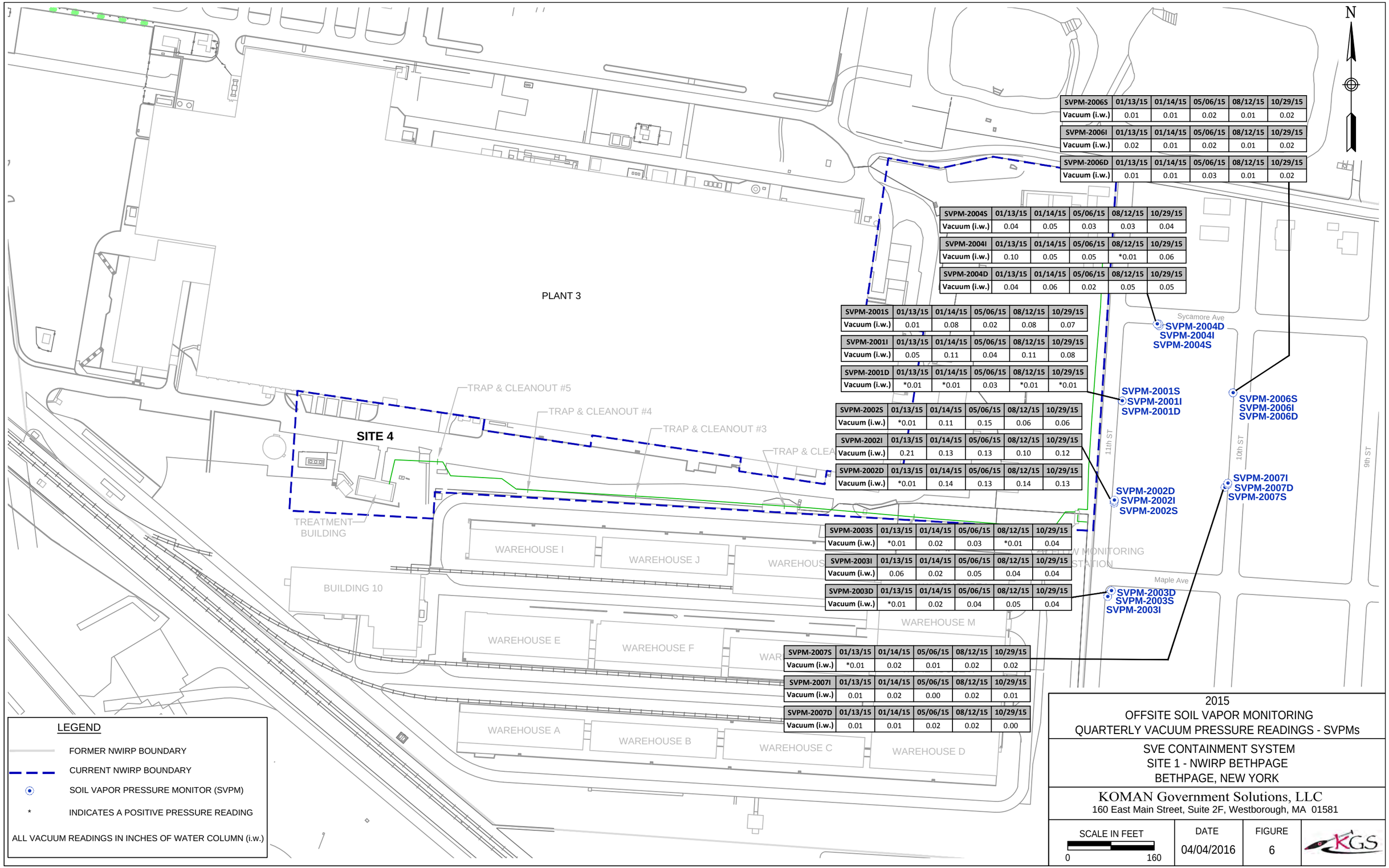
KOMAN Government Solutions, LLC
160 East Main Street, Suite 2F, Westborough, MA 01581

SCALE IN FEET: 0 — 160

DATE: 04/04/2016

FIGURE: 5

BETHPAGE_4Q15_VOC_SVEWs_Fig5.dwg



SVPM-2006S	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.01	0.01	0.02	0.01	0.02

SVPM-2006I	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.02	0.01	0.02	0.01	0.02

SVPM-2006D	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.01	0.01	0.03	0.01	0.02

SVPM-2004S	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.04	0.05	0.03	0.03	0.04

SVPM-2004I	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.10	0.05	0.05	*0.01	0.06

SVPM-2004D	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.04	0.06	0.02	0.05	0.05

SVPM-2001S	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.01	0.08	0.02	0.08	0.07

SVPM-2001I	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.05	0.11	0.04	0.11	0.08

SVPM-2001D	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	*0.01	*0.01	0.03	*0.01	*0.01

SVPM-2002S	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	*0.01	0.11	0.15	0.06	0.06

SVPM-2002I	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.21	0.13	0.13	0.10	0.12

SVPM-2002D	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	*0.01	0.14	0.13	0.14	0.13

SVPM-2003S	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	*0.01	0.02	0.03	*0.01	0.04

SVPM-2003I	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.06	0.02	0.05	0.04	0.04

SVPM-2003D	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	*0.01	0.02	0.04	0.05	0.04

SVPM-2007S	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	*0.01	0.02	0.01	0.02	0.02

SVPM-2007I	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.01	0.02	0.00	0.02	0.01

SVPM-2007D	01/13/15	01/14/15	05/06/15	08/12/15	10/29/15
Vacuum (i.w.)	0.01	0.01	0.02	0.02	0.00

LEGEND

- FORMER NWIRP BOUNDARY
- CURRENT NWIRP BOUNDARY
- SOIL VAPOR PRESSURE MONITOR (SVPM)
- * INDICATES A POSITIVE PRESSURE READING

ALL VACUUM READINGS IN INCHES OF WATER COLUMN (i.w.)

2015
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	DATE	FIGURE	
0 160	04/04/2016	6	KGS

BETHPAGE_4Q15_VAC_SVPM_Fig6.dwg

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; David.Brayack@ttnus.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
FOIlable
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 ($\mu g/m^3$)		Current Discharge Goal (pound/hour)[3]
	Concentration ($\mu g/m^3$)[1]	Loading (pound/ hour)[1]	Concentration ($\mu g/m^3$)	Loading (pound/ hour)[2]	
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

(1) 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.
(2) Calculated using a flow rate of 400 CFM.
(3) 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 ($\mu g/m^3$)	Loading (pounds/ hour)		Concentration at 500 CFM ($\mu g/m^3$)	Loading (pounds/ hour)
TCA	868	0.0009	0.0004	None[1]	225
TCE	4,170	0.0039	19.4	11,000	0.02
PCE	5,780	0.0057	14.2	22,000	0.04

(1) Greater than 100,000 $\mu g/m^3$.
AGC - Annual Guideline Concentration

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

Website: 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
ec/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-OU1-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 / /

State Facility Certification

I certify that this facility will be operated in conformance with all provisions of existing regulations.

Responsible Official	Title
Signature	Date / /

Section II - Identification Information

Title V Facility Permit N/A
☐ New ☐ Significant Modification ☐ Administrative Amendment
☐ Renewal ☐ Minor Modification General Permit Title:

State Facility Permit N/A
☐ New ☐ Modification
General Permit Title:

☒ Application involves construction of new facility ☐ Application involves construction of new emission unit(s)

Owner/Firm

Name US Navy / NAVFAC Midlant
Street Address 9742 Maryland Ave, Bldg Z-144
City Norfolk | State VA | Country US | Zip 23511-3095
Owner Classification ☒ Federal ☐ State ☐ Municipal ☐ Corporation/Partnership ☐ Individual | Taxpayer ID

Facility ☐ Confidential

Name Naval Weapons Industrial Reserve Plant (NWIRP) Site 1
Location Address Bethpage
☐ City / ☒ Town / ☐ Village Oyster Bay, New York | Zip 11714

Project Description ☐ Continuation Sheet(s)

Vapor phase granular activated carbon to remove VOCs from soil gas

Owner/Firm Contact Mailing Address

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

Facility Contact Mailing Address

Name (Last, First, Middle Initial) | Phone No. ( )
Affiliation | Title | Fax No. ( )
Street Address
City | State | Country | Zip

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
- -

Section III - Facility Information

Classification					
❑ Hospital	❑ Residential	❑ Educational/Institutional	❑ Commercial	☒ Industrial	❑ Utility

Affected States (Title V Only) N/A				
❑ Vermont	❑ Massachusetts	❑ Rhode Island	❑ Pennsylvania	Tribal Land:
❑ New Hampshire	❑ Connecticut	❑ New Jersey	❑ Ohio	Tribal Land:

SIC Codes												
9999												

Facility Description	❑ Continuation Sheet(s)
Soil vapor remediation by SVE followed by vaper phase GAC	

Compliance Statements (Title V Only) N/A

I certify that as of the date of this application the facility is in compliance with all applicable requirements: ❑ YES ❑ NO

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 in compliance with all applicable requirements complete the following:

- ❑ 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.
- ❑ 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.
- ❑ 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.

