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Dear Mr. Todd:

Subject: ***Submittal of Corrective Action Management Unit (CAMU) Report of Post-Closure Care Activities, Calendar Year 2016, Sandia National Laboratories/New Mexico (SNL/NM), Environmental Protection Agency (EPA) Identification Number NM5890110518***

The CAMU Report of Post-Closure Care Activities for the calendar year 2016 is being provided to the Department of Energy (DOE) for submittal to the New Mexico Environment Department (NMED). The submittal is required by Attachment H, Section H.9 of the Hazardous Waste Facility Operating Permit (Permit) for Sandia National Laboratories. The report includes information for monitoring and inspection activities conducted at the CAMU during the calendar year 2016 and satisfies requirements listed in Permit Attachment H, Section H.9.

I have signed the certification to be sent to the NMED as the Operator at SNL/NM. If you agree, please sign the certification as the Owner. If you have any questions regarding the enclosed document, please contact Jaime Moya, Director, at (505) 844-7955/jlmoya@sandia.gov, Johnathon Huff, Senior Manager, at (505) 844-1046/jhuff@sandia.gov, or Pam Puissant, Manager, at (505) 844-3185/ pmpuiss@sandia.gov.

Sincerely,

Enclosures:

1. Enclosure A – Corrective Action Management Unit Report of Post-Closure Care Activities, Calendar Year 2016 for Sandia National Laboratories/New Mexico, March 2017
2. Submittal of Corrective Action Management Unit Report of Post-Closure Care Activities, Calendar Year 2016, Certification Statement

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Submittal of Corrective Action Management Unit Report of Post-Closure Care Activities
Calendar Year 2016
Hazardous Waste Facility Operating Permit

Sandia National Laboratories
Albuquerque, New Mexico
EPA ID No. NM5890110518

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

____________________________________ ____________

Michael W. Hazen, Vice-President — Date signed
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Operator

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James W. Todd, Assistant Manager — Date signed
U.S. Department of Energy
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Enclosure A

Corrective Action Management Unit Report of Post-Closure Care Activities
Calendar Year 2016
Sandia National Laboratories, EPA ID No. NM5890110518

Sandia National Laboratories

CORRECTIVE ACTION MANAGEMENT UNIT REPORT OF POST-CLOSURE CARE ACTIVITIES CALENDAR YEAR 2016

SANDIA NATIONAL LABORATORIES, NEW MEXICO
LONG-TERM STEWARDSHIP
POST-CLOSURE CARE

MARCH 2017

U.S. DEPARTMENT OF ENERGY

NNSA National Nuclear Security Administration

United States Department of Energy
Sandia Field Office

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CORRECTIVE ACTION MANAGEMENT UNIT
REPORT OF POST-CLOSURE CARE ACTIVITIES

Facility: Corrective Action Management Unit (CAMU)

Location: Sandia National Laboratories
Kirtland Air Force Base
Albuquerque, New Mexico

EPA ID No.: NM5890110518

Permit Basis: Hazardous Waste Facility Operating Permit, Sandia National Laboratories, EPA ID Number NM5890110518, February 26, 2015

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ACRONYMS AND ABBREVIATIONS

%	percent
°C	degrees Celsius
CAMU	Corrective Action Management Unit
CPN	California Pacific Nuclear
CSS	CWL sanitary sewer
CWL	Chemical Waste Landfill
CY	calendar year
EPA	U.S. Environmental Protection Agency
FOP	Field Operating Procedure
HDPE	high-density polyethylene
LCRS	leachate collection and removal system
LRL	laboratory reporting limit
MDL	method detection limit
NMED	New Mexico Environment Department
PCCP	Post-Closure Care Permit
Permit	Hazardous Waste Facility Operating Permit
PID	photoionization detector
ppbv	parts per billion by volume
ppmv	parts per million by volume
PSL	primary subliner
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RMWMU	Radiological Mixed Waste Management Unit
Sandia	Sandia Corporation
SNL/NM	Sandia National Laboratories, New Mexico
TDR	time-domain reflectometry
VCM	voluntary corrective measure
VCP	vitrified clay pipe
VE	vapor extraction
VOC	volatile organic compound
VSA	vertical sensor array
VZMS	vadose zone monitoring system

1.0 INTRODUCTION

The Corrective Action Management Unit (CAMU) at Sandia National Laboratories, New Mexico (SNL/NM) consisted of a containment cell, two treatment systems, four associated waste staging and storage areas, and support areas; all were used for management of remediation wastes between 1997 and 2003. The U.S. Department of Energy and Sandia Corporation (Sandia) operated the CAMU in accordance with the requirements of:

- The Class 3 Permit Modification Request for the CAMU (SNL/NM September 1997, as amended); and

- Module IV of Permit NM5890110518, “Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments to Resource Conservation and Recovery Act (RCRA) for Sandia National Laboratory, U.S. Environmental Protection Agency (EPA) Identification Number NM5890110518,” August 1993, (EPA 1993, as amended) and subsequently administered by the New Mexico Environment Department (NMED).

The CAMU underwent closure in 2003 in accordance with the Closure Plan in Appendix D of the Class 3 Permit Modification (SNL/NM September 1997). The containment cell was closed with wastes in place. Hazardous wastes were removed from all other CAMU systems and areas, and they underwent clean closure. The NMED approved completion of closure in May 2004 (Kieling May 2004). From May 2004 until February 2015, the containment cell underwent post-closure care (i.e., monitoring, inspections, maintenance, and repairs) in accordance with the Closure Plan.

On January 27, 2015, the NMED issued the Hazardous Waste Facility Operating Permit (Permit) for Sandia National Laboratories (NMED January 2015). The Permit became effective on February 26, 2015. The CAMU is undergoing post-closure care in accordance with the Permit as revised and updated.

1.1 Purpose and Scope

The purpose and scope of this report is to describe post-closure care at the CAMU during calendar year (CY) 2016, in accordance with the requirements of the Permit, particularly Permit Part 7, Section 7.3.

Protection of human health and the environment at the CAMU is provided through continued monitoring and maintenance of the containment cell and monitoring systems to minimize the potential for exposure to the contents of the containment cell. This report documents the overall performance of the CAMU systems during CY 2016. Performance is based on the following:

- Maintenance of the integrity and effectiveness of the final cover. The requirements are defined in Permit Part 7, Section 7.3, in Permit Attachment E, Sections E.3 and E.10, and in Permit Attachment H.

- Assessment of the vadose zone environment underlying the containment cell through operation of the monitoring systems. Monitoring requirements are defined in Permit Attachment H, Section H.5. Monitored parameters include soil moisture, soil temperature, and soil vapor volatile organic compound (VOC) concentrations.

- Operation of the containment cell leachate collection and removal system (LCRS). The requirements are defined in Permit Attachment A, Section A.7.6.3, and Attachment E, Section E.10.4.

- Maintenance of security measures to restrict access to the CAMU. The requirements are defined in Permit Attachment H, Section H.3.

- Other inspection, maintenance, and repair activities. The requirements are defined in Permit Attachment E, Sections E.3 and E.10.

1.2 Report Organization

This report is organized as follows:

- Chapter 2.0 provides a description of the CAMU, including the containment cell and each vadose zone monitoring system (VZMS) monitoring subsystem.

- Chapter 3.0 reviews the monitoring requirements for the VZMS.

- Chapter 4.0 describes the data collection equipment and the data collection methodologies for the VZMS.

- Chapter 5.0 discusses the quality assurance (QA)/quality control (QC) procedures employed as part of the data collection and management process for the VZMS.

- Chapter 6.0 presents the 2016 VZMS data together with an assessment of the distribution and trends noted in the VZMS data sets.

- Chapter 7.0 provides a description and summary of the LCRS.

- Chapter 8.0 provides a description and summary of all inspections, maintenance, and repair activities.

- Chapter 9.0 presents general conclusions concerning containment cell performance and post-closure care of the CAMU.

- Chapter 10.0 lists the references cited in this report.

The monitoring results for CY 2016 are provided in Annexes A through E.

2.0 CORRECTIVE ACTION MANAGEMENT UNIT DESCRIPTION

The CAMU consists of a containment cell and ancillary systems surrounded by a fence with two locking gates. It occupies a 3.75-acre site located in the southeastern portion of SNL/NM Technical Area III, directly north of the SNL/NM Radiological Mixed Waste Management Unit (RMWMU), and approximately 400 feet northwest of the Chemical Waste Landfill (CWL) (Figure 2-1). The RMWMU is used for storage and treatment of hazardous and mixed wastes under the Permit. The CWL is undergoing post-closure care and monitoring under a separate Post-Closure Care Permit (PCCP) (NMED October 2009 and subsequent revisions). Certain aspects of the CWL are relevant to post-closure care at the CAMU; therefore, the CWL is described in more detail in Section 2.3 of this report.

2.1 Containment Cell

The containment cell was constructed with an engineered liner system on the bottom and sides. During closure, an engineered final cover system was installed. The components of the final cover system from bottom to top include the following: textured 60-millimeter high-density polyethylene (HDPE) membrane, bedding sand, pea gravel, filter sand, native soil blend, topsoil with gravel mulch and native vegetation. The sides of the containment cell cover are sloped to minimize erosion and to minimize infiltration by directing precipitation away from the cell. The soil immediately around the cell is also sloped to direct precipitation away from the cell.

The engineered liner system on the bottom and sides of the containment cell consists of several layers that were installed over prepared subgrade. The layers include a geosynthetic clay layer overlain by an HDPE liner. An LCRS was incorporated into the construction of the containment cell; the LCRS is designed to collect and withdraw leachate form the closed cell during the post-closure care period.

2.2 Vadose Zone Monitoring System

Three subsystems for monitoring the condition of the vadose zone under the closed containment cell were installed during construction of the cell. The set of three subsystems comprise the VZMS; they are designed to provide real-time information on containment cell performance with respect to early detection of any leaks from the cell. They are located beneath and adjacent to the containment cell. Each subsystem includes multiple surface locations as shown in Figures 2-2 and 2-3. The subsystems are described in detail in the following sections.

2.2.1 Primary Subliner Monitoring Subsystem

The primary subliner (PSL) monitoring subsystem is the primary monitoring component of the VZMS. This subsystem is designed to detect increased moisture content immediately below the engineered liner system on the bottom of the containment cell.

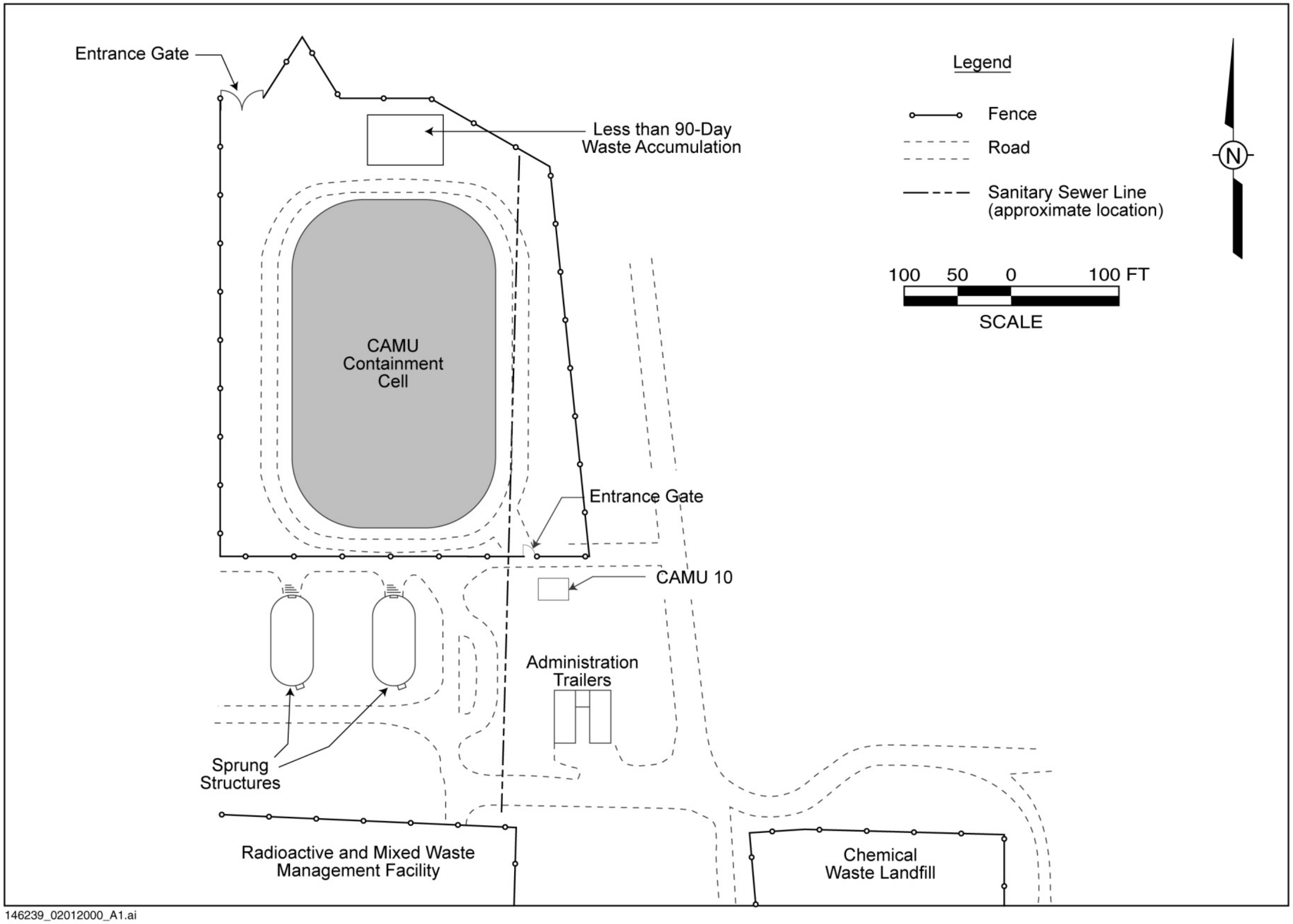

Figure 2-1
Local Area Map of Corrective Action Management Unit Containment Cell

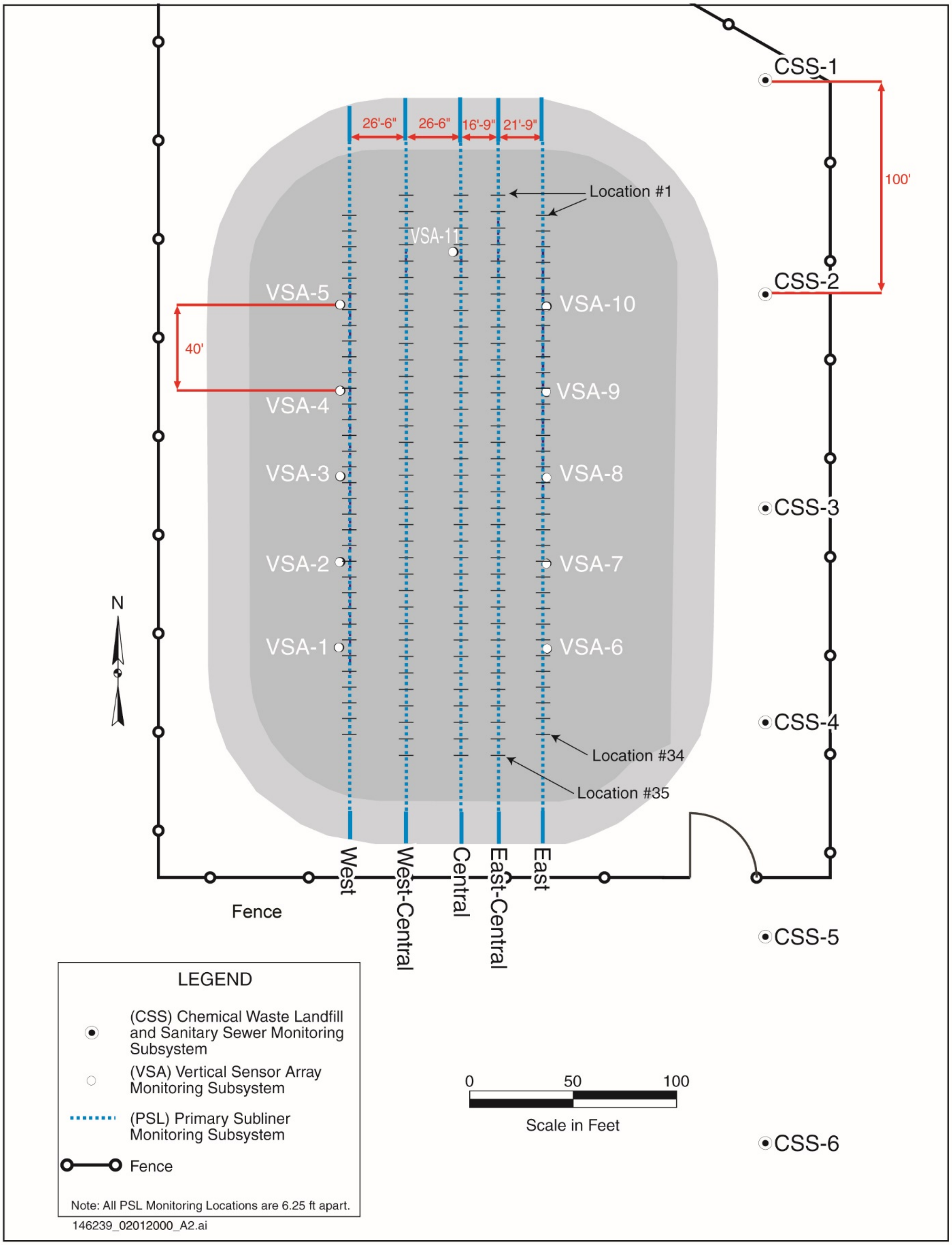

Figure 2-2
Plan View of Containment Cell and Vadose Zone Monitoring System

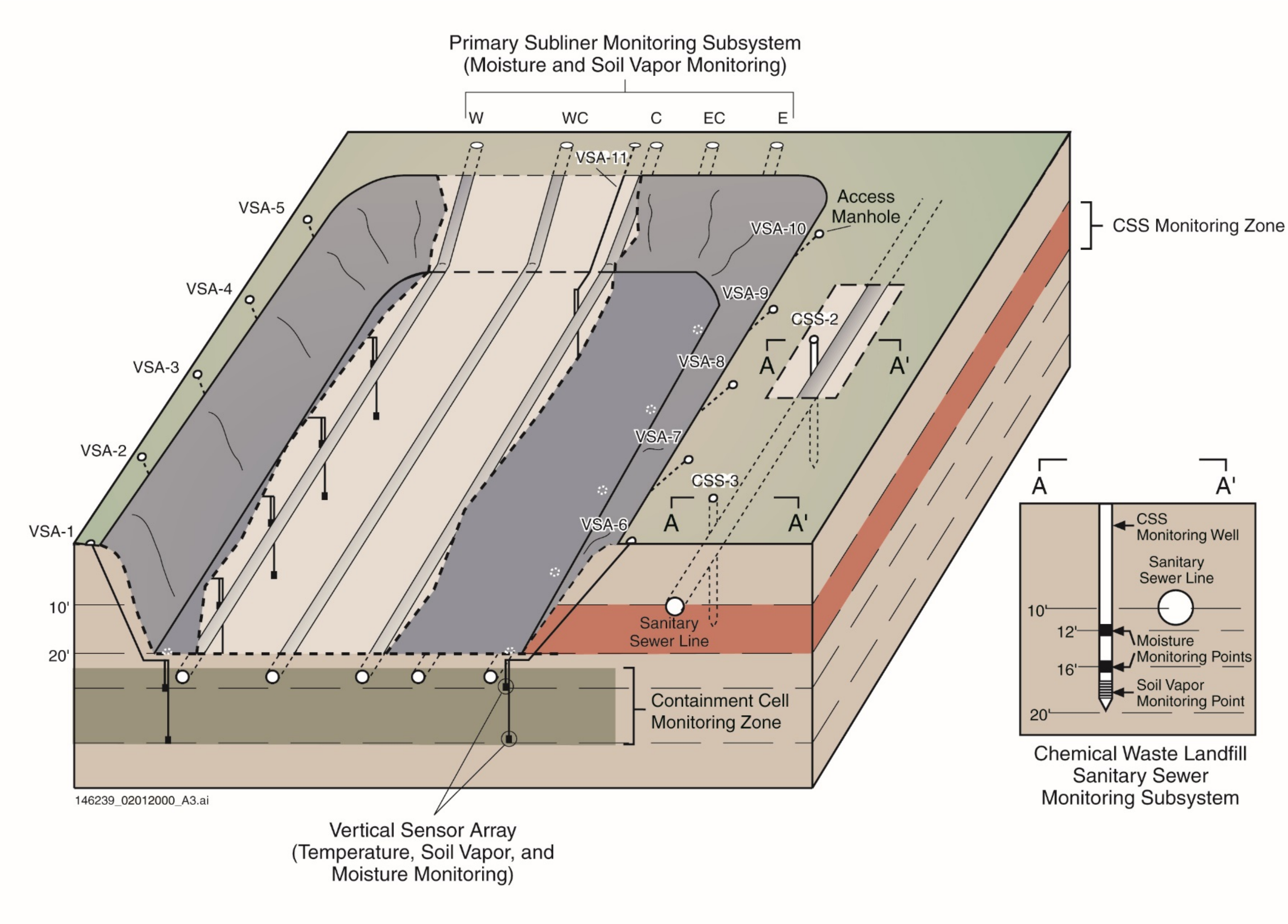

Figure 2-3
Block Diagram of Containment Cell and Vadose Zone Monitoring System

Five vitrified clay pipes (VCPs) are located in trenches approximately 4 feet below the engineered liner system (Figure 2-4). The VCPs allow for soil moisture detection from beneath the containment cell. The pipes are spaced approximately 17 to 27 feet apart (Figures 2-2 and 2-3) and run along the north-south axis of the containment cell. The VCP trenches are backfilled with a wicking material (Figure 2-4) consisting of native soil of a specified particle size distribution (i.e., silty sand). The wicking material and ends of the cell subliner membrane drape into each trench to facilitate transport of moisture to the VCP in the event that the primary liner system fails (Figure 2-4).

Inclined sections of polyvinyl chloride (PVC) riser pipes are connected to each end of the VCPs to allow access for soil moisture measurements. A neutron moisture probe is deployed into the VCP to collect the soil moisture data. The probe reports neutron counts at preselected points along each pipe run. The neutron counts are then translated into soil moisture data by using a site-specific empirical formula (developed using site-specific properties as described in Section 4.1) that relate count values to soil moisture content.

2.2.2 Vertical Sensor Array Monitoring Subsystem

The vertical sensor array (VSA) monitoring subsystem provides information on moisture content, temperature, and concentrations of VOCs in soil vapor beneath the edges of the containment cell. The soil moisture data may help determine whether increases are the result of containment cell leakage or related to a source adjacent to the cell.

This subsystem consists of eleven pairs of vertically oriented monitoring locations. Five are located on both the eastern and western margins of the containment cell (Figures 2-2 and 2-3). The eleventh monitoring location is situated at the northern end of the cell, beneath the LCRS sump. Each VSA location contains monitoring points at both 5 and 15 feet beneath the containment cell subliner. Each monitoring point contains the following three components: a time-domain reflectometry (TDR) soil moisture content probe, a soil temperature sensor, and a soil vapor port (Figure 2-5).

2.2.3 Chemical Waste Landfill Sanitary Sewer Monitoring Subsystem

The CWL sanitary sewer (CSS) monitoring subsystem, located east of the containment cell, is designed to detect leaks emanating from the sanitary sewer line that could impact the PSL or VSA soil moisture monitoring subsystems (Figure 2-3). The sanitary sewer line runs from south to north approximately 45 feet east of the containment cell (Figures 2-1 and 2-2). Six vertical monitoring well points are positioned between the containment cell and the sanitary sewer line. The monitoring well points are approximately 20 feet deep and 100 feet apart. The bottom of each well contains a 2-foot section of galvanized steel screen to support soil vapor sampling. The remaining length is constructed of 2-inch diameter, galvanized steel pipe (Figure 2-6).

Each monitoring well is equipped for soil vapor sampling and is accessible by a neutron moisture probe to monitor soil moisture content. The soil vapor monitoring is used to detect VOCs within the vadose zone.

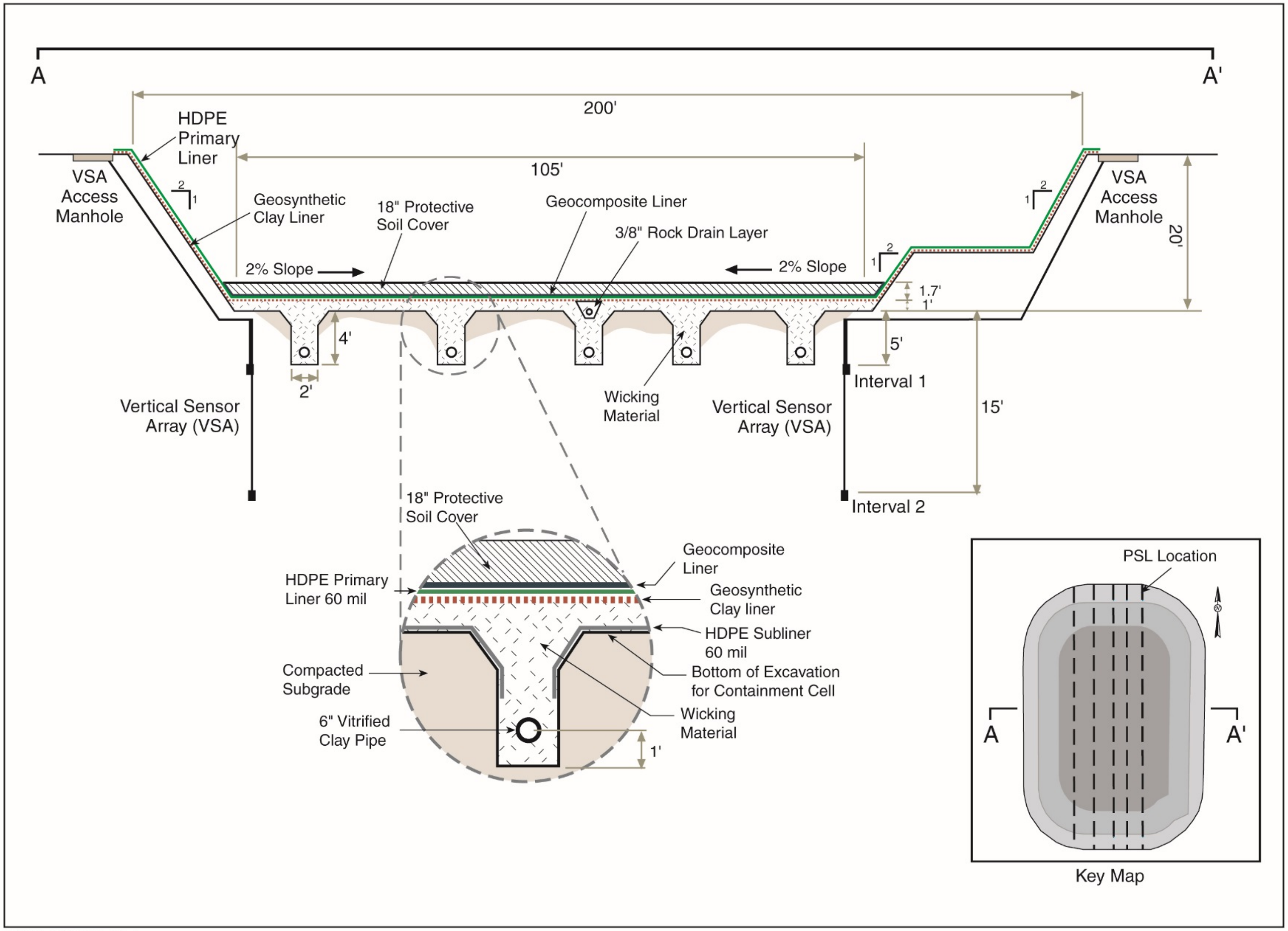

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Figure 2.4
Cross-Sectional View of Containment Cell and Primary Subliner Monitoring Subsystem

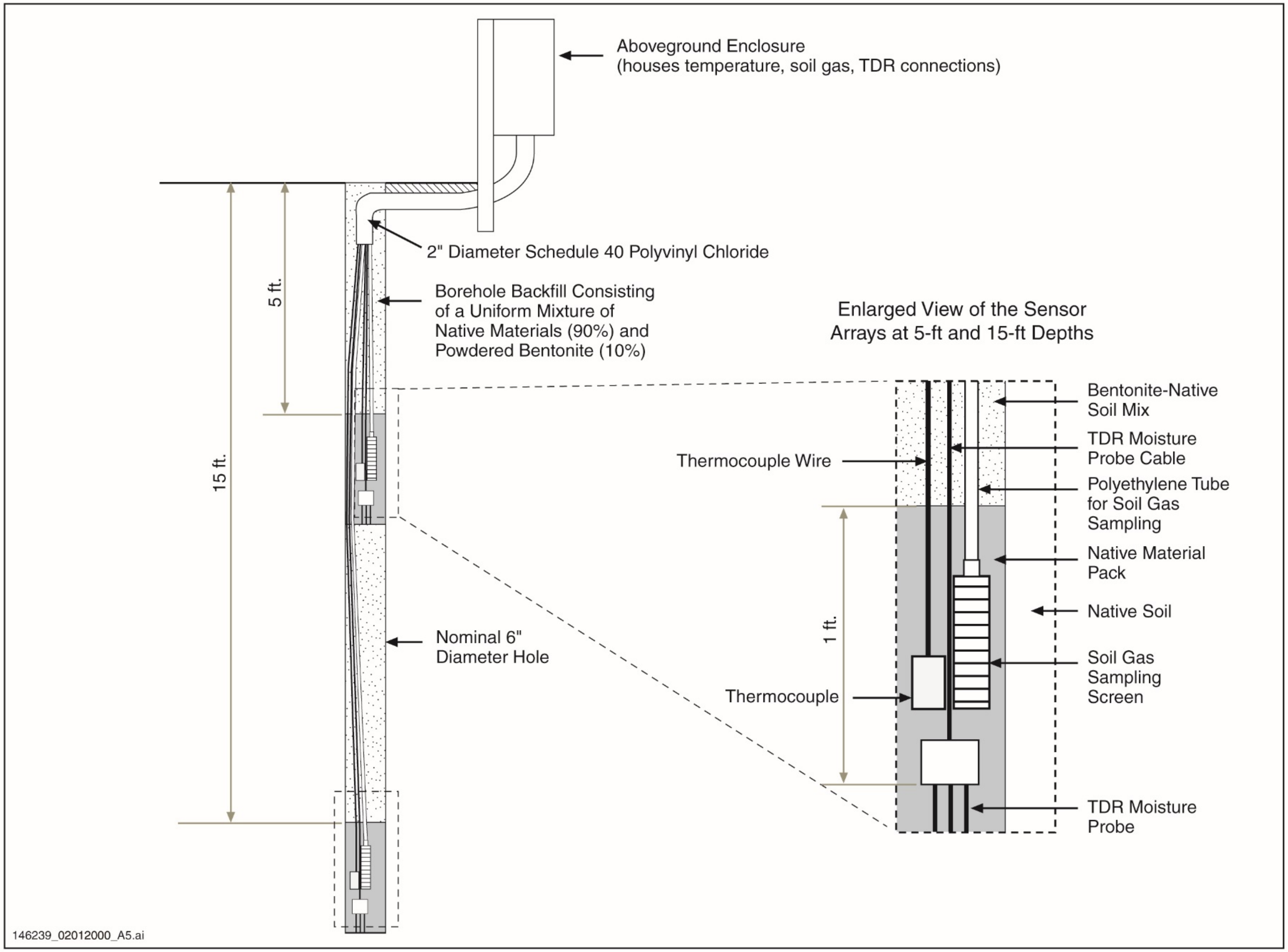

Figure 2-5
Configuration of Vertical Sensor Array Monitoring Subsystem

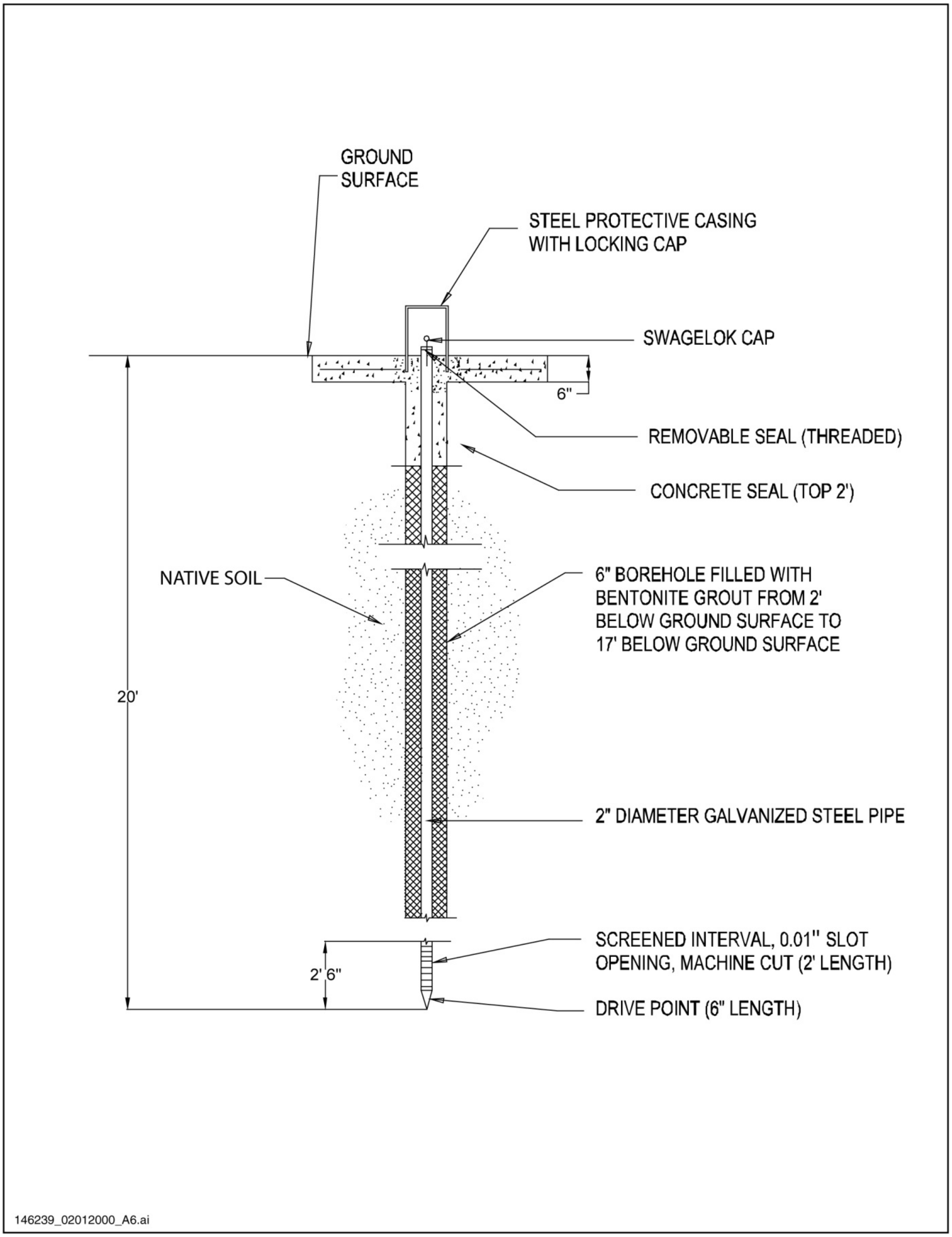

Figure 2-6
Cross-Section of the Chemical Waste Landfill Sanitary Sewer Monitoring Subsystem

2.3 Chemical Waste Landfill

The CWL, located southeast of the CAMU, is a 1.9-acre hazardous waste landfill undergoing post-closure care. Two voluntary corrective measures (VCMs) were conducted at the CWL. A soil vapor extraction (VE) VCM was conducted from 1997 through 1998 to reduce the concentrations of VOCs in soil vapor in the vadose zone, to control the VOC soil vapor plume, and to reduce trichloroethene concentrations in the groundwater below the landfill (SNL/NM May 2000). Following the VE VCM, a landfill excavation VCM was conducted from September 1998 through February 2002. All former disposal areas were excavated during the landfill excavation VCM. The excavation was backfilled and an evapotranspirative cover was constructed over the landfill.

Additional information on the VCMs, closure activities, and CWL current conditions can be found in the CWL Final RCRA Closure Report for the CWL (SNL/NM September 2010), the PCCP (NMED October 2009 and subsequent revisions), and the CWL Corrective Measures Study Report (SNL/NM December 2004). Detailed information on residual soil contamination at the CWL can be found in Part 3, Section 3.1 and Table 3-1 of the PCCP.

Post-closure care activities at the CWL include monitoring soil vapor concentrations of several chlorinated VOCs, and monitoring groundwater concentrations of selected chlorinated VOCs, chromium, and nickel. Monitoring results are documented in annual reports submitted to the NMED in accordance with the PCCP.

Residual soil contamination is present in the vadose zone under the CWL. VOC vapors associated with the residual soil vapor plume are still present throughout the 500-foot vadose zone extending beneath the CWL to groundwater. The residual vapor plume also extends outward from the CWL in all directions.

The most common VOCs that are present in the residual soil vapor plume include:

- Dichlorodifluoromethane
- Tetrachloroethane
- 1,1,1-Trichloroethane
- 1,1,2-Trichloro-1,2,2-trifluoroethane
- Trichloroethene
- Trichlorofluoromethane.

The conceptual model of the CWL residual VOC soil vapor plume, supported by annual CWL monitoring results, indicates it is controlled and slowly dissipating though diffusion and advection (SNL/NM December 2004).

3.0 VADOSE ZONE MONITORING SYSTEM MONITORING REQUIREMENTS

Table H-1 in Permit Attachment H (NMED January 2015) defines the requirements for VZMS monitoring frequency, parameters, and methods. They are presented in Table 3-1.

Table 3-1
Monitoring Frequency, Parameters, and Methods for the Vadose Zone Monitoring System

<table>
<tr><th>Monitoring Frequency</th><th>Monitoring Subsystems</th><th>Monitoring Parameter</th><th>Monitoring Method</th></tr>
<tr><td rowspan="4">Quarterly</td><td>PSL</td><td>Moisture content</td><td>Neutron Moisture Probe</td></tr>
<tr><td rowspan="2">VSA</td><td>Moisture content</td><td>TDR Probe</td></tr>
<tr><td>Temperature</td><td>Temperature Sensor</td></tr>
<tr><td>CSS</td><td>Moisture content</td><td>Neutron Moisture Probe</td></tr>
<tr><td rowspan="2">Annually[a]</td><td>VSA</td><td rowspan="2">Active soil vapor</td><td rowspan="2">EPA Method TO-14A or equivalent, as revised and updated[b]</td></tr>
<tr><td>CSS</td></tr>
</table>

Notes:
[a]Active soil vapor sampling shall be conducted annually unless increased soil moisture is detected, in which case active soil vapor sampling shall be conducted on a quarterly basis.
[b]Method TO-14A (EPA January 1999a) or an equivalent method such as TO-15 (EPA January 1999b) that includes the same analyte list, method detection limits equal to or lower than the TO-14A limits, and provides the same or higher level of data quality.
CSS = CWL sanitary sewer.
CWL = Chemical Waste Landfill.
EPA = U.S. Environmental Protection Agency.
PSL = Primary subliner.
TDR = Time-domain reflectometry.
VSA = Vertical sensor array.

4.0 VADOSE ZONE MONITORING SYSTEM DATA COLLECTION EQUIPMENT AND METHODOLOGIES

The following sections describe the equipment and methodologies used to collect data from the three subsystems that comprise the VZMS.