Facility Applicable Federal Requirements N/A ❑ Continuation Sheet(s)

Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause

Facility State Only Requirements ❑ Continuation Sheet(s)

Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause

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Section III - Facility Information (continued)

Facility Compliance Certification N/A ❑ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause

❑ Applicable Federal Requirement ❑ State Only Requirement	❑ Capping	CAS No.	Contaminant Name
		- -	

Monitoring Information

❑ Ambient Air Monitoring ❑ Work Practice Involving Specific Operations ❑ Record Keeping/Maintenance Procedures

Description

Work Practice Type	Process Material Code	Process Material Description	Reference Test Method

Parameter Code	Parameter Description	Manufacturer Name/Model No.

Limit Upper	Limit Lower	Limit Units Code	Limit Units Description

Averaging Method Code	Averaging Method Description	Monitoring Frequency Code	Monitoring Frequency Description	Reporting Requirements Code	Reporting Requirements Description

Facility Emissions Summary ☒ Continuation Sheet(s)

CAS No.	Contaminant Name	PTE (lbs/yr)	PTE Range Code	Actual (lbs/yr)
NY075 - 00 - 5	PM-10			
NY075 - 00 - 0	PARTICULATES			
7446 - 09 - 5	SULFUR DIOXIDE			
NY210 - 00 - 0	OXIDES OF NITROGEN			
630 - 08 - 0	CARBON MONOXIDE			
7439 - 92 - 1	LEAD			
NY998 - 00 - 0	VOC	1,222		
NY100 - 00 - 0	HAP	1,813		
00071 - 55 - 6	1,1,1-Trichloroethane (Methyl Chloroform)	591		
00127 - 18 - 4	Tetrachloroethylene	8		
00079 - 01 - 6	Trichloroethylene	1,181		
00075 - 34 - 3	1,1-Dichloroethane	11		
00075 - 35 - 4	1,1-Dichloroethylene (Vinylidine Chloride)	16		

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Section III - Facility Information

Facility Emissions Summary (continuation)

CAS No.	Contaminant Name	PTE (lbs/yr)	PTE Range Code	Actual (lbs/yr)
00540-59-0	cis-1,2-Dichloroethene	5		
00107-06-2	1,2-Dichloroethane	0		
00156-60-5	trans-1,2-Dichloroethene	0		
00075-01-4	Vinyl Chloride	0		
- -				
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Section IV - Emission Unit Information

Emission Unit Description ☐ Continuation Sheet(s)

EMISSION UNIT: 1-00EU1 Effluent from first soil vapor extraction blower (BL-1)

Vapor Phase Granular Activated Carbon Unit. The emission point is stack 00ST-2

Building ☐ Continuation Sheet(s)

Building	Building Name	Length (ft)	Width (ft)	Orientation
03-35	Treatment Building	60	40	0

Emission Point ☐ Continuation Sheet(s)

EMISSION PT.: 00ST2

Ground Elev. (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section Length (in)	Cross Section Width (in)
	36	6	8	70		

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)	Cross Section 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 ☐ Continuation Sheet(s)

Emission Source ID	Emission Source Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.
BL 1/2	1				048	Granular Act. Carbon	Tetrasolv Filtration

Design Capacity	Design Capacity Units Code	Design Capacity Units Description	Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description

Emission Source ID	Emission Source Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.

Design Capacity	Design Capacity Units Code	Design Capacity Units Description	Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description

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Section IV - Emission Unit Information (continued)

Process Information

☐ Continuation Sheet(s)

EMISSION UNIT 1-00EU1 PROCESS SVE

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

☐ Confidential
☒ Operating at Maximum Capacity
☐ 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 - PROCESS

Description

Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units	
	Quantity/Hr	Quantity/Yr	Code	Description

☐ Confidential
☐ Operating at Maximum Capacity
☐ 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 ❑ 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 ❑ Continuation Sheet(s)									
				Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause
-													
-													
-													
-													

Emission Unit Compliance Certification ❑ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause
6	NYCRR	212							

❑ Applicable Federal Requirement ❑ State Only Requirement ❑ Capping

Emission Unit	Emission Point	Process	Emission Source	CAS No.	Contaminant Name
1-00EU1	00ST2	SVE		00079-01-6	Trichloroethylene

Monitoring Information

- ❑ Continuous Emission Monitoring
- [X] Intermittent Emission Testing
- ❑ Ambient Air Monitoring
- ❑ Monitoring of Process or Control Device Parameters as Surrogate
- ❑ Work Practice Involving Specific Operations
- ❑ Record Keeping/Maintenance Procedures

Description

Monthly grab samples analyzed for VOCs from the VGAC unit influent and effluent

Work Practice Type	Process Material Code	Process Material Description	Reference Test Method

Parameter Code	Parameter Description	Manufacturer Name/Model No.
23	Concentration	

Limit Upper	Limit Lower	Limit Units Code	Limit Units Description
36,000		255	micrograms per cubic meter

Averaging Method Code	Averaging Method Description	Monitoring Frequency Code	Monitoring Frequency Description	Reporting Requirements Code	Reporting Requirements 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) N/A ❑ 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	❑ Applicable Federal Requirement ❑ 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	❑ Applicable Federal Requirement ❑ State Only Requirement
-				

Description

Process Emissions Summary ☒ Continuation Sheet(s)

EMISSION UNIT	1-00EU1				PROCESS	S V E
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 (lbs/hr)	PTE (lbs/yr)	PTE (standard units)	Standard Units	PTE How Determined	Actual (lbs/hr)	Actual (lbs/yr)
0.07	591			02		

EMISSION UNIT	1-00EU1				PROCESS	S V E
CAS No.	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined
00127-18-4	Tetrachloroethylene			80	0.00	02

PTE (lbs/hr)	PTE (lbs/yr)	PTE (standard units)	Standard Units	PTE How Determined	Actual (lbs/hr)	Actual (lbs/yr)
~~0.00~~ BRT	8			02		

EMISSION UNIT	1-00EU1				PROCESS	S V E
CAS No.	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined
00079-01-6	Trichloroethylene			80	0.67	02

PTE (lbs/hr)	PTE (lbs/yr)	PTE (standard units)	Standard Units	PTE How Determined	Actual (lbs/hr)	Actual (lbs/yr)
0.13	1,181			02		

New York State Department of Environmental Conservation
Air Permit Application

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Section IV - Emission Unit Information (continued)

EMISSION UNIT	Emission Unit Emissions Summary			☒ Continuation Sheet(s)
1-00EU1				
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 (Vinylidine 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-Dichloroethene			
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 ☐ Continuation Sheet(s)

For any emission units which are not in compliance 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

New York State Department of Environmental Conservation
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Section IV - Emission Unit Information

EMISSION UNIT	Emission Unit Emissions Summary (continuation)			
1 - 0 0 E U 1				
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

❑ Continuation Sheet(s)

EMISSION UNIT -

Emission Reduction Description

Contaminant Emission Reduction Data

Baseline Period ___/___/___ to ___/___/___

CAS No.	Contaminant Name	Reduction Date	Reduction Method	ERC (lbs/yr) Netting	ERC (lbs/yr) Offset
- -		/ /			
- -					
- -					

Facility to Use Future Reduction

Name | APPLICATION ID - - /

Location Address

❑ City / ❑ Town / ❑ Village | State | Zip

Use of Emission Reduction Credits

❑ Continuation Sheet(s)

EMISSION UNIT -

Proposed Project Description

Contaminant Emissions Increase Data

CAS No.	Contaminant Name	PEP (lbs/yr)
- -		

Statement of Compliance

❑ 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

❑ City / ❑ Town / ❑ Village | State | Zip

Emission Unit	CAS No.	Contaminant Name	ERC (lbs/yr) Netting	ERC (lbs/yr) Offset
-	- -			
-	- -			
-	- -			

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

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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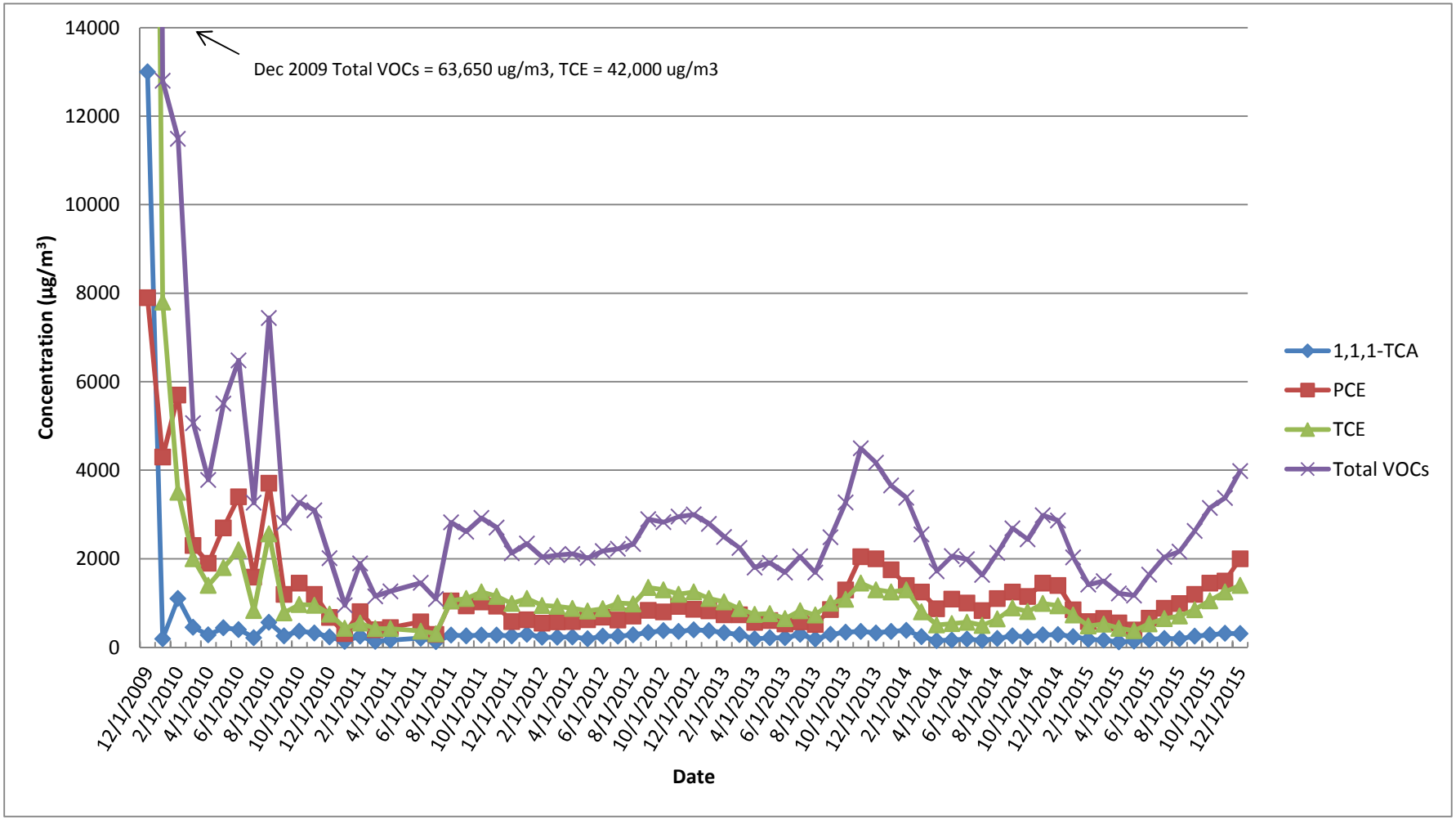
APPENDIX B

VAPOR CONCENTRATION TREND GRAPHS

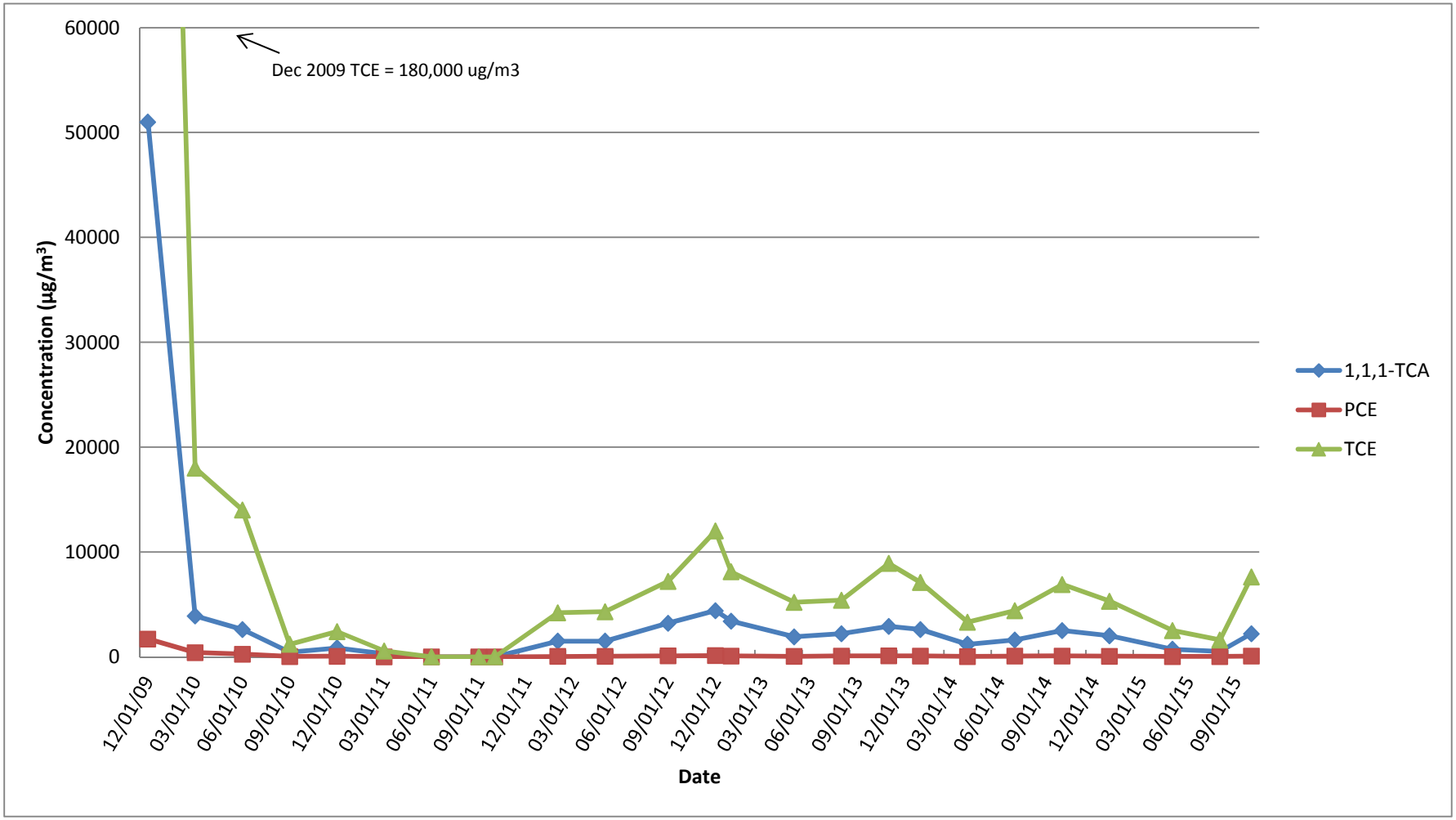
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Vapor Concentration Trends of Select and Total VOCs