4.1 Neutron Moisture Probe

A neutron moisture probe manufactured by California Pacific Nuclear (CPN) is used to measure neutron counts in the PSL and CSS monitoring subsystems. The probe is a Model 503 DR Hydroprobe® that utilizes a neutron source (50-millicuries Americium 241/Beryllium) and a neutron detector. The source emits fast neutrons into the surrounding material. The fast neutrons interact with hydrogen atoms of water molecules and are slowed (thermalized). The detector measures the thermalized neutrons that are returned. The number of thermalized neutrons detected is a function of the hydrogen concentration, which is proportionally related to the soil moisture content. Neutron counts can be directly read and recorded from the CPN probe, which is queried at predetermined locations within the PSL and CSS subsystems.

In situ soil moisture content is determined by correlating neutron counts with known moisture values in accordance with Permit Attachment H, Section H.6.2 (NMED January 2015). Test fixtures were built (using native soil with known moisture content) that simulated the configuration of the PSL and CSS subsystems. Instrument measurements were taken within these fixtures to develop empirical formulas that express the correlation between neutron counts and soil moisture content. The correlation formulas provide the basis for determining soil moisture values within the PSL and CSS monitoring subsystems. The values are reported as percent (%) by mass.

4.1.1 Primary Subliner Neutron Moisture Probe

The neutron moisture probe data collection procedures are the same for each of the five VCPs. There are 34 data collection (count) locations in both the East and West VCPs, and 35 count locations in each of the East-Central, Central, and West-Central VCPs. Count locations are numbered consecutively from north to south along each of the VCPs and are spaced approximately 6.25 feet apart. The neutron moisture probe is stopped at each of the predefined count locations and a neutron count is obtained. The probe is positioned based upon the distance measured by a winch line counter.

At each count location, the probe measures hydrogen concentrations within a sphere that includes air space around the probe, the VCP wall, and a portion of the wicking material in the trench surrounding the pipe. The manufacturer of the CPN probe reports an effective radius measurement of 10 inches, or about 6 inches beyond the pipe wall into the wicking material and surrounding soil (under dry conditions). As moisture values surrounding the neutron moisture probe increase, the radius of detection decreases. Soil moisture content for the PSL subsystem is reported as a percentage of soil mass.

4.1.2 Chemical Waste Landfill Sanitary Sewer Neutron Moisture Probe

Neutron count measurements are collected at depths of approximately 12 and 16 feet below ground surface in each of the six CSS monitoring wells.

The monitoring environment of the CSS subsystem is different from that of the PSL. The neutron moisture probe is operating in a galvanized steel pipe that has no moisture-absorbing capacity. Material adjacent to the pipe consists of a 2-inch annular borehole space filled with bentonite grout. The grout is surrounded by native soil (Figure 2-6). Because the galvanized pipe diameter is smaller than the diameter of the VCP, more of the surrounding material is measured. The effective radius measurement is approximately 8 inches from the outside pipe wall into the surrounding soil. Soil moisture content for the CSS subsystem is reported as percentage of soil mass.

4.2 Time-Domain Reflectometry Moisture Probe

TDR soil moisture measurements are made using a Campbell® Scientific, Inc. Model CS 610-L TDR probe connected by a coaxial cable to a TDR100 signal generator. The TDR100 sends a voltage signal to the probe. The signal travels from the TDR100 to the probe, then into the surrounding soil, back to the probe, and back to the TDR100. The delay between the initial signal and the return pulse is related to the moisture content of the soil. The TDR100 software uses a preprogrammed algorithm, Topp Equation (Campbell® April 2002), to convert this distance into a volumetric soil moisture value.

The probes are positioned at 5 and 15 feet below the containment cell subliner at each of the eleven VSA locations. They have been repacked in native material to duplicate the effective pore size of the adjacent native materials. Soil moisture content is reported on a volumetric basis as a percentage of soil volume.

Occasionally, the TDR coaxial cables at the VSA-4 and VSA-5 locations experience interference from an outside, unidentified source at the 5-foot depth that affects the voltage signal waveform. When this occurs, the TDR100 software cannot read the waveform. Additional attempts are made until the software recognizes the waveform and can calculate a soil moisture value. Thus far, the soil moisture values calculated by the TDR100 have been consistent with baseline values.

4.3 Thermocouple Temperature Probe

Each VSA monitoring location has a thermocouple temperature probe located at 5 and 15 feet below the containment cell subliner. Temperature measurements were obtained by connecting a Fluke® 52 II microprocessor-based, digital thermometer to the thermocouple temperature probes. The Fluke® 52 II converts the drop in voltage across the thermocouple junction to a temperature in degrees Celsius (°C) and displays the value.

Soil temperature does affect the TDR soil moisture values because the dielectric value of water is temperature dependent. The effect, however, is negligible (i.e., for a 30°C change in temperature, the change in measured water content using the Topp Equation is approximately 2 %). Temperature values at the VSA monitoring locations have generally varied less than 5°C (Tables A-1 and A-2 in Annex A).

4.4 Active Soil Vapor Sampling Equipment

The CSS and VSA subsystems are sampled for VOCs in soil vapor. The equipment consists of a vacuum pump, sampling manifold assembly, and photoionization detector (PID). The vacuum pump is used to draw soil vapor through the monitoring port, sampling tubing (VSA) or well casing (CSS), and the sampling screen until a minimum of three volumes are evacuated, and until VOC levels stabilized as determined with the PID. The pump is turned off and a valve is opened on the manifold assembly that directs soil vapor flow to the SUMMA™ canister. Because the SUMMA™ canister is under vacuum, it draws the soil vapor sample into the canister. Annex B contains the soil vapor VOC data.

5.0 VADOSE ZONE MONITORING SYSTEM QUALITY ASSURANCE/QUALITY CONTROL MEASURES AND DATA MANAGEMENT

This chapter summarizes the procedures and quality assurance/quality control (QA/QC) measures used to collect the VZMS data and QA/QC requirements for characterizing the vadose zone underneath the containment cell in accordance with the Permit (NMED January 2015). The data flow process, from the initial instrument readings and sample collection through final archival data storage, is also presented.

5.1 Data Collection Procedures

The scope of CY 2016 monitoring includes the following activities:

- Measurement of soil moisture content using neutron counts at 185 locations within the PSL (173) and CSS (12) subsystems.

- Measurement of temperature and soil moisture content using TDR at 22 locations within the VSA subsystem.

- Collection of soil vapor samples from the VSA (22 samples) and CSS (6 samples) subsystems.

The QA/QC elements designed to minimize errors during data collection include the following:

- Use properly trained and experienced field personnel.
- Follow plans and procedures.
- Perform annual function checks or calibrations of instrumentation.
- Perform field function checks of instrumentation (if applicable).
- Perform initial data review.

The following Field Operating Procedures (FOPs) for the CAMU VZMS define operational and data collection procedures that ensure adherence to a standardized method of data collection:

- FOP 08-20 for use of the CPN neutron moisture probe (SNL/NM April 2013, April 2016).

- FOP 08-21 for data collection using TDR and temperature probes (SNL/NM June 2015).

- FOP 08-22 for soil vapor sampling procedures (SNL/NM June 2014).

A brief review of the field data collection procedures specified in the FOPs is provided in the following sections.

5.1.1 Measurement of Soil Moisture Using the Neutron Probe

A standard count is collected with the CPN probe prior to collecting field data to verify that it is operating properly. When collecting field data, the CPN probe is queried at each monitoring location via a control panel. The neutron count data are displayed on the control panel and recorded on the associated field forms.

An empirical coefficient equation is used to correlate neutron counts to soil moisture content. The equation was developed by measuring neutron counts in test fixtures containing soil of known moisture content as described in Section 4.1. The neutron moisture probe is returned to the manufacturer annually for calibration and is adjusted to account for the decay of the Americium-241 source. This allows for continual use of the original coefficient equation.

5.1.2 Measurement of Soil Moisture Using Time-Domain Reflectometry Probe

The TDR waveforms are displayed on a laptop computer when running the TDR100 software. Software settings are selected that ensure the complete TDR waveform is being measured during data collection. Calculated soil moisture content values are read directly from the software display window and recorded on the associated field forms.

The TDR100 signal generator is returned to the manufacturer annually where a quality control check is performed to ensure that it is operating within the design specifications.

5.1.3 Measurement of Temperature Using Thermocouple Temperature Probe

The thermocouple temperature data are collected using a Fluke 52 II microprocessor-based, digital thermometer that converts the voltage drop across the thermocouple junctions to a temperature in °C. The temperatures are read from the Fluke 52 II display and recorded on the associated field forms.

The Fluke 52 II digital thermometer undergoes an annual calibration to ensure it is functioning within the manufacturer’s specifications.

5.1.4 Collection and Analysis of Soil Vapor Samples

Certified clean SUMMA™ canisters are provided to SNL/NM from the analytical laboratory. To assure the integrity of soil vapor samples, the following steps are taken during sampling activities:

- Upon receipt of the SUMMA™ canisters at SNL/NM, Sandia personnel check the vacuum of each SUMMA™ canister and record the value. The initial vacuum values are supplied to the laboratory with the samples.

- A PID is used to determine stabilized VOC levels prior to collection of the sample. These data are recorded. The PID undergoes an annual calibration to ensure it is functioning within the manufacturer’s specifications.

- The volume of the soil vapor collected in the SUMMA™ canisters is monitored with a vacuum gauge (part of the sampling manifold assembly) during the sampling process. With a vacuum of approximately 10 inches of mercury remaining in the SUMMA™ canister, sampling is completed by closing the valve on the canister. The ending vacuum values are recorded and supplied to the laboratory with the samples.

- Samples are assigned unique identification numbers. Sample labels with pertinent information (i.e., sample date, time, identification, and location; analysis required; and sampling crew) are attached to each SUMMA™ canister when the samples are collected. Completed analysis request/chain-of-custody forms accompany the samples from the collection point to the analytical laboratory.

Duplicate samples are collected to check the precision of the sampling process. Analytical results above the method detection limit (MDL) but below the laboratory reporting limit (LRL) are qualified as estimated values and designated with a “J” qualifier.

A field control sample (field/trip blank) is collected at the beginning of a sampling event. The field/trip blank consists of a SUMMA ™ canister filled with ultra-pure grade nitrogen. It is kept in the presence of the other SUMMA™ canisters during sampling, storage, and shipment to the analytical laboratory. The field/trip blank is used to confirm whether contamination of samples may have resulted from ambient field conditions, or during storage and shipment to the analytical laboratory.

5.2 Data Management and Archiving

Field and analytical laboratory data are evaluated and retained in the Operating Record for the CAMU in accordance with Permit Part 2, Section 2.14.

All instrument field data (i.e., neutron counts and TDR soil moisture and temperature data) are entered into electronic spreadsheets for preliminary review. The electronic files and field form entries are transferred into a VZMS software program that creates a standardized data set. The program also incorporates the neutron count/soil moisture content correlation equations for the PSL and CSS subsystems and calculates in situ soil moisture values. The output files are downloaded into a database and retained in the CAMU Operating Record in accordance with Permit Part 2, Section 2.14.

Sandia personnel review the analytical results (including QA/QC documentation) from the analytical laboratory to determine conformance to established QA/QC criteria. Any discrepancies are resolved with the laboratory prior to finalizing the electronic results stored in the database. Corrective actions that may be required of the analytical laboratory include providing additional data, qualifying conditionally acceptable date, or reanalyzing samples. If these measures do not resolve data quality issues, resampling and reanalysis will be performed. Any corrections to the data are documented and included with the data archived in the operating record.

6.0 VADOSE ZONE MONITORING SYSTEM DATA ANALYSIS

This chapter presents soil moisture, soil temperature, and soil vapor VOC results along with a discussion of the distribution and trends in the VZMS data collected during the CY 2016.

6.1 Soil Moisture Distribution and Trends

Four monitoring events were conducted during CY 2016 fulfilling the quarterly monitoring requirement (NMED January 2015 and subsequent revisions). Soil moisture data was collected from the VZMS in February, May, August, and November of 2016. The data are presented in tables and corresponding figures provided in Annexes C, D, and E. Each figure shows a graph with the following six plots for each subsystem:

- The four quarterly soil moisture results for each monitoring location.
- Baseline soil moisture − defined as data collected monthly for one year after the closure of the containment cell in October 2003. The data are averaged at each monitoring location.
- Trigger level − defined as the baseline soil moisture plus 4%. An unexplained increase of 4% in soil moisture will trigger a secondary assessment and confirmation/rejection phase. If the 4% moisture value increase is confirmed, the NMED will be notified and consulted to determine an appropriate course of action in accordance with the requirements of Permit Attachment H, Section H.5.2.1.

The data tables and figures for each subsystem are located in the following annexes:

- Annex C—PSL Subsystem
- Annex D—VSA Subsystem
- Annex E—CSS Subsystem

6.1.1 Lateral Distribution of Moisture Underlying the Containment Cell as Indicated by the Primary Subliner Monitoring Subsystem

Tables C-1 through C-5 (Annex C) present soil moisture values (% by mass) recorded during this reporting period for each PSL monitoring location. The quarterly monitoring results were compared to the trigger level, which is 4% above the established baseline soil moisture. The quarterly monitoring results track very closely to the soil-moisture baseline for the five PSL access tubes and did not exceed the trigger level at any location. The soil moisture for all the monitoring locations averaged 7.8% for this reporting period, which is consistent with the baseline average of 7.8%.

The historical trend of lateral variability in soil moisture levels in the West-Central, Central, East-Central, and East VCPs continued during CY 2016. The levels were consistently lower in the northern portion of these VCPs, which is consistent with the baseline average. The zone of lower soil moisture values is attributed to a temporary construction ramp that shielded the area from water infiltration during a significant precipitation event that occurred in November 1998 (before the bottom liner system was installed) (SNL/NM April 1999).

Figures C-1 through C-5 (Annex C) present soil moisture (% by mass) graphically for each PSL monitoring location. The PSL data in the tables and graphs demonstrate stable soil moisture values during this reporting period.

6.1.2 Vertical Distribution of Moisture Along the Margins of the Containment Cell as Indicated by the Vertical Sensor Array Monitoring Subsystem

Tables D-1 and D-2 (Annex D) present soil moisture values (% by volume) recorded during this reporting period for each VSA monitoring location. Soil moisture content was determined using TDR monitoring points at depths of 5 and 15 feet below the containment cell. The quarterly monitoring results were compared to the trigger level, which is 4% above the established baseline soil moisture. The quarterly monitoring results track very closely to the soil-moisture baseline for all VSA locations and did not exceed the trigger level at any location.

Average soil moisture values range from 5.8% to 13.4% at the 5-foot monitoring depth (Table D-1) which is consistent with the baseline average range of 5.2% to 14.6%. Average soil moisture values range from 5.1% to 8.4% at the 15-foot depth (Table D-2), which is consistent with the baseline average range of 4.9% to 8.2%.

Figures D-1 and D2 (Annex D) present soil moisture (% volume) graphically for the 5- and 15-foot depths, respectively, for each VSA monitoring location. The VSA data in the tables and graphs demonstrate stable soil moisture values during the reporting period.

6.1.3 Distribution of Moisture Adjacent to the East Side of the Containment Cell as Indicated by the Chemical Waste Landfill Sanitary Sewer Monitoring Subsystem

Tables E-1 and E-2 (Annex E) present soil moisture values (% by mass) recorded during this reporting period for each CSS monitoring location. The CSS locations were established to monitor potential leakage from the sewer line located east of the CAMU facility. Figures E-1 and E-2 (Annex E) present soil moisture (% by mass) graphically for the 12- and 16-foot depths, respectively, for each CSS monitoring location.

The quarterly monitoring results were compared to the trigger level, which is 4% above the established baseline soil moisture. The quarterly monitoring results track very closely to the soil-moisture baseline for CSS-1, CSS-4, and CSS-5 locations and did not exceed the trigger level during 2016. For these locations, average soil moisture values range from 2.1% to 2.3% at the 12-foot depth (Table E-1), which is consistent with the baseline average range of 2.1% to 2.3%. At these three locations, the average soil moisture values range from 2.8% to 3.2% at the 16-foot depth (Table E-2), which is consistent with the baseline average of 2.7% to 3.1%.

Quarterly soil moisture monitoring results at the CSS-6 location for the 12- and 16-foot depths track very closely to the soil moisture baseline but are higher compared to the other CSS locations. Average soil moisture values were 4.6% and 6.2% at the 12- and 16-foot depths, respectively, compared to the baseline averages of 4.4% and 5.8%. Originally, CSS-6 was situated in a slight topographic depression. The suspected likely explanation is that surface-water runoff accumulated in the depression after heavy rainfall and infiltrated, causing the higher soil moisture values at this location. In May 2002, the area was graded to direct runoff away from the CSS-6 wellhead.

Average soil moisture values of 3.6% and 3.7% were recorded for CSS-2 at the 12- and 16-foot depths, respectively, compared to baseline averages of 2.2% and 2.3%. Soil moisture values began increasing at the CSS-2 location in September 2005, continued to increase through September 2008, and appear to have stabilized with just minor fluctuations occurring since September 2008. CSS-2 soil moisture values did not exceed the trigger level during 2016. Figure E-3 (Annex E) graphically shows the soil moisture (% by mass) upward and stabilization trends that occurred at the 12- and 16-foot monitoring depths of location CSS-2.

Average soil moisture values of 4.1% and 3.0% were recorded for CSS-3 at the 12- and 16-foot depths, respectively, compared to baseline averages of 3.0% and 2.6%. Figure E-4 (Annex E) graphically shows the soil moisture values at the 12-foot and 16-foot monitoring depths of location CSS-3. Soil moisture values began increasing at the 12-foot depth in March 2007, continued to increase through March 2012, fluctuated during the 2013 reporting period (July 2012 to June 2013, (SNL/NM September 2013), and now appear to have stabilized with only minor fluctuations occurring since June 2013. Soil moisture values have remained relatively stable at the 16-foot depth. CSS-3 soil moisture values did not exceed the trigger level during 2016.

Initially, the increased values below the sanitary sewer line were attributed to a suspected leak in the sewer line near the CSS-2 and CSS-3 locations. Sandia personnel conducted a camera survey of the sewer line adjacent to the CSS monitoring wells in September 2006. The camera survey showed no obvious evidence of potential leakage near the CSS-2 and CSS-3 locations.

The soil moisture continued to increase and the levels remained consistently higher at the CSS-2 and CSS-3 locations after September 2006; therefore, Sandia personnel performed another camera survey of the sewer line in August 2010. The camera survey showed no obvious evidence for potential leakage near the CSS-2 and CSS-3 locations. However, the soil moisture data indicated otherwise, and there was no other explanation for the soil moisture increases. Therefore, Sandia personnel relined approximately 895 feet of sewer line in September 2010. A dual-tube, polyester felt, cured-in-place pipe lining tube system with a coated resin-carrying tube and coated, stay-in-place, calibration hose were used to reline the sewer line from approximately 255 feet north of CSS-1 to 140 feet south of CSS-6. The soil moisture trends at CSS-2 and CSS-3 appear to have stabilized; however, it may take some time to discern the overall effect of the liner insert.

6.2 Seasonal Temperature Variations in Soil Underlying the Containment Cell

Four monitoring events were conducted during CY 2016 fulfilling the quarterly monitoring requirements in Permit Attachment H. Soil temperature data were collected from the VSA subsystem in February, May, August, and November of 2016. The VSA subsystem temperature data are provided in Annex A. The soil temperature data exhibit minor seasonal variations. During the winter months, the subsurface soil temperature is slightly warmer than it is during the summer months. During this reporting period, the maximum soil temperature variation at the 5-foot monitoring points was 2.2°C (Table A-1) and 1.9°C (Table A-2) at the 15-foot monitoring points. These temperature variations are not large enough to significantly affect the TDR soil moisture values, as discussed in Section 4.3.

6.3 Distribution of Soil Vapor Volatile Organic Compounds Underlying, and Adjacent to, the Containment Cell

The VSA and CSS subsystems were sampled on May 4, 2016 fulfilling the annual soil vapor monitoring requirements in Permit Attachment H. Soil vapor samples were submitted to Test America, Inc. for chemical analyses by EPA Method TO-15 (EPA January 1999a). This was the first time samples were analyzed using EPA Method TO-15 instead of EPA Method TO-14A (EPA January 1999b). EPA Method TO-15 provides equal or lower detection limits with improved QA/QC compared to EPA Method TO-14A, which has historically been used to analyze soil vapor samples collected at the CAMU.

All related data and figures are provided in Annex B. Tables B-1, B-2, and B-3 present results of quality control samples including field duplicate results of samples collected from the VSA and CSS locations, and a field control sample (field/trip blank). The sample descriptions were previously discussed in Section 5.1.4. Overall, the analytical results for the environmental and duplicate sample pairs are very similar and demonstrate good precision. This indicates the field collection procedures and laboratory analytical method are producing representative, defensible data.

Tables B-1 and B-2 present the field duplicate results for samples collected from the VSA and CSS locations.

Table B-3 presents the field/trip blank results. Acetone and methylene chloride were the only VOCs detected in the trip/field blank at 0.20 and 0.25 parts per billion by volume (ppbv) respectively. Methylene chloride was qualified by data validation as a non-detection due to laboratory method blank contamination greater than the MDL. Acetone was qualified as an estimated result less than the LRL.

Tables B-4 through B-6 provide a list of analytes, MDLs, LRLs, and sample results for the following subsystems: VSA (5-foot monitoring depth), VSA (15-foot monitoring depth), and CSS, respectively. Tables B-7, B-8, and B-9 summarize the total VOC concentrations (i.e., the sum of validated detected VOCs) for the following subsystems: VSA (5-foot monitoring depth), VSA (15-foot monitoring depth), and CSS, respectively.

6.3.1 Soil Vapor Volatile Organic Compounds Detected in the Vertical Sensor Array Monitoring Subsystem

In the May 2016 samples taken from the VSA locations (Tables B-4 and B-5), 29 VOCs were detected above laboratory MDLs. Of those 29 VOCs, the following have been frequently detected at or above the LRL since monitoring began:

- Dichlorodifluoromethane
- Tetrachloroethene
- 1,1,2-Trichloro-1,2,2-trifluoroethane
- 1,1,1-Trichloroethane

- Trichloroethene
- Trichlorofluoromethane

These VOCs have all been detected in the CWL residual soil vapor plume.

Acetone and methylene chloride have been detected during previous reporting periods, but with less frequency than the VOCs listed above. During this reporting period, acetone was detected at all VSA locations. but due to its presence in the field/trip blank (Table B-3), was qualified by data validation as a non-detection at the LRL for locations VSA-7 (5-foot monitoring depth), VSA-5, VSA-8, and VSA-9 (15-foot monitoring depth). Methylene chloride was detected at all VSA locations, but was qualified by data validation as non-detection due to laboratory method blank contamination at a concentration greater than the MDL. Acetone shows no apparent trend of increasing concentrations. Both VOCs are constituents of concern at the CWL, common laboratory contaminants, and occur at very low concentrations in the vicinity of the CAMU (i.e., low ppbv).

Some of the remaining VOCs were detected above the LRL, but have not consistently been detected since monitoring began.

Total VOCs were reported for all sample locations at concentrations ranging from 0.03476 parts per million by volume (ppmv) (VSA-5) to 0.11194 ppmv (VSA-8) at the 5-foot monitoring depth (Table B-7), and from 0.03341 ppmv (VSA-11) to 0.09857 ppmv (VSA-7) at the 15-foot monitoring depth (Table B-8). All results are far below the 20 ppmv trigger level.

6.3.2 Soil Vapor Volatile Organic Compounds Detected in the Chemical Waste Landfill Sanitary Sewer Monitoring Subsystem

In the May 2016 samples taken from the CSS locations (Table B-6), 16 VOCs above laboratory MDLs were detected. Of those 16 VOCs, the following have been frequently detected at or above the LRL since monitoring began:

- Dichlorodifluoromethane
- Tetrachloroethene
- 1,1,2-Trichloro-1,2,2-trifluoroethane
- Trichloroethene
- Trichlorofluoromethane

These VOCs have all been detected in the CWL residual soil vapor plume.

Similar to the VSA data set, acetone and methylene chloride have been detected during previous reporting periods, but with less frequency than the VOCs listed above. During this reporting period, acetone was detected at all CSS locations with values below the LRL. Methylene chloride was detected in CSS locations 2 through 6, but these were qualified by data validation as non-detections due to laboratory method blank contamination at a concentration greater than the MDL. Acetone shows no apparent trend of increasing concentrations. Both VOCs are constituents of concern at the CWL, common laboratory contaminants, and occur at very low concentrations in the vicinity of the CAMU (i.e., low ppbv).

The remaining VOCs had some measurements above the LRL but have not consistently been detected since monitoring began.

Total VOCs ranged from 0.01428 ppmv (CSS-1) to 0.04918 ppmv (CSS-6); far below the 20 ppmv trigger level (Table B-9).

6.3.3 Residual Volatile Organic Compound Soil Vapor Plume from the Chemical Waste Landfill

The following VOCs are the primary constituents of the residual VOC plume from the CWL and have been consistently detected since monitoring of the VSA and CSS subsystems began in September 2000, prior to placement of wastes in the CAMU containment cell:

- Dichlorodifluoromethane
- Tetrachloroethane
- 1,1,1-Trichloroethane
- 1,1,2-Trichloro-1,2,2-trifluoroethane
- Trichloroethene
- Trichlorofluoromethane

The CAMU containment cell overlies the CWL residual VOC soil vapor plume, as demonstrated by the consistent low-concentration detections of the same VOCs. The VOC levels observed beneath the containment cell are well below those measured in the CWL soil vapor monitoring network and are consistent with the CWL conceptual model.

It is expected that detections of very low VOC concentrations will continue to occur, and may even increase, but will remain at very low concentrations in the vicinity of the containment cell. This will continue until the VOC soil vapor plume completely dissipates by either one or both of the following mechanisms:

- Diffusion in three dimensions, including to the atmosphere
- Degradation by soil bacteria

Directly beneath the CAMU containment cell, VOC concentrations are expected to be higher relative to the immediate surrounding area. The slightly higher levels are a result of reduced soil vapor movement underneath the containment cell. The containment cell bottom liner system (e.g., geosynthetic clay liner and HPDE liners) prevents the soil vapors from venting directly to the surface as the residual soil vapor plume slowly diffuses underneath the containment cell. Over time, the VOC soil vapors will diffuse laterally around the containment cell and dissipate by the mechanisms listed above.

Subsurface soil conditions (i.e., grain size, pore space, moisture content) around the containment cell, as well as the residual VOC soil vapor plume, are not homogeneous, which causes variations in the observed trends. VOC concentrations tend to be higher in the CSS locations closest to the CWL and decrease as the distance from the CWL increases. This is demonstrated in Figures B-1 through B-6 with the CSS-6 location being the closest to and the CSS-1 location the farthest from the CWL. Figures B-1 through B-6 show concentrations over time for the following VOCs:

- Dichlorodifluoromethane
- Tetrachloroethene
- 1,1,2-Trichloro-1,2,2-trifluoroethane
- Trichloroethene
- Trichlorofluoromethane

VOC concentrations appear to correlate with soil temperature variations described in Section 6.2. The VOC results demonstrate increases in concentrations when the soil temperature is warmer and decreases in concentrations when the soil temperature is cooler (Figures B-7 through B-28).

Based upon the analysis of the existing data, the containment cell is not a source of VOCs in the vadose zone. The residual VOC soil vapor plume beneath the CWL is the source of VOCs identified in the CAMU containment cell area, and it is expected that this residual soil vapor plume will completely dissipate over time. Monitoring of the residual CWL soil vapor plume is being performed in accordance with the CWL PCCP (NMED October 2009 and subsequent revisions) and the results are provided to the NMED annually.

7.0 LEACHATE COLLECTION AND REMOVAL SYSTEM

7.1 Description

The LCRS is designed to collect and withdraw leachate from the containment cell at the CAMU during the post-closure care period. The LCRS includes a lined sump at the northern end of the containment cell, a collection pipe in a central trench located above the geomembrane liner, a dedicated pump, and a geocomposite drainage layer (Figure 7-1). The central trench extends the length of the bottom of the containment cell from the south to the north and is sloped approximately 1% toward the north. The bottom of the containment cell is sloped approximately 2% to drain toward the central trench (Figure 7-2). The trench receives leachate from the geocomposite drainage layer. The collection pipe in the bottom of the trench is a slotted, 4-inch diameter, PVC pipe. A sloped, 10-inch diameter, PVC pipe (Figure 7-1) provides pump access to the LCRS sump from the northern end of the containment cell cover. The pump is turned on manually to deliver leachate to aboveground, portable, polyethylene containers.

7.2 Operation

Operation of the LCRS was reduced from weekly to quarterly pumping of leachate after January 15, 2015, in accordance with Permit Part E, Section E.10.4 (NMED January 2015).

7.3 Leachate Management

The leachate is pumped directly into portable polyethylene containers, which are closed, labeled, and placed on secondary containment pallets in a hazardous waste accumulation area adjacent to the containment cell. The containers of leachate are sent to a permitted, off-site hazardous waste management facility.

7.4 Results

Approximately 276 gallons of leachate were generated during this reporting period (CY 2016). The quarterly quantities are provided in Table 7-1.

Table 7-1
Gallons of Leachate Pumped from the Leachate Collection and Removal System Sump
Calendar Year 2016

Collection Dates	Leachate Volume (gallons)
March 1, 2016	77
June 1, 2016	69
September 21, 2016	70
December 6, 2016	60
Total Volume (gallons)	276

Notes: LCRS = Leachate Collection and Removal System.

North — South

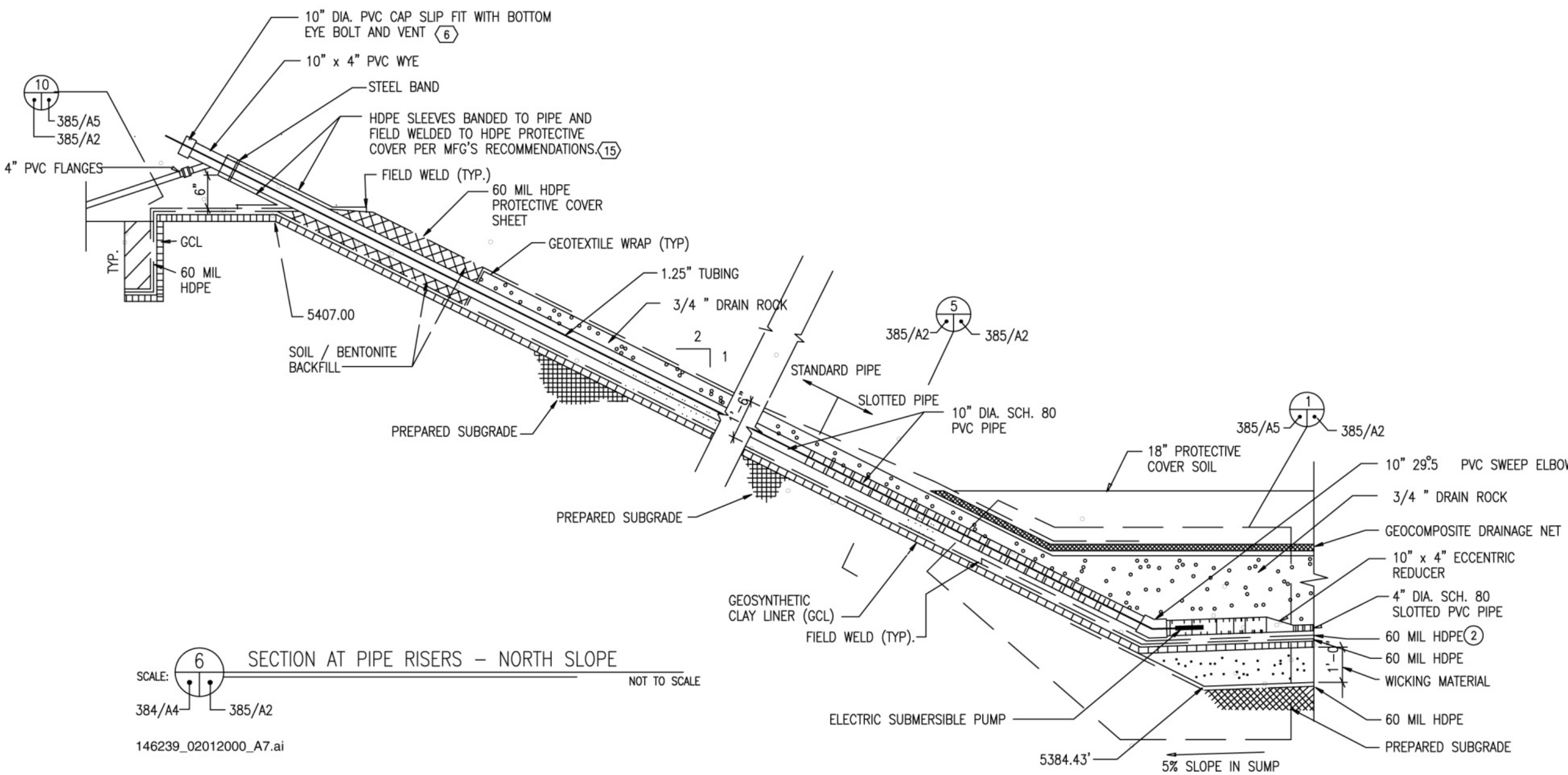

Figure 7-1
North-South Cross-Section of Leachate Collection and Removal System Sump

West — East

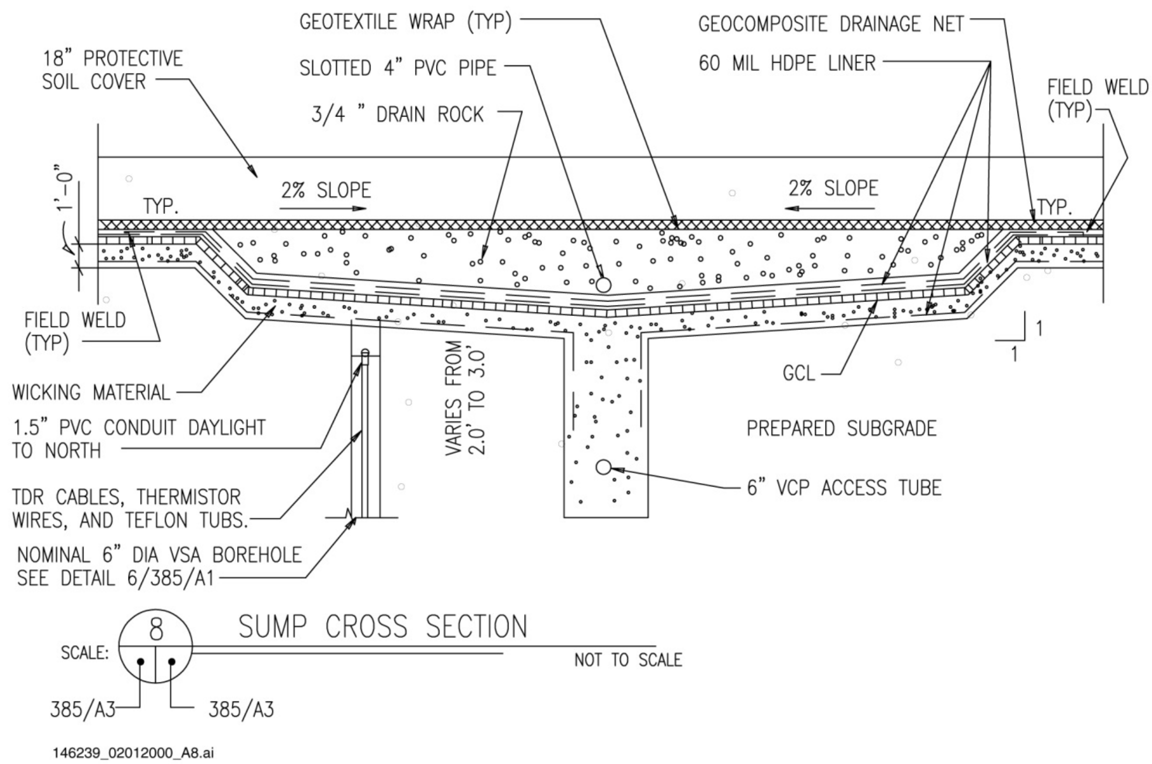

Figure 7-2
West-East Cross-Section of Containment Cell

8.0 INSPECTION, MAINTENANCE, AND REPAIR RESULTS

Inspection requirements for the final cover system, stormwater diversion structures, LCRS, VZMS, security fence, and safety and emergency equipment are detailed in Permit Attachment E, Section E.10. All inspections were performed by personnel who meet the qualification and training requirements of Permit Attachment F. The schedule for implementing inspections and prescribed maintenance and/or repairs is provided in Permit Attachment E, Table E-6. Table 8-1 of this report summarizes the inspection date, type, frequency, and documentation form for inspections performed during the CY 2016 reporting period.

8.1 Final Cover System Inspection/Maintenance/Repair Activities

Inspection of the cover system is divided into two parts. Part I is a quarterly inspection performed by a field technician. The inspections were performed in March, June, September, and December 2016; and included the following parameters:

- Visible settlement of the soil cover in excess of 6 inches.
- Erosion of the soil cover in excess of 6 inches deep.
- Identifying, for removal, plant species that are invasive or can develop a deep-root system of 8 feet or greater at maturity.
- Animal burrows in excess of 4 inches in diameter or burrows that appear to be of a species able to burrow to a depth of 6 feet or greater.
- Contiguous areas of no vegetation greater than 200 square feet.

No conditions were identified that required repair or maintenance during CY 2016.

Part II of the cover system inspection includes an annual biological inspection by a staff biologist that was performed in September 2016; and included the following inspection parameters:

- Approximate percentage vegetative coverage (actively photosynthesizing or living plants as determined during the growing season).
- Of the total vegetative cover, the approximate percentage native vegetation.
- Main plant species growing on the cover and the approximate percentage of the cover populated by each species.

Table 8-1
Inspection Frequency and Dates Performed
Calendar Year 2016

Inspection Type	Frequency[a]	Inspection Documentation Form	Date Performed
Final Cover System – Part I Stormwater Diversion Structures Security Fence	Quarterly	CAMU Post-Closure Quarterly Inspection Form Final Cover System/Stormwater Diversion Structures/Security Fence	March 8, 2016
			June 8, 2016
			September 22, 2016
			December 2, 2016
Final Cover System – Part II (vegetative cover)	Annually[b]	CAMU Post-Closure Inspection Form Final Cover Biology System	September 15, 2016
LCRS	Quarterly	CAMU Post-Closure Quarterly Inspection Form Leachate Collection and Removal System	March 1, 2016
			June 1, 2016
			September 21, 2016
			December 6, 2016
VZMS	Quarterly	CAMU Post-Closure Quarterly Inspection Form VZMS CSS Soil Moisture/Soil Vapor Monitoring Locations & Equipment	February 12, 2016
			May 2, 2016
			August 11, 2016
			November 2, 2016
		CAMU Post-Closure Quarterly Inspection Form VZMS PSL Soil Moisture Monitoring Locations & Equipment	February 22, 23, 24, 2016
			May 5, 11, 25, 2016
			August 9, 10, 2016
			November 7, 16, 2016
		CAMU Post-Closure Quarterly Inspection Form VZMS VSA Soil Moisture Monitoring Locations & Equipment	February 11, 2016
			May 2, 2016
			August 11, 2016
			November 2, 2016
Safety and Emergency Equipment	Monthly	CAMU Post-Closure Monthly Inspection Form Safety and Emergency Equipment	January 5, 2016
			February 4, 2016
			March 1, 2016
			April 7, 2016
			May 2, 2016
			June 1, 2016
			July 1, 2016
			August 2, 2016
			September 1, 2016
			October 7, 2016
			November 1, 2016
			December 2, 2016

Notes:
[a]Inspection frequency and criteria taken from Permit Attachment E, Table E-6.
[b]Changed from quarterly to annually after meeting successful revegetation criteria as determined by the staff biologist during the September 2015 growing season inspection. Revegetation criteria specified in Permit Attachment E, Section E.10.2.
CAMU = Corrective Action Management Unit.
CSS = Chemical Waste Landfill sanitary sewer.
LCRS = Leachate collection and removal system.
PSL = Primary subliner.
VSA = Vertical sensor array.
VZMS = Vadose zone monitoring system.