COMBINED INFLUENT



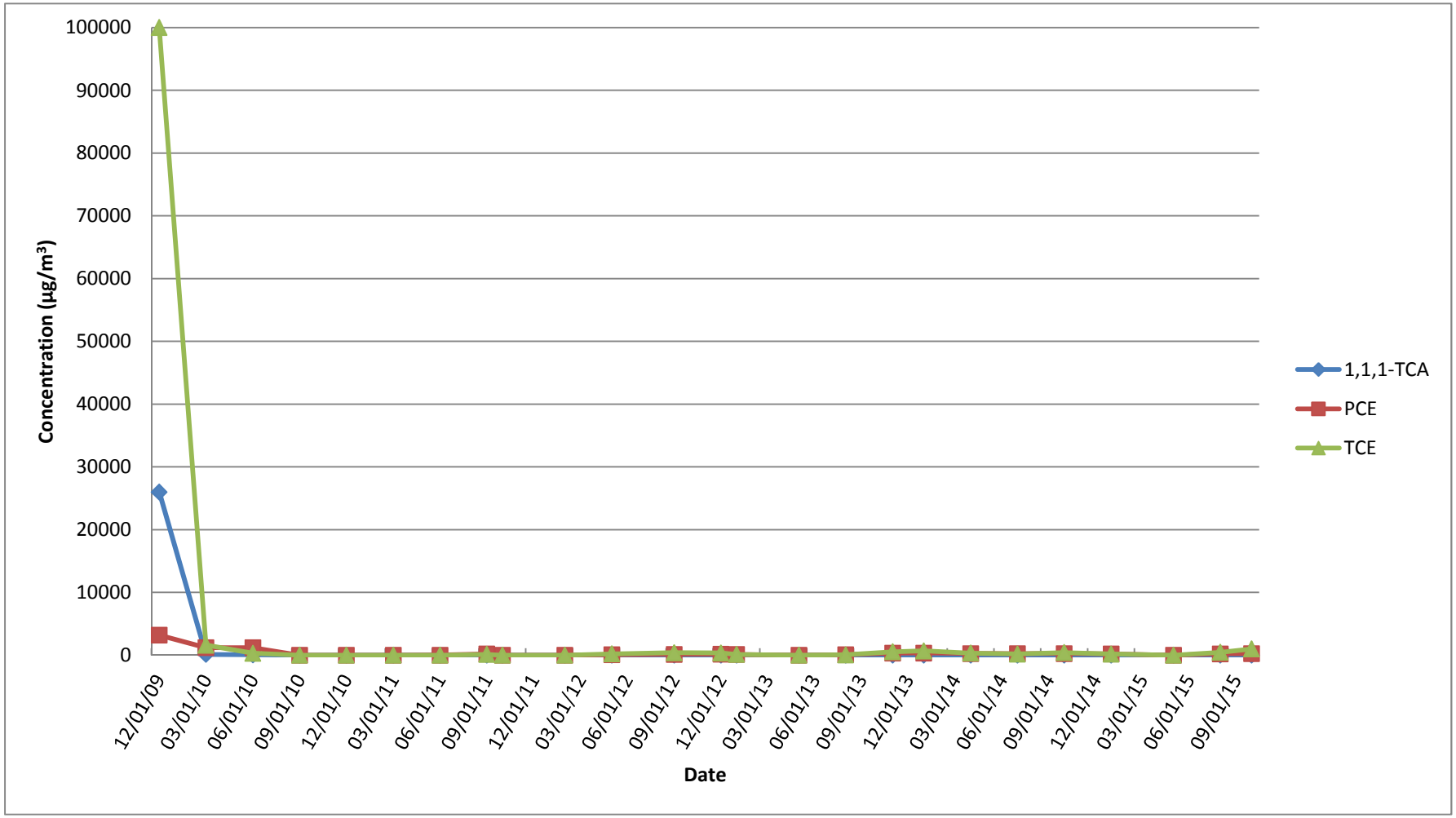
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Concentration Trends of Select VOCs

SV-101I



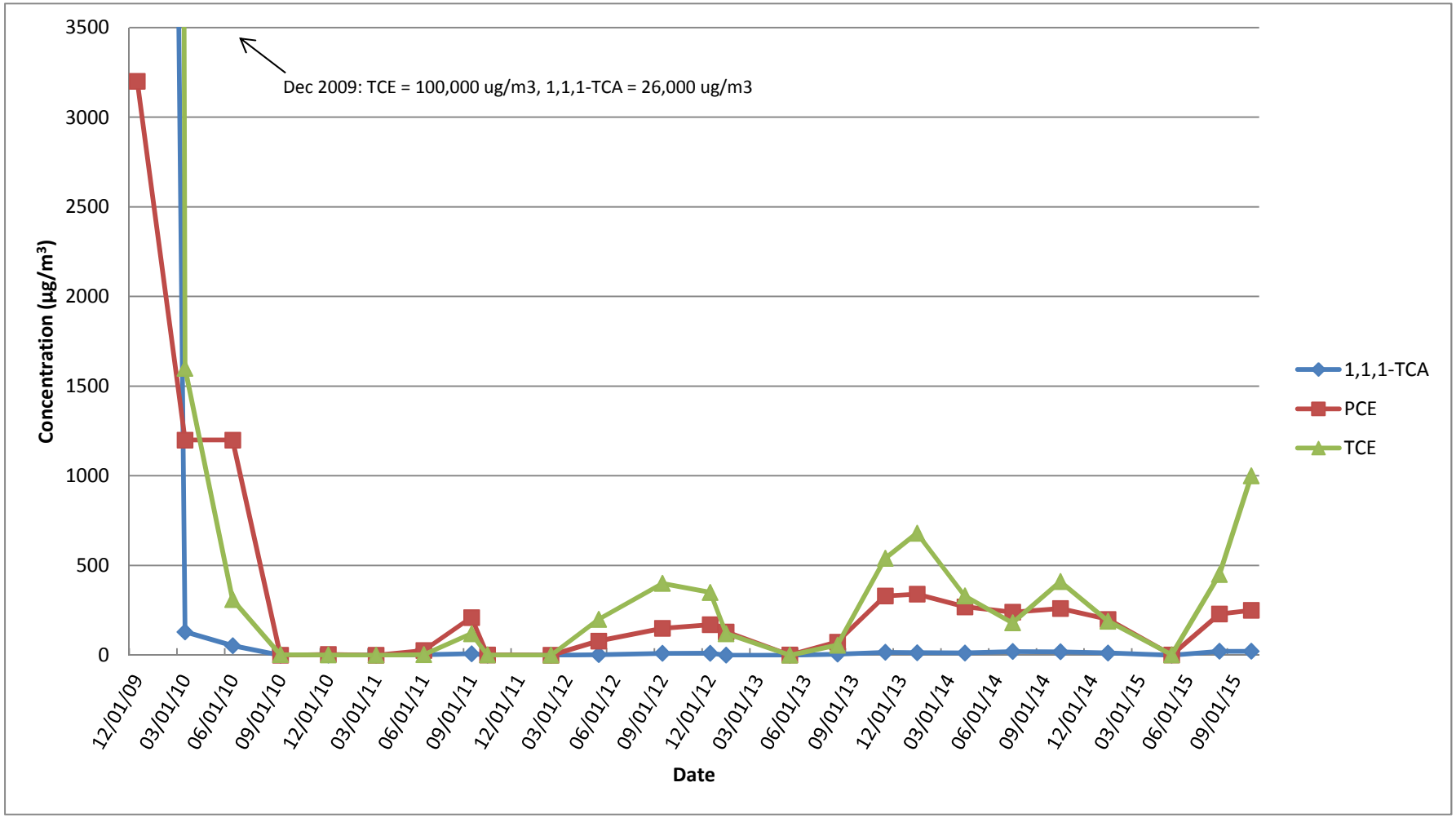
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Concentration Trends of Select VOCs