Approximately 42% of the vegetative cover was identified as actively photosynthesizing, primarily comprised of galleta grass (27%), mesa dropseed (10%), and blue grama (2%). Approximately 98% of the actively photosynthesizing plants were identified as native vegetation. Two four-wing saltbush plants were identified growing on the cover. The plants and their entire root system were removed by hand at the time of inspection. There were no contiguous areas without vegetation exceeding 200 square feet in size.

8.2 Stormwater Diversion Structures System Inspection/Maintenance/Repair Activities

Inspections of the stormwater diversion structures system by a field technician were performed in March, June, September, and December of 2016; and included the following parameters:

- Channel or sidewall erosion in excess of 6 inches deep.
- Channel sediment accumulation in excess of 6 inches deep.
- Debris that blocks more than one-third of the channel width.

The September 22, 2016 inspection identified debris blocking the drainage grate located on the north side of the containment cell. The debris was removed at the time of inspection. No other conditions were identified that required repair or maintenance.

The December 2, 2016 inspection identified debris blocking the drainage grate located on the north side of the containment cell. The debris was removed at the time of inspection. No other conditions were identified that required repair or maintenance.

8.3 Leachate Collection Removal System Inspection/Maintenance/Repair Activities

Inspection of the LCRS is performed during the leachate removal operation by a field technician. The inspections were performed in March, June, September, and December of 2016; and included the following parameters:

- Visual inspection of the dedicated hose and fittings (i.e., connections and end caps).

- Testing of the ground fault circuit interrupter used to power the submersible pump.

- Audible check to verify the pump is operational. If there is no audible sound and/or the pump fails to extract leachate from the sump, it is pulled from the sump and inspected. If it is determined that the pump is functioning properly yet no leachate was removed, a visual inspection is made of the sump with a down-hole video camera to determine the leachate level.

The September 21, 2016 inspection identified a faulty O-ring on the dedicated hose. It was replaced at time of inspection. No other conditions were identified that required repair or maintenance.

8.4 Vadose Zone Monitoring System Inspection/Maintenance/Repair Activities

Inspection of the VZMS (i.e., CSS, PSL, and VSA subsystems) is performed by a field technician in conjunction with VZMS monitoring. Inspections were performed in February, May, August, and November 2016; and included the following parameters:

- Protective casings, access covers and doors, instrumentation access boxes, and compression caps (repair/maintenance or replacement).
- Locks (cleaning or replacement).
- Electronic monitoring system (calibration/repair/maintenance).
- Aboveground VZMS components exposed to weather (general condition).
- Monitoring equipment, such as pump, tubing, gauges, valves, etc. (repair/maintenance or replacement).

The May 2, 2016 CSS subsystem inspection identified the protective casings, access covers, and bollards of CSS-1 through CSS-6 were in need of repainting. Repainting was completed on May 24, 2016. No other conditions were identified that required repair or maintenance.

The November 2, 2016 CSS subsystem inspection identified sediment build up on the concrete pad for locations CSS-3 and CSS-6. The sediment was removed at time of inspection.

8.5 Security Fence Inspection/Maintenance/Repair Activities

Inspection of the security fence is performed by a field technician. The inspections were performed in March, June, September, and December 2016. Follow-up activities to the December 2016 inspection are also presented in this report. The inspections included the following parameters:

- Accumulation of wind-blown plants and debris.
- Fence wires and posts in need of repair/maintenance.
- Gates in need of oiling/repair/maintenance.
- Locks in need of cleaning or replacement.
- Warning signs in need of repair or replacement.

The December 2, 2015 inspection identified wind-blown plant debris on the south perimeter fence. The plant debris was removed by the final cover system maintenance/landscaping contractor on January 21 and 25, 2016. No other conditions were identified that required repair or maintenance.

The March 8, 2016 inspection identified wind-blown plant debris on the perimeter fence. The plant debris was removed by the final cover system maintenance/landscaping contractor on April 26 and 27, 2016. No other conditions were identified that required repair or maintenance.

The June 8, 2016 inspection identified wind-blown plant debris on the perimeter fence. The plant debris was removed by the final cover system maintenance/landscaping contractor from July 25 through July 27, 2016. No other conditions were identified that required repair or maintenance.

The December 2, 2016 inspection identified wind-blown plant debris on the perimeter fence and one snakeweed plant on the east slope of the containment cell. The plant debris and snakeweed plant were removed by the final cover system maintenance/landscaping contractor from December 19 through December 20, 2016. No other conditions were identified that required repair or maintenance.

8.6 Safety and Emergency Equipment/Maintenance/Repair Activities

Inspection of the safety and emergency equipment is performed monthly by a field technician; and included the following parameters:

- Spill control materials, including sorbent material, brooms and shovels are present, accessible, and in good condition.
- Fire extinguisher is present, charged, accessible, and in good condition.
- Portable eyewash station is operational and in good condition.
- Fire hydrant is operational, accessible, and in good condition.

The November inspection identified the eyewash cartridge was about to expire. The eyewash cartridge was replaced at time of the inspection. No other conditions were identified that required repair or maintenance.

8.7 Site Maintenance

Site maintenance activities were performed twice during CY 2016 by the final cover system maintenance/landscaping contractor.

<u>April 26 through 28, 2016</u>

Weeds were removed from the area between the toe of the containment cell cover and the site perimeter fence. A pre-emergent herbicide was applied to this same area; during application, care was taken to avoid spraying desirable plants. Undesirable tumbleweed vegetation was removed by hand from the containment cell cover.

July 25 through 27 and August 4 through 5, 2016

Weeds were removed from all sides of the area between the toe of the containment cell cover and the site perimeter fence. A pre-emergent herbicide was applied to this same area; during application, care was taken to avoid spraying desirable plants. Undesirable tumbleweed vegetation was removed by hand from the containment cell cover.

9.0 SUMMARY AND CONCLUSIONS

A summary of CY 2016 activities and results is provided in this chapter, along with conclusions.

9.1 Vadose Zone Monitoring System

The VZMS results provide information about the subsurface environment and indicate the containment cell system is operating as designed. The data analysis completed as part of this annual evaluation confirms that the monitoring equipment is functioning properly and providing results that are representative of conditions in the subsurface near the containment cell.

The increasing soil moisture trend at the CSS-2 location (12- and 16-foot depths) was first observed in September 2005. An increasing soil moisture trend at the CSS-3 location (12-foot depth) was first observed in March 2007. During the same periods, the PSL and VSA monitoring locations have remained stable indicating the containment cell is not the source of the moisture. The source of the soil moisture increase was the sanitary sewer line that was repaired with a liner in September 2010. The soil moisture trends at CSS-2 and CSS-3 appear to have stabilized.

The moisture in the soil beneath the containment cell liner is the result of historic residual water and water added for soil compaction during containment cell construction activities. The soil and soil moisture content are not homogeneous. Slight soil moisture fluctuations are expected as the soil moisture levels continue to equilibrate and stabilize. The soil moisture monitoring results show no significant changes and are consistent with those presented in the Corrective Action Management Unit Report of Post-Closure Care Activities, Calendar Year 2015 (SNL/NM March 2016). The results at all monitoring locations are significantly below the soil moisture trigger level. These trends indicate that the containment cell is performing as designed and no leaks have been detected.

During this reporting period, acetone was detected at most CSS and VSA locations with some values at or above the LRL. Methylene chloride was detected at all CSS and VSA locations with the exception of CSS-1; however, all results were qualified by data validation as non-detection due to laboratory method blank contamination at a concentration greater than the MDL. Both VOCs are constituents of concern at the CWL, are common laboratory contaminants, and occur at very low concentrations in the vicinity of the CAMU (i.e., low ppbv).

The soil vapor data reflect VOC contamination from the residual VOC soil vapor plume emanating from the CWL. This is consistent with the conceptual model of the CWL residual soil vapor plume (SNL/NM December 2004) based on more than 20 years of VOC soil vapor monitoring at the CWL and 18 years of VOC soil vapor monitoring at the CAMU.

Total VOC results for all sample locations were far below the 20 ppmv trigger level. VOC concentrations continue to correlate with seasonal soil temperature variations, increasing when the soil temperature is warmer and decreasing when soil temperature is cooler.

Detections of the CWL residual VOC soil vapor plume in the VZMS are expected to continue until the residual VOC plume completely dissipates as discussed in Section 6.3.

9.2 Inspections

Inspections of the CAMU cover system, stormwater diversion structures, LCRS, VZMS, security fence, and safety and emergency equipment were performed in accordance with Permit requirements. CY 2016 maintenance and repair activities included:

- Removing plants capable of developing deep-root systems and invasive plants (September and December).
- Removing debris blocking drainage grate (September and December).
- Replacing a faulty O-ring on dedicated LCRS hose (September).
- Repainting the protective casings, access covers, and bollards for CSS-1 through CSS-6 (May).
- Removing sediment build up on the concrete pad at CSS-3 and CSS-6 (November).
- Removing windblown plant debris along the fence (April, July, and December)
- Replacing the eyewash cartridge (November).

9.3 Regulatory Activities

CY 2016 regulatory activities included submittal of the following:

- CAMU Report of Post-Closure Care Activities, Calendar Year 2015 (SNL/NM March 2016).
- FOP 08-20, Soil Moisture Determination Utilizing Neutron (SNL/NM April 2016).
- FOP 08-22, Soil Vapor Monitoring (SNL/NM October 2016).

9.4 Conclusions

All CAMU post-closure monitoring, inspection, and maintenance/repair requirements have been met for CY 2016, as required by Permit Part 7, Section 7.3. Specifically, Sandia personnel maintained and monitored the following as discussed in this report:

- The integrity and effectiveness of the final cover, including engineering controls to minimize erosion damage; and
- The LCRS, VZMS, fencing, security signs, and locks.

Personnel also maintained records of personnel training, operations, inspections, and monitoring activities, This Annual Post-Closure Care Report documents all activities and results.

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ANNEX A
Vertical Sensor Array Temperature Monitoring Results

Table A-1
Vertical Sensor Array Temperature Monitoring Results
5-Foot Monitoring Depth
Calendar Year 2016

Collection Dates	Instrument Location										
	VSA-1	VSA-2	VSA-3	VSA-4	VSA-5	VSA-6	VSA-7	VSA-8	VS8-9	VSA-10	VSA-11
	(Temperature in Degrees Celsius)										
February	18.6	18.5	18.4	18.2	18.1	18.5	18.4	18.5	18.2	18.2	17.7
May	18.0	17.8	17.8	17.9	17.6	18.0	17.6	17.6	17.6	17.5	17.5
August	16.5	16.3	16.8	16.7	16.9	17.1	17.2	17.0	17.2	17.0	16.9
November	17.3	17.1	17.2	17.4	17.3	18.0	17.9	17.6	17.6	17.8	17.3
Minimum	16.5	16.3	16.8	16.7	16.9	17.1	17.2	17.0	17.2	17.0	16.9
Maximum	18.6	18.5	18.4	18.2	18.1	18.5	18.4	18.5	18.2	18.2	17.7
Difference	2.1	2.2	1.6	1.5	1.2	1.4	1.2	1.5	1.0	1.2	0.8

Notes:
VSA = Vertical sensor array.

Table A-2
Vertical Sensor Array Temperature Monitoring Results
15-Foot Monitoring Depth
Calendar Year 2016

	Instrument Location										
	VSA-1	VSA-2	VSA-3	VSA-4	VSA-5	VSA-6	VSA-7	VSA-8	VS8-9	VSA-10	VSA-11
Collection Dates	(Temperature in Degrees Celsius)										
February	18.2	18.5	18.2	18.1	17.8	18.3	18.1	18.1	17.9	17.8	17.5
May	18.4	18.0	18.1	18.1	17.9	18.3	17.9	17.8	17.7	17.7	17.6
August	17.0	16.8	17.0	17.1	17.3	17.5	17.5	17.5	17.6	17.4	16.7
November	17.1	16.6	16.9	16.9	17.0	17.9	17.7	17.6	17.7	18.0	17.4
Minimum	17.0	16.6	16.9	16.9	17.0	17.5	17.5	17.5	17.6	17.4	16.7
Maximum	18.4	18.5	18.2	18.1	17.9	18.3	18.1	18.1	17.9	18.0	17.6
Difference	1.4	1.9	1.3	1.2	0.9	0.8	0.6	0.6	0.3	0.6	0.9

Notes:
VSA = Vertical sensor array.

ANNEX B
Summaries of Volatile Organic Compound Concentrations

Table B-1
Summary of Duplicate Sample Results
Vertical Sensor Array
Calendar Year 2016

Analyte Detected	Sample Location (May 4, 2016) VSA-7 15-foot monitoring depth Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier	VSA-7 15-foot monitoring depth (duplicate) Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Acetone	2.6	0.18	5	J		3.5	0.18	5	J	
Benzene	0.17	0.079	0.4	J		0.20	0.079	0.4	J	
Butanone, 2-	0.70	0.20	0.8	J		1.8	0.2	0.8		
Carbon disulfide		0.078	0.8	U		0.77	0.078	0.8	J	
Carbon tetrachloride	0.14	0.064	0.8	J		0.16	0.064	0.8	J	
Chloroform	0.22	0.095	0.3	J		0.21	0.095	0.3	J	
Dichlorodifluoromethane	2.5	0.15	0.4			2.4	0.15	0.4		
Dichloroethane, 1,1-	0.47	0.072	0.3			0.45	0.072	0.3		
Dichloroethene, trans-1,2-	0.25	0.1	0.4	J		0.24	0.1	0.4	J	
Methylene chloride	0.28	0.072	0.4	J,B	0.40U,B	0.32	0.072	0.4	J,B	0.40U,B
Pentanone, 4-methyl-, 2-	0.36	0.14	0.4	J			0.14	0.4	U	
Tetrachloroethene	17.0	0.051	0.4			16.0	0.051	0.4		
Toluene	0.077	0.051	0.4	J		0.60	0.051	0.4		
Trichloro-1,2,2-trifluoroethane, 1,1,2-	5.5	0.16	0.4			5.2	0.16	0.4		
Trichloroethane, 1,1,1-	2.1	0.065	0.3			2.1	0.065	0.3		
Trichloroethene	60.0	0.16	0.6			59.0	0.11	0.4		
Trichlorofluoromethane	6.1	0.2	0.4			5.8	0.2	0.4		
m,p-Xylene		0.1	0.8	U		0.14	0.1	0.8	J	
Total Organics[a]	98.187	NA	NA	NA	NA	98.57	NA	NA	NA	NA

Notes:
Concentrations above the MDL and below the LRL are qualified as estimated values by the laboratory.
Blank cell in result column denotes non-detection.
Blank cells in laboratory and validation columns denote all quality control samples met acceptance criteria.
Shaded areas denote detections at, or above, the LRL.
Total Organics is the sum of validated detected organic analytes (i.e., results for analytes reported as detections by the laboratory, but qualified during data validation as not detected are not included in the Total Organics value).

B = Method blank contamination at concentration >MDL.
J = Estimated result. Result is less than the LRL.
LRL = Laboratory reporting limit.
MDL = Method detection limit.
NA = Not applicable.
ppbv = Part(s) per billion by volume.
U = Qualified by laboratory and/or data validation as a non-detection.
VSA = Vertical sensor array.

Table B-2
Summary of Duplicate Sample Results
Chemical Waste Landfill Sanitary Sewer
Calendar Year 2016

Analyte Detected	Sample Location (May 4, 2016) CSS-1					CSS-1 (duplicate)				
	Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier	Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Acetone	4.6	0.18	5	J		3.9	0.18	5	J	
2-Butanone	1.8	0.2	0.8			0.75	0.2	0.8	J	
Carbon disulfide	2.6	0.078	0.8				0.078	0.8	U	
Dichlorodifluoromethane	0.79	0.15	0.4			0.78	0.15	0.4		
Methylene chloride		0.072	0.4	U		0.35	0.072	0.4	J,B	0.40U,B
Tetrachloroethene	0.65	0.051	0.4			0.62	0.051	0.4		
Toluene	0.092	0.051	0.4	J		0.59	0.051	0.4		
1,2,2-Trichloro-1,1,2-trifluoroethane	1.1	0.16	0.4			1.1	0.16	0.4		
1,1,1-Trichloroethane	0.35	0.065	0.3			0.33	0.065	0.3		
Trichloroethene	1.2	0.11	0.4			1.1	0.11	0.4		
Trichloorofluoromethane	1.1	0.2	0.4			1.1	0.2	0.4		
Total Organics[a]	14.282	NA	NA	NA	NA	10.27	NA	NA	NA	NA

Notes:
Concentrations above the MDL and below the LRL are qualified as estimated values by the laboratory.
Blank cell in result column denotes non-detection.
Blank cells in laboratory and validation columns denote all quality control samples met acceptance criteria.
Shaded areas denote detections at, or above the LRL.
[a]Total Organics = Sum of validated detected organic analytes (i.e., results for analytes reported as detections by the laboratory, but qualified during data validation as not detected are not included in the Total Organics value).

B = Method blank contamination at concentration >MDL.
CSS = CWL sanitary sewer.
CWL = Chemical Waste Landfill.
J = Estimated result. Result is less than the LRL.
LRL = Laboratory reporting limit.
MDL = Method detection limit.
NA = Not applicable.
ppbv = Part(s) per billion by volume.
U = Qualified by laboratory and/or data validation as a non-detection.

Table B-3
Summary of Field/Trip Blank Sample Results
Calendar Year 2016

Analyte Detected	Field/Trip Blank (May 4, 2016) Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Acetone	0.20	0.18	5	J	
Methylene chloride	0.25	0.072	0.4	J,B	0.40U,B

Notes:
Concentrations above the MDL and below the LRL are qualified as estimated values by the laboratory.
Blank cells in laboratory and validation columns denote all quality control samples met acceptance criteria.
B = Method blank contamination at concentration >MDL.
J = Estimated result. Result is less than the LRL.
LRL = Laboratory reporting limit.
MDL = Method detection limit.
ppbv = Part(s) per billion by volume.
U = Qualified by laboratory and/or data validation as a non-detection.

Table B-4
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Acetone	VSA-1	2.5	0.18	5	J	
	VSA-2	3.3	0.18	5	J	
	VSA-3	4.0	0.18	5	J	
	VSA-4	2.6	0.18	5	J	
	VSA-5	3.9	0.18	5	J	
	VSA-6	2.7	0.18	5	J	
	VSA-7	1.7	0.18	5	J	5.0U,B2
	VSA-8	5.6	0.18	5		
	VS8-9	6.2	0.18	5		
	VSA-10	3.7	0.18	5	J	
	VSA-11	2.2	0.18	5	J	
Benzene	VSA-1	0.08	0.079	0.4	J	
	VSA-2	0.16	0.079	0.4	J	
	VSA-3	0.18	0.079	0.4	J	
	VSA-4	0.14	0.079	0.4	J	
	VSA-5	0.082	0.079	0.4	J	
	VSA-6	0.14	0.079	0.4	J	
	VSA-7	0.18	0.079	0.4	J	
	VSA-8	0.17	0.079	0.4	J	
	VS8-9	0.20	0.079	0.4	J	
	VSA-10		0.079	0.4	U	
	VSA-11	0.079	0.079	0.4	J	
Benzyl chloride	VSA-1		0.16	0.8	U	
	VSA-2		0.16	0.8	U	
	VSA-3		0.16	0.8	U	
	VSA-4		0.16	0.8	U	
	VSA-5		0.16	0.8	U	
	VSA-6		0.16	0.8	U	
	VSA-7		0.16	0.8	U	
	VSA-8		0.16	0.8	U	
	VS8-9		0.16	0.8	U	
	VSA-10		0.16	0.8	U	
	VSA-11		0.16	0.8	U	
Bromodichloromethane	VSA-1		0.066	0.3	U	
	VSA-2		0.066	0.3	U	
	VSA-3		0.066	0.3	U	
	VSA-4		0.066	0.3	U	
	VSA-5		0.066	0.3	U	
	VSA-6		0.066	0.3	U	
	VSA-7		0.066	0.3	U	
	VSA-8		0.066	0.3	U	
	VS8-9		0.066	0.3	U	
	VSA-10		0.066	0.3	U	
	VSA-11		0.066	0.3	U	

Refer to notes at end of Table B-4.

Table B-4 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016				
		Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)				
Bromoform	VSA-1		0.07	0.4	U	
	VSA-2		0.07	0.4	U	
	VSA-3		0.07	0.4	U	
	VSA-4		0.07	0.4	U	
	VSA-5		0.07	0.4	U	
	VSA-6		0.07	0.4	U	
	VSA-7		0.07	0.4	U	
	VSA-8		0.07	0.4	U	
	VS8-9		0.07	0.4	U	
	VSA-10		0.07	0.4	U	
	VSA-11		0.07	0.4	U	
Bromomethane	VSA-1		0.34	0.8	U	
	VSA-2		0.34	0.8	U	
	VSA-3		0.34	0.8	U	
	VSA-4		0.34	0.8	U	
	VSA-5		0.34	0.8	U	
	VSA-6		0.34	0.8	U	
	VSA-7		0.34	0.8	U	
	VSA-8		0.34	0.8	U	
	VS8-9		0.34	0.8	U	
	VSA-10		0.34	0.8	U	
	VSA-11		0.34	0.8	U	
2-Butanone	VSA-1	0.60	0.2	0.8	J	J+,C2
	VSA-2	0.58	0.2	0.8	J	J+,C2
	VSA-3	0.77	0.2	0.8	J	J+,C2
	VSA-4	0.44	0.2	0.8	J	J+,C2
	VSA-5	0.54	0.2	0.8	J	J+,C2
	VSA-6	0.43	0.2	0.8	J	
	VSA-7	0.53	0.2	0.8	J	
	VSA-8	2.3	0.2	0.8		
	VS8-9	1.4	0.2	0.8		
	VSA-10	0.71	0.2	0.8	J	
	VSA-11	1.6	0.2	0.8		
Carbon disulfide	VSA-1		0.078	0.8	U	
	VSA-2	0.62	0.078	0.8	J	
	VSA-3		0.078	0.8	U	
	VSA-4		0.078	0.8	U	
	VSA-5		0.078	0.8	U	
	VSA-6		0.078	0.8	U	
	VSA-7	0.26	0.078	0.8	J	
	VSA-8	1.9	0.078	0.8		
	VS8-9	2.2	0.078	0.8		
	VSA-10		0.078	0.8	U	
	VSA-11	0.15	0.078	0.8	J	

Refer to notes at end of Table B-4.

Table B-4 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)				
Carbon tetrachloride	VSA-1	0.073	0.064	0.8	J	
	VSA-2	0.13	0.064	0.8	J	
	VSA-3		0.064	0.8	U	
	VSA-4	0.099	0.064	0.8	J	
	VSA-5	0.072	0.064	0.8	J	
	VSA-6	0.077	0.064	0.8	J	
	VSA-7	0.11	0.064	0.8	J	
	VSA-8	0.13	0.064	0.8	J	
	VS8-9	0.13	0.064	0.8	J	
	VSA-10	0.13	0.064	0.8	J	
	VSA-11	0.093	0.064	0.8	J	
Chlorobenzene	VSA-1		0.064	0.3	U	
	VSA-2		0.064	0.3	U	
	VSA-3		0.064	0.3	U	
	VSA-4		0.064	0.3	U	
	VSA-5		0.064	0.3	U	
	VSA-6		0.064	0.3	U	
	VSA-7		0.064	0.3	U	
	VSA-8	0.07	0.064	0.3	J	
	VS8-9		0.064	0.3	U	
	VSA-10		0.064	0.3	U	
	VSA-11		0.064	0.3	U	
Chloroethane	VSA-1		0.31	0.8	U	
	VSA-2		0.31	0.8	U	
	VSA-3		0.31	0.8	U	
	VSA-4		0.31	0.8	U	
	VSA-5		0.31	0.8	U	
	VSA-6		0.31	0.8	U	
	VSA-7		0.31	0.8	U	
	VSA-8		0.31	0.8	U	
	VS8-9		0.31	0.8	U	
	VSA-10		0.31	0.8	U	
	VSA-11		0.31	0.8	U	
Chloroform	VSA-1	0.27	0.095	0.3	J	
	VSA-2	0.41	0.095	0.3		
	VSA-3	0.46	0.095	0.3		
	VSA-4	0.55	0.095	0.3		
	VSA-5	0.30	0.095	0.3		
	VSA-6	0.13	0.095	0.3	J	
	VSA-7		0.095	0.3	U	
	VSA-8	0.31	0.095	0.3		
	VS8-9	0.34	0.095	0.3		
	VSA-10	0.40	0.095	0.3		
	VSA-11	0.22	0.095	0.3	J	

Refer to notes at end of Table B-4.

Table B-4 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Chloromethane	VSA-1		0.2	0.8	U	
	VSA-2		0.2	0.8	U	
	VSA-3		0.2	0.8	U	
	VSA-4		0.2	0.8	U	
	VSA-5	0.21	0.2	0.8	J	
	VSA-6		0.2	0.8	U	
	VSA-7		0.2	0.8	U	
	VSA-8		0.2	0.8	U	
	VS8-9		0.2	0.8	U	
	VSA-10		0.2	0.8	U	
	VSA-11		0.2	0.8	U	
Dibromochloromethane	VSA-1		0.079	0.4	U	
	VSA-2		0.079	0.4	U	
	VSA-3		0.079	0.4	U	
	VSA-4		0.079	0.4	U	
	VSA-5		0.079	0.4	U	
	VSA-6		0.079	0.4	U	
	VSA-7		0.079	0.4	U	
	VSA-8		0.079	0.4	U	
	VS8-9		0.079	0.4	U	
	VSA-10		0.079	0.4	U	
	VSA-11		0.079	0.4	U	
1,2-Dibromoethane	VSA-1		0.075	0.8	U	
	VSA-2		0.075	0.8	U	
	VSA-3		0.075	0.8	U	
	VSA-4		0.075	0.8	U	
	VSA-5		0.075	0.8	U	
	VSA-6		0.075	0.8	U	
	VSA-7		0.075	0.8	U	
	VSA-8		0.075	0.8	U	
	VS8-9		0.075	0.8	U	
	VSA-10		0.075	0.8	U	
	VSA-11		0.075	0.8	U	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	VSA-1		0.16	0.4	U	
	VSA-2		0.16	0.4	U	
	VSA-3		0.16	0.4	U	
	VSA-4		0.16	0.4	U	
	VSA-5		0.16	0.4	U	
	VSA-6		0.16	0.4	U	
	VSA-7		0.16	0.4	U	
	VSA-8		0.16	0.4	U	
	VS8-9		0.16	0.4	U	
	VSA-10		0.16	0.4	U	
	VSA-11		0.16	0.4	U	

Refer to notes at end of Table B-4.

Table B-4 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016				
		Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)				
1,2-Dichlorobenzene	VSA-1		0.13	0.4	U	
	VSA-2		0.13	0.4	U	
	VSA-3		0.13	0.4	U	
	VSA-4		0.13	0.4	U	
	VSA-5		0.13	0.4	U	
	VSA-6		0.13	0.4	U	
	VSA-7		0.13	0.4	U	
	VSA-8		0.13	0.4	U	
	VS8-9		0.13	0.4	U	
	VSA-10		0.13	0.4	U	
	VSA-11		0.13	0.4	U	
1,3-Dichlorobenzene	VSA-1		0.11	0.4	U	
	VSA-2		0.11	0.4	U	
	VSA-3	0.28	0.11	0.4	J	
	VSA-4		0.11	0.4	U	
	VSA-5		0.11	0.4	U	
	VSA-6		0.11	0.4	U	
	VSA-7		0.11	0.4	U	
	VSA-8		0.11	0.4	U	
	VS8-9		0.11	0.4	U	
	VSA-10		0.11	0.4	U	
	VSA-11		0.11	0.4	U	
1,4-Dichlorobenzene	VSA-1		0.15	0.4	U	
	VSA-2		0.15	0.4	U	
	VSA-3		0.15	0.4	U	
	VSA-4		0.15	0.4	U	
	VSA-5		0.15	0.4	U	
	VSA-6		0.15	0.4	U	
	VSA-7		0.15	0.4	U	
	VSA-8		0.15	0.4	U	
	VS8-9		0.15	0.4	U	
	VSA-10		0.15	0.4	U	
	VSA-11		0.15	0.4	U	
Dichlorodifluoromethane	VSA-1	1.4	0.15	0.4		
	VSA-2	2.1	0.15	0.4		
	VSA-3	1.9	0.15	0.4		
	VSA-4	2.0	0.15	0.4		
	VSA-5	1.3	0.15	0.4		
	VSA-6	1.8	0.15	0.4		
	VSA-7	1.9	0.15	0.4		
	VSA-8	2.8	0.15	0.4		
	VS8-9	2.2	0.15	0.4		
	VSA-10	2.4	0.15	0.4		
	VSA-11	1.6	0.15	0.4		

Refer to notes at end of Table B-4.

Table B-4 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)	(ppbv)	(ppbv)		
1,1-Dichloroethane	VSA-1	0.21	0.072	0.3	J	
	VSA-2	0.64	0.072	0.3		
	VSA-3	0.65	0.072	0.3		
	VSA-4	0.68	0.072	0.3		
	VSA-5	0.27	0.072	0.3	J	
	VSA-6	0.15	0.072	0.3	J	
	VSA-7	0.37	0.072	0.3		
	VSA-8	0.60	0.072	0.3		
	VS8-9	0.12	0.072	0.3	J	
	VSA-10		0.072	0.3	U	
	VSA-11		0.072	0.3	U	
1,2-Dichloroethane	VSA-1		0.088	0.8	U	
	VSA-2		0.088	0.8	U	
	VSA-3		0.088	0.8	U	
	VSA-4		0.088	0.8	U	
	VSA-5		0.088	0.8	U	
	VSA-6		0.088	0.8	U	
	VSA-7		0.088	0.8	U	
	VSA-8		0.088	0.8	U	
	VS8-9		0.088	0.8	U	
	VSA-10		0.088	0.8	U	
	VSA-11		0.088	0.8	U	
1,1-Dichloroethene	VSA-1		0.13	0.8	U	
	VSA-2		0.13	0.8	U	
	VSA-3		0.13	0.8	U	
	VSA-4		0.13	0.8	U	
	VSA-5		0.13	0.8	U	
	VSA-6		0.13	0.8	U	
	VSA-7		0.13	0.8	U	
	VSA-8		0.13	0.8	U	
	VS8-9		0.13	0.8	U	
	VSA-10		0.13	0.8	U	
	VSA-11		0.13	0.8	U	
cis-1,2-Dichloroethene	VSA-1		0.089	0.4	U	
	VSA-2		0.089	0.4	U	
	VSA-3		0.089	0.4	U	
	VSA-4		0.089	0.4	U	
	VSA-5		0.089	0.4	U	
	VSA-6		0.089	0.4	U	
	VSA-7		0.089	0.4	U	
	VSA-8		0.089	0.4	U	
	VS8-9		0.089	0.4	U	
	VSA-10		0.089	0.4	U	
	VSA-11		0.089	0.4	U	

Refer to notes at end of Table B-4.

Table B-4 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)				
Trans-1,2- Dichloroethene	VSA-1		0.1	0.4	U	
	VSA-2	0.25	0.1	0.4	J	
	VSA-3	0.22	0.1	0.4	J	
	VSA-4	0.18	0.1	0.4	J	
	VSA-5		0.1	0.4	U	
	VSA-6		0.1	0.4	U	
	VSA-7	0.17	0.1	0.4	J	
	VSA-8	0.27	0.1	0.4	J	
	VS8-9		0.1	0.4	U	
	VSA-10		0.1	0.4	U	
	VSA-11		0.1	0.4	U	
1,2-Dichloropropane	VSA-1		0.24	0.4	U	
	VSA-2		0.24	0.4	U	
	VSA-3		0.24	0.4	U	
	VSA-4		0.24	0.4	U	
	VSA-5		0.24	0.4	U	
	VSA-6		0.24	0.4	U	
	VSA-7		0.24	0.4	U	
	VSA-8		0.24	0.4	U	
	VS8-9		0.24	0.4	U	
	VSA-10		0.24	0.4	U	
	VSA-11		0.24	0.4	U	
cis-1,3-Dichloropropene	VSA-1		0.1	0.4	U	
	VSA-2		0.1	0.4	U	
	VSA-3		0.1	0.4	U	
	VSA-4		0.1	0.4	U	
	VSA-5		0.1	0.4	U	
	VSA-6		0.1	0.4	U	
	VSA-7		0.1	0.4	U	
	VSA-8		0.1	0.4	U	
	VS8-9		0.1	0.4	U	
	VSA-10		0.1	0.4	U	
	VSA-11		0.1	0.4	U	
Trans-1,3-Dichloropropene	VSA-1		0.088	0.4	U	
	VSA-2		0.088	0.4	U	
	VSA-3		0.088	0.4	U	
	VSA-4		0.088	0.4	U	
	VSA-5		0.088	0.4	U	
	VSA-6		0.088	0.4	U	
	VSA-7		0.088	0.4	U	
	VSA-8		0.088	0.4	U	
	VS8-9		0.088	0.4	U	
	VSA-10		0.088	0.4	U	
	VSA-11		0.088	0.4	U	

Refer to notes at end of Table B-4.

Table B-4 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
			(ppbv)			
Ethyl benzene	VSA-1		0.063	0.4	U	
	VSA-2		0.063	0.4	U	
	VSA-3		0.063	0.4	U	
	VSA-4		0.063	0.4	U	
	VSA-5		0.063	0.4	U	
	VSA-6		0.063	0.4	U	
	VSA-7		0.063	0.4	U	
	VSA-8		0.063	0.4	U	
	VS8-9		0.063	0.4	U	
	VSA-10		0.063	0.4	U	
	VSA-11	0.27	0.063	0.4	J	
4-Ethyltoluene	VSA-1		0.19	0.4	U	
	VSA-2		0.19	0.4	U	
	VSA-3		0.19	0.4	U	
	VSA-4		0.19	0.4	U	
	VSA-5		0.19	0.4	U	
	VSA-6		0.19	0.4	U	
	VSA-7		0.19	0.4	U	
	VSA-8		0.19	0.4	U	
	VS8-9		0.19	0.4	U	
	VSA-10		0.19	0.4	U	
	VSA-11	0.24	0.19	0.4	J	
Hexachlorobutadiene	VSA-1		0.43	2.0	U	
	VSA-2		0.43	2.0	U	
	VSA-3		0.43	2.0	U	
	VSA-4		0.43	2.0	U	
	VSA-5		0.43	2.0	U	
	VSA-6		0.43	2.0	U	
	VSA-7		0.43	2.0	U	
	VSA-8		0.43	2.0	U	
	VS8-9		0.43	2.0	U	
	VSA-10		0.43	2.0	U	
	VSA-11		0.43	2.0	U	
2-Hexanone	VSA-1		0.087	0.4	U	
	VSA-2		0.087	0.4	U	
	VSA-3		0.087	0.4	U	
	VSA-4		0.087	0.4	U	
	VSA-5		0.087	0.4	U	
	VSA-6		0.087	0.4	U	
	VSA-7		0.087	0.4	U	
	VSA-8		0.087	0.4	U	
	VS8-9	0.13	0.087	0.4	J	
	VSA-10		0.087	0.4	U	
	VSA-11		0.087	0.4	U	

Refer to notes at end of Table B-4.

Table B-4 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Methylene chloride	VSA-1	0.25	0.072	0.4	J,B	0.40U,B
	VSA-2	0.35	0.072	0.4	J,B	0.40U,B
	VSA-3	0.44	0.072	0.4	B	0.44U,B
	VSA-4	0.67	0.072	0.4	B	0.67U,B
	VSA-5	0.32	0.072	0.4	J,B	0.40U,B
	VSA-6	0.20	0.072	0.4	J,B	0.40U,B
	VSA-7	0.26	0.072	0.4	J,B	0.40U,B
	VSA-8	0.30	0.072	0.4	J,B	0.40U,B
	VSA-9	0.26	0.072	0.4	J,B	0.40U,B
	VSA-10	0.26	0.072	0.4	J,B	0.40U,B
	VSA-11	0.34	0.072	0.4	J,B	0.40U,B
4-Methyl-2-pentanone	VSA-1		0.14	0.4	U	
	VSA-2		0.14	0.4	U	
	VSA-3		0.14	0.4	U	
	VSA-4		0.14	0.4	U	
	VSA-5		0.14	0.4	U	
	VSA-6		0.14	0.4	U	
	VSA-7		0.14	0.4	U	
	VSA-8		0.14	0.4	U	
	VS8-9		0.14	0.4	U	
	VSA-10		0.14	0.4	U	
	VSA-11		0.14	0.4	U	
Styrene	VSA-1		0.059	0.4	U	
	VSA-2		0.059	0.4	U	
	VSA-3		0.059	0.4	U	
	VSA-4		0.059	0.4	U	
	VSA-5		0.059	0.4	U	
	VSA-6		0.059	0.4	U	
	VSA-7		0.059	0.4	U	
	VSA-8		0.059	0.4	U	
	VS8-9	0.09	0.059	0.4	J	
	VSA-10		0.059	0.4	U	
	VSA-11		0.059	0.4	U	
1,1,2,2-Tetrachloroethane	VSA-1		0.069	0.4	U	
	VSA-2		0.069	0.4	U	
	VSA-3		0.069	0.4	U	
	VSA-4		0.069	0.4	U	
	VSA-5		0.069	0.4	U	
	VSA-6		0.069	0.4	U	
	VSA-7		0.069	0.4	U	
	VSA-8		0.069	0.4	U	
	VS8-9		0.069	0.4	U	
	VSA-10		0.069	0.4	U	
	VSA-11		0.069	0.4	U	

Refer to notes at end of Table B-4.

Table B-4 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Tetrachloroethene	VSA-1	6.7	0.051	0.4		
	VSA-2	6.4	0.051	0.4		
	VSA-3	11.0	0.051	0.4		
	VSA-4	7.5	0.051	0.4		
	VSA-5	3.5	0.051	0.4		
	VSA-6	12.0	0.051	0.4		
	VSA-7	14.0	0.051	0.4		
	VSA-8	18.0	0.051	0.4		
	VS8-9	9.7	0.051	0.4		
	VSA-10	10.0	0.051	0.4		
	VSA-11	6.3	0.051	0.4		
Toluene	VSA-1	0.097	0.051	0.4	J	
	VSA-2		0.051	0.4	U	
	VSA-3		0.051	0.4	U	
	VSA-4	1.0	0.051	0.4		
	VSA-5	0.071	0.051	0.4	J	
	VSA-6		0.051	0.4	U	
	VSA-7	0.11	0.051	0.4	J	
	VSA-8	0.091	0.051	0.4	J	
	VS8-9	0.14	0.051	0.4	J	
	VSA-10	0.068	0.051	0.4	J	
	VSA-11	0.47	0.051	0.4		
1,1,2-Trichloro-1,2,2-trifluoroethane	VSA-1	1.4	0.16	0.4		
	VSA-2	2.2	0.16	0.4		
	VSA-3	1.6	0.16	0.4		
	VSA-4	1.7	0.16	0.4		
	VSA-5	0.61	0.16	0.4		
	VSA-6	2.7	0.16	0.4		
	VSA-7	3.2	0.16	0.4		
	VSA-8	4.6	0.16	0.4		
	VS8-9	3.2	0.16	0.4		
	VSA-10	3.3	0.16	0.4		
	VSA-11	1.5	0.16	0.4		
1,2,4-Trichlorobenzene	VSA-1		0.43	2.0	U	
	VSA-2		0.43	2.0	U	
	VSA-3		0.43	2.0	U	
	VSA-4		0.43	2.0	U	
	VSA-5		0.43	2.0	U	
	VSA-6		0.43	2.0	U	
	VSA-7		0.43	2.0	U	
	VSA-8		0.43	2.0	U	
	VS8-9		0.43	2.0	U	
	VSA-10		0.43	2.0	U	
	VSA-11		0.43	2.0	U	

Refer to notes at end of Table B-4.

Table B-4 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
1,1,1-Trichloroethane	VSA-1	1.5	0.065	0.3		
	VSA-2	2.1	0.065	0.3		
	VSA-3	2.1	0.065	0.3		
	VSA-4	2.3	0.065	0.3		
	VSA-5	1.2	0.065	0.3		
	VSA-6	1.8	0.065	0.3		
	VSA-7	1.6	0.065	0.3		
	VSA-8	2.6	0.065	0.3		
	VS8-9	3.1	0.065	0.3		
	VSA-10	3.9	0.065	0.3		
	VSA-11	2.1	0.065	0.3		
1,1,2-Trichloroethane	VSA-1		0.067	0.4	U	
	VSA-2		0.067	0.4	U	
	VSA-3		0.067	0.4	U	
	VSA-4		0.067	0.4	U	
	VSA-5		0.067	0.4	U	
	VSA-6		0.067	0.4	U	
	VSA-7		0.067	0.4	U	
	VSA-8		0.067	0.4	U	
	VS8-9		0.067	0.4	U	
	VSA-10		0.067	0.4	U	
	VSA-11		0.067	0.4	U	
Trichloroethene	VSA-1	27.0	0.11	0.4		
	VSA-2	57.0	0.11	0.4		
	VSA-3	50.0	0.11	0.4		
	VSA-4	50.0	0.11	0.4		
	VSA-5	20.0	0.11	0.4		
	VSA-6	33.0	0.11	0.4		
	VSA-7	49.0	0.11	0.4		
	VSA-8	66.0	0.16	0.6		
	VS8-9	31.0	0.11	0.4		
	VSA-10	28.0	0.11	0.4		
	VSA-11	21.0	0.11	0.4		
Trichlorofluoromethane	VSA-1	2.7	0.2	0.4		
	VSA-2	4.2	0.2	0.4		
	VSA-3	4.2	0.2	0.4		
	VSA-4	5.1	0.2	0.4		
	VSA-5	2.7	0.2	0.4		
	VSA-6	4.4	0.2	0.4		
	VSA-7	4.0	0.2	0.4		
	VSA-8	6.5	0.2	0.4		
	VS8-9	5.8	0.2	0.4		
	VSA-10	7.5	0.2	0.4		
	VSA-11	4.9	0.2	0.4		

Refer to notes at end of Table B-4.

Table B-4 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)				
1,2,4-Trimethylbenzene	VSA-1		0.16	0.8	U	
	VSA-2		0.16	0.8	U	
	VSA-3		0.16	0.8	U	
	VSA-4		0.16	0.8	U	
	VSA-5		0.16	0.8	U	
	VSA-6		0.16	0.8	U	
	VSA-7		0.16	0.8	U	
	VSA-8		0.16	0.8	U	
	VS8-9		0.16	0.8	U	
	VSA-10		0.16	0.8	U	
	VSA-11	0.5	0.16	0.8	J	
1,3,5-Trimethylbenzene	VSA-1		0.13	0.4	U	
	VSA-2		0.13	0.4	U	
	VSA-3		0.13	0.4	U	
	VSA-4		0.13	0.4	U	
	VSA-5		0.13	0.4	U	
	VSA-6		0.13	0.4	U	
	VSA-7		0.13	0.4	U	
	VSA-8		0.13	0.4	U	
	VS8-9		0.13	0.4	U	
	VSA-10		0.13	0.4	U	
	VSA-11	0.28	0.13	0.4	J	
Vinyl acetate	VSA-1		0.15	0.8	U	
	VSA-2		0.15	0.8	U	
	VSA-3		0.15	0.8	U	
	VSA-4		0.15	0.8	U	
	VSA-5		0.15	0.8	U	
	VSA-6		0.15	0.8	U	
	VSA-7		0.15	0.8	U	
	VSA-8		0.15	0.8	U	
	VS8-9		0.15	0.8	U	
	VSA-10		0.15	0.8	U	
	VSA-11		0.15	0.8	U	
Vinyl chloride	VSA-1		0.12	0.4	U	
	VSA-2		0.12	0.4	U	
	VSA-3		0.12	0.4	U	
	VSA-4		0.12	0.4	U	
	VSA-5		0.12	0.4	U	
	VSA-6		0.12	0.4	U	
	VSA-7		0.12	0.4	U	
	VSA-8		0.12	0.4	U	
	VS8-9		0.12	0.4	U	
	VSA-10		0.12	0.4	U	
	VSA-11		0.12	0.4	U	

Refer to notes at end of Table B-4.

Table B-4 (Concluded)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
5-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)				
m,p-Xylene	VSA-1		0.1	0.8	U	
	VSA-2	0.11	0.1	0.8	J	
	VSA-3		0.1	0.8	U	
	VSA-4		0.1	0.8	U	
	VSA-5		0.1	0.8	U	
	VSA-6		0.1	0.8	U	
	VSA-7	0.11	0.1	0.8	J	
	VSA-8		0.1	0.8	U	
	VS8-9		0.1	0.8	U	
	VSA-10		0.1	0.8	U	
	VSA-11	0.70	0.1	0.8	J	
o-Xylene	VSA-1		0.054	0.4	U	
	VSA-2		0.054	0.4	U	
	VSA-3		0.054	0.4	U	
	VSA-4		0.054	0.4	U	
	VSA-5		0.054	0.4	U	
	VSA-6		0.054	0.4	U	
	VSA-7		0.054	0.4	U	
	VSA-8		0.054	0.4	U	
	VS8-9		0.054	0.4	U	
	VSA-10		0.054	0.4	U	
	VSA-11	0.12	0.054	0.4	J	

Notes:
Concentrations above the MDL and below the LRL are qualified as estimated values by the laboratory.
Blank cell in result column denotes non-detection.
Blank cells in laboratory and validation columns denote all quality control samples met acceptance criteria.
Shaded areas denote detections at, or above, the LRL.

B = Method blank contamination at concentration >MDL.
B2 = Field blank contamination at concentration >MDL.
C2 = Continuing calibration percent difference failed high.
J = Estimated result. Result is less than the LRL.
J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
LRL = Laboratory reporting limit.
MDL = Method detection limit.
ppbv = Part(s) per billion by volume.
U = Qualified by laboratory and/or data validation as a non-detection.
VSA = Vertical sensor array.

Table B-5
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Acetone	VSA-1	3.6	0.18	5	J	
	VSA-2	5.6	0.18	5		
	VSA-3	2.7	0.18	5	J	
	VSA-4	3.3	0.18	5	J	
	VSA-5	1.5	0.18	5	J	5.0U,B2
	VSA-6	4.3	0.18	5	J	
	VSA-7	2.6	0.18	5	J	
	VSA-8	1.7	0.18	5	J	5.0U,B2
	VS8-9	1.2	0.18	5	J	5.0U,B2
	VSA-10	6.5	0.18	5		
	VSA-11	4.1	0.18	5	J	
Benzene	VSA-1	0.10	0.079	0.4	J	
	VSA-2	0.18	0.079	0.4	J	
	VSA-3	0.17	0.079	0.4	J	
	VSA-4	0.13	0.079	0.4	J	
	VSA-5	0.086	0.079	0.4	J	
	VSA-6	0.18	0.079	0.4	J	
	VSA-7	0.17	0.079	0.4	J	
	VSA-8	0.19	0.079	0.4	J	
	VS8-9	0.11	0.079	0.4	J	
	VSA-10		0.079	0.4	U	
	VSA-11		0.079	0.4	U	
Benzyl chloride	VSA-1		0.16	0.8	U	
	VSA-2		0.16	0.8	U	
	VSA-3		0.16	0.8	U	
	VSA-4		0.16	0.8	U	
	VSA-5		0.16	0.8	U	
	VSA-6		0.16	0.8	U	
	VSA-7		0.16	0.8	U	
	VSA-8		0.16	0.8	U	
	VS8-9		0.16	0.8	U	
	VSA-10		0.16	0.8	U	
	VSA-11		0.16	0.8	U	
Bromodichloromethane	VSA-1		0.066	0.3	U	
	VSA-2		0.066	0.3	U	
	VSA-3		0.066	0.3	U	
	VSA-4		0.066	0.3	U	
	VSA-5		0.066	0.3	U	
	VSA-6		0.066	0.3	U	
	VSA-7		0.066	0.3	U	
	VSA-8		0.066	0.3	U	
	VS8-9		0.066	0.3	U	
	VSA-10		0.066	0.3	U	
	VSA-11		0.066	0.3	U	

Refer to notes at end of Table B-5.

Table B-5 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
			(ppbv)			
Bromoform	VSA-1		0.07	0.4	U	
	VSA-2		0.07	0.4	U	
	VSA-3		0.07	0.4	U	
	VSA-4		0.07	0.4	U	
	VSA-5		0.07	0.4	U	
	VSA-6		0.07	0.4	U	
	VSA-7		0.07	0.4	U	
	VSA-8		0.07	0.4	U	
	VS8-9		0.07	0.4	U	
	VSA-10		0.07	0.4	U	
	VSA-11		0.07	0.4	U	
Bromomethane	VSA-1		0.34	0.8	U	
	VSA-2		0.34	0.8	U	
	VSA-3		0.34	0.8	U	
	VSA-4		0.34	0.8	U	
	VSA-5		0.34	0.8	U	
	VSA-6		0.34	0.8	U	
	VSA-7		0.34	0.8	U	
	VSA-8		0.34	0.8	U	
	VS8-9		0.34	0.8	U	
	VSA-10		0.34	0.8	U	
	VSA-11		0.34	0.8	U	
2-Butanone	VSA-1	1.1	0.2	0.8		
	VSA-2	1.1	0.2	0.8		
	VSA-3	0.51	0.2	0.8	J	J+,C2
	VSA-4	0.47	0.2	0.8	J	J+,C2
	VSA-5	0.41	0.2	0.8	J	
	VSA-6	0.92	0.2	0.8		
	VSA-7	0.70	0.2	0.8	J	
	VSA-8	0.39	0.2	0.8	J	
	VS8-9		0.2	0.8	U	
	VSA-10	3.3	0.2	0.8		
	VSA-11	0.85	0.2	0.8		
Carbon disulfide	VSA-1		0.078	0.8	U	
	VSA-2	1.2	0.078	0.8		
	VSA-3		0.078	0.8	U	
	VSA-4	0.83	0.078	0.8		
	VSA-5		0.078	0.8	U	
	VSA-6		0.078	0.8	U	
	VSA-7		0.078	0.8	U	
	VSA-8		0.078	0.8	U	
	VS8-9		0.078	0.8	U	
	VSA-10	5.1	0.078	0.8		
	VSA-11		0.078	0.8	U	

Refer to notes at end of Table B-5.

Table B-5 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Carbon tetrachloride	VSA-1	0.13	0.064	0.8	J	
	VSA-2	0.14	0.064	0.8	J	
	VSA-3	0.11	0.064	0.8	J	
	VSA-4	0.092	0.064	0.8	J	
	VSA-5	0.087	0.064	0.8	J	
	VSA-6		0.064	0.8	U	
	VSA-7	0.14	0.064	0.8	J	
	VSA-8	0.15	0.064	0.8	J	
	VS8-9	0.16	0.064	0.8	J	
	VSA-10	0.15	0.064	0.8	J	
	VSA-11	0.086	0.064	0.8	J	
Chlorobenzene	VSA-1		0.064	0.3	U	
	VSA-2		0.064	0.3	U	
	VSA-3		0.064	0.3	U	
	VSA-4		0.064	0.3	U	
	VSA-5		0.064	0.3	U	
	VSA-6		0.064	0.3	U	
	VSA-7		0.064	0.3	U	
	VSA-8		0.064	0.3	U	
	VS8-9		0.064	0.3	U	
	VSA-10		0.064	0.3	U	
	VSA-11		0.064	0.3	U	
Chloroethane	VSA-1		0.31	0.8	U	
	VSA-2		0.31	0.8	U	
	VSA-3		0.31	0.8	U	
	VSA-4		0.31	0.8	U	
	VSA-5		0.31	0.8	U	
	VSA-6		0.31	0.8	U	
	VSA-7		0.31	0.8	U	
	VSA-8		0.31	0.8	U	
	VS8-9		0.31	0.8	U	
	VSA-10		0.31	0.8	U	
	VSA-11		0.31	0.8	U	
Chloroform	VSA-1	0.34	0.095	0.3		
	VSA-2	0.45	0.095	0.3		
	VSA-3	0.57	0.095	0.3		
	VSA-4	0.39	0.095	0.3		
	VSA-5	0.50	0.095	0.3		
	VSA-6	0.18	0.095	0.3	J	
	VSA-7	0.22	0.095	0.3	J	
	VSA-8	0.32	0.095	0.3		
	VS8-9	0.43	0.095	0.3		
	VSA-10	0.50	0.095	0.3		
	VSA-11	0.17	0.095	0.3	J	

Refer to notes at end of Table B-5.

Table B-5 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Chloromethane	VSA-1		0.2	0.8	U	
	VSA-2		0.2	0.8	U	
	VSA-3		0.2	0.8	U	
	VSA-4	0.22	0.2	0.8	J	
	VSA-5		0.2	0.8	U	
	VSA-6		0.2	0.8	U	
	VSA-7		0.2	0.8	U	
	VSA-8		0.2	0.8	U	
	VS8-9		0.2	0.8	U	
	VSA-10		0.2	0.8	U	
	VSA-11		0.2	0.8	U	
Dibromochloromethane	VSA-1		0.079	0.4	U	
	VSA-2		0.079	0.4	U	
	VSA-3		0.079	0.4	U	
	VSA-4		0.079	0.4	U	
	VSA-5		0.079	0.4	U	
	VSA-6		0.079	0.4	U	
	VSA-7		0.079	0.4	U	
	VSA-8		0.079	0.4	U	
	VS8-9		0.079	0.4	U	
	VSA-10		0.079	0.4	U	
	VSA-11		0.079	0.4	U	
1,2-Dibromoethane	VSA-1		0.075	0.8	U	
	VSA-2		0.075	0.8	U	
	VSA-3		0.075	0.8	U	
	VSA-4		0.075	0.8	U	
	VSA-5		0.075	0.8	U	
	VSA-6		0.075	0.8	U	
	VSA-7		0.075	0.8	U	
	VSA-8		0.075	0.8	U	
	VS8-9		0.075	0.8	U	
	VSA-10		0.075	0.8	U	
	VSA-11		0.075	0.8	U	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	VSA-1		0.16	0.4	U	
	VSA-2		0.16	0.4	U	
	VSA-3		0.16	0.4	U	
	VSA-4		0.16	0.4	U	
	VSA-5		0.16	0.4	U	
	VSA-6		0.16	0.4	U	
	VSA-7		0.16	0.4	U	
	VSA-8		0.16	0.4	U	
	VS8-9		0.16	0.4	U	
	VSA-10		0.16	0.4	U	
	VSA-11		0.16	0.4	U	

Refer to notes at end of Table B-5.

Table B-5 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)				
1,2-Dichlorobenzene	VSA-1		0.13	0.4	U	
	VSA-2		0.13	0.4	U	
	VSA-3	0.33	0.13	0.4	J	
	VSA-4		0.13	0.4	U	
	VSA-5		0.13	0.4	U	
	VSA-6		0.13	0.4	U	
	VSA-7		0.13	0.4	U	
	VSA-8		0.13	0.4	U	
	VS8-9	0.18	0.13	0.4	J	
	VSA-10		0.13	0.4	U	
	VSA-11		0.13	0.4	U	
1,3-Dichlorobenzene	VSA-1	0.16	0.11	0.4	J	
	VSA-2	0.31	0.11	0.4	J	
	VSA-3	0.20	0.11	0.4	J	
	VSA-4	0.11	0.11	0.4	J	
	VSA-5		0.11	0.4	U	
	VSA-6		0.11	0.4	U	
	VSA-7		0.11	0.4	U	
	VSA-8		0.11	0.4	U	
	VS8-9		0.11	0.4	U	
	VSA-10		0.11	0.4	U	
	VSA-11		0.11	0.4	U	
1,4-Dichlorobenzene	VSA-1		0.15	0.4	U	
	VSA-2		0.15	0.4	U	
	VSA-3		0.15	0.4	U	
	VSA-4		0.15	0.4	U	
	VSA-5		0.15	0.4	U	
	VSA-6		0.15	0.4	U	
	VSA-7		0.15	0.4	U	
	VSA-8		0.15	0.4	U	
	VS8-9		0.15	0.4	U	
	VSA-10		0.15	0.4	U	
	VSA-11		0.15	0.4	U	
Dichlorodifluoromethane	VSA-1	2.1	0.15	0.4		
	VSA-2	2.4	0.15	0.4		
	VSA-3	2.2	0.15	0.4		
	VSA-4	1.3	0.15	0.4		
	VSA-5	2.0	0.15	0.4		
	VSA-6	2.6	0.15	0.4		
	VSA-7	2.5	0.15	0.4		
	VSA-8	2.7	0.15	0.4		
	VS8-9	2.6	0.15	0.4		
	VSA-10	2.5	0.15	0.4		
	VSA-11	1.4	0.15	0.4		

Refer to notes at end of Table B-5.

Table B-5 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		Result	MDL	LRL		
		(ppbv)				
1,1-Dichloroethane	VSA-1	0.29	0.072	0.3	J	
	VSA-2	0.66	0.072	0.3		
	VSA-3	0.74	0.072	0.3		
	VSA-4	0.51	0.072	0.3		
	VSA-5	0.44	0.072	0.3		
	VSA-6	0.27	0.072	0.3	J	
	VSA-7	0.47	0.072	0.3		
	VSA-8	0.45	0.072	0.3		
	VS8-9	0.16	0.072	0.3	J	
	VSA-10	0.095	0.072	0.3	J	
	VSA-11		0.072	0.3	U	
1,2-Dichloroethane	VSA-1		0.088	0.8	U	
	VSA-2		0.088	0.8	U	
	VSA-3		0.088	0.8	U	
	VSA-4		0.088	0.8	U	
	VSA-5		0.088	0.8	U	
	VSA-6		0.088	0.8	U	
	VSA-7		0.088	0.8	U	
	VSA-8		0.088	0.8	U	
	VS8-9		0.088	0.8	U	
	VSA-10		0.088	0.8	U	
	VSA-11		0.088	0.8	U	
1,1-Dichloroethene	VSA-1		0.13	0.8	U	
	VSA-2		0.13	0.8	U	
	VSA-3		0.13	0.8	U	
	VSA-4		0.13	0.8	U	
	VSA-5		0.13	0.8	U	
	VSA-6		0.13	0.8	U	
	VSA-7		0.13	0.8	U	
	VSA-8		0.13	0.8	U	
	VS8-9		0.13	0.8	U	
	VSA-10		0.13	0.8	U	
	VSA-11		0.13	0.8	U	
cis-1,2-Dichloroethene	VSA-1		0.089	0.4	U	
	VSA-2		0.089	0.4	U	
	VSA-3		0.089	0.4	U	
	VSA-4		0.089	0.4	U	
	VSA-5		0.089	0.4	U	
	VSA-6		0.089	0.4	U	
	VSA-7		0.089	0.4	U	
	VSA-8		0.089	0.4	U	
	VS8-9		0.089	0.4	U	
	VSA-10		0.089	0.4	U	
	VSA-11		0.089	0.4	U	

Refer to notes at end of Table B-5.

Table B-5 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Trans-1,2-Dichloroethene	VSA-1		0.1	0.4	U	
	VSA-2	0.26	0.1	0.4	J	
	VSA-3	0.26	0.1	0.4	J	
	VSA-4	0.13	0.1	0.4	J	
	VSA-5	0.10	0.1	0.4	J	
	VSA-6	0.11	0.1	0.4	J	
	VSA-7	0.25	0.1	0.4	J	
	VSA-8	0.22	0.1	0.4	J	
	VS8-9		0.1	0.4	U	
	VSA-10		0.1	0.4	U	
	VSA-11		0.1	0.4	U	
1,2-Dichloropropane	VSA-1		0.24	0.4	U	
	VSA-2		0.24	0.4	U	
	VSA-3		0.24	0.4	U	
	VSA-4		0.24	0.4	U	
	VSA-5		0.24	0.4	U	
	VSA-6		0.24	0.4	U	
	VSA-7		0.24	0.4	U	
	VSA-8		0.24	0.4	U	
	VS8-9		0.24	0.4	U	
	VSA-10		0.24	0.4	U	
	VSA-11		0.24	0.4	U	
cis-1,3-Dichloropropene	VSA-1		0.1	0.4	U	
	VSA-2		0.1	0.4	U	
	VSA-3		0.1	0.4	U	
	VSA-4		0.1	0.4	U	
	VSA-5		0.1	0.4	U	
	VSA-6		0.1	0.4	U	
	VSA-7		0.1	0.4	U	
	VSA-8		0.1	0.4	U	
	VS8-9		0.1	0.4	U	
	VSA-10		0.1	0.4	U	
	VSA-11		0.1	0.4	U	
Trans-1,3-Dichloropropene	VSA-1		0.088	0.4	U	
	VSA-2		0.088	0.4	U	
	VSA-3		0.088	0.4	U	
	VSA-4		0.088	0.4	U	
	VSA-5		0.088	0.4	U	
	VSA-6		0.088	0.4	U	
	VSA-7		0.088	0.4	U	
	VSA-8		0.088	0.4	U	
	VS8-9		0.088	0.4	U	
	VSA-10		0.088	0.4	U	
	VSA-11		0.088	0.4	U	

Refer to notes at end of Table B-5.

Table B-5 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL (ppbv)	LRL	Laboratory Qualifier	Validation Qualifier
Ethyl benzene	VSA-1		0.063	0.4	U	
	VSA-2		0.063	0.4	U	
	VSA-3		0.063	0.4	U	
	VSA-4		0.063	0.4	U	
	VSA-5		0.063	0.4	U	
	VSA-6		0.063	0.4	U	
	VSA-7		0.063	0.4	U	
	VSA-8		0.063	0.4	U	
	VS8-9		0.063	0.4	U	
	VSA-10	0.076	0.063	0.4	J	
	VSA-11	0.085	0.063	0.4	J	
4-Ethyltoluene	VSA-1		0.19	0.4	U	
	VSA-2		0.19	0.4	U	
	VSA-3		0.19	0.4	U	
	VSA-4		0.19	0.4	U	
	VSA-5		0.19	0.4	U	
	VSA-6		0.19	0.4	U	
	VSA-7		0.19	0.4	U	
	VSA-8		0.19	0.4	U	
	VS8-9		0.19	0.4	U	
	VSA-10		0.19	0.4	U	
	VSA-11		0.19	0.4	U	
Hexachlorobutadiene	VSA-1		0.43	2.0	U	
	VSA-2		0.43	2.0	U	
	VSA-3		0.43	2.0	U	
	VSA-4		0.43	2.0	U	
	VSA-5		0.43	2.0	U	
	VSA-6		0.43	2.0	U	
	VSA-7		0.43	2.0	U	
	VSA-8		0.43	2.0	U	
	VS8-9		0.43	2.0	U	
	VSA-10		0.43	2.0	U	
	VSA-11		0.43	2.0	U	
2-Hexanone	VSA-1		0.087	0.4	U	
	VSA-2		0.087	0.4	U	
	VSA-3		0.087	0.4	U	
	VSA-4		0.087	0.4	U	
	VSA-5		0.087	0.4	U	
	VSA-6	0.16	0.087	0.4	J	
	VSA-7		0.087	0.4	U	
	VSA-8		0.087	0.4	U	
	VS8-9		0.087	0.4	U	
	VSA-10		0.087	0.4	U	
	VSA-11		0.087	0.4	U	

Refer to notes at end of Table B-5.

Table B-5 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		Result	MDL	LRL		
		(ppbv)				
Methylene chloride	VSA-1	0.32	0.072	0.4	J,B	0.40U,B
	VSA-2	0.38	0.072	0.4	J,B	0.40U,B
	VSA-3	0.53	0.072	0.4	B	0.53U,B
	VSA-4	0.49	0.072	0.4	B	0.49U,B
	VSA-5	0.33	0.072	0.4	J,B	0.40U,B
	VSA-6	0.25	0.072	0.4	J,B	0.40U,B
	VSA-7	0.28	0.072	0.4	J,B	0.40U,B
	VSA-8	0.27	0.072	0.4	J,B	0.40U,B
	VSA-9	0.25	0.072	0.4	J,B	0.40U,B
	VSA-10	0.25	0.072	0.4	J,B	0.40U,B
	VSA-11	0.25	0.072	0.4	J,B	0.40U,B
4-Methyl-2-pentanone	VSA-1		0.14	0.4	U	
	VSA-2	0.23	0.14	0.4	J	
	VSA-3		0.14	0.4	U	
	VSA-4		0.14	0.4	U	
	VSA-5		0.14	0.4	U	
	VSA-6		0.14	0.4	U	
	VSA-7	0.36	0.14	0.4	J	
	VSA-8		0.14	0.4	U	
	VS8-9		0.14	0.4	U	
	VSA-10		0.14	0.4	U	
	VSA-11		0.14	0.4	U	
Styrene	VSA-1		0.059	0.4	U	
	VSA-2		0.059	0.4	U	
	VSA-3		0.059	0.4	U	
	VSA-4		0.059	0.4	U	
	VSA-5		0.059	0.4	U	
	VSA-6		0.059	0.4	U	
	VSA-7		0.059	0.4	U	
	VSA-8		0.059	0.4	U	
	VS8-9		0.059	0.4	U	
	VSA-10		0.059	0.4	U	
	VSA-11		0.059	0.4	U	
1,1,2,2-Tetrachloroethane	VSA-1		0.069	0.4	U	
	VSA-2		0.069	0.4	U	
	VSA-3		0.069	0.4	U	
	VSA-4		0.069	0.4	U	
	VSA-5		0.069	0.4	U	
	VSA-6		0.069	0.4	U	
	VSA-7		0.069	0.4	U	
	VSA-8		0.069	0.4	U	
	VS8-9		0.069	0.4	U	
	VSA-10		0.069	0.4	U	
	VSA-11		0.069	0.4	U	

Refer to notes at end of Table B-5.

Table B-5 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Tetrachloroethene	VSA-1	7.6	0.051	0.4		
	VSA-2	12.0	0.051	0.4		
	VSA-3	12.0	0.051	0.4		
	VSA-4	6.3	0.051	0.4		
	VSA-5	7.8	0.051	0.4		
	VSA-6	13.0	0.051	0.4		
	VSA-7	17.0	0.051	0.4		
	VSA-8	17.0	0.051	0.4		
	VS8-9	11.0	0.051	0.4		
	VSA-10	11.0	0.051	0.4		
	VSA-11	4.9	0.051	0.4		
Toluene	VSA-1	0.43	0.051	0.4		
	VSA-2		0.051	0.4	U	
	VSA-3		0.051	0.4	U	
	VSA-4		0.051	0.4	U	
	VSA-5		0.051	0.4	U	
	VSA-6		0.051	0.4	U	
	VSA-7	0.077	0.051	0.4	J	
	VSA-8	0.076	0.051	0.4	J	
	VS8-9		0.051	0.4	U	
	VSA-10	0.19	0.051	0.4	J	
	VSA-11	0.12	0.051	0.4	J	
1,1,2-Trichloro-1,2,2-trifluoroethane	VSA-1	3.4	0.16	0.4		
	VSA-2	3.0	0.16	0.4		
	VSA-3	2.5	0.16	0.4		
	VSA-4	0.67	0.16	0.4		
	VSA-5	1.6	0.16	0.4		
	VSA-6	5.7	0.16	0.4		
	VSA-7	5.5	0.16	0.4		
	VSA-8	5.2	0.16	0.4		
	VS8-9	4.3	0.16	0.4		
	VSA-10	3.7	0.16	0.4		
	VSA-11	1.1	0.16	0.4		
1,2,4-Trichlorobenzene	VSA-1		0.43	2.0	U	
	VSA-2		0.43	2.0	U	
	VSA-3		0.43	2.0	U	
	VSA-4		0.43	2.0	U	
	VSA-5		0.43	2.0	U	
	VSA-6		0.43	2.0	U	
	VSA-7		0.43	2.0	U	
	VSA-8		0.43	2.0	U	
	VS8-9		0.43	2.0	U	
	VSA-10		0.43	2.0	U	
	VSA-11		0.43	2.0	U	

Refer to notes at end of Table B-5.

Table B-5 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)				
1,1,1-Trichloroethane	VSA-1	2.1	0.065	0.3		
	VSA-2	2.4	0.065	0.3		
	VSA-3	2.5	0.065	0.3		
	VSA-4	1.4	0.065	0.3		
	VSA-5	2.5	0.065	0.3		
	VSA-6	2.5	0.065	0.3		
	VSA-7	2.1	0.065	0.3		
	VSA-8	2.8	0.065	0.3		
	VS8-9	3.6	0.065	0.3		
	VSA-10	3.9	0.065	0.3		
	VSA-11	1.6	0.065	0.3		
1,1,2-Trichloroethane	VSA-1		0.067	0.4	U	
	VSA-2		0.067	0.4	U	
	VSA-3		0.067	0.4	U	
	VSA-4		0.067	0.4	U	
	VSA-5		0.067	0.4	U	
	VSA-6		0.067	0.4	U	
	VSA-7		0.067	0.4	U	
	VSA-8		0.067	0.4	U	
	VS8-9		0.067	0.4	U	
	VSA-10		0.067	0.4	U	
	VSA-11		0.067	0.4	U	
Trichloroethene	VSA-1	32.0	0.11	0.4		
	VSA-2	58.0	0.11	0.4		
	VSA-3	55.0	0.11	0.4		
	VSA-4	33.0	0.11	0.4		
	VSA-5	36.0	0.11	0.4		
	VSA-6	42.0	0.11	0.4		
	VSA-7	60.0	0.16	0.6		
	VSA-8	62.0	0.16	0.6		
	VS8-9	38.0	0.11	0.4		
	VSA-10	33.0	0.11	0.4		
	VSA-11	15.0	0.11	0.4		
Trichlorofluoromethane	VSA-1	4.8	0.2	0.4		
	VSA-2	5.1	0.2	0.4		
	VSA-3	5.4	0.2	0.4		
	VSA-4	2.6	0.2	0.4		
	VSA-5	5.7	0.2	0.4		
	VSA-6	6.8	0.2	0.4		
	VSA-7	6.1	0.2	0.4		
	VSA-8	6.6	0.2	0.4		
	VS8-9	7.2	0.2	0.4		
	VSA-10	7.8	0.2	0.4		
	VSA-11	3.7	0.2	0.4		

Refer to notes at end of Table B-5.

Table B-5 (Continued)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		Result	MDL	LRL		
		(ppbv)				
1,2,4-Trimethylbenzene	VSA-1		0.16	0.8	U	
	VSA-2		0.16	0.8	U	
	VSA-3		0.16	0.8	U	
	VSA-4		0.16	0.8	U	
	VSA-5		0.16	0.8	U	
	VSA-6		0.16	0.8	U	
	VSA-7		0.16	0.8	U	
	VSA-8		0.16	0.8	U	
	VS8-9		0.16	0.8	U	
	VSA-10		0.16	0.8	U	
	VSA-11		0.16	0.8	U	
1,3,5-Trimethylbenzene	VSA-1		0.13	0.4	U	
	VSA-2		0.13	0.4	U	
	VSA-3		0.13	0.4	U	
	VSA-4		0.13	0.4	U	
	VSA-5		0.13	0.4	U	
	VSA-6		0.13	0.4	U	
	VSA-7		0.13	0.4	U	
	VSA-8		0.13	0.4	U	
	VS8-9		0.13	0.4	U	
	VSA-10		0.13	0.4	U	
	VSA-11		0.13	0.4	U	
Vinyl acetate	VSA-1		0.15	0.8	U	
	VSA-2		0.15	0.8	U	
	VSA-3		0.15	0.8	U	
	VSA-4		0.15	0.8	U	
	VSA-5		0.15	0.8	U	
	VSA-6		0.15	0.8	U	
	VSA-7		0.15	0.8	U	
	VSA-8		0.15	0.8	U	
	VS8-9		0.15	0.8	U	
	VSA-10		0.15	0.8	U	
	VSA-11		0.15	0.8	U	
Vinyl chloride	VSA-1		0.12	0.4	U	
	VSA-2		0.12	0.4	U	
	VSA-3		0.12	0.4	U	
	VSA-4		0.12	0.4	U	
	VSA-5		0.12	0.4	U	
	VSA-6		0.12	0.4	U	
	VSA-7		0.12	0.4	U	
	VSA-8		0.12	0.4	U	
	VS8-9		0.12	0.4	U	
	VSA-10		0.12	0.4	U	
	VSA-11		0.12	0.4	U	

Refer to notes at end of Table B-5.

Table B-5 (Concluded)
Summary of Volatile Organic Compounds
Vertical Sensor Array Soil Vapor Monitoring
15-Foot Monitoring Depth
Calendar Year 2016

Analytes Detected	VSA Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)				
m,p-Xylene	VSA-1		0.1	0.8	U	
	VSA-2		0.1	0.8	U	
	VSA-3		0.1	0.8	U	
	VSA-4		0.1	0.8	U	
	VSA-5		0.1	0.8	U	
	VSA-6		0.1	0.8	U	
	VSA-7		0.1	0.8	U	
	VSA-8		0.1	0.8	U	
	VS8-9		0.1	0.8	U	
	VSA-10	0.21	0.1	0.8	J	
	VSA-11	0.24	0.1	0.8	J	
o-Xylene	VSA-1		0.054	0.4	U	
	VSA-2		0.054	0.4	U	
	VSA-3		0.054	0.4	U	
	VSA-4		0.054	0.4	U	
	VSA-5		0.054	0.4	U	
	VSA-6		0.054	0.4	U	
	VSA-7		0.054	0.4	U	
	VSA-8		0.054	0.4	U	
	VS8-9		0.054	0.4	U	
	VSA-10		0.054	0.4	U	
	VSA-11	0.056	0.054	0.4	J	

Notes:
Concentrations above the MDL and below the LRL are qualified as estimated values by the laboratory.
Blank cell in result column denotes non-detection.
Blank cells in laboratory and validation columns denote all quality control samples met acceptance criteria.
Shaded areas denote detections at, or above, the LRL.
B = Method blank contamination at concentration >MDL.
B2 = Field blank contamination at concentration >MDL.
C2 = Continuing calibration percent difference failed high.
J = Estimated result. Result is less than the LRL.
J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
LRL = Laboratory reporting limit.
MDL = Method detection limit.
ppbv = Part(s) per billion by volume.
U = Qualified by laboratory and/or data validation as a non-detection.
VSA = Vertical sensor array.

Table B-6
Summary of Volatile Organic Compounds
Chemical Waste Landfill Sanitary Sewer Soil Vapor Monitoring
Calendar Year 2016

Analytes Detected	CSS Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Acetone	CSS-1	4.6	0.18	5	J	
	CSS-2	3.7	0.18	5	J	
	CSS-3	3.6	0.18	5	J	
	CSS-4	2.1	0.18	5	J	
	CSS-5	2.6	0.18	5	J	
	CSS-6	4.9	0.18	5	J	
Benzene	CSS-1		0.079	0.4	U	
	CSS-2	0.081	0.079	0.4	J	
	CSS-3	0.081	0.079	0.4	J	
	CSS-4	0.086	0.079	0.4	J	
	CSS-5	0.086	0.079	0.4	J	
	CSS-6	0.092	0.079	0.4	J	
Benzyl chloride	CSS-1		0.16	0.8	U	
	CSS-2		0.16	0.8	U	
	CSS-3		0.16	0.8	U	
	CSS-4		0.16	0.8	U	
	CSS-5		0.16	0.8	U	
	CSS-6		0.16	0.8	U	
Bromodichloromethane	CSS-1		0.066	0.3	U	
	CSS-2		0.066	0.3	U	
	CSS-3		0.066	0.3	U	
	CSS-4		0.066	0.3	U	
	CSS-5		0.066	0.3	U	
	CSS-6		0.066	0.3	U	
Bromoform	CSS-1		0.07	0.4	U	
	CSS-2		0.07	0.4	U	
	CSS-3		0.07	0.4	U	
	CSS-4		0.07	0.4	U	
	CSS-5		0.07	0.4	U	
	CSS-6		0.07	0.4	U	
Bromomethane	CSS-1		0.34	0.8	U	
	CSS-2		0.34	0.8	U	
	CSS-3		0.34	0.8	U	
	CSS-4		0.34	0.8	U	
	CSS-5		0.34	0.8	U	
	CSS-6		0.34	0.8	U	
2-Butanone	CSS-1	1.8	0.2	0.8		
	CSS-2	0.33	0.2	0.8	J	J+,C2
	CSS-3	0.27	0.2	0.8	J	J+,C2
	CSS-4		0.2	0.8	U	
	CSS-5		0.2	0.8	U	
	CSS-6	1.1	0.2	0.8		

Refer to notes at end of Table B-6.

Table B-6 (Continued)
Summary of Volatile Organic Compounds
Chemical Waste Landfill Sanitary Sewer Soil Vapor Monitoring
Calendar Year 2016

Analytes Detected	CSS Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Carbon disulfide	CSS-1	2.6	0.078	0.8		
	CSS-2		0.078	0.8	U	
	CSS-3		0.078	0.8	U	
	CSS-4		0.078	0.8	U	
	CSS-5		0.078	0.8	U	
	CSS-6		0.078	0.8	U	
Carbon tetrachloride	CSS-1		0.064	0.8	U	
	CSS-2		0.064	0.8	U	
	CSS-3		0.064	0.8	U	
	CSS-4	0.12	0.064	0.8	J	
	CSS-5	0.09	0.064	0.8	J	
	CSS-6	0.24	0.064	0.8	J	
Chlorobenzene	CSS-1		0.064	0.3	U	
	CSS-2		0.064	0.3	U	
	CSS-3		0.064	0.3	U	
	CSS-4		0.064	0.3	U	
	CSS-5		0.064	0.3	U	
	CSS-6		0.064	0.3	U	
Chloroethane	CSS-1		0.31	0.8	U	
	CSS-2		0.31	0.8	U	
	CSS-3		0.31	0.8	U	
	CSS-4		0.31	0.8	U	
	CSS-5		0.31	0.8	U	
	CSS-6		0.31	0.8	U	
Chloroform	CSS-1		0.095	0.3	U	
	CSS-2		0.095	0.3	U	
	CSS-3	0.12	0.095	0.3	J	
	CSS-4	0.11	0.095	0.3	J	
	CSS-5		0.095	0.3	U	
	CSS-6	0.49	0.095	0.3		
Chloromethane	CSS-1		0.2	0.8	U	
	CSS-2	0.52	0.2	0.8	J	
	CSS-3	0.52	0.2	0.8	J	
	CSS-4		0.2	0.8	U	
	CSS-5	0.39	0.2	0.8	J	
	CSS-6		0.2	0.8	U	
Dibromochloromethane	CSS-1		0.079	0.4	U	
	CSS-2		0.079	0.4	U	
	CSS-3		0.079	0.4	U	
	CSS-4		0.079	0.4	U	
	CSS-5		0.079	0.4	U	
	CSS-6		0.079	0.4	U	

Refer to notes at end of Table B-6.