SV-101D



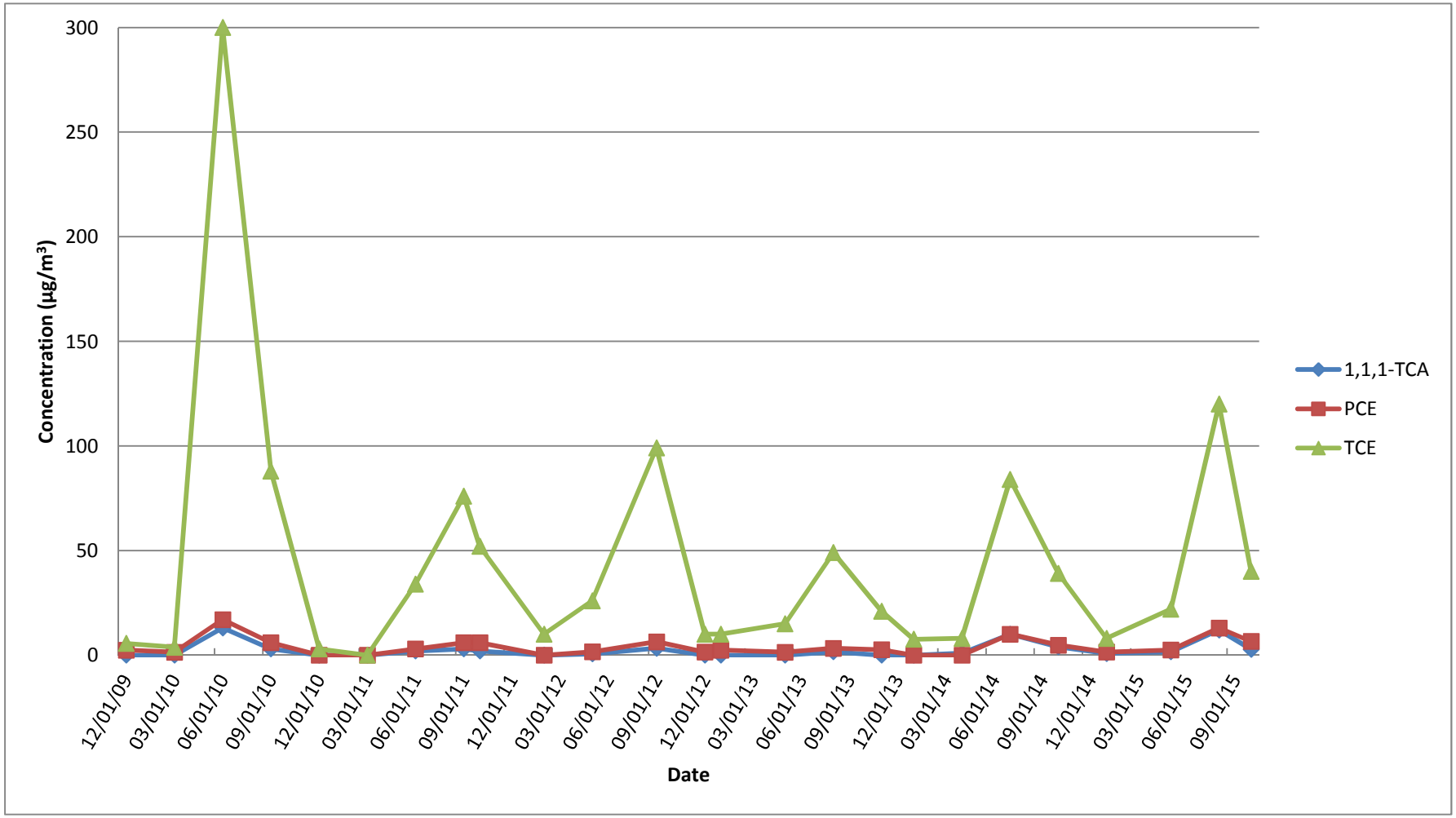
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Concentration Trends of Select VOCs

SV-101D (smaller scale)



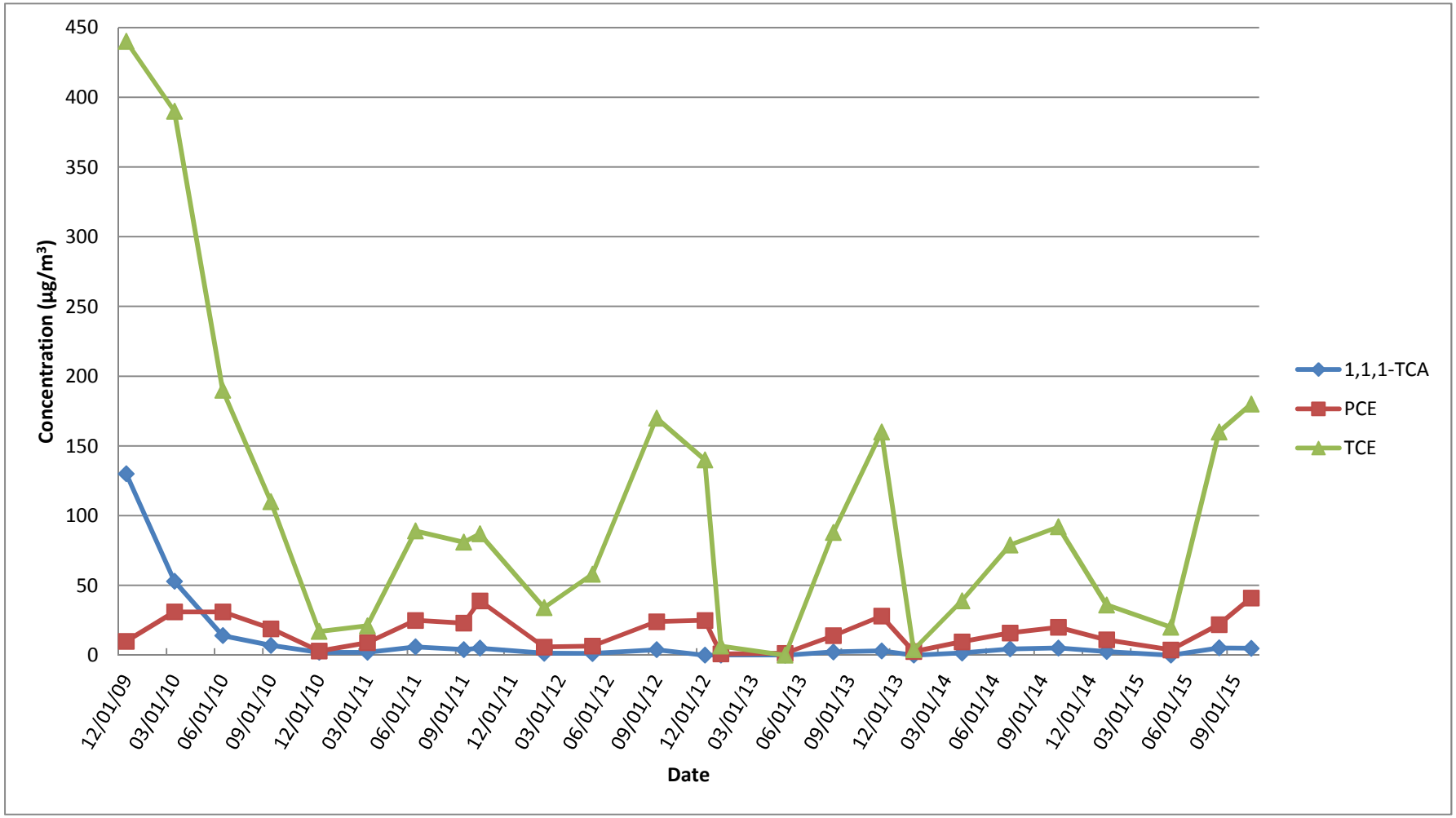
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Concentration Trends of Select VOCs

SV102I



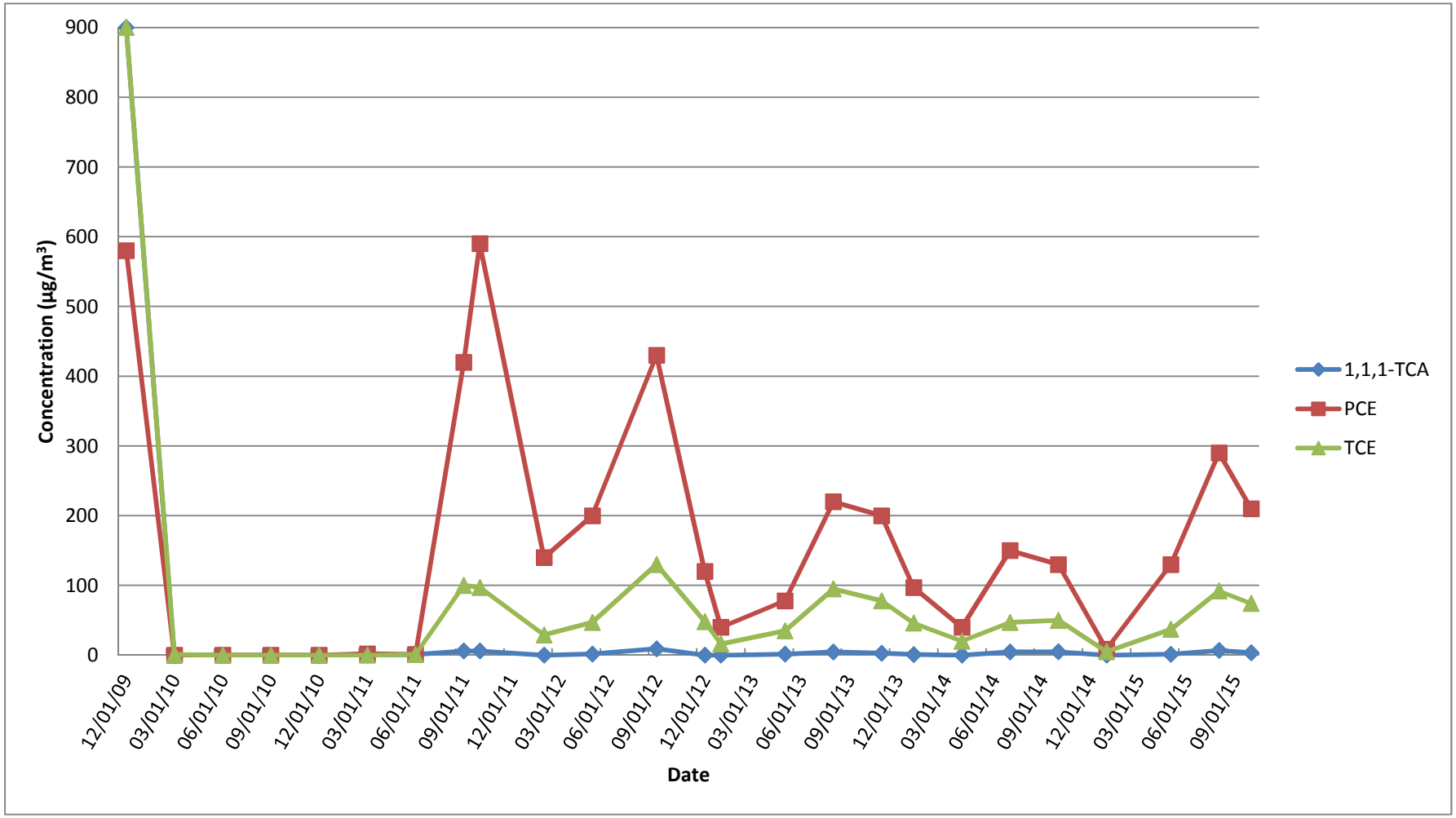
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Concentration Trends of Select VOCs

SV-102D



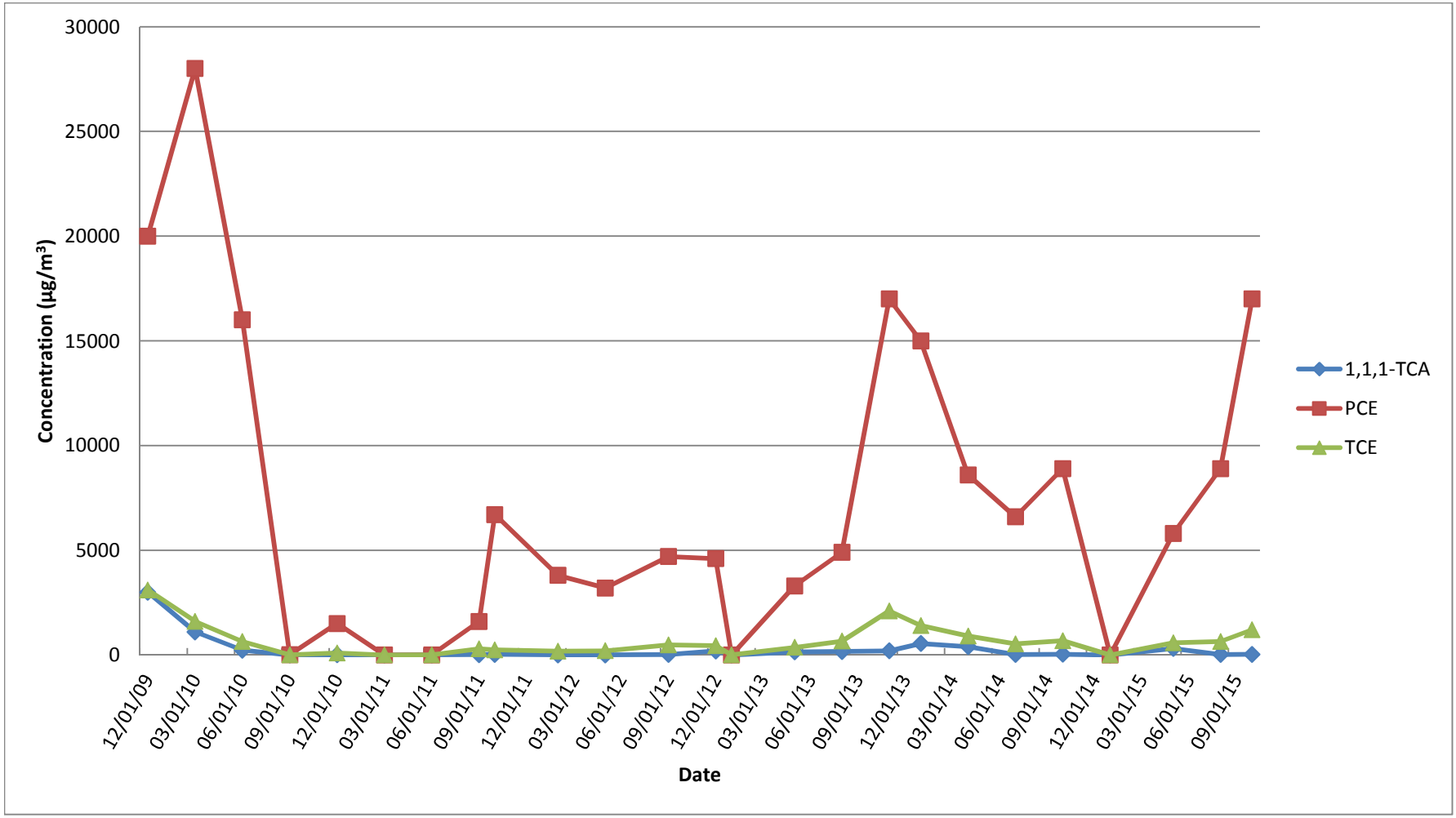
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Concentration Trends of Select VOCs

SV-103I



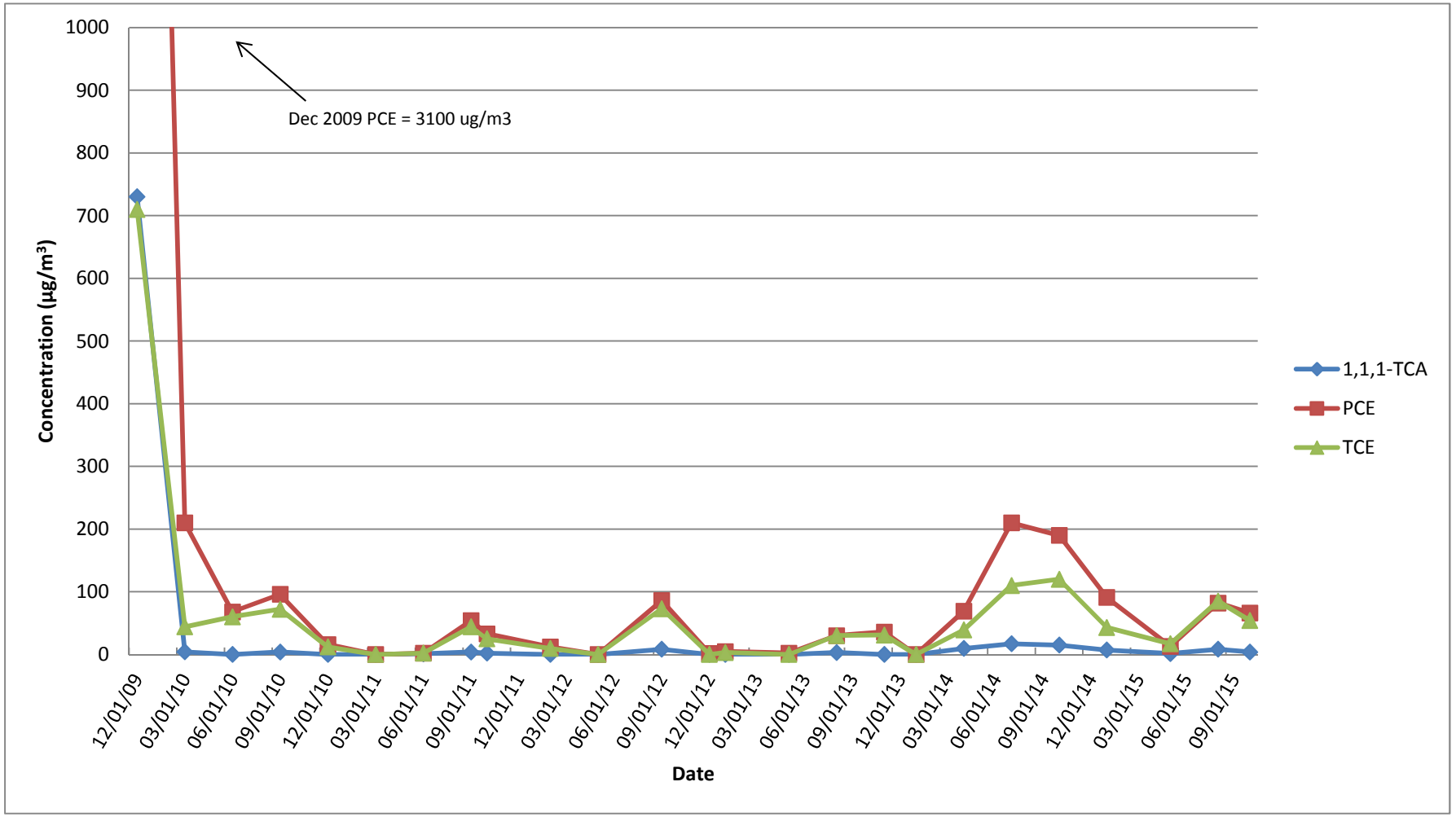
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Concentration Trends of Select VOCs