Table B-6 (Continued)
Summary of Volatile Organic Compounds
Chemical Waste Landfill Sanitary Sewer Soil Vapor Monitoring
Calendar Year 2016

Analytes Detected	CSS Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)				
1,2-Dibromoethane	CSS-1		0.075	0.8	U	
	CSS-2		0.075	0.8	U	
	CSS-3		0.075	0.8	U	
	CSS-4		0.075	0.8	U	
	CSS-5		0.075	0.8	U	
	CSS-6		0.075	0.8	U	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	CSS-1		0.16	0.4	U	
	CSS-2		0.16	0.4	U	
	CSS-3		0.16	0.4	U	
	CSS-4		0.16	0.4	U	
	CSS-5		0.16	0.4	U	
	CSS-6		0.16	0.4	U	
1,2-Dichlorobenzene	CSS-1		0.13	0.4	U	
	CSS-2		0.13	0.4	U	
	CSS-3		0.13	0.4	U	
	CSS-4		0.13	0.4	U	
	CSS-5		0.13	0.4	U	
	CSS-6		0.13	0.4	U	
1,3-Dichlorobenzene	CSS-1		0.11	0.4	U	
	CSS-2		0.11	0.4	U	
	CSS-3		0.11	0.4	U	
	CSS-4		0.11	0.4	U	
	CSS-5		0.11	0.4	U	
	CSS-6		0.11	0.4	U	
1,4-Dichlorobenzene	CSS-1		0.15	0.4	U	
	CSS-2		0.15	0.4	U	
	CSS-3		0.15	0.4	U	
	CSS-4		0.15	0.4	U	
	CSS-5		0.15	0.4	U	
	CSS-6		0.15	0.4	U	
Dichlorodifluoromethane	CSS-1	0.79	0.15	0.4		
	CSS-2	1.0	0.15	0.4		
	CSS-3	0.91	0.15	0.4		
	CSS-4	1.7	0.15	0.4		
	CSS-5	1.3	0.15	0.4		
	CSS-6	2.0	0.15	0.4		
1,1-Dichloroethane	CSS-1		0.072	0.3	U	
	CSS-2		0.072	0.3	U	
	CSS-3		0.072	0.3	U	
	CSS-4		0.072	0.3	U	
	CSS-5		0.072	0.3	U	
	CSS-6		0.072	0.3	U	

Refer to notes at end of Table B-6.

Table B-6 (Continued)
Summary of Volatile Organic Compounds
Chemical Waste Landfill Sanitary Sewer Soil Vapor Monitoring
Calendar Year 2016

Analytes Detected	CSS Location	Date Sampled May 4, 2016 Result	MDL (ppbv)	LRL	Laboratory Qualifier	Validation Qualifier
1,2-Dichloroethane	CSS-1		0.088	0.8	U	
	CSS-2		0.088	0.8	U	
	CSS-3		0.088	0.8	U	
	CSS-4		0.088	0.8	U	
	CSS-5		0.088	0.8	U	
	CSS-6		0.088	0.8	U	
1,1-Dichloroethene	CSS-1		0.13	0.8	U	
	CSS-2		0.13	0.8	U	
	CSS-3		0.13	0.8	U	
	CSS-4		0.13	0.8	U	
	CSS-5		0.13	0.8	U	
	CSS-6		0.13	0.8	U	
cis-1,2-Dichloroethene	CSS-1		0.089	0.4	U	
	CSS-2		0.089	0.4	U	
	CSS-3		0.089	0.4	U	
	CSS-4		0.089	0.4	U	
	CSS-5		0.089	0.4	U	
	CSS-6		0.089	0.4	U	
Trans-1,2-Dichloroethene	CSS-1		0.1	0.4	U	
	CSS-2		0.1	0.4	U	
	CSS-3		0.1	0.4	U	
	CSS-4		0.1	0.4	U	
	CSS-5		0.1	0.4	U	
	CSS-6		0.1	0.4	U	
1,2-Dichloropropane	CSS-1		0.24	0.4	U	
	CSS-2		0.24	0.4	U	
	CSS-3		0.24	0.4	U	
	CSS-4		0.24	0.4	U	
	CSS-5		0.24	0.4	U	
	CSS-6		0.24	0.4	U	
cis-1,3-Dichloropropene	CSS-1		0.1	0.4	U	
	CSS-2		0.1	0.4	U	
	CSS-3		0.1	0.4	U	
	CSS-4		0.1	0.4	U	
	CSS-5		0.1	0.4	U	
	CSS-6		0.1	0.4	U	
Trans-1,3-Dichloropropene	CSS-1		0.088	0.4	U	
	CSS-2		0.088	0.4	U	
	CSS-3		0.088	0.4	U	
	CSS-4		0.088	0.4	U	
	CSS-5		0.088	0.4	U	
	CSS-6		0.088	0.4	U	

Refer to notes at end of Table B-6.

Table B-6 (Continued)
Summary of Volatile Organic Compounds
Chemical Waste Landfill Sanitary Sewer Soil Vapor Monitoring
Calendar Year 2016

Analytes Detected	CSS Location	Date Sampled May 4, 2016 Result	MDL	LRL	Laboratory Qualifier	Validation Qualifier
		(ppbv)				
Ethyl benzene	CSS-1		0.063	0.4	U	
	CSS-2		0.063	0.4	U	
	CSS-3		0.063	0.4	U	
	CSS-4		0.063	0.4	U	
	CSS-5		0.063	0.4	U	
	CSS-6		0.063	0.4	U	
4-Ethytoluene	CSS-1		0.19	0.4	U	
	CSS-2		0.19	0.4	U	
	CSS-3		0.19	0.4	U	
	CSS-4		0.19	0.4	U	
	CSS-5		0.19	0.4	U	
	CSS-6		0.19	0.4	U	
Hexachlorobutadiene	CSS-1		0.43	2	U	
	CSS-2		0.43	2	U	
	CSS-3		0.43	2	U	
	CSS-4		0.43	2	U	
	CSS-5		0.43	2	U	
	CSS-6		0.43	2	U	
2-Hexanone	CSS-1		0.087	0.4	U	
	CSS-2		0.087	0.4	U	
	CSS-3		0.087	0.4	U	
	CSS-4		0.087	0.4	U	
	CSS-5		0.087	0.4	U	
	CSS-6		0.087	0.4	U	
Methylene chloride	CSS-1		0.072	0.4	U	
	CSS-2	0.30	0.072	0.4	J,B	0.40U,B
	CSS-3	0.31	0.072	0.4	J,B	0.40U,B
	CSS-4	0.25	0.072	0.4	J,B	0.40U,B
	CSS-5	0.30	0.072	0.4	J,B	0.40U,B
	CSS-6	0.27	0.072	0.4	J,B	0.40U,B
4-Methyl-2-pentanone	CSS-1		0.14	0.4	U	
	CSS-2		0.14	0.4	U	
	CSS-3		0.14	0.4	U	
	CSS-4		0.14	0.4	U	
	CSS-5		0.14	0.4	U	
	CSS-6		0.14	0.4	U	
Styrene	CSS-1		0.059	0.4	U	
	CSS-2		0.059	0.4	U	
	CSS-3		0.059	0.4	U	
	CSS-4		0.059	0.4	U	
	CSS-5		0.059	0.4	U	
	CSS-6		0.059	0.4	U	

Refer to notes at end of Table B-6.

Table B-6 (Continued)
Summary of Volatile Organic Compounds
Chemical Waste Landfill Sanitary Sewer Soil Vapor Monitoring
Calendar Year 2016

Analytes Detected	CSS Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
1,1,2,2-Tetrachloroethane	CSS-1		0.069	0.4	U	
	CSS-2		0.069	0.4	U	
	CSS-3		0.069	0.4	U	
	CSS-4		0.069	0.4	U	
	CSS-5		0.069	0.4	U	
	CSS-6		0.069	0.4	U	
Tetrachloroethene	CSS-1	0.65	0.051	0.4		
	CSS-2	1.5	0.051	0.4		
	CSS-3	1.4	0.051	0.4		
	CSS-4	3.3	0.051	0.4		
	CSS-5	0.41	0.051	0.4		
	CSS-6	0.62	0.051	0.4		
Toluene	CSS-1	0.092	0.051	0.4	J	
	CSS-2		0.051	0.4	U	
	CSS-3	0.10	0.051	0.4	J	
	CSS-4	0.053	0.051	0.4	J	
	CSS-5	0.058	0.051	0.4	J	
	CSS-6		0.051	0.4	U	
1,1,2-Trichloro-1,2,2-trifluoroethane	CSS-1	1.1	0.16	0.4		
	CSS-2	1.1	0.16	0.4		
	CSS-3	1.0	0.16	0.4		
	CSS-4	6.3	0.16	0.4		
	CSS-5	6.1	0.16	0.4		
	CSS-6	14.0	0.16	0.4		
1,2,4-Trichlorobenzene	CSS-1		0.43	2	U	
	CSS-2		0.43	2	U	
	CSS-3		0.43	2	U	
	CSS-4		0.43	2	U	
	CSS-5		0.43	2	U	
	CSS-6		0.43	2	U	
1,1,1-Trichloroethane	CSS-1	0.35	0.065	0.3		
	CSS-2	0.87	0.065	0.3		
	CSS-3	0.37	0.065	0.3		
	CSS-4	0.98	0.065	0.3		
	CSS-5	0.13	0.065	0.3	J	
	CSS-6	0.14	0.065	0.3	J	
1,1,2-Trichloroethane	CSS-1		0.067	0.4	U	
	CSS-2		0.067	0.4	U	
	CSS-3		0.067	0.4	U	
	CSS-4		0.067	0.4	U	
	CSS-5		0.067	0.4	U	
	CSS-6		0.067	0.4	U	

Refer to notes at end of Table B-6.

Table B-6 (Continued)
Summary of Volatile Organic Compounds
Chemical Waste Landfill Sanitary Sewer Soil Vapor Monitoring
Calendar Year 2016

Analytes Detected	CSS Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
Trichloroethene	CSS-1	1.2	0.11	0.4		
	CSS-2	4.5	0.11	0.4		
	CSS-3	4.8	0.11	0.4		
	CSS-4	8.9	0.11	0.4		
	CSS-5	6.5	0.11	0.4		
	CSS-6	20.0	0.11	0.4		
Trichlorofluoromethane	CSS-1	1.1	0.2	0.4		
	CSS-2	1.9	0.2	0.4		
	CSS-3	1.2	0.2	0.4		
	CSS-4	4.1	0.2	0.4		
	CSS-5	2.8	0.2	0.4		
	CSS-6	5.6	0.2	0.4		
1,2,4-Trimethylbenzene	CSS-1		0.16	0.8	U	
	CSS-2		0.16	0.8	U	
	CSS-3		0.16	0.8	U	
	CSS-4		0.16	0.8	U	
	CSS-5		0.16	0.8	U	
	CSS-6		0.16	0.8	U	
1,3,5-Trimethylbenzene	CSS-1		0.13	0.4	U	
	CSS-2		0.13	0.4	U	
	CSS-3		0.13	0.4	U	
	CSS-4		0.13	0.4	U	
	CSS-5		0.13	0.4	U	
	CSS-6		0.13	0.4	U	
Vinyl acetate	CSS-1		0.15	0.8	U	
	CSS-2		0.15	0.8	U	
	CSS-3		0.15	0.8	U	
	CSS-4		0.15	0.8	U	
	CSS-5		0.15	0.8	U	
	CSS-6		0.15	0.8	U	
Vinyl chloride	CSS-1		0.12	0.4	U	
	CSS-2		0.12	0.4	U	
	CSS-3		0.12	0.4	U	
	CSS-4		0.12	0.4	U	
	CSS-5		0.12	0.4	U	
	CSS-6		0.12	0.4	U	
m,p-Xylene	CSS-1		0.1	0.8	U	
	CSS-2		0.1	0.8	U	
	CSS-3		0.1	0.8	U	
	CSS-4		0.1	0.8	U	
	CSS-5	0.11	0.1	0.8	J	
	CSS-6		0.1	0.8	U	

Refer to notes at end of Table B-6.

Table B-6 (Concluded)
Summary of Volatile Organic Compounds
Chemical Waste Landfill Sanitary Sewer Soil Vapor Monitoring
Calendar Year 2016

Analytes Detected	CSS Location	Date Sampled May 4, 2016 Result (ppbv)	MDL (ppbv)	LRL (ppbv)	Laboratory Qualifier	Validation Qualifier
o-Xylene	CSS-1		0.054	0.4	U	
	CSS-2		0.054	0.4	U	
	CSS-3		0.054	0.4	U	
	CSS-4		0.054	0.4	U	
	CSS-5		0.054	0.4	U	
	CSS-6		0.054	0.4	U	

Notes:
Concentrations above the MDL and below the LRL are qualified as estimated values by the laboratory.
Blank cell in result column denotes non-detection.
Blank cells in laboratory and validation columns denote all quality control samples met acceptance criteria.
Shaded areas denote detections at, or above, the LRL.
B = Method blank contamination at concentration >MDL.
C2 = Continuing calibration percent difference failed high.
CSS = CWL sanitary sewer.
CWL = Chemical Waste Landfill.
J = Estimated result. Result is less than the LRL.
J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
LRL = Laboratory reporting limit.
MDL = Method detection limit.
ppbv = Part(s) per billion by volume.
U = Qualified by laboratory and/or data validation as a non-detection.

Table B-7
Total Volatile Organic Compound[a] Concentrations
Vertical Sensor Array Soil Vapor Monitoring
5-foot Monitoring Depth
Calendar Year 2016

VSA Location	Date Sampled May 4, 2016 Result (ppmv)	Trigger Level[b] (ppmv)
VSA-1	0.04453	20
VSA-2	0.08020	
VSA-3	0.07736	
VSA-4	0.07429	
VSA-5	0.03476	
VSA-6	0.05933	
VSA-7	0.07554	
VSA-8	0.11194	
VSA-9	0.06595	
VSA-10	0.06011	
VSA-11	0.04432	

Notes:
[a] Sum of validated detected organic analytes (i.e., results for analytes reported as detections by the laboratory but qualified during data validation as not detected are not included in the Total VOCs value).
[b] Level at which verification sampling is required.
ppmv = Parts per million by volume.
VOC = Volatile organic compound.
VSA = Vertical sensor array.

Table B-8
Total Volatile Organic Compound[a] Concentrations
Vertical Sensor Array Soil Vapor Monitoring
15-foot Monitoring Depth
Calendar Year 2016

VSA Location	Date Sampled May 4, 2016 Result (ppmv)	Trigger Level[b] (ppmv)
VSA-1	0.05815	20
VSA-2	0.09303	
VSA-3	0.08519	
VSA-4	0.05145	
VSA-5	0.05722	
VSA-6	0.07872	
VSA-7 (duplicate)	0.09857[c]	
VSA-8	0.09810	
VSA-9	0.06774	
VSA-10	0.07802	
VSA-11	0.03341	

Notes:
[a] Sum of validated detected organic analytes (i.e., results for analytes reported as detections by the laboratory, but qualified during data validation as not detected are not included in the Total VOCs value).
[b] Level at which verification sampling is required.
[c] The total VOC value was higher in the sample reported as the duplicate.
ppmv = Parts per million by volume.
VOC = Volatile organic compound.
VSA = Vertical sensor array.

Table B-9
Total Volatile Organic Compound[a] Concentrations
Chemical Waste Landfill Sanitary Sewer Soil Vapor Monitoring
15-foot Monitoring Depth
Calendar Year 2016

VSA Location	Date Sampled May 4, 2016 Result (ppmv)	Trigger Level[b] (ppmv)
CSS-1	0.01428	20
CSS-2	0.01550	
CSS-3	0.01437	
CSS-4	0.02775	
CSS-5	0.02057	
CSS-6	0.04918	

Notes:
[a] Sum of validated detected organic analytes (i.e., results for analytes reported as detections by the laboratory, but qualified during data validation as not detected are not included in the Total VOCs value).
[b] Level at which verification sampling is required.
CSS = CWL sanitary sewer.
CWL = Chemical Waste Landfill.
ppmv = Parts per million by volume.
VOC = Volatile organic compound.

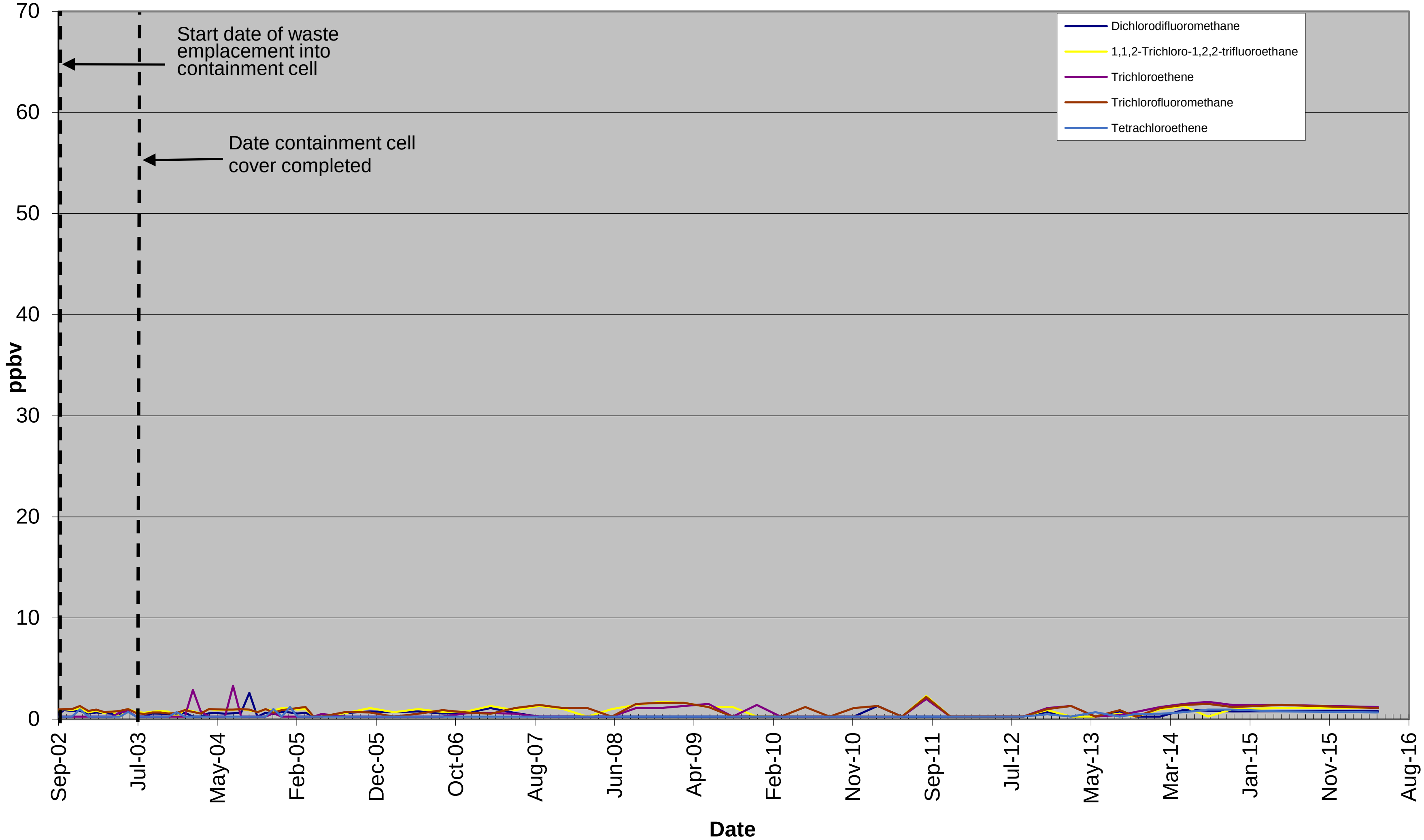

Figure B-1
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at CSS-1
September 2002 through May 2016

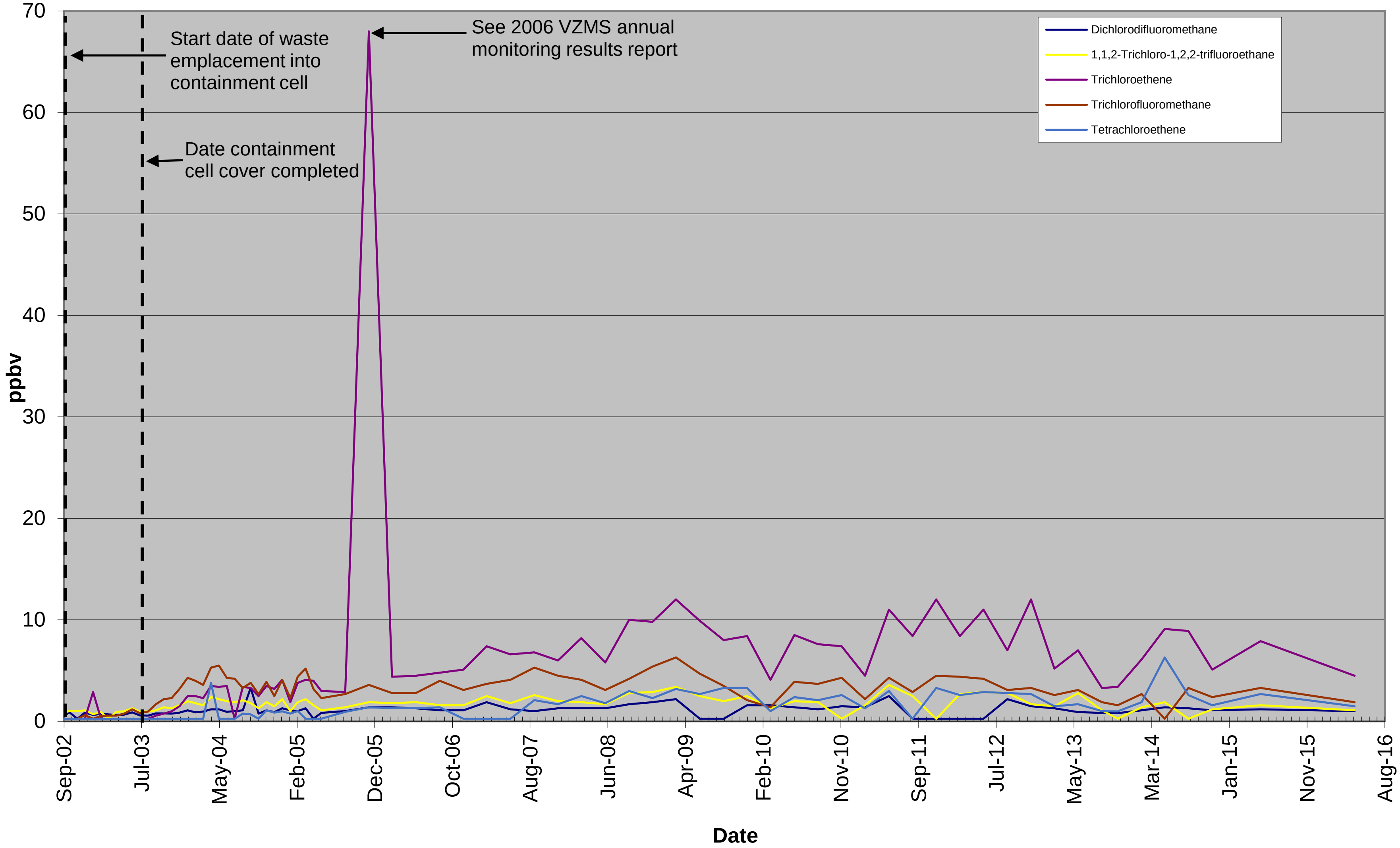

Figure B-2
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at CSS-2
September 2002 through May 2016

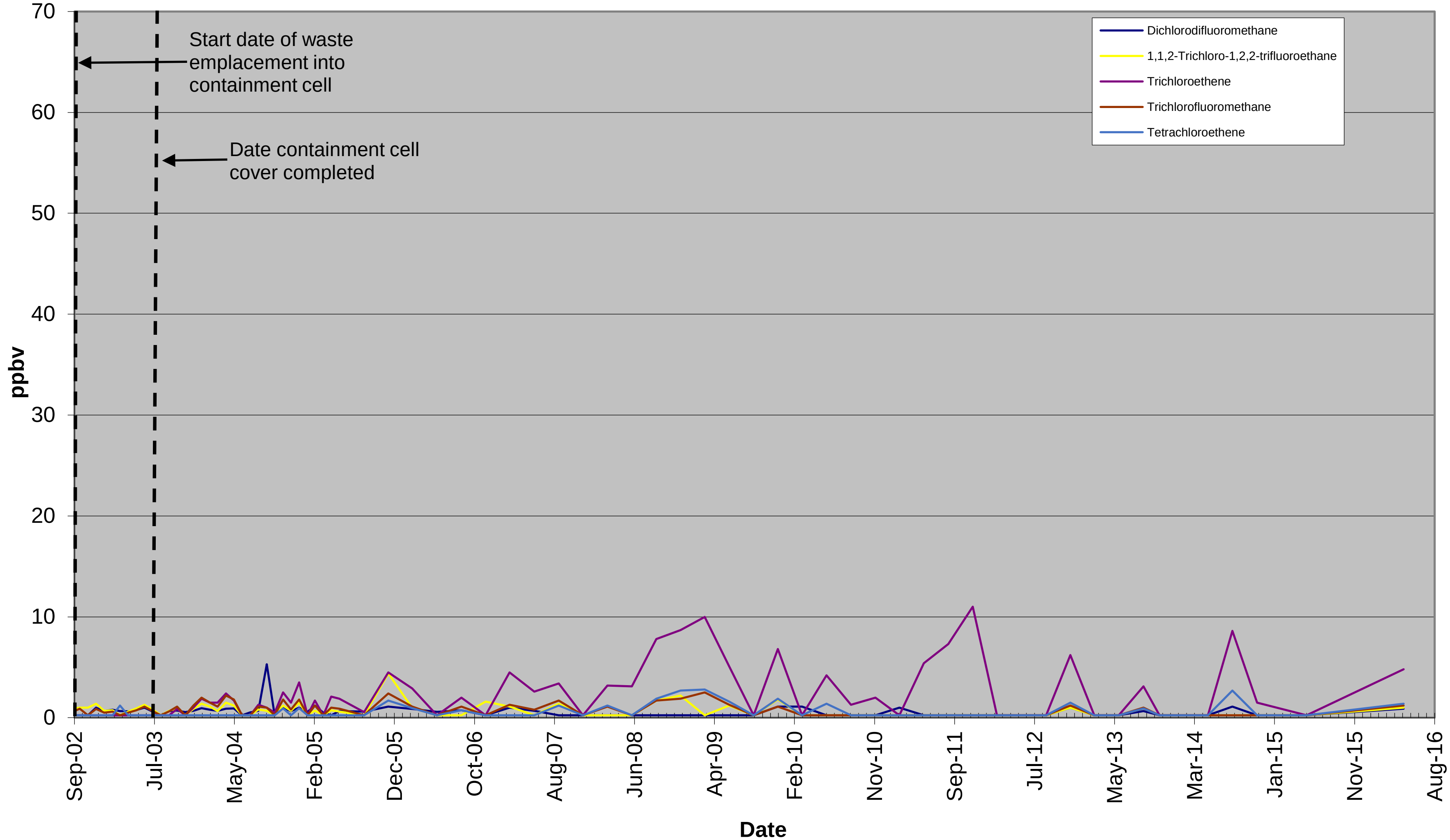

Figure B-3
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at CSS-3
September 2002 through May 2016

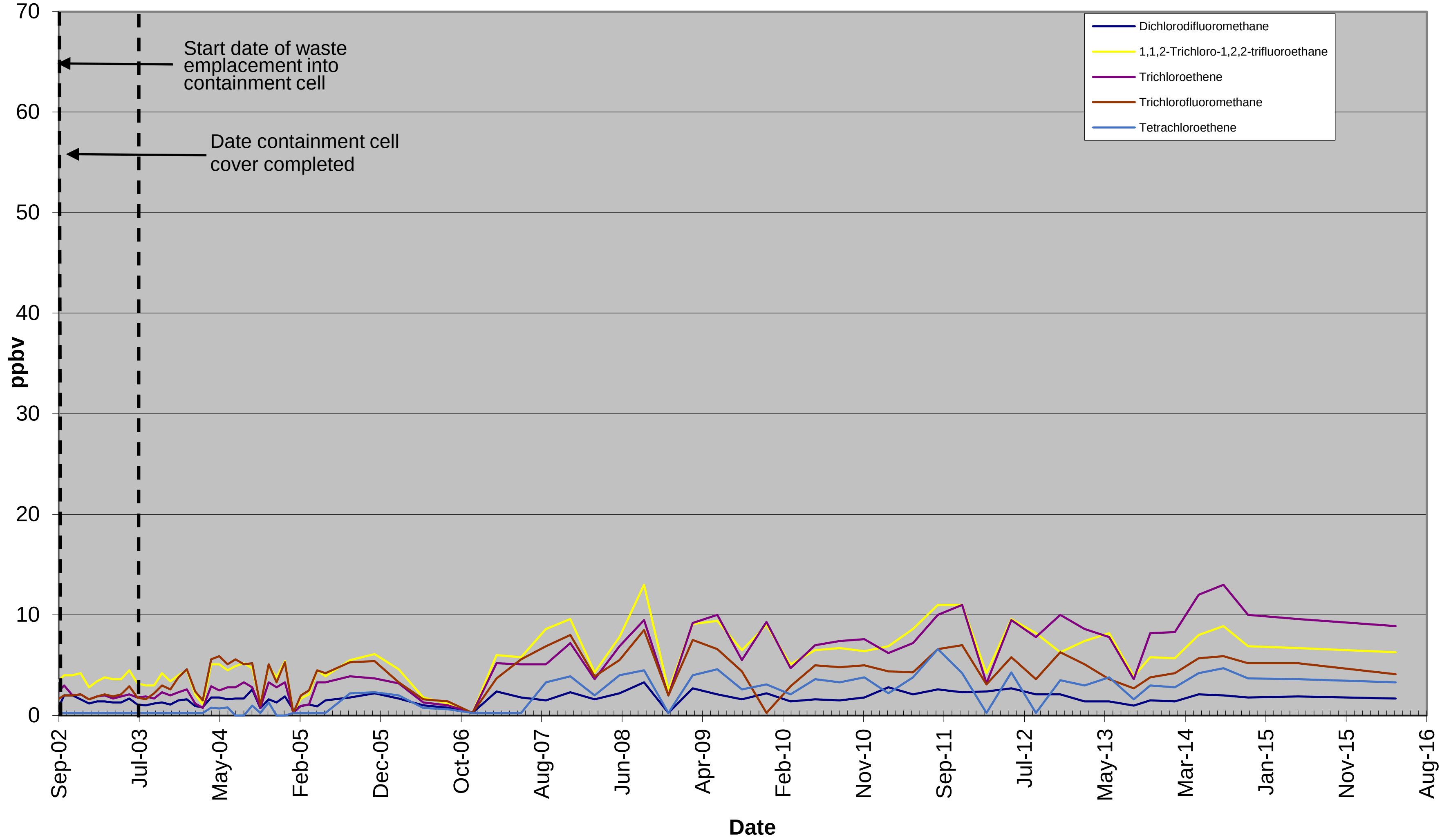

Figure B-4
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at CSS-4
September 2002 through May 2016

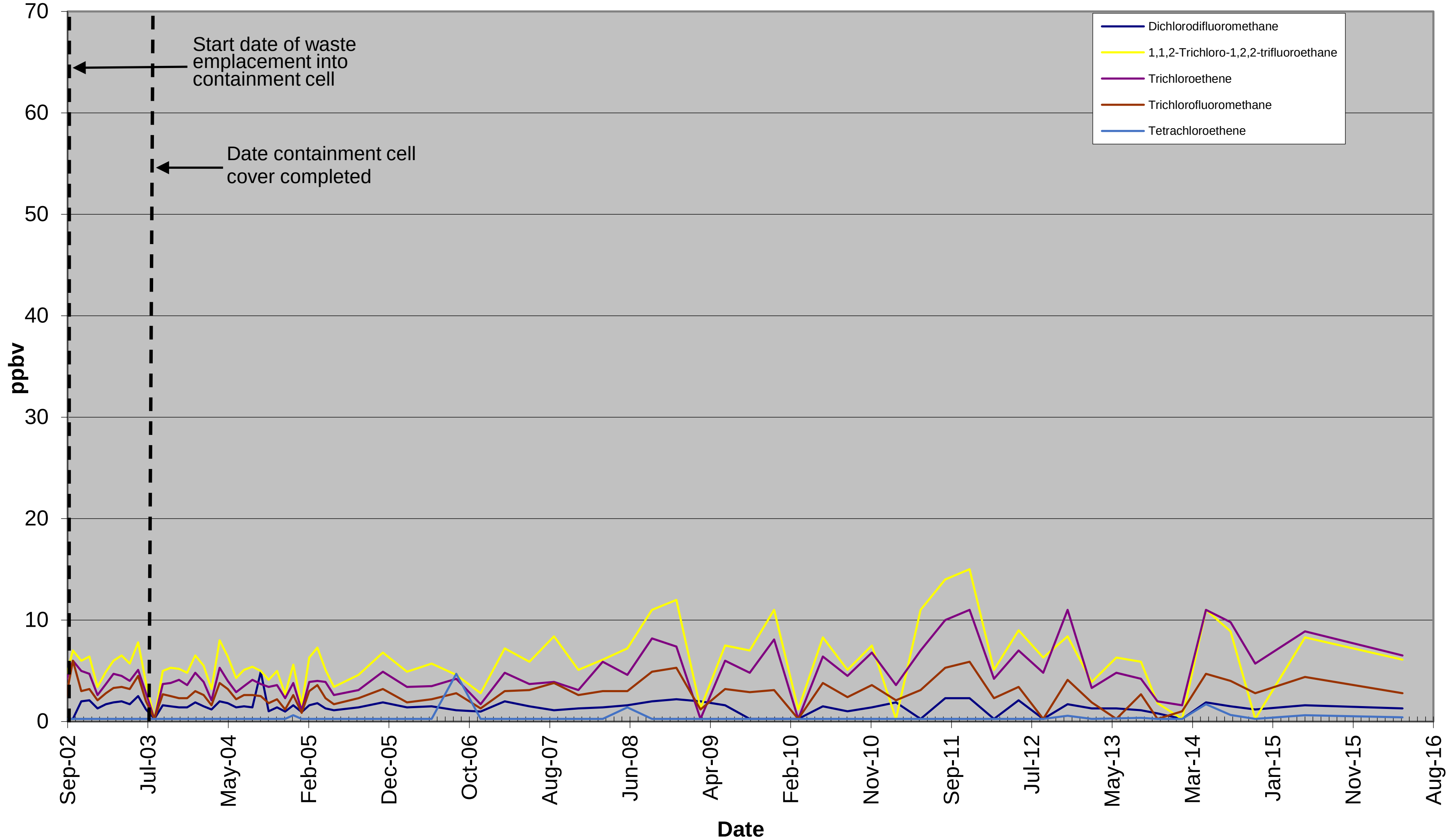

Figure B-5
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at CSS-5
September 2002 through May 2016

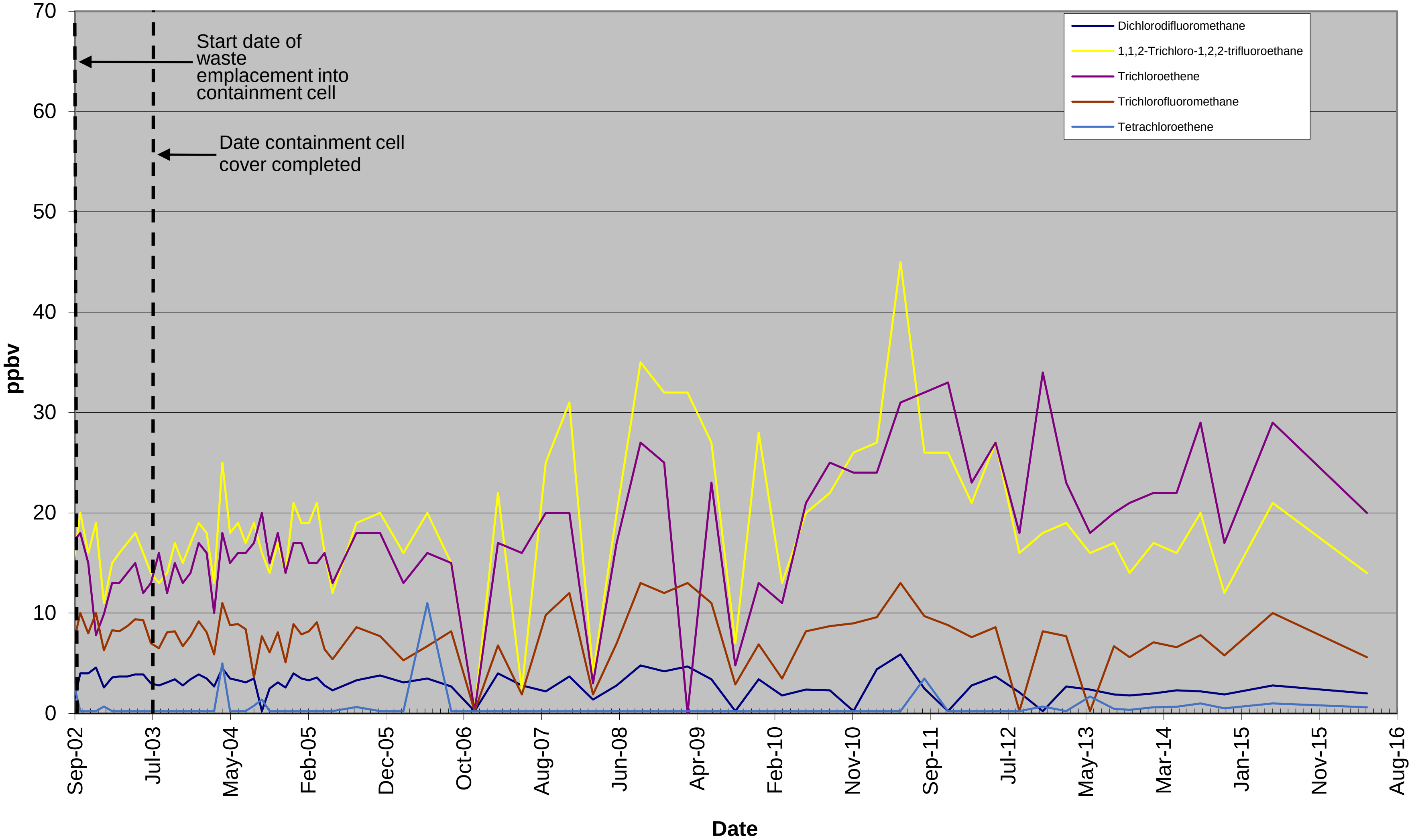

Figure B-6
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at CSS-6
September 2002 through May 2016

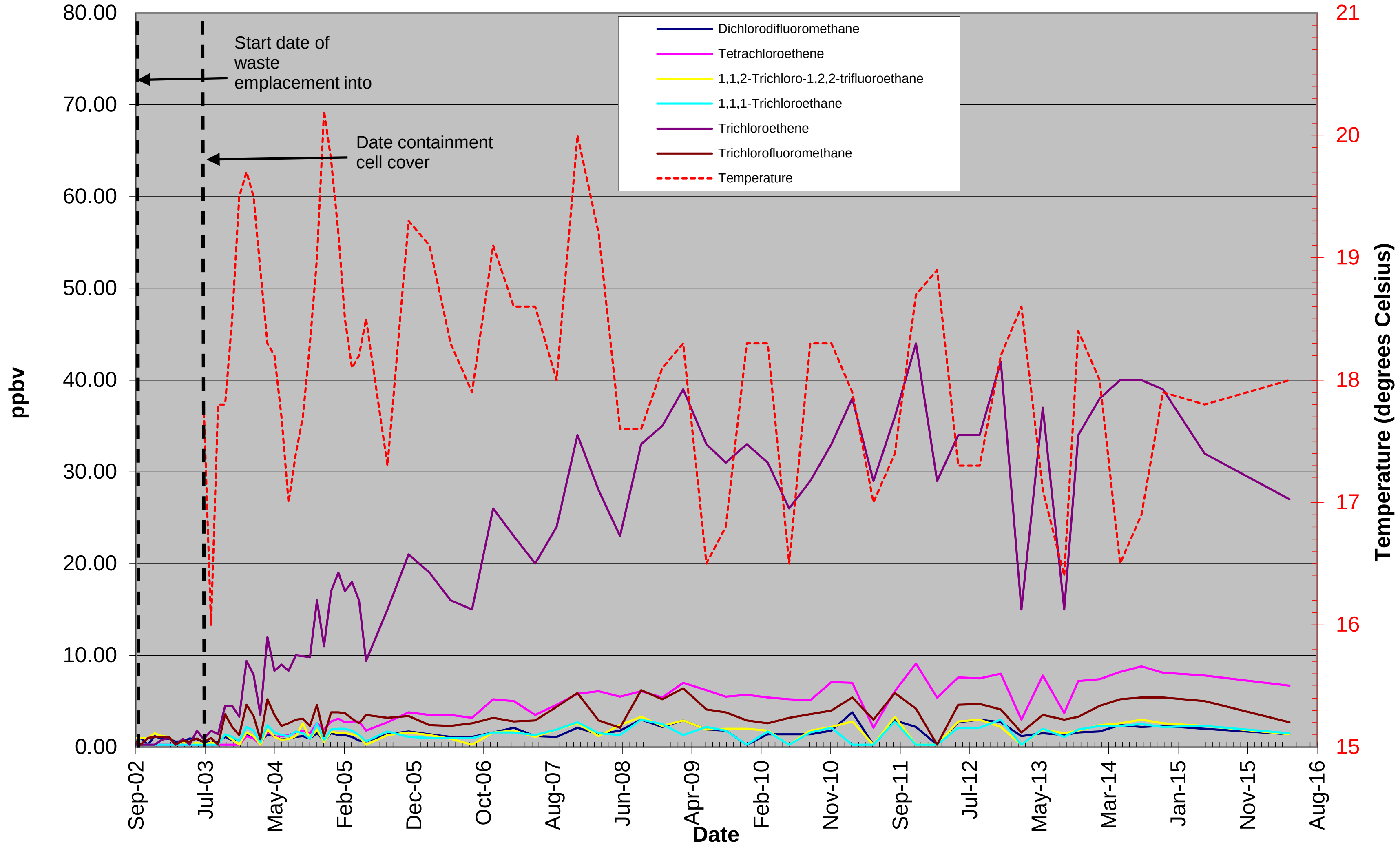

Figure B-7
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-1 (5-ft)
September 2002 through May 2016

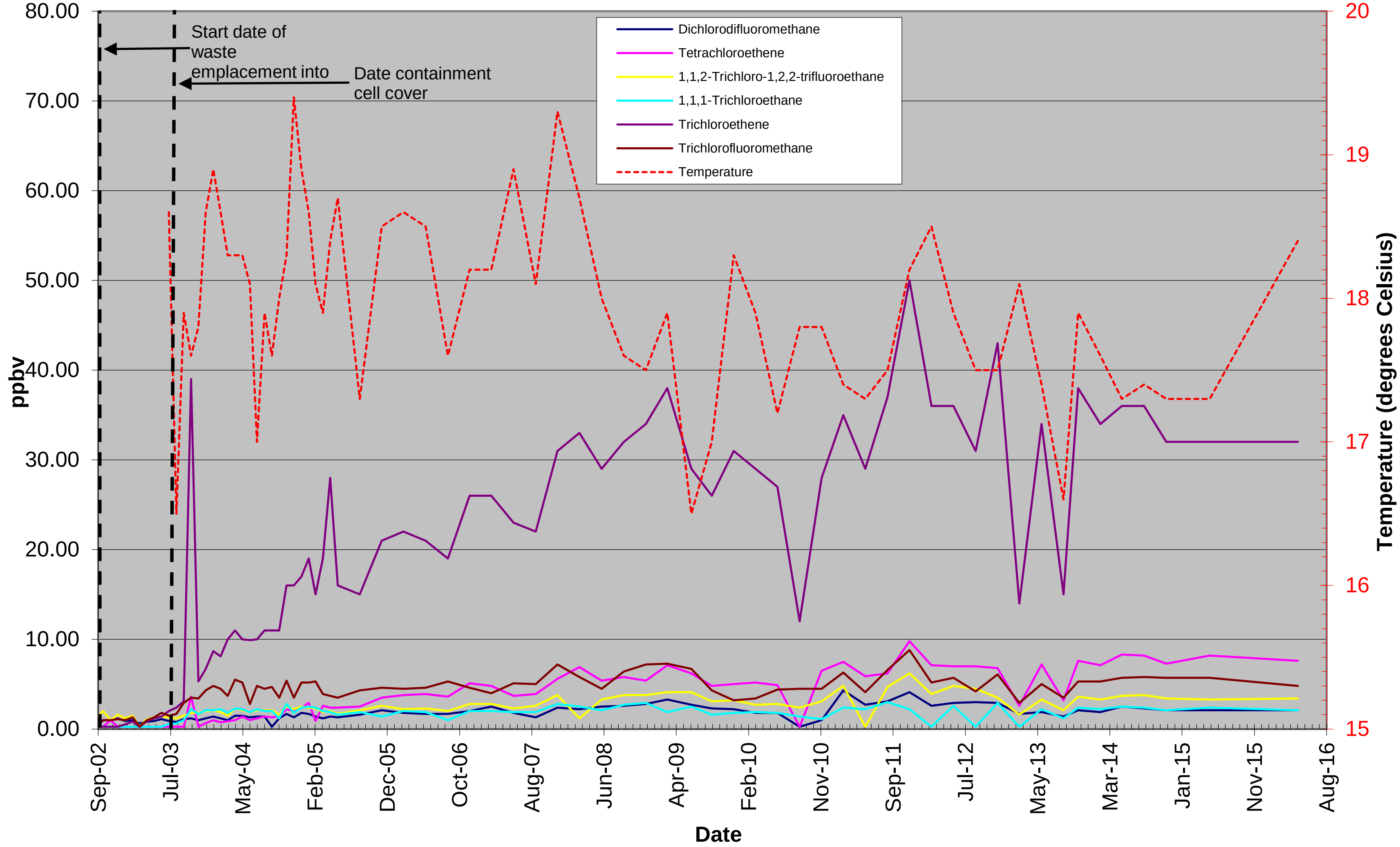

Figure B-8
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-1 (15-ft)
September 2002 through May 2016

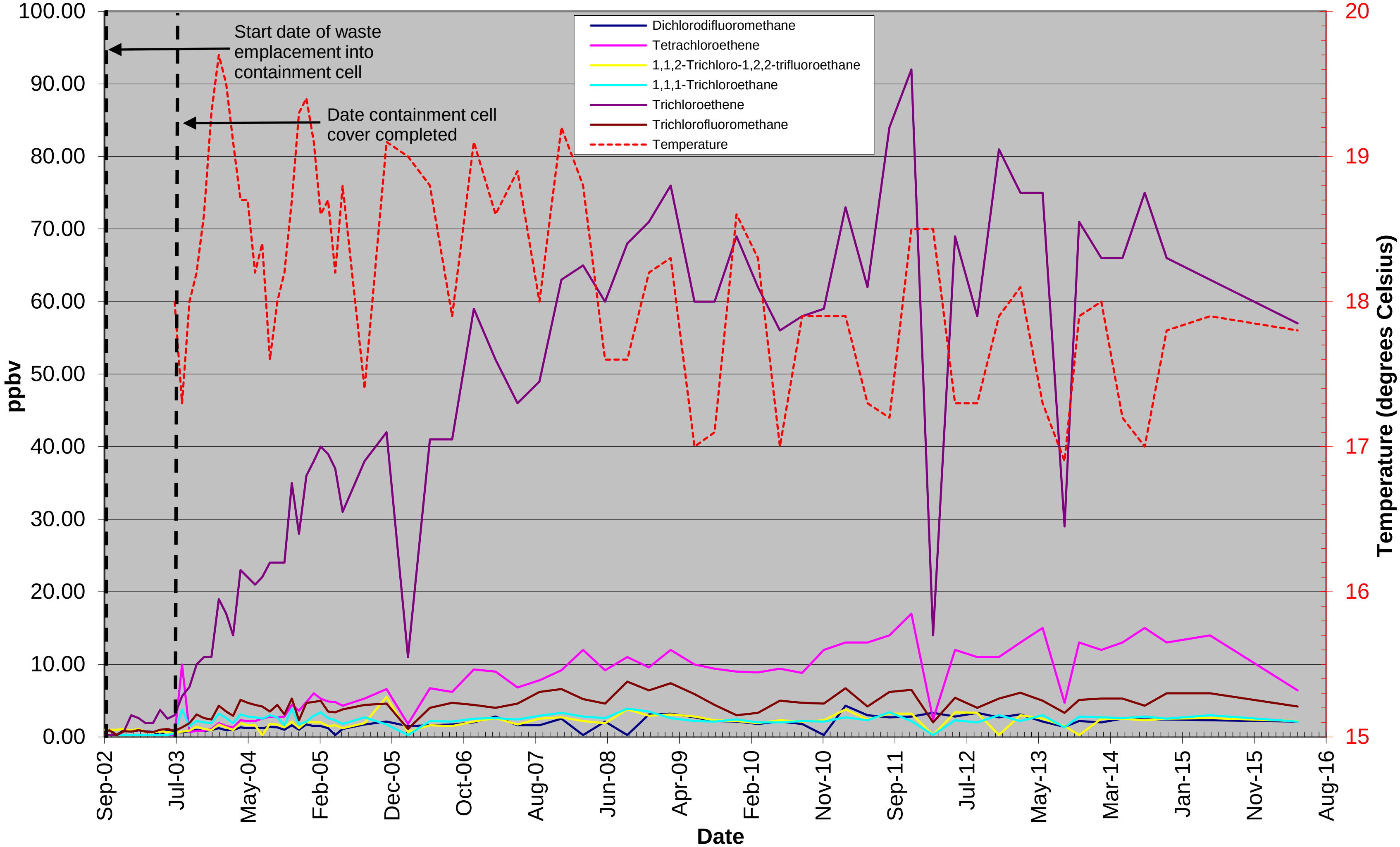

Figure B-9
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-2 (5-ft)
September 2002 through May 2016

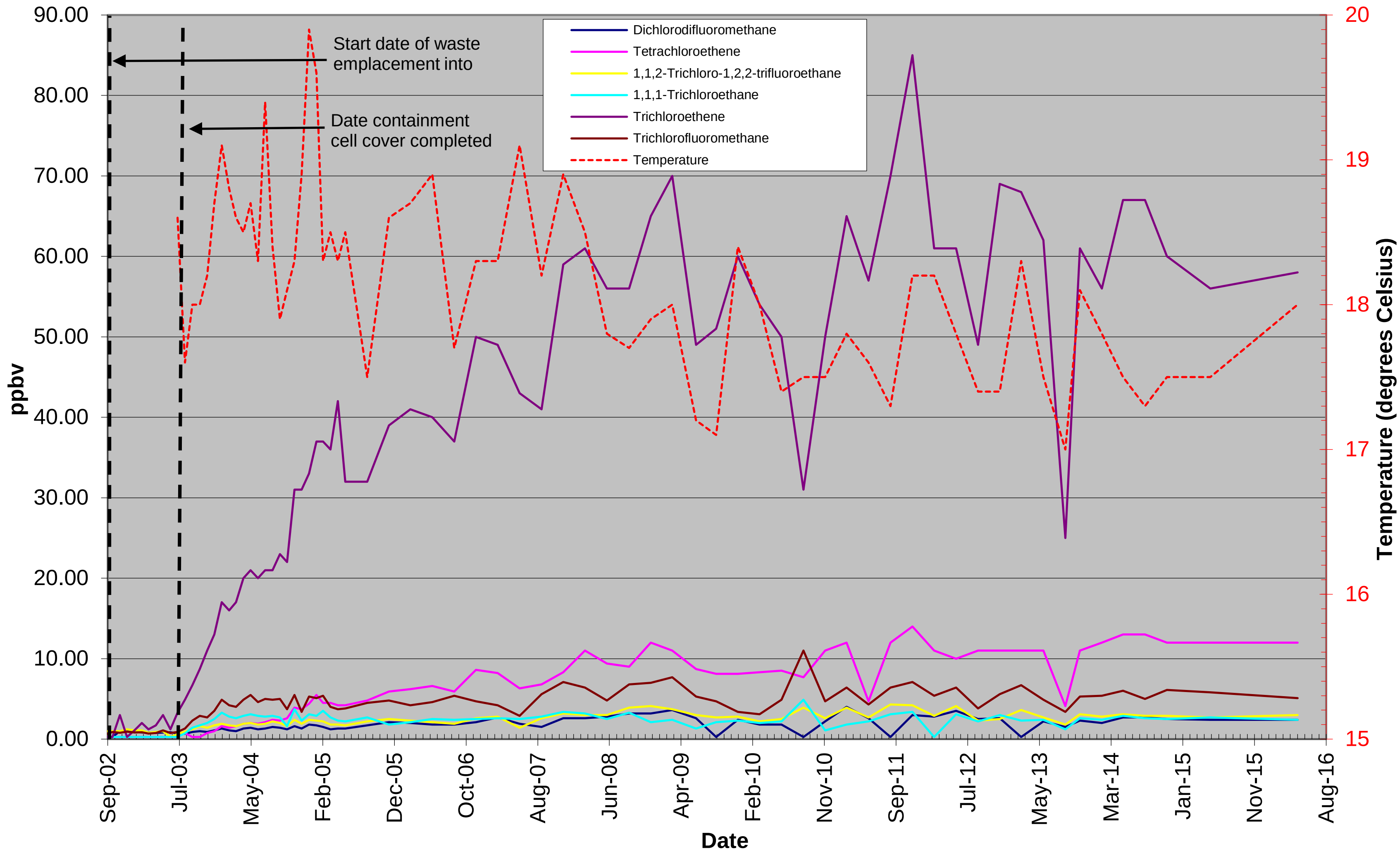

Figure B-10
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-2 (15-ft)
September 2002 through May 2016

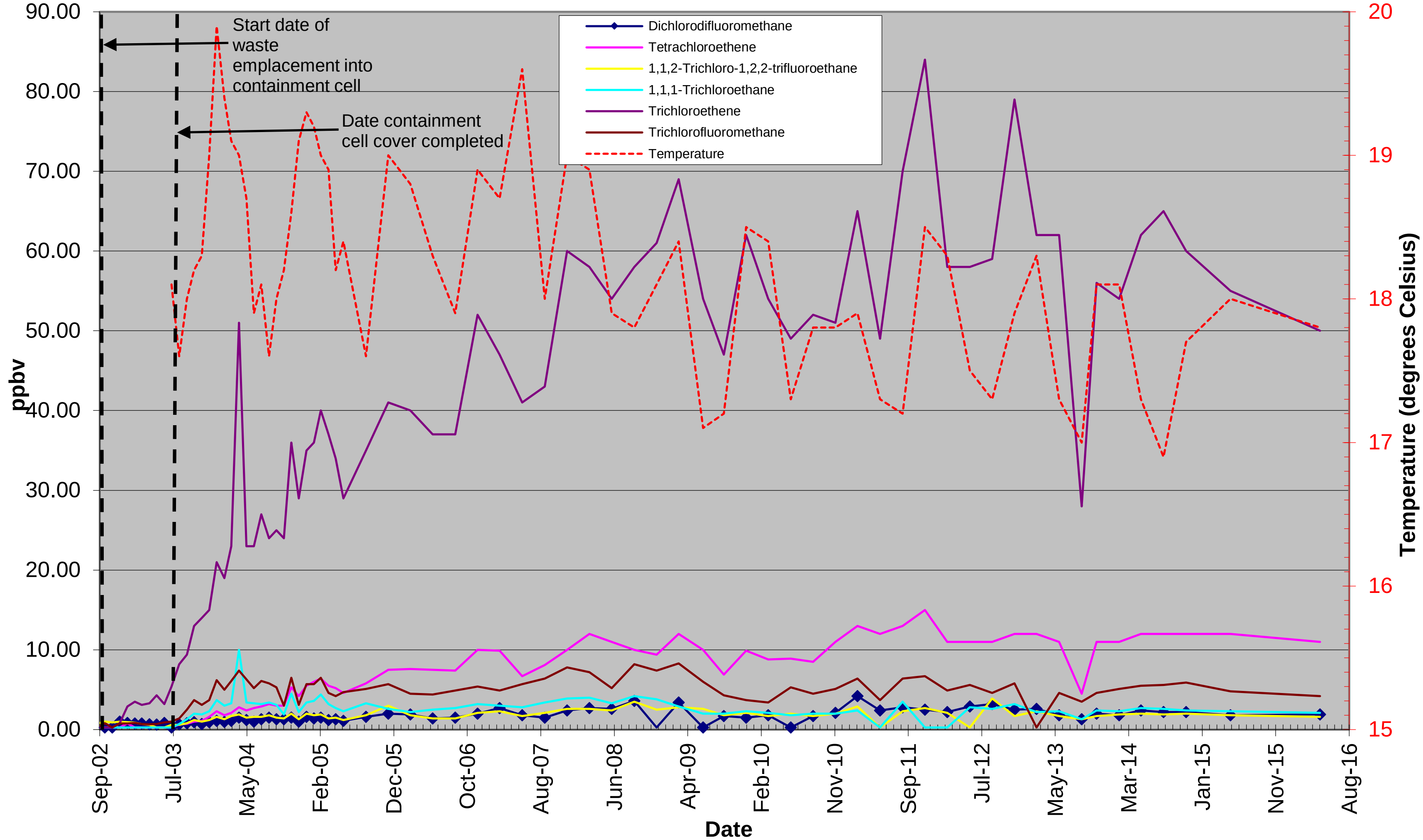

Figure B-11
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-3 (5-ft)
September 2002 through May 2016

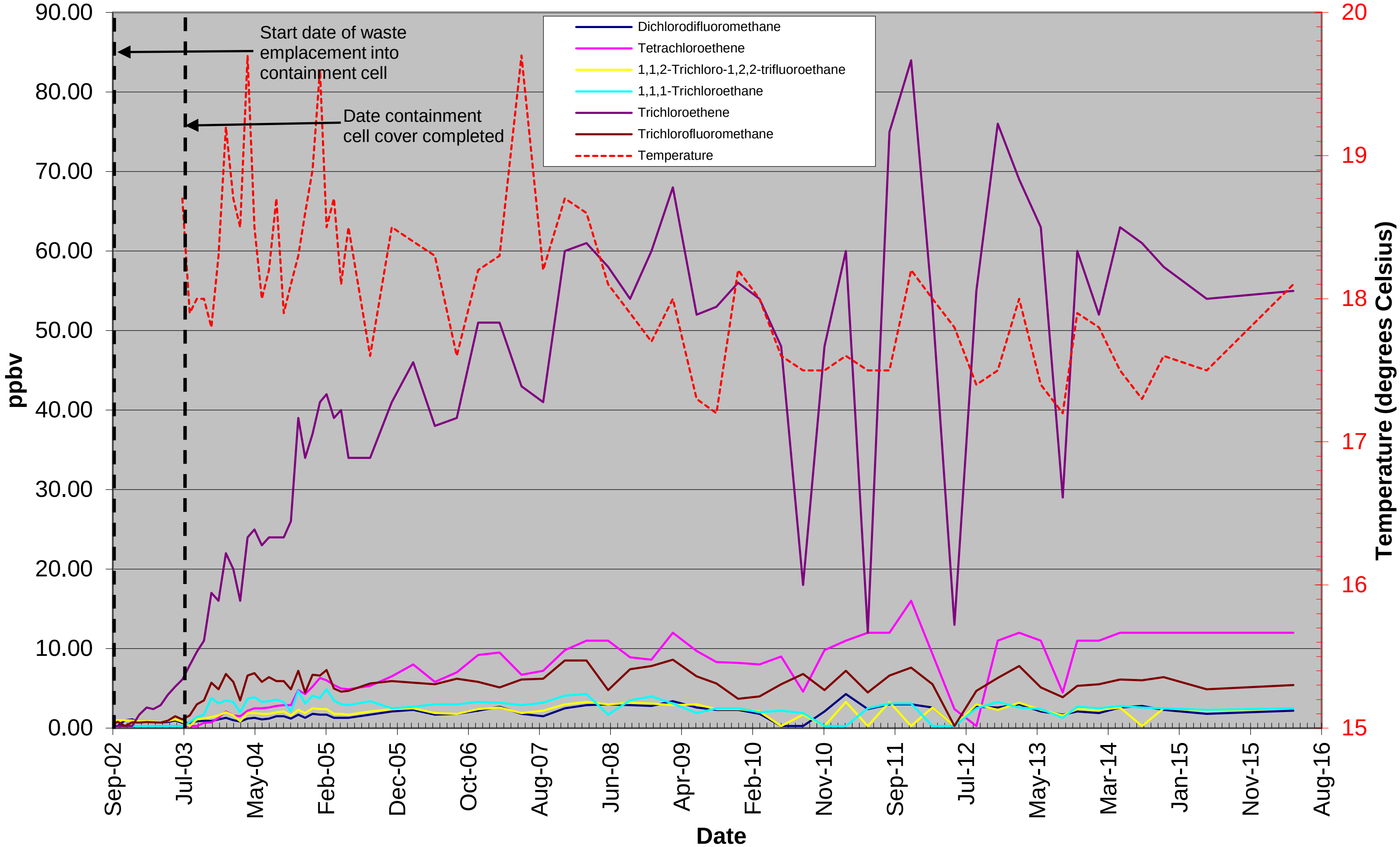

Figure B-12
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-3 (15-ft)
September 2002 through May 2016

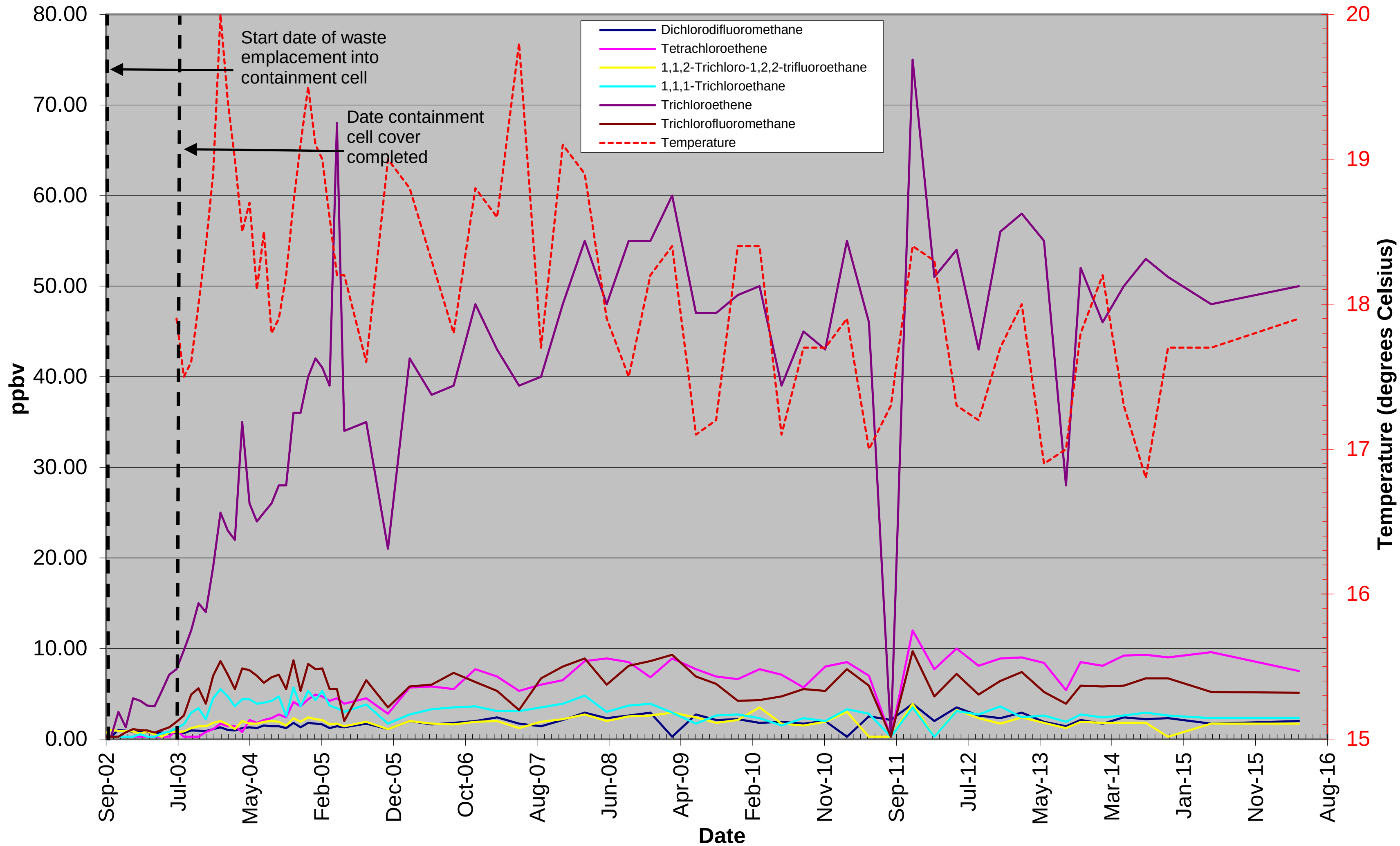

Figure B-13
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-4 (5-ft)
September 2002 through May 2016

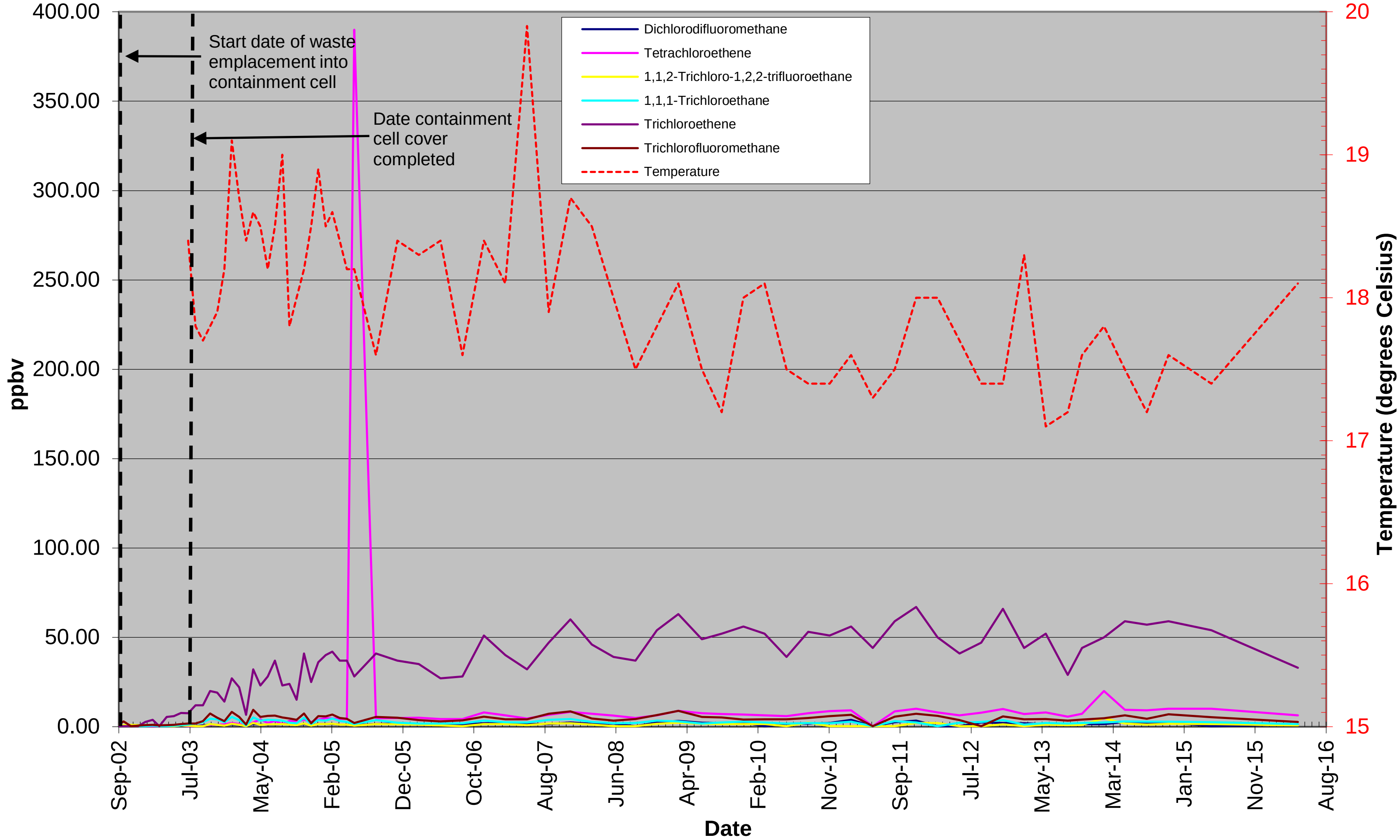

Figure B-14
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-4 (15-ft)
September 2002 through May 2016

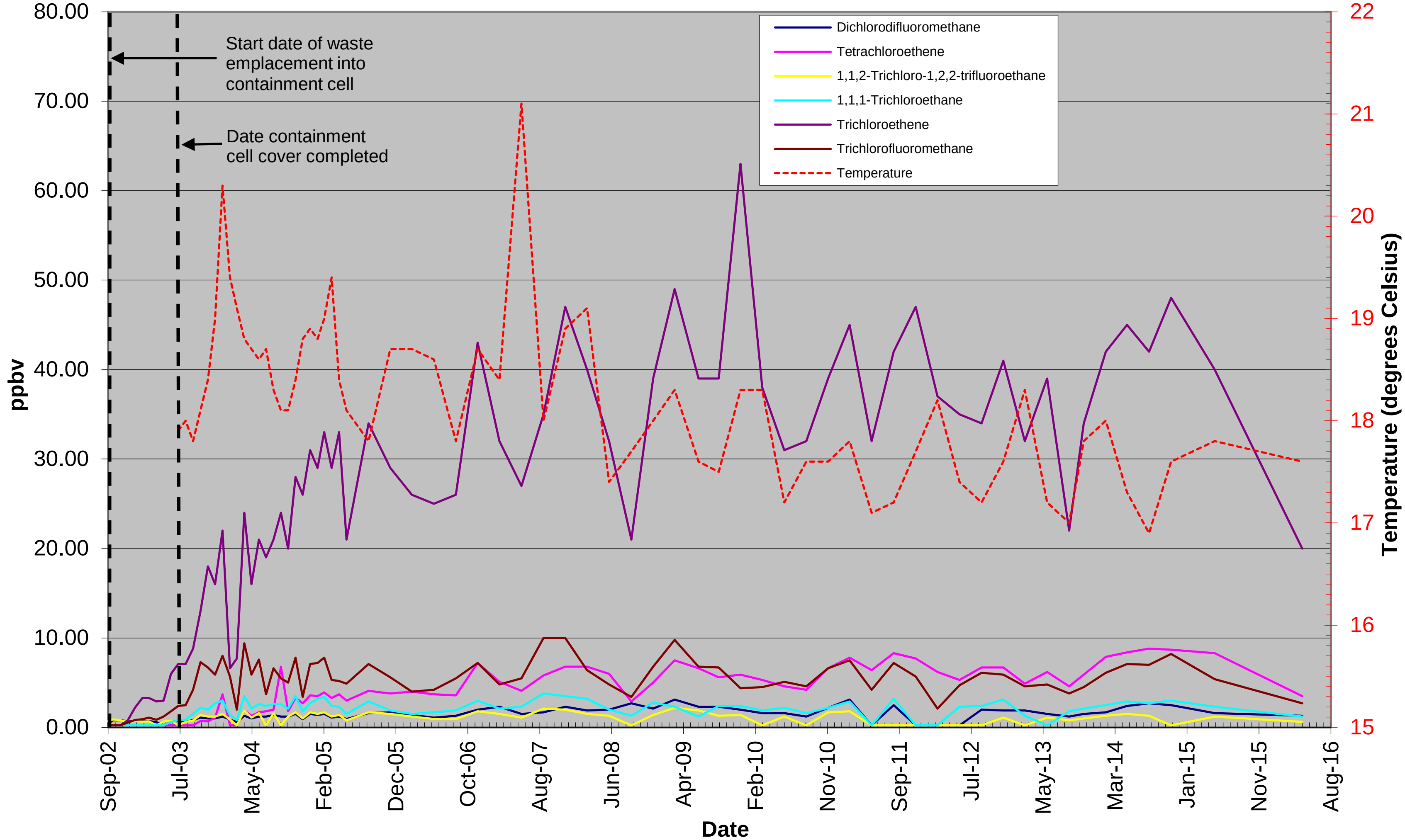

Figure B-15
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-5 (5-ft)
September 2002 through May 2016

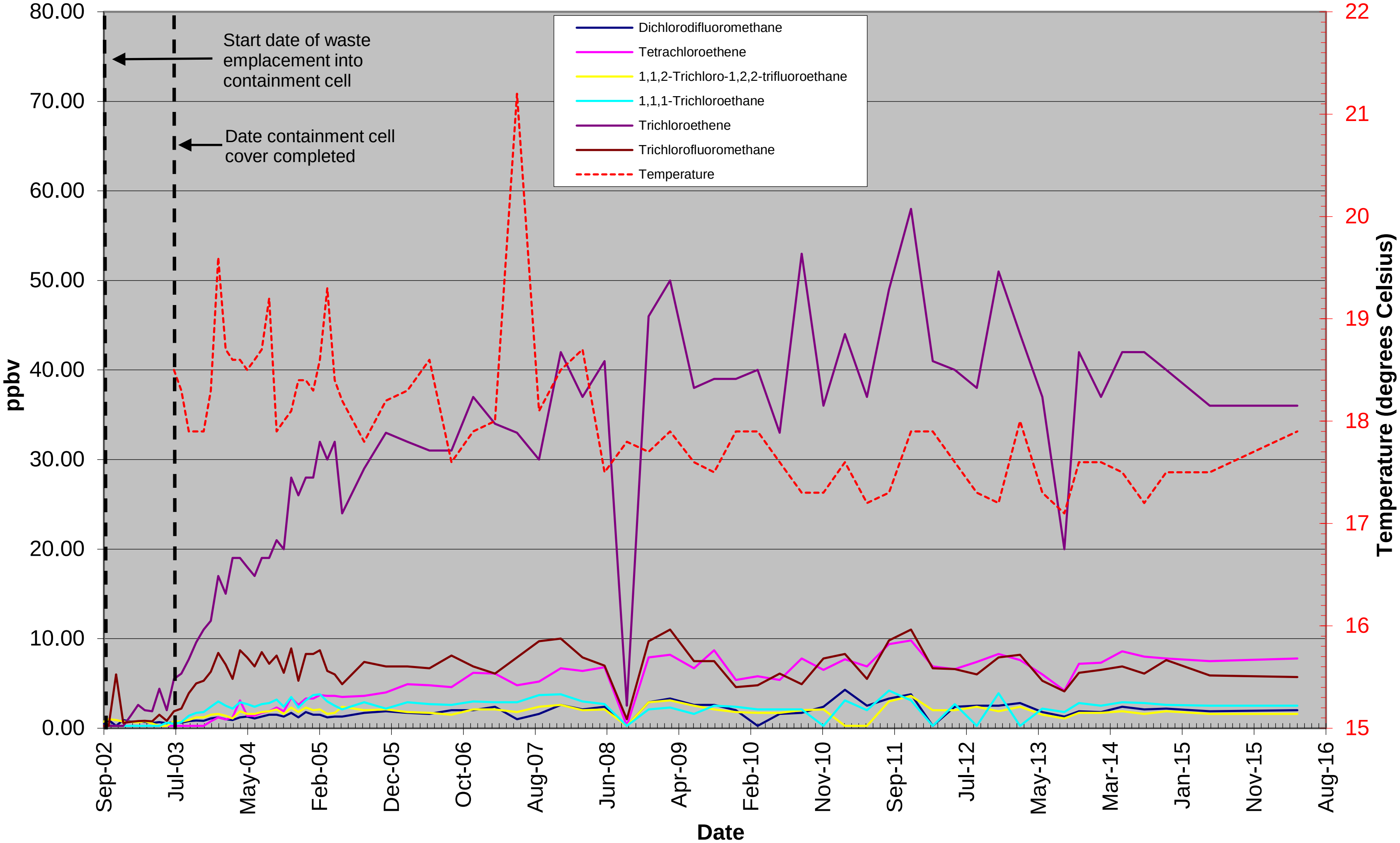

Figure B-16
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-5 (15-ft)
September 2002 through May 2016

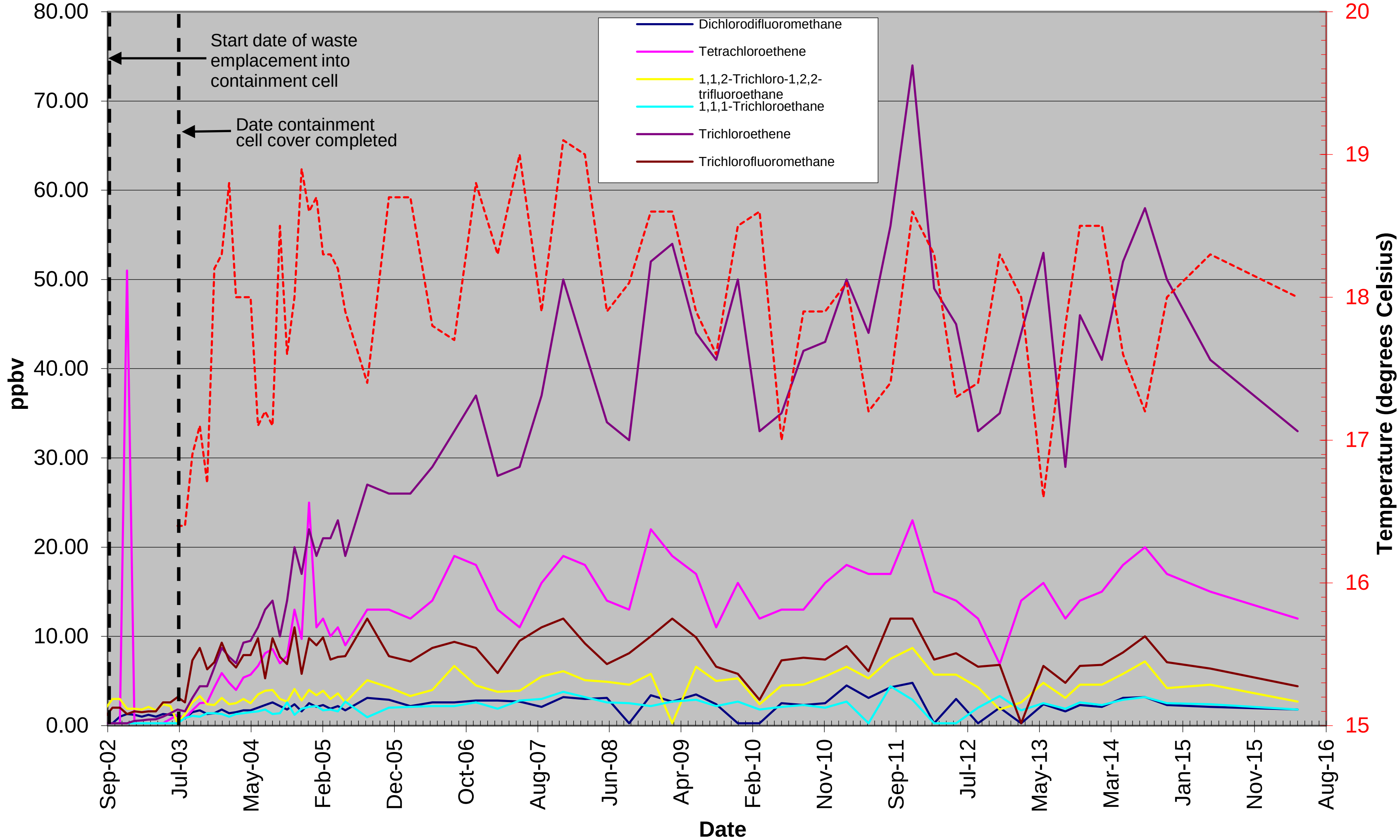

Figure B-17
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-6 (5-ft)
September 2002 through May 2016