SV103D



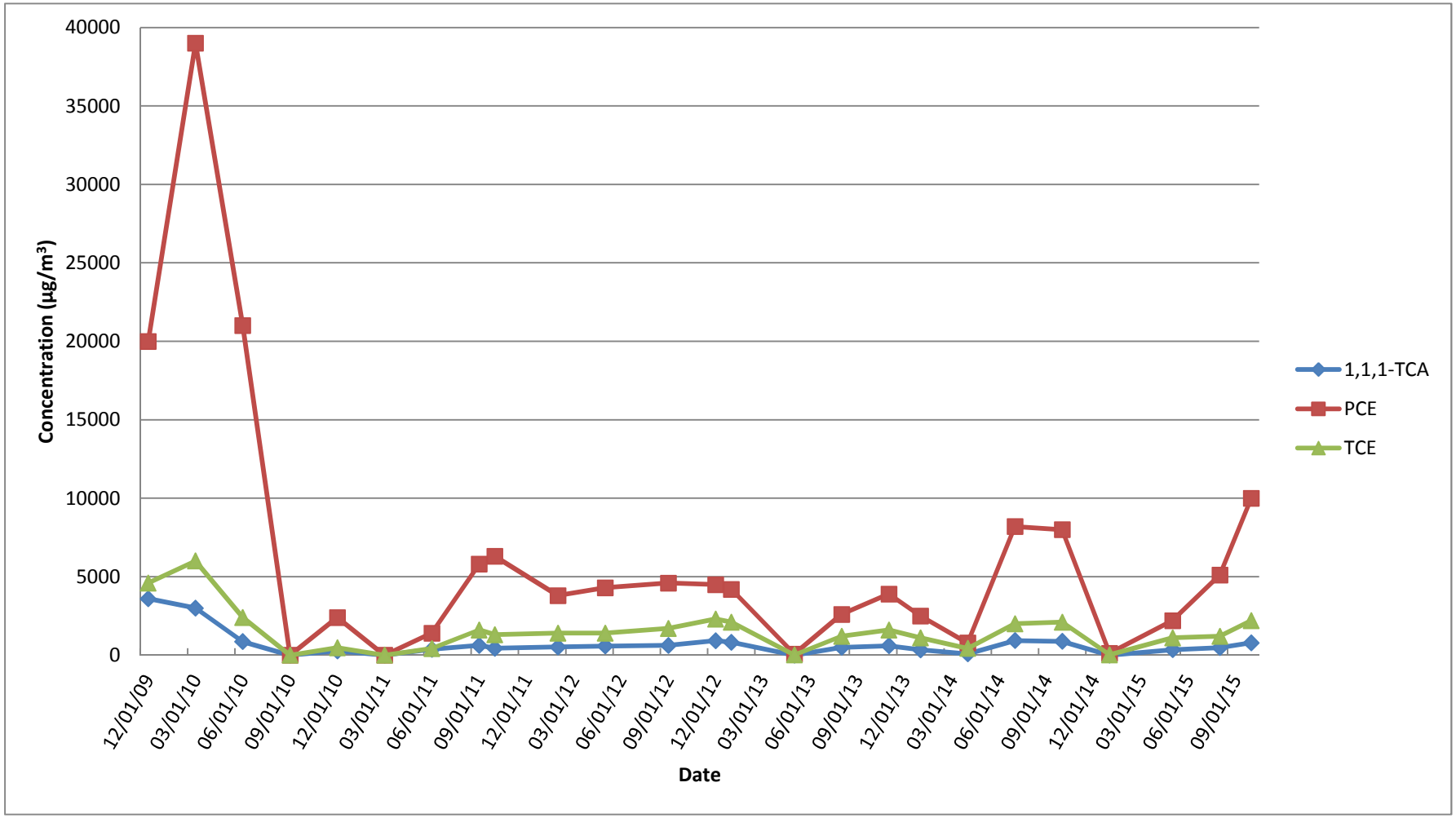
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Concentration Trends of Select VOCs

SV104I



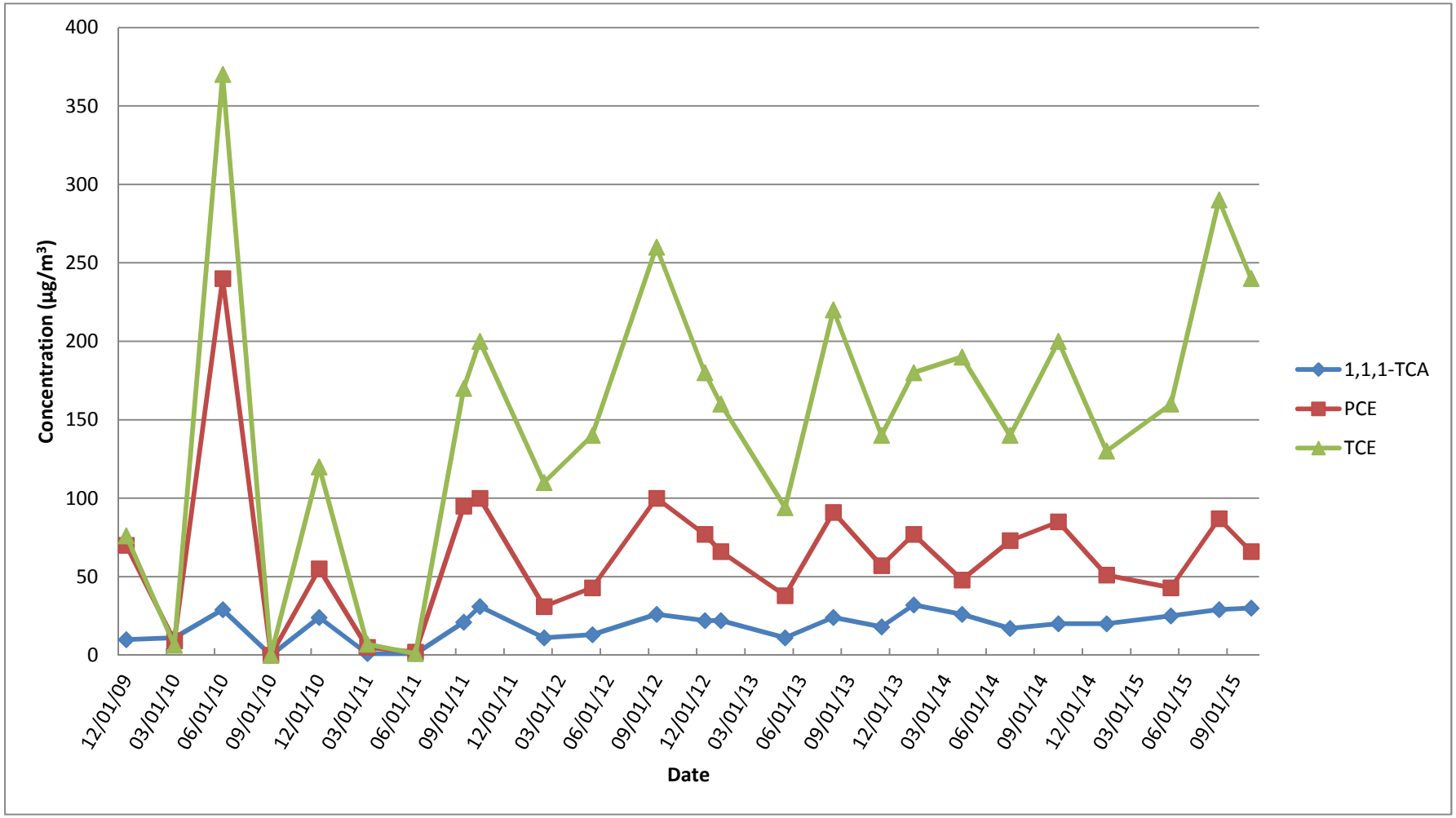
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Concentration Trends of Select VOCs