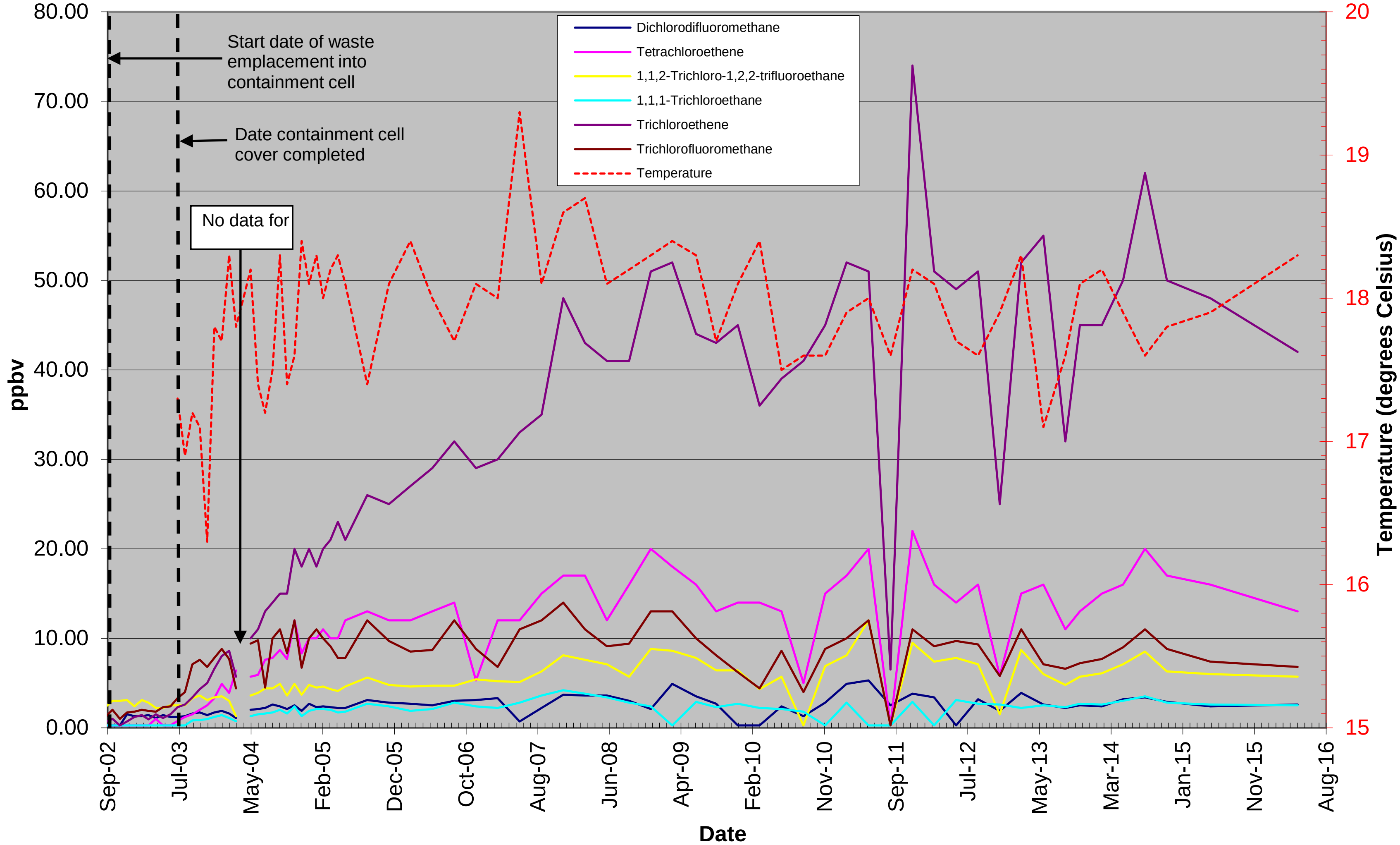

Figure B-18
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-6 (15-ft)
September 2002 through May 2016

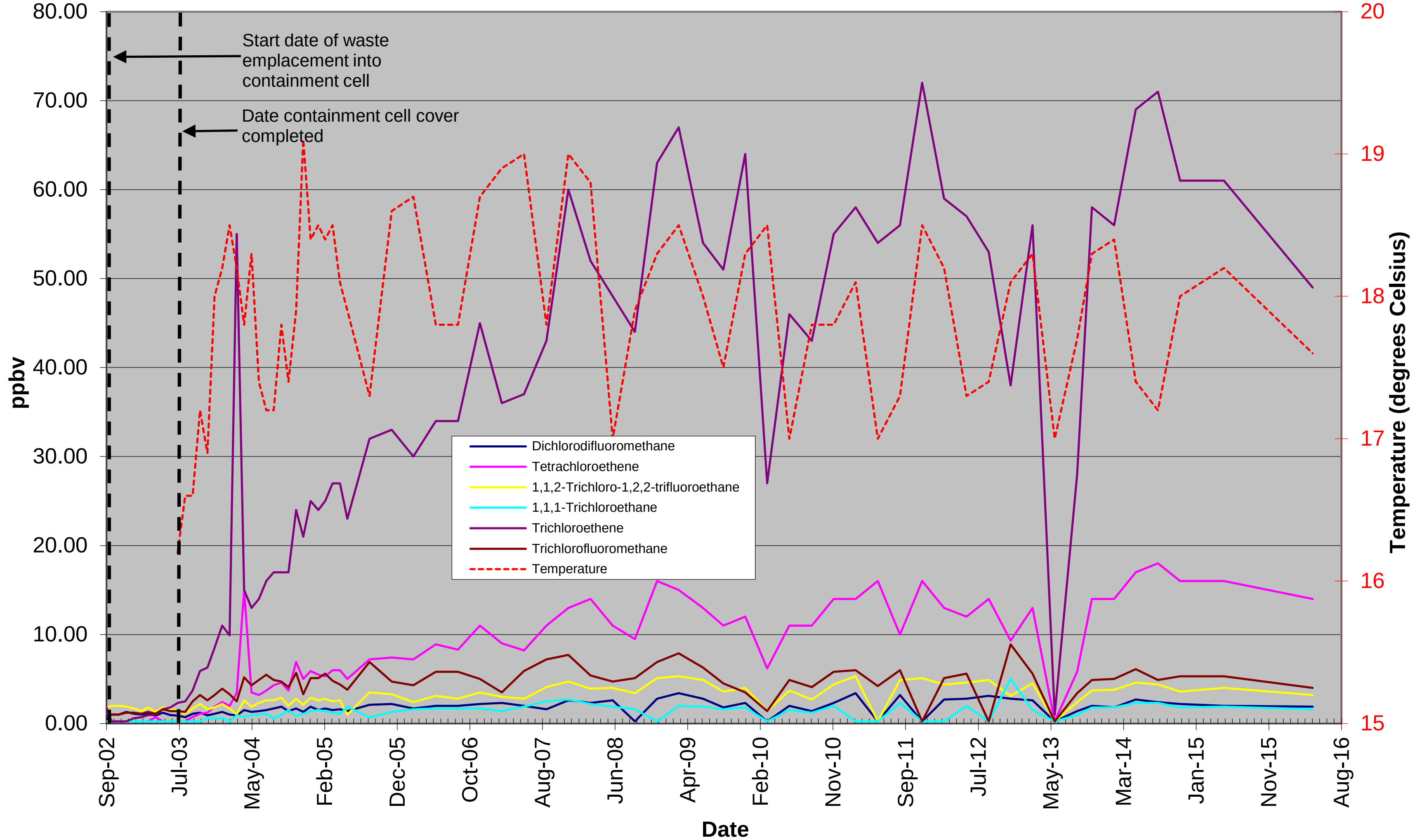

Figure B-19
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-7 (5-ft)
September 2002 through May 2016

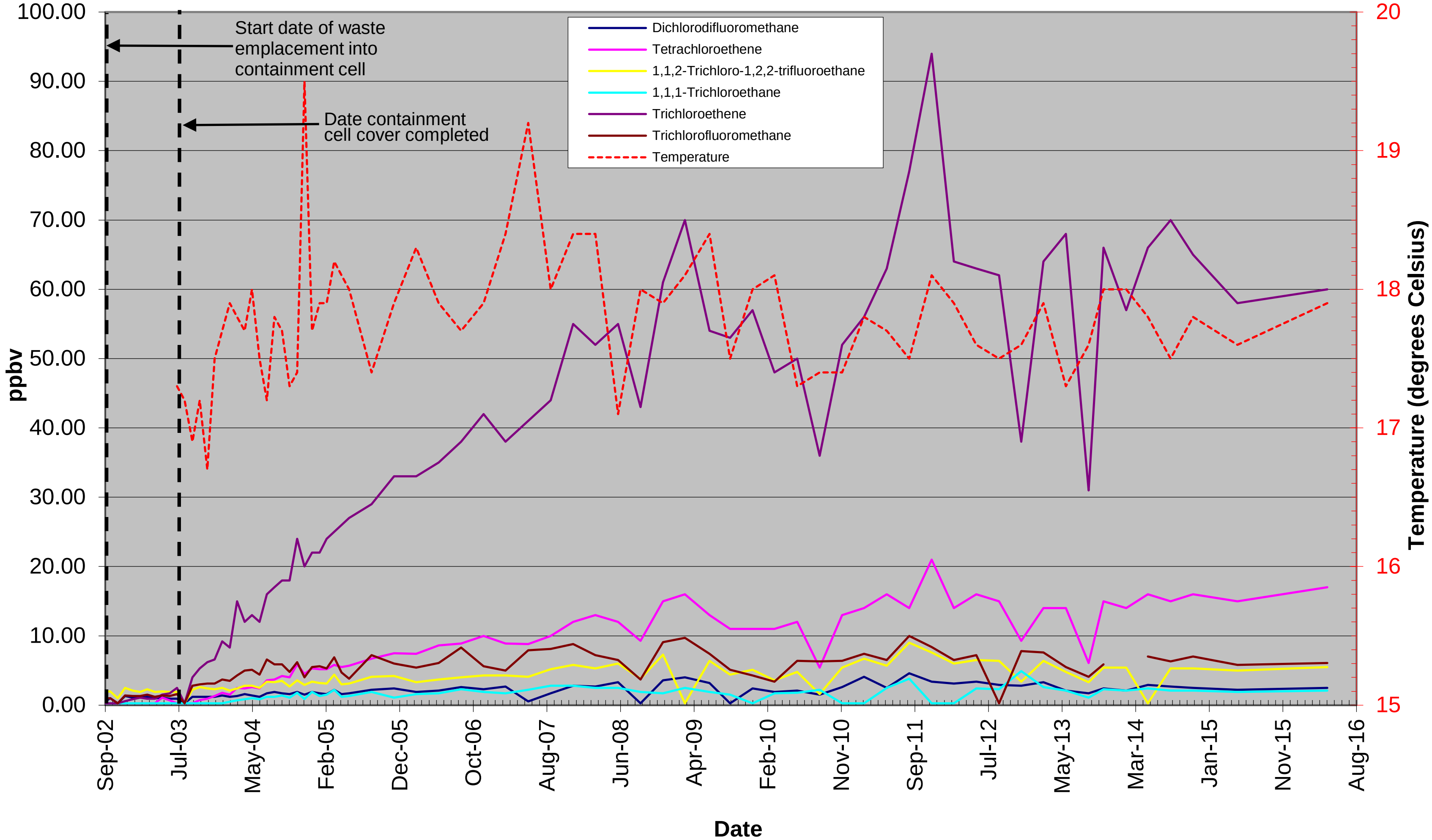

Figure B-20
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-7 (15-ft)
September 2002 through May 2016

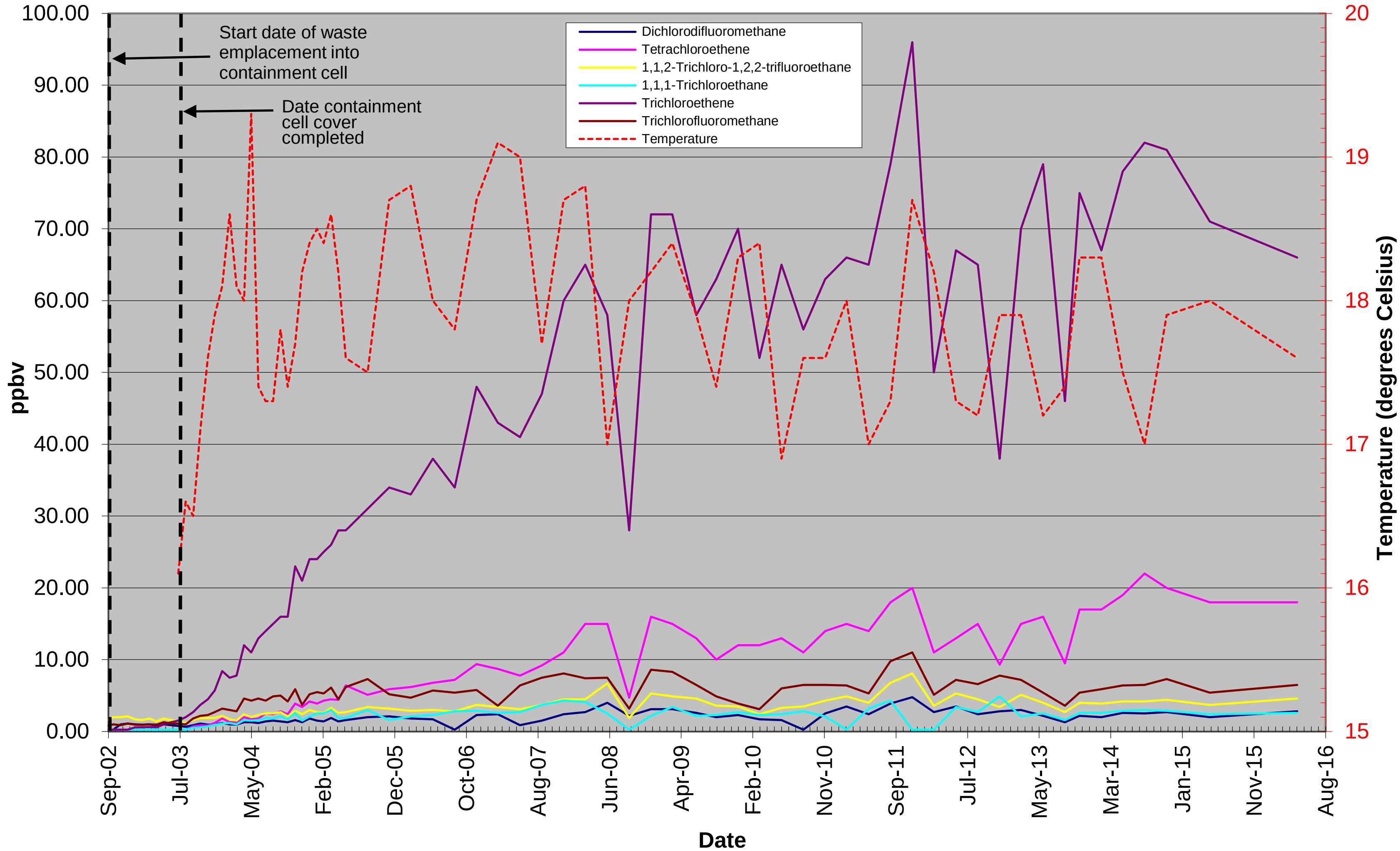

Figure B-21
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-8 (5-ft)
September 2002 through May 2016

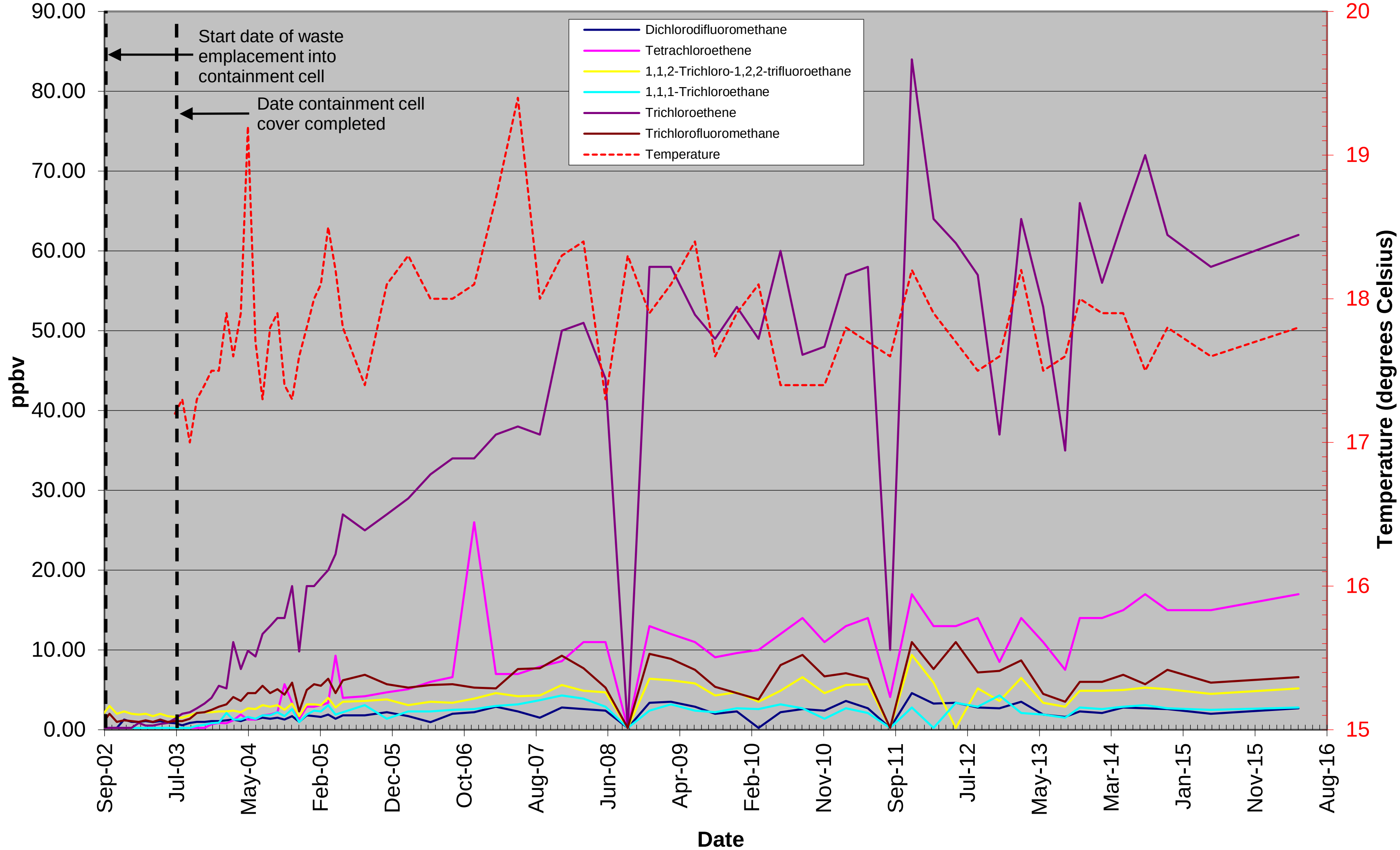

Figure B-22
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-8 (15-ft)
September 2002 through May 2016

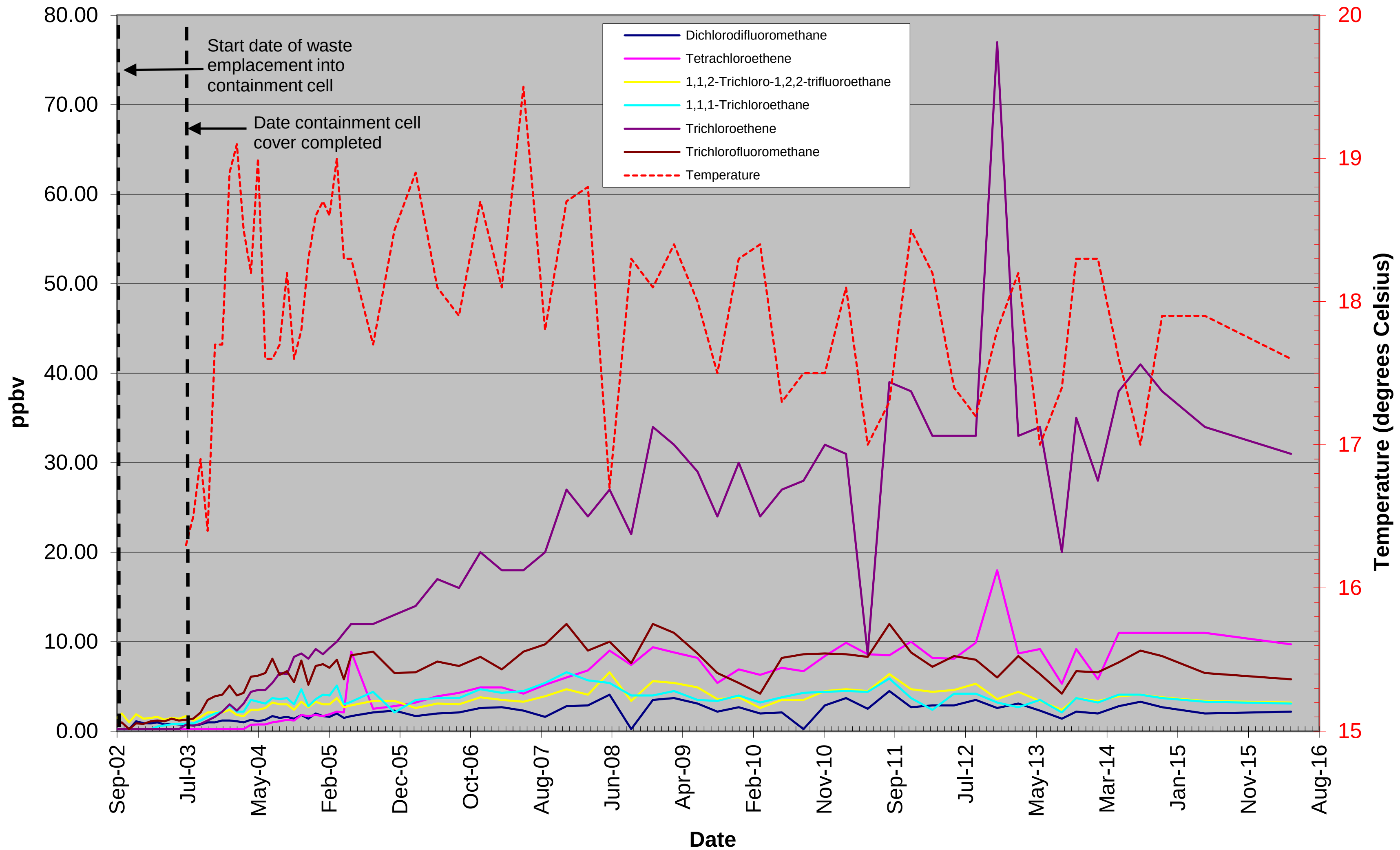

Figure B-23
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-9 (5-ft)
September 2002 through May 2016

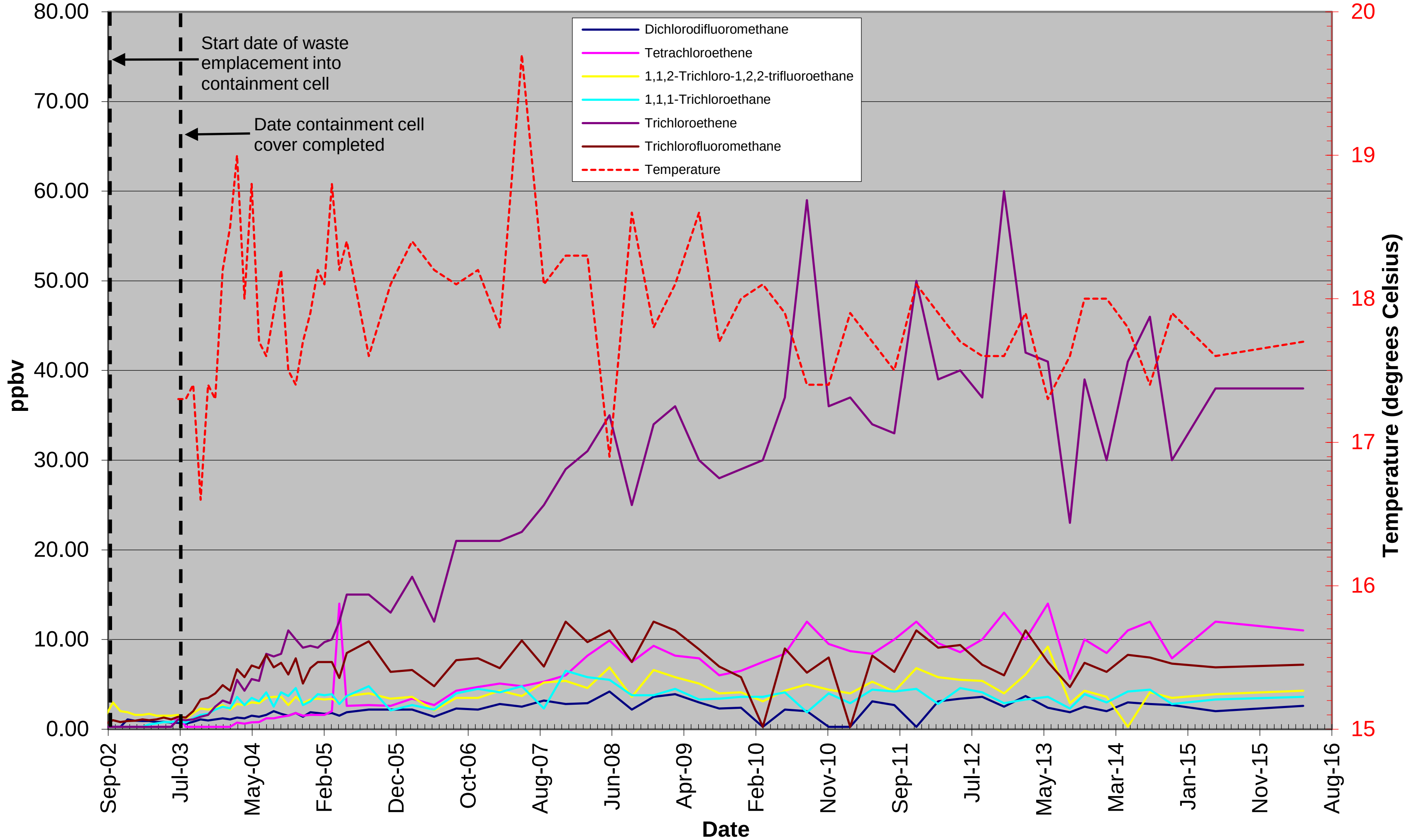

Figure B-24
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-9 (15-ft)
September 2002 through May 2016

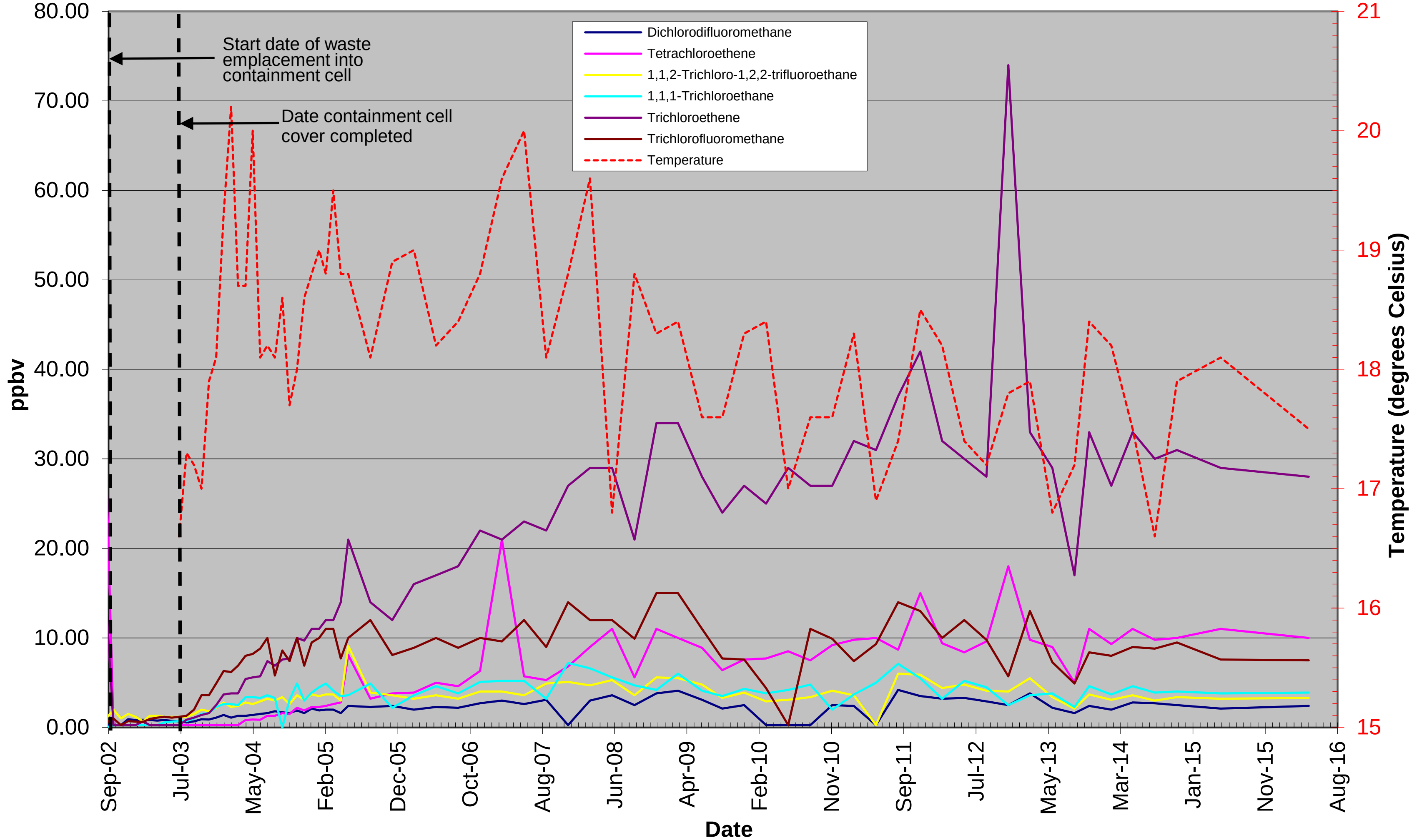

Figure B-25
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-10 (5-ft)
September 2002 through May 2016

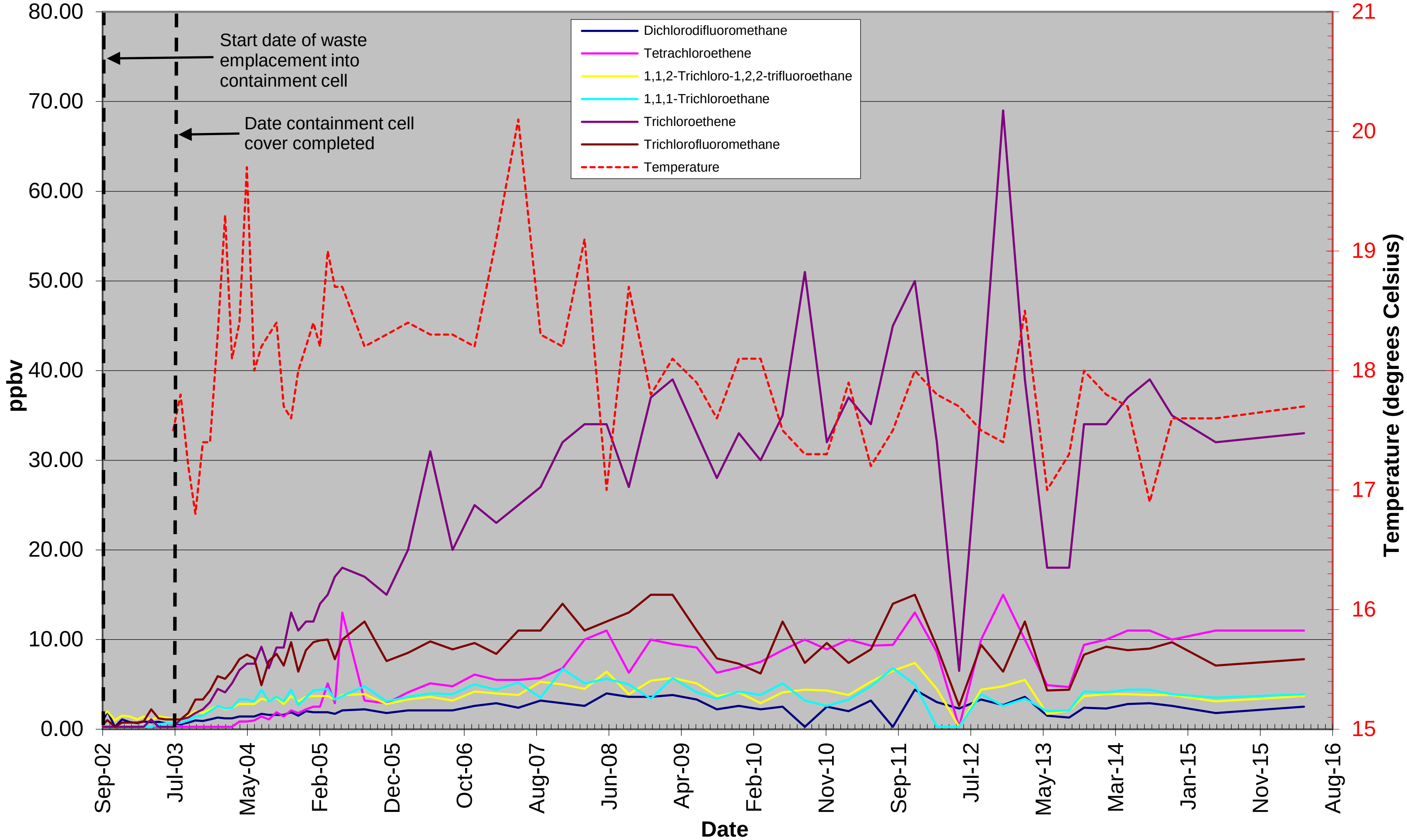

Figure B-26
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-10 (15-ft)
September 2002 through May 2016

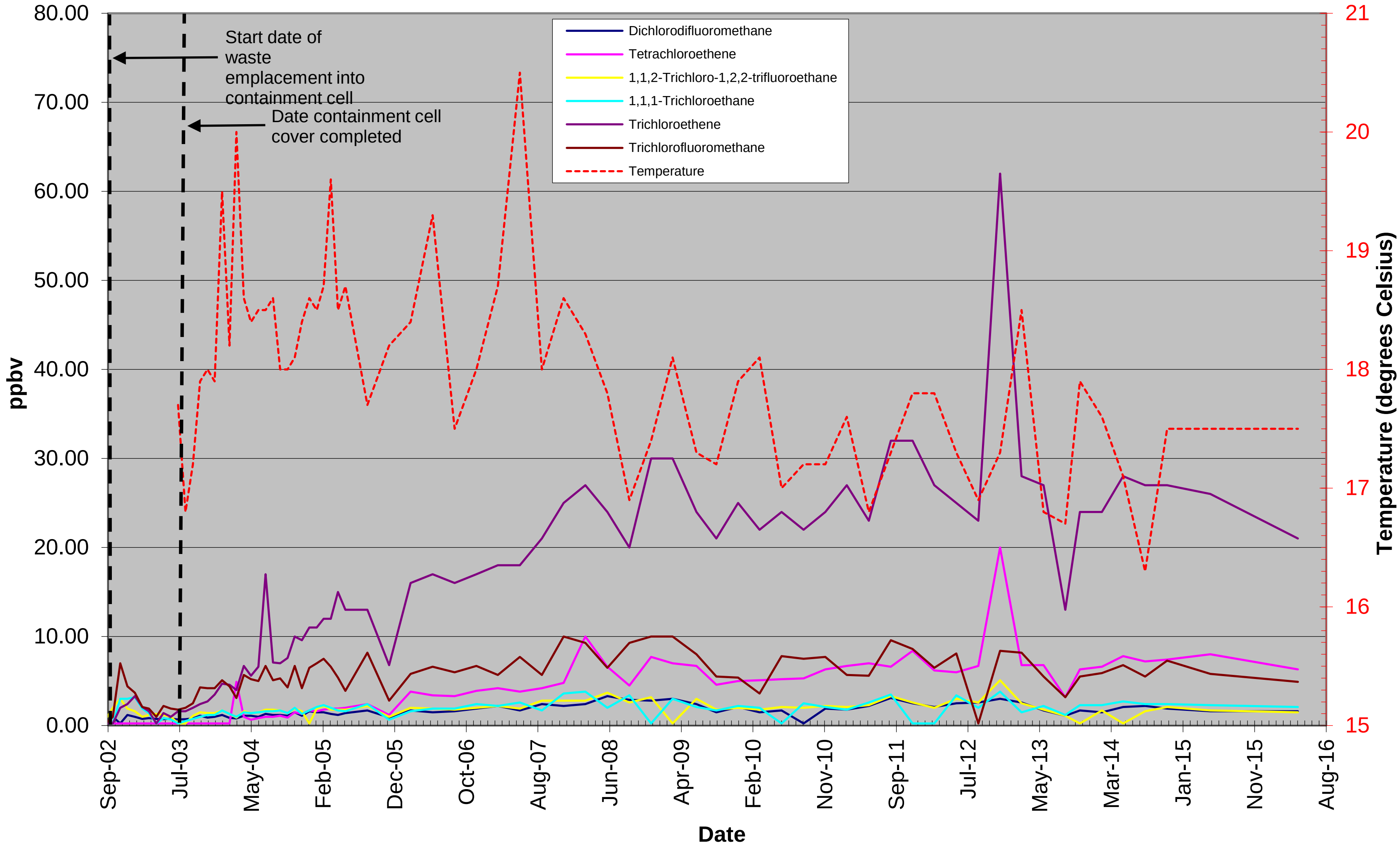

Figure B-27
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-11 (5-ft)
September 2002 through May 2016

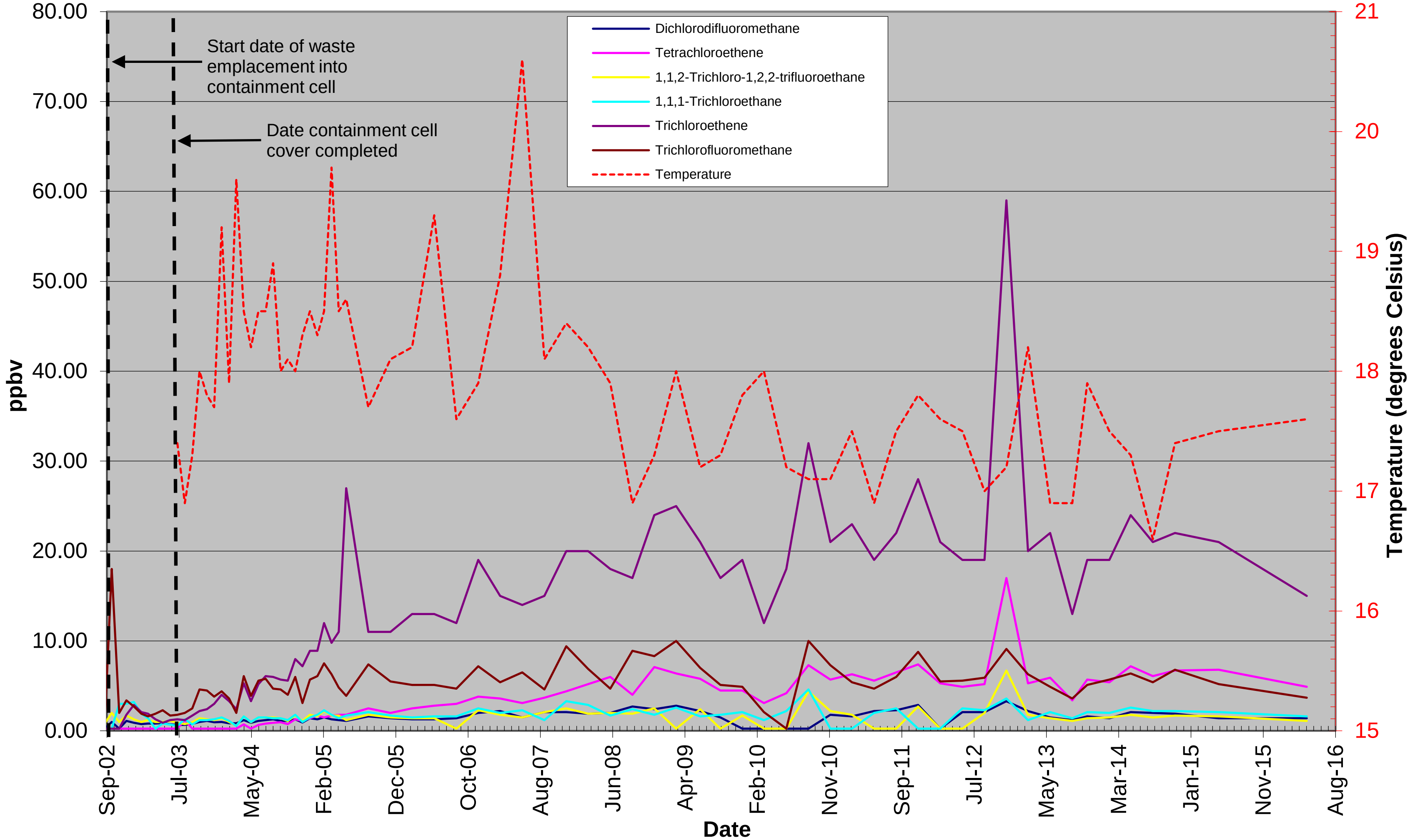

Figure B-28
Concentration Graph of Most Frequently Detected Volatile Organic Compounds at VSA-11 (15-ft)
September 2002 through May 2016