SV-104D



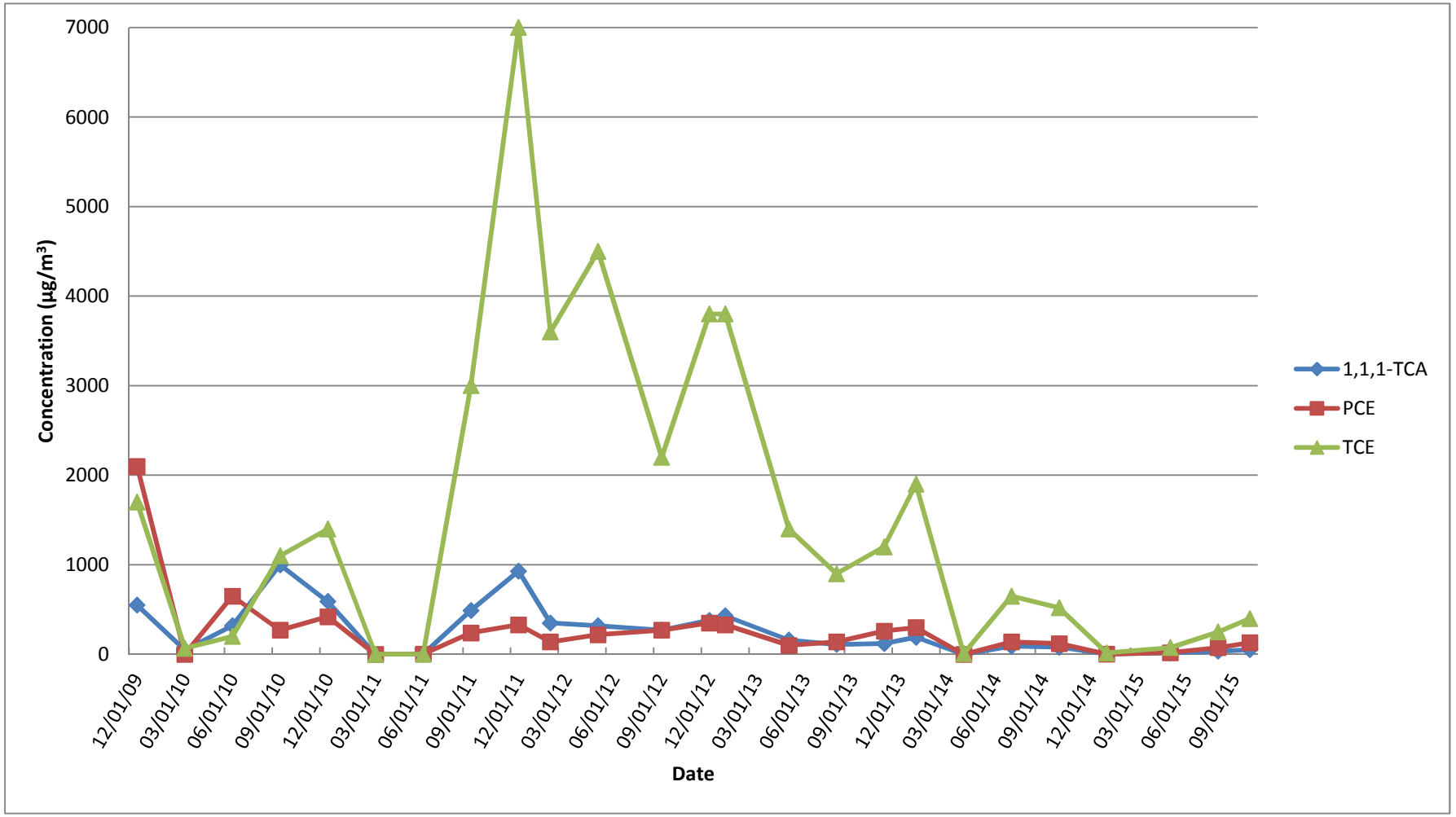
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Concentration Trends of Select VOCs

SV-105I



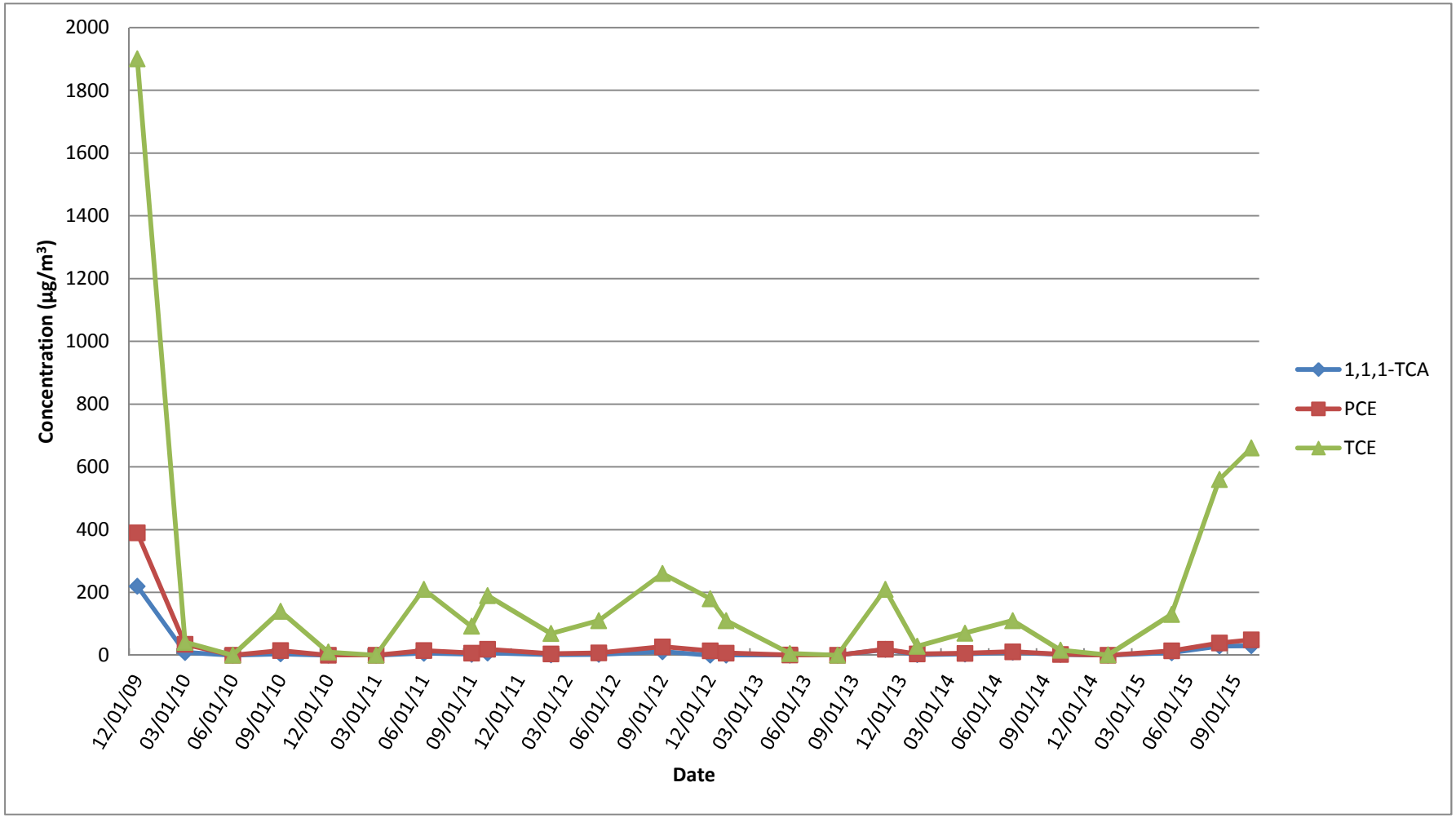
Soil Vapor Extraction Containment System
Site 1, Former Drum Marshalling Yard
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Concentration Trends of Select VOCs

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

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

SV-106D