ANNEX C
Primary Subliner
Soil Moisture Monitoring Results

Table C-1
Primary Subliner Soil Moisture Monitoring Results at West Access Tube
Calendar Year 2016

Monitoring Position	Collection Dates				Reporting Period Minimum	Reporting Period Maximum	Reporting Period Average	Reporting Period Std Dev	Baseline Average (10/2003-9/2004)	Difference between Baseline Average & Reporting Period Average	Trigger Level (Baseline plus 4%)
	February	May	August	November							
	Moisture (% by mass)								Moisture (% by mass)		
1	7.3	7.2	7.5	7.1	7.1	7.5	7.3	0.2	7.9	-0.6	11.9
2	7.8	7.8	7.9	7.8	7.8	7.9	7.8	0.1	8.1	-0.3	12.1
3	8.1	8.0	8.0	8.1	8.0	8.1	8.1	0.1	8.4	-0.3	12.4
4	8.3	8.2	8.1	8.2	8.1	8.3	8.2	0.1	8.2	0.0	12.2
5	8.3	8.3	8.4	8.4	8.3	8.4	8.4	0.1	8.5	-0.1	12.5
6	8.3	8.2	8.3	8.2	8.2	8.3	8.3	0.1	8.3	0.0	12.3
7	8.2	8.1	8.0	8.0	8.0	8.2	8.1	0.1	8.2	-0.1	12.2
8	8.1	8.0	8.0	7.9	7.9	8.1	8.0	0.1	8.0	0.0	12.0
9	8.1	8.1	8.0	8.0	8.0	8.1	8.1	0.1	8.1	0.0	12.1
10	8.0	7.9	8.0	8.0	7.9	8.0	8.0	0.0	8.1	-0.1	12.1
11	8.1	7.9	7.9	8.1	7.9	8.1	8.0	0.1	8.1	-0.1	12.1
12	7.8	7.7	7.9	7.7	7.7	7.9	7.8	0.1	8.0	-0.2	12.0
13	8.0	8.1	8.1	8.0	8.0	8.1	8.1	0.1	8.0	0.1	12.0
14	8.1	8.0	8.0	8.0	8.0	8.1	8.0	0.0	8.1	-0.1	12.1
15	7.9	7.9	7.8	8.0	7.8	8.0	7.9	0.1	7.8	0.1	11.8
16	8.1	8.1	8.1	8.0	8.0	8.1	8.1	0.0	8.1	0.0	12.1
17	7.9	7.9	7.9	7.9	7.9	7.9	7.9	0.0	7.9	0.0	11.9
18	7.7	7.7	7.7	7.8	7.7	7.8	7.7	0.0	7.8	-0.1	11.8
19	7.9	7.9	7.8	7.8	7.8	7.9	7.9	0.1	7.8	0.1	11.8
20	7.7	7.8	7.7	8.0	7.7	8.0	7.8	0.1	7.7	0.1	11.7
21	7.9	7.9	7.8	7.8	7.8	7.9	7.9	0.1	7.8	0.1	11.8
22	7.9	7.8	7.8	7.9	7.8	7.9	7.9	0.1	7.7	0.2	11.7
23	7.9	7.8	7.7	7.7	7.7	7.9	7.8	0.1	7.8	0.0	11.8
24	7.7	7.9	7.6	7.8	7.6	7.9	7.8	0.1	7.7	0.1	11.7
25	7.9	7.8	7.9	7.8	7.8	7.9	7.9	0.1	7.8	0.1	11.8
26	7.9	8.1	7.9	8.1	7.9	8.1	8.0	0.1	8.0	0.0	12.0
27	8.1	7.9	8.1	7.9	7.9	8.1	8.0	0.1	8.0	0.0	12.0
28	8.0	8.2	7.9	8.3	7.9	8.3	8.1	0.2	8.0	0.1	12.0
29	7.9	7.9	7.9	7.9	7.9	7.9	7.9	0.0	7.8	0.1	11.8
30	8.3	8.4	8.1	8.2	8.1	8.4	8.3	0.1	8.1	0.2	12.1
31	8.0	8.2	8.1	8.0	8.0	8.2	8.1	0.1	8.1	0.0	12.1
32	8.2	8.4	7.9	8.0	7.9	8.4	8.1	0.2	8.0	0.1	12.0
33	7.9	7.9	8.1	7.9	7.9	8.1	8.0	0.1	8.2	-0.2	12.2
34	8.1	8.0	8.0	8.0	8.0	8.1	8.0	0.0	8.2	-0.2	12.2
Average	8.0	8.0	7.9	8.0		Average	8.0	Average	8.0		
Std Dev	0.2	0.2	0.2	0.2							

Notes:
Std Dev = Standard deviation.

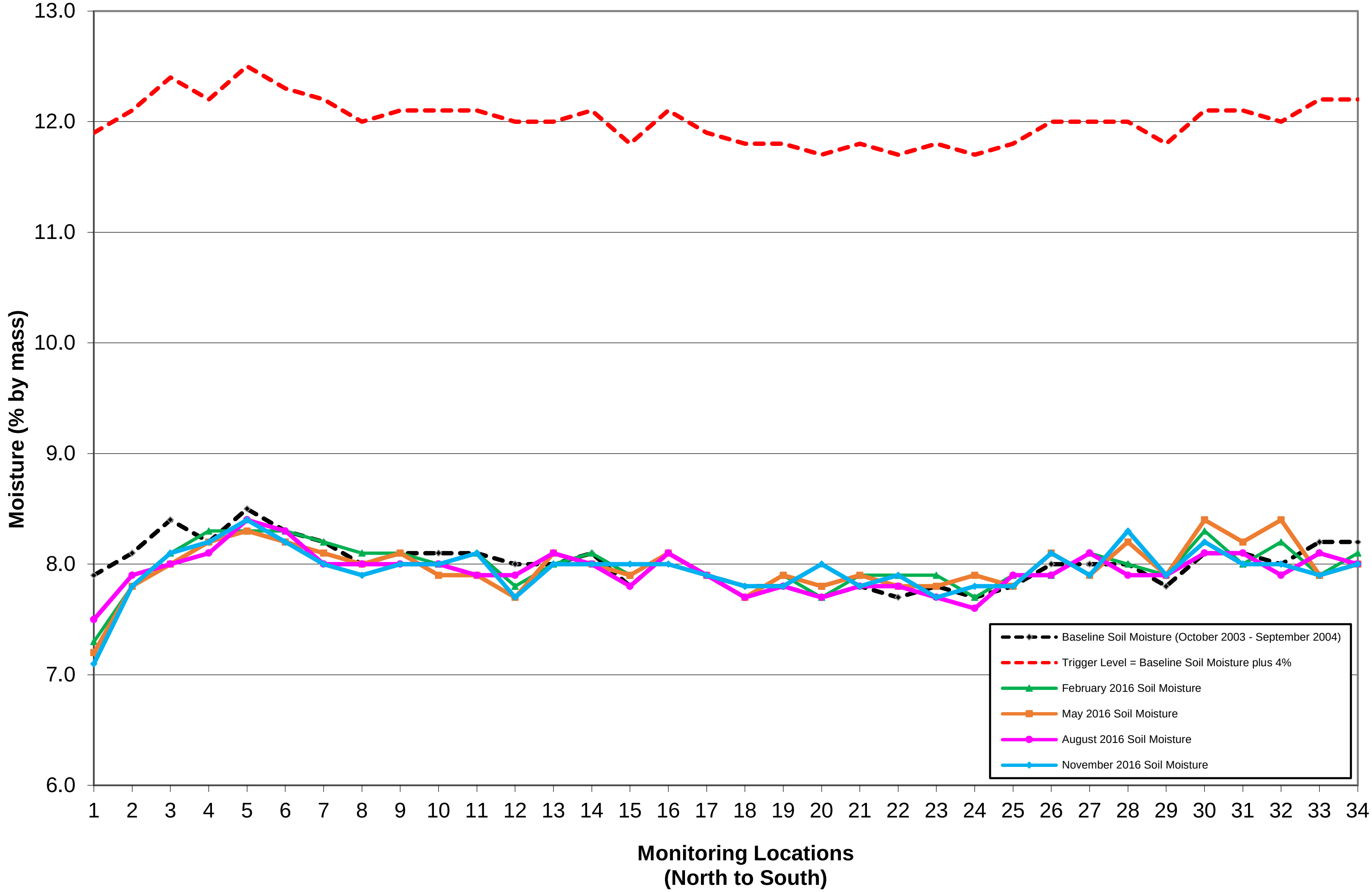

Figure C-1
Graph of Primary Subliner Soil Moisture Monitoring Results at West Access Tube
Calendar Year 2016

Table C-2
Primary Subliner Soil Moisture Monitoring Results at West-Central Access Tube
Calendar Year 2016

Monitoring Position	Collection Dates: February	May	August	November	Reporting Period Minimum	Reporting Period Maximum	Reporting Period Average	Reporting Period Std Dev	Baseline Average (10/2003-9/2004)	Difference between Baseline Average & Reporting Period Average	Trigger Level (Baseline plus 4%)
	Moisture (% by mass)								Moisture (% by mass)		
1	7.4	7.4	7.4	7.4	7.4	7.4	7.4	0.0	7.6	-0.2	11.6
2	5.9	5.8	6.2	5.8	5.8	6.2	5.9	0.2	7.5	-1.6	11.5
3	5.2	5.2	5.2	5.1	5.1	5.2	5.2	0.1	7.1	-1.9	11.1
4	5.7	5.7	5.9	5.6	5.6	5.9	5.7	0.1	6.6	-0.9	10.6
5	6.2	6.2	6.2	6.0	6.0	6.2	6.2	0.1	6.8	-0.6	10.8
6	7.2	7.2	7.0	7.2	7.0	7.2	7.2	0.1	7.2	0.0	11.2
7	7.5	7.4	7.4	7.4	7.4	7.5	7.4	0.0	7.5	-0.1	11.5
8	7.7	7.6	7.5	7.6	7.5	7.7	7.6	0.1	7.5	0.1	11.5
9	8.1	7.8	7.7	7.7	7.7	8.1	7.8	0.2	7.8	0.0	11.8
10	7.8	7.7	7.6	7.6	7.6	7.8	7.7	0.1	8.1	-0.4	12.1
11	7.9	8.0	8.0	8.0	7.9	8.0	8.0	0.0	8.0	0.0	12.0
12	8.3	8.3	8.4	8.2	8.2	8.4	8.3	0.1	8.2	0.1	12.2
13	8.0	8.0	8.0	8.0	8.0	8.0	8.0	0.0	8.2	-0.2	12.2
14	8.1	8.2	8.1	8.2	8.1	8.2	8.2	0.1	8.1	0.1	12.1
15	8.1	8.0	8.2	8.1	8.0	8.2	8.1	0.1	8.1	0.0	12.1
16	7.9	8.0	8.0	8.0	7.9	8.0	8.0	0.0	8.0	0.0	12.0
17	7.8	7.7	7.8	7.7	7.7	7.8	7.8	0.1	7.8	0.0	11.8
18	8.0	7.9	7.9	7.9	7.9	8.0	7.9	0.0	8.1	-0.2	12.1
19	7.9	8.0	8.2	7.9	7.9	8.2	8.0	0.1	7.8	0.2	11.8
20	7.8	7.9	7.7	7.8	7.7	7.9	7.8	0.1	8.0	-0.2	12.0
21	8.1	8.4	8.1	8.2	8.1	8.4	8.2	0.1	8.0	0.2	12.0
22	8.0	7.8	8.0	7.9	7.8	8.0	7.9	0.1	8.0	-0.1	12.0
23	8.1	8.0	8.0	8.1	8.0	8.1	8.1	0.1	7.8	0.3	11.8
24	8.0	7.9	7.8	7.9	7.8	8.0	7.9	0.1	8.0	-0.1	12.0
25	8.3	8.1	7.9	7.9	7.9	8.3	8.1	0.2	7.8	0.3	11.8
26	7.6	7.7	7.7	7.7	7.6	7.7	7.7	0.1	7.8	-0.1	11.8
27	8.0	7.9	8.0	7.9	7.9	8.0	8.0	0.1	7.9	0.1	11.9
28	7.9	7.9	7.7	7.9	7.7	7.9	7.9	0.1	7.9	0.0	11.9
29	8.0	7.9	8.0	8.1	7.9	8.1	8.0	0.1	7.9	0.1	11.9
30	7.7	7.7	7.7	7.6	7.6	7.7	7.7	0.1	7.7	0.0	11.7
31	7.9	7.9	7.9	7.9	7.9	7.9	7.9	0.0	8.0	-0.1	12.0
32	8.1	8.1	8.3	8.1	8.1	8.3	8.2	0.1	8.1	0.1	12.1
33	8.1	7.9	8.0	8.0	7.9	8.1	8.0	0.1	8.1	-0.1	12.1
34	7.7	8.0	8.2	8.0	7.7	8.2	8.0	0.2	8.1	-0.1	12.1
35	7.9	7.9	8.0	8.0	7.9	8.0	8.0	0.1	8.0	0.0	12.0
Average	7.7	7.6	7.6	7.6		Average	7.6	Average	7.8		
Std Dev	0.7	0.7	0.7	0.8							

Notes:
Std Dev = Standard deviation

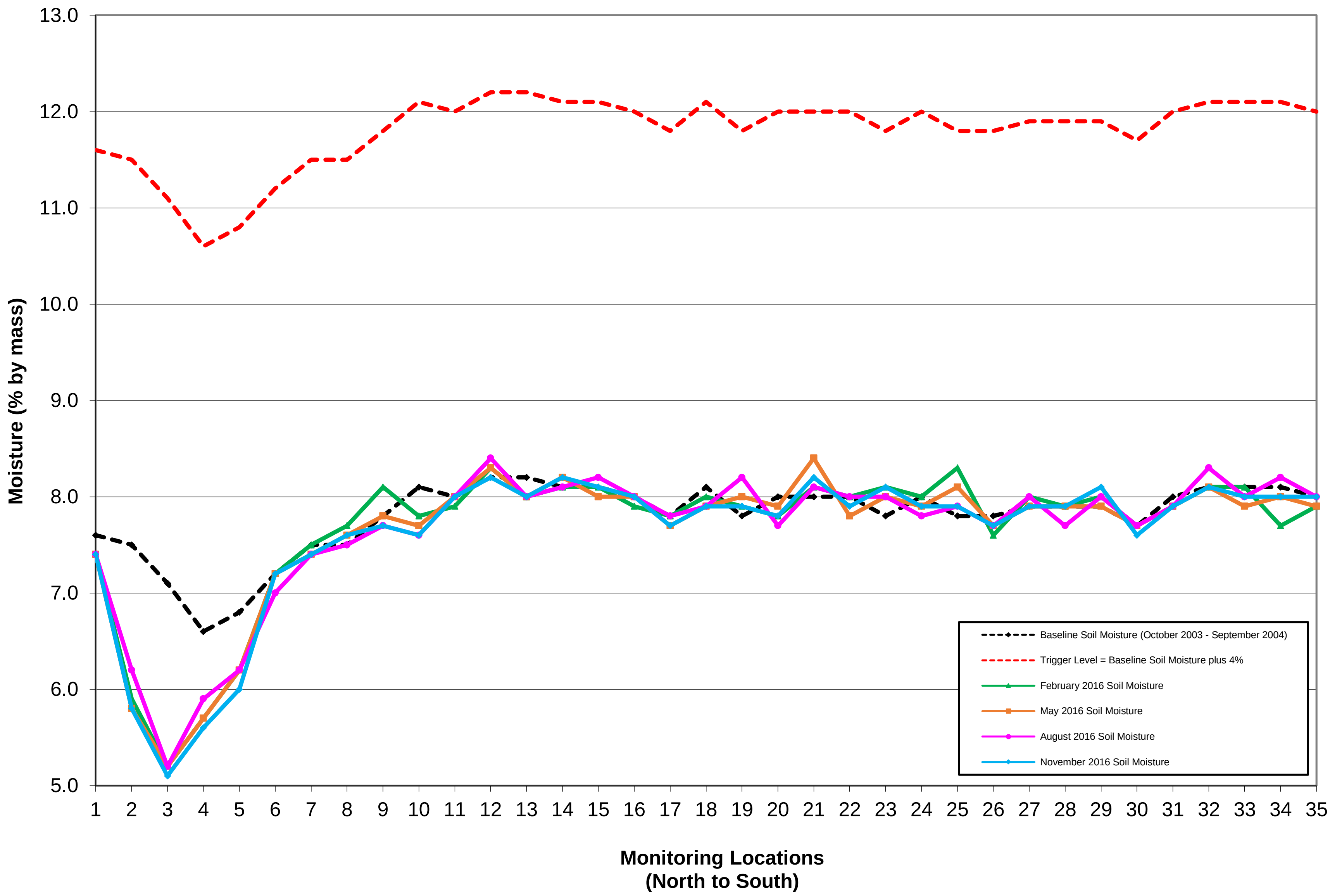

Figure C-2
Graph of Primary Subliner Soil Moisture Monitoring Results at West-Central Access Tube
Calendar Year 2016

Table C-3
Primary Subliner Soil Moisture Monitoring Results at Central Access Tube
Calendar Year 2016

Monitoring Position	Collection Dates: February	May	August	November	Reporting Period Minimum	Reporting Period Maximum	Reporting Period Average	Reporting Period Std Dev	Baseline Average (10/2003-9/2004)	Difference between Baseline Average & Reporting Period Average	Trigger Level (Baseline plus 4%)
	Moisture (% by mass)								Moisture (% by mass)		
1	6.7	7.2	7.2	5.6	5.6	7.2	6.7	0.8	8.2	-1.5	12.2
2	8.5	8.4	8.4	8.3	8.3	8.5	8.4	0.1	8.6	-0.2	12.6
3	7.4	7.4	7.6	7.5	7.4	7.6	7.5	0.1	8.3	-0.8	12.3
4	7.6	7.5	7.6	7.6	7.5	7.6	7.6	0.0	8.2	-0.6	12.2
5	7.5	7.3	7.5	7.5	7.3	7.5	7.5	0.1	7.7	-0.2	11.7
6	7.9	7.8	7.8	7.8	7.8	7.9	7.8	0.1	7.7	0.1	11.7
7	7.6	7.6	7.9	7.6	7.6	7.9	7.7	0.2	7.5	0.2	11.5
8	7.9	7.9	8.0	7.9	7.9	8.0	7.9	0.0	7.9	0.0	11.9
9	8.2	8.1	8.5	8.2	8.1	8.5	8.3	0.2	8.2	0.1	12.2
10	8.0	8.0	8.2	8.2	8.0	8.2	8.1	0.1	8.0	0.1	12.0
11	8.1	7.7	8.0	8.0	7.7	8.1	8.0	0.2	7.8	0.2	11.8
12	8.1	8.1	8.1	8.1	8.1	8.1	8.1	0.0	8.0	0.1	12.0
13	8.1	7.9	8.0	8.3	7.9	8.3	8.1	0.2	7.9	0.2	11.9
14	8.1	8.1	8.2	8.1	8.1	8.2	8.1	0.0	8.0	0.1	12.0
15	8.0	7.9	7.9	8.2	7.9	8.2	8.0	0.1	7.8	0.2	11.8
16	7.9	7.9	7.9	7.8	7.8	7.9	7.9	0.1	7.8	0.1	11.8
17	8.1	8.3	8.1	8.1	8.1	8.3	8.2	0.1	7.9	0.3	11.9
18	8.1	8.0	8.1	8.0	8.0	8.1	8.1	0.1	8.0	0.1	12.0
19	8.1	7.7	8.0	8.2	7.7	8.2	8.0	0.2	7.8	0.2	11.8
20	7.8	7.8	7.8	7.8	7.8	7.8	7.8	0.0	7.7	0.1	11.7
21	7.9	8.0	7.8	7.6	7.6	8.0	7.8	0.2	7.8	0.0	11.8
22	7.7	7.6	7.7	7.7	7.6	7.7	7.7	0.1	7.6	0.1	11.6
23	7.6	7.9	7.8	7.6	7.6	7.9	7.7	0.2	7.8	-0.1	11.8
24	7.8	7.9	7.7	7.7	7.7	7.9	7.8	0.1	7.9	-0.1	11.9
25	7.7	7.9	7.8	7.8	7.7	7.9	7.8	0.1	7.8	0.0	11.8
26	7.9	8.0	7.8	7.8	7.8	8.0	7.9	0.1	7.9	0.0	11.9
27	8.0	8.1	7.9	7.9	7.9	8.1	8.0	0.1	8.0	0.0	12.0
28	7.8	7.8	8.1	7.9	7.8	8.1	7.9	0.1	7.8	0.1	11.8
29	7.8	7.7	7.8	7.9	7.7	7.9	7.8	0.1	7.9	-0.1	11.9
30	7.9	7.8	7.9	7.7	7.7	7.9	7.8	0.1	7.9	-0.1	11.9
31	7.8	7.9	7.7	7.8	7.7	7.9	7.8	0.1	7.8	0.0	11.8
32	7.7	7.7	7.8	7.8	7.7	7.8	7.8	0.1	7.7	0.1	11.7
33	7.9	7.8	7.9	7.9	7.8	7.9	7.9	0.1	8.0	-0.1	12.0
34	7.8	7.9	7.8	7.8	7.8	7.9	7.8	0.1	7.8	0.0	11.8
35	7.9	7.8	7.9	7.9	7.8	7.9	7.9	0.1	7.9	0.0	11.9
Average	7.9	7.8	7.9	7.8		Average	7.9	Average	7.9		
Std Dev	0.3	0.3	0.2	0.4							

Notes:
Std Dev = Standard deviation.

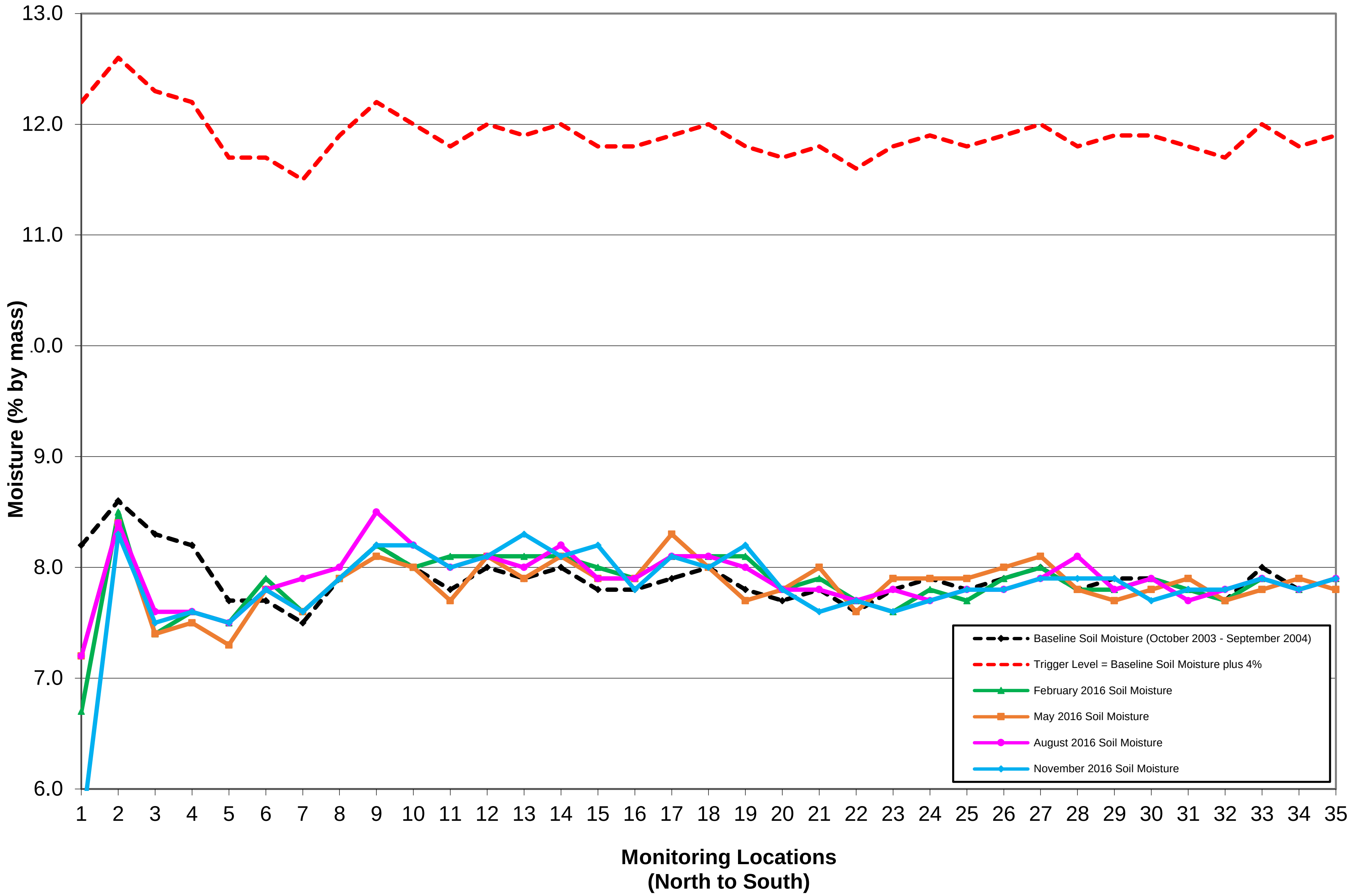

Figure C-3
Graph of Primary Subliner Soil Moisture Monitoring Results at Central Access Tube
Calendar Year 2016

Table C-4
Primary Subliner Soil Moisture Monitoring Results at East-Central Access Tube
Calendar Year 2016

Monitoring Position	Collection Dates: February	May	August	November	Reporting Period Minimum	Reporting Period Maximum	Reporting Period Average	Reporting Period Std Dev	Baseline Average (10/2003-9/2004)	Difference between Baseline Average & Reporting Period Average	Trigger Level (Baseline plus 4%)
	Moisture (% by mass)								Moisture (% by mass)		
1	8.1	8.0	8.0	8.0	8.0	8.1	8.0	0.0	8.2	-0.2	12.2
2	7.9	7.7	7.7	7.8	7.7	7.9	7.8	0.1	8.1	-0.3	12.1
3	6.8	6.7	6.8	6.7	6.7	6.8	6.8	0.1	6.7	0.1	10.7
4	6.8	6.7	6.9	6.8	6.7	6.9	6.8	0.1	6.6	0.2	10.6
5	7.1	7.2	7.1	7.3	7.1	7.3	7.2	0.1	7.5	-0.3	11.5
6	7.4	7.5	7.3	7.5	7.3	7.5	7.4	0.1	7.5	-0.1	11.5
7	7.3	7.3	7.2	7.2	7.2	7.3	7.3	0.1	7.5	-0.2	11.5
8	7.5	7.4	7.4	7.4	7.4	7.5	7.4	0.0	7.6	-0.2	11.6
9	7.5	7.5	7.5	7.5	7.5	7.5	7.5	0.0	7.6	-0.1	11.6
10	7.7	7.8	7.8	7.7	7.7	7.8	7.8	0.1	7.8	0.0	11.8
11	8.1	8.1	8.1	8.1	8.1	8.1	8.1	0.0	8.2	-0.1	12.2
12	8.1	8.0	8.0	8.0	8.0	8.1	8.0	0.0	8.0	0.0	12.0
13	7.8	7.7	7.7	7.7	7.7	7.8	7.7	0.0	8.0	-0.3	12.0
14	8.0	7.9	8.1	8.0	7.9	8.1	8.0	0.1	8.0	0.0	12.0
15	7.9	7.8	7.8	7.8	7.8	7.9	7.8	0.1	7.9	-0.1	11.9
16	8.0	8.0	7.9	7.7	7.7	8.0	7.9	0.1	7.7	0.2	11.7
17	7.9	7.9	7.9	7.8	7.8	7.9	7.9	0.1	7.9	0.0	11.9
18	8.0	8.0	8.0	7.8	7.8	8.0	8.0	0.1	7.9	0.1	11.9
19	7.6	7.6	7.7	7.7	7.6	7.7	7.7	0.1	7.7	0.0	11.7
20	7.8	7.8	8.0	7.8	7.8	8.0	7.9	0.1	7.7	0.2	11.7
21	7.7	7.6	7.7	7.8	7.6	7.8	7.7	0.1	7.7	0.0	11.7
22	7.6	7.8	7.8	7.8	7.6	7.8	7.8	0.1	7.7	0.1	11.7
23	7.6	7.6	7.6	7.6	7.6	7.6	7.6	0.0	7.6	0.0	11.6
24	7.7	7.8	7.7	7.7	7.7	7.8	7.7	0.0	7.6	0.1	11.6
25	7.5	7.4	7.4	7.5	7.4	7.5	7.5	0.1	7.6	-0.1	11.6
26	7.3	7.3	7.3	7.7	7.3	7.7	7.4	0.2	7.5	-0.1	11.5
27	7.4	7.5	7.4	7.5	7.4	7.5	7.5	0.1	7.5	0.0	11.5
28	7.6	7.5	7.5	7.7	7.5	7.7	7.6	0.1	7.4	0.2	11.4
29	7.7	7.7	7.7	7.7	7.7	7.7	7.7	0.0	7.6	0.1	11.6
30	7.5	7.6	7.6	7.7	7.5	7.7	7.6	0.1	7.4	0.2	11.4
31	7.7	7.6	7.7	7.7	7.6	7.7	7.7	0.1	7.5	0.2	11.5
32	7.9	7.9	8.0	8.1	7.9	8.1	8.0	0.1	7.9	0.1	11.9
33	8.1	8.0	7.9	8.1	7.9	8.1	8.0	0.1	8.1	-0.1	12.1
34	8.1	8.3	8.2	8.1	8.1	8.3	8.2	0.1	8.0	0.2	12.0
35	7.9	8.2	8.0	8.2	7.9	8.2	8.1	0.1	8.2	-0.1	12.2
Average	7.7	7.7	7.7	7.7		Average	7.7	Average	7.7		
Std Dev	0.3	0.3	0.3	0.3							

Notes:
Std Dev = Standard deviation.

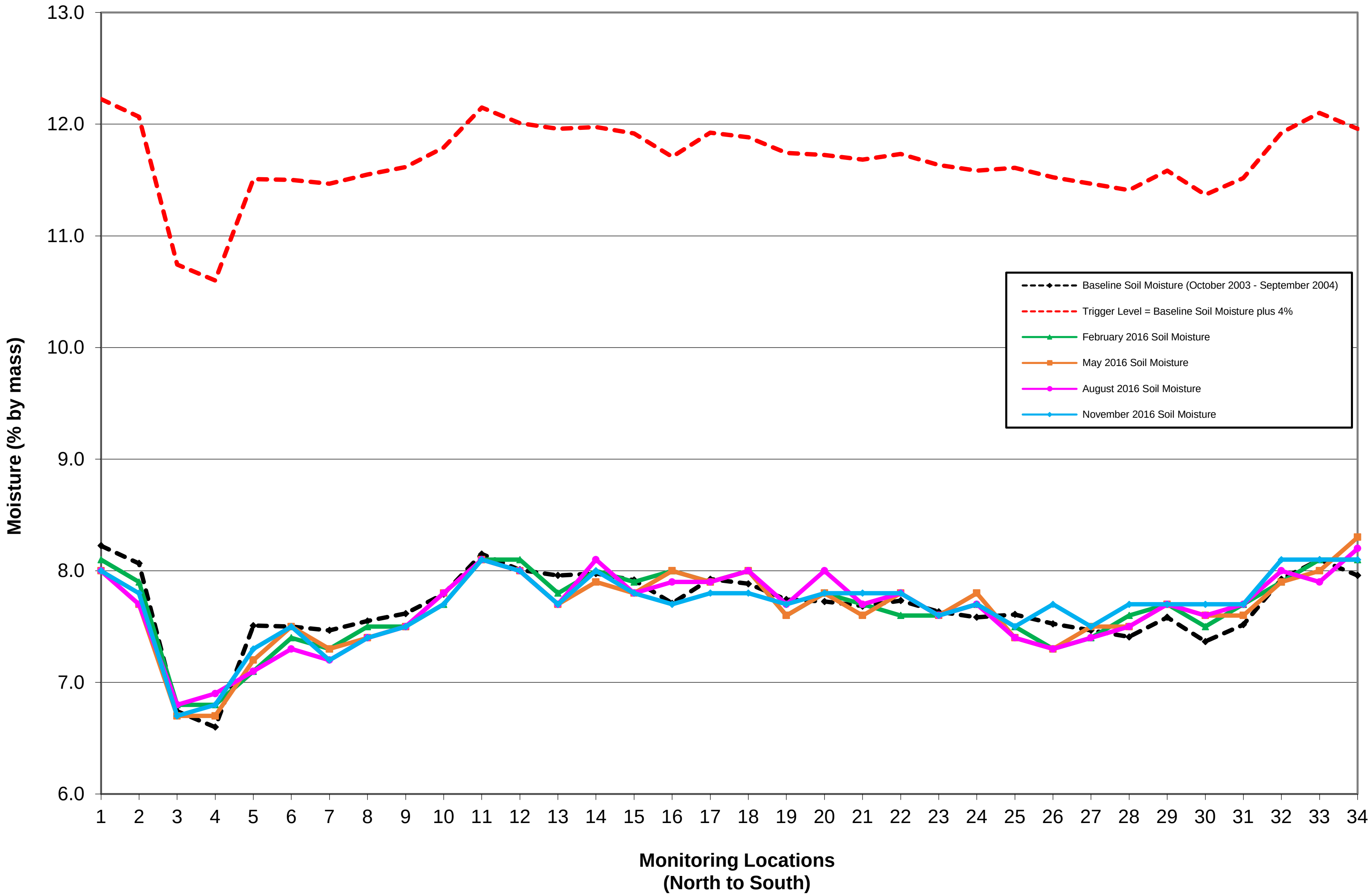

Figure C-4
Graph of Primary Subliner Soil Moisture Monitoring Results at East-Central Access Tube
Calendar Year 2016

Table C-5
Primary Subliner Soil Moisture Monitoring Results at East Access Tube
Calendar Year 2016

Monitoring Position	Collection Dates: February	May	August	November	Reporting Period Minimum	Reporting Period Maximum	Reporting Period Average	Reporting Period Std Dev	Baseline Average (10/2003-9/2004)	Difference between Baseline Average & Reporting Period Average	Trigger Level (Baseline plus 4%)
	Moisture (% by mass)								Moisture (% by mass)		
1	7.2	7.2	7.4	7.1	7.1	7.4	7.2	0.1	7.9	-0.7	11.9
2	7.4	7.4	7.4	7.4	7.4	7.4	7.4	0.0	7.9	-0.5	11.9
3	7.1	6.7	6.9	6.8	6.7	7.1	6.9	0.2	7.4	-0.5	11.4
4	6.9	6.8	6.8	6.8	6.8	6.9	6.8	0.1	6.8	0.0	10.8
5	6.6	6.5	6.7	6.6	6.5	6.7	6.6	0.1	6.6	0.0	10.6
6	6.9	7.0	6.9	7.0	6.9	7.0	7.0	0.1	7.1	-0.1	11.1
7	7.1	7.1	7.0	7.0	7.0	7.1	7.1	0.1	6.7	0.4	10.7
8	6.9	7.1	6.9	7.1	6.9	7.1	7.0	0.1	6.9	0.1	10.9
9	7.3	7.2	7.3	7.2	7.2	7.3	7.3	0.1	7.2	0.1	11.2
10	7.5	7.6	7.4	7.5	7.4	7.6	7.5	0.1	7.7	-0.2	11.7
11	7.4	7.4	7.4	7.5	7.4	7.5	7.4	0.0	7.5	-0.1	11.5
12	7.7	7.6	7.7	7.6	7.6	7.7	7.7	0.1	8.1	-0.4	12.1
13	8.0	8.1	8.0	8.0	8.0	8.1	8.0	0.0	8.0	0.0	12.0
14	8.0	8.1	8.0	8.0	8.0	8.1	8.0	0.0	8.4	-0.4	12.4
15	8.3	8.3	8.2	8.2	8.2	8.3	8.3	0.1	8.2	0.1	12.2
16	8.4	8.4	8.4	8.3	8.3	8.4	8.4	0.0	8.4	0.0	12.4
17	7.6	7.6	7.7	7.6	7.6	7.7	7.6	0.1	7.8	-0.2	11.8
18	7.5	7.5	7.6	7.6	7.5	7.6	7.6	0.1	7.7	-0.1	11.7
19	7.8	7.6	7.9	7.7	7.6	7.9	7.8	0.1	7.7	0.1	11.7
20	7.7	7.8	7.7	7.6	7.6	7.8	7.7	0.1	7.9	-0.2	11.9
21	7.8	7.8	7.7	7.7	7.7	7.8	7.8	0.1	7.8	0.0	11.8
22	7.8	7.9	7.8	7.7	7.7	7.9	7.8	0.1	7.9	-0.1	11.9
23	7.5	7.6	7.7	7.6	7.5	7.7	7.6	0.1	7.7	-0.1	11.7
24	8.0	8.0	8.1	7.9	7.9	8.1	8.0	0.1	7.9	0.1	11.9
25	7.7	7.8	7.8	7.7	7.7	7.8	7.8	0.1	7.7	0.1	11.7
26	7.7	7.8	7.8	7.7	7.7	7.8	7.8	0.1	7.9	-0.1	11.9
27	7.7	7.9	7.9	7.7	7.7	7.9	7.8	0.1	7.8	0.0	11.8
28	7.8	7.8	7.9	7.9	7.8	7.9	7.9	0.1	8.0	-0.1	12.0
29	8.1	7.9	7.9	7.9	7.9	8.1	8.0	0.1	7.9	0.1	11.9
30	8.0	7.9	7.8	7.9	7.8	8.0	7.9	0.1	8.2	-0.3	12.2
31	8.0	8.0	7.9	8.0	7.9	8.0	8.0	0.0	8.1	-0.1	12.1
32	8.2	8.1	8.1	8.1	8.1	8.2	8.1	0.0	8.4	-0.3	12.4
33	8.3	8.0	8.1	8.2	8.0	8.3	8.2	0.1	8.2	0.0	12.2
34	7.9	7.8	7.9	7.9	7.8	7.9	7.9	0.1	8.2	-0.3	12.2
Average	7.6	7.6	7.6	7.6		Average	7.6	Average	7.8		
Std Dev	0.4	0.5	0.4	0.4							

Notes:
Std Dev = Standard deviation.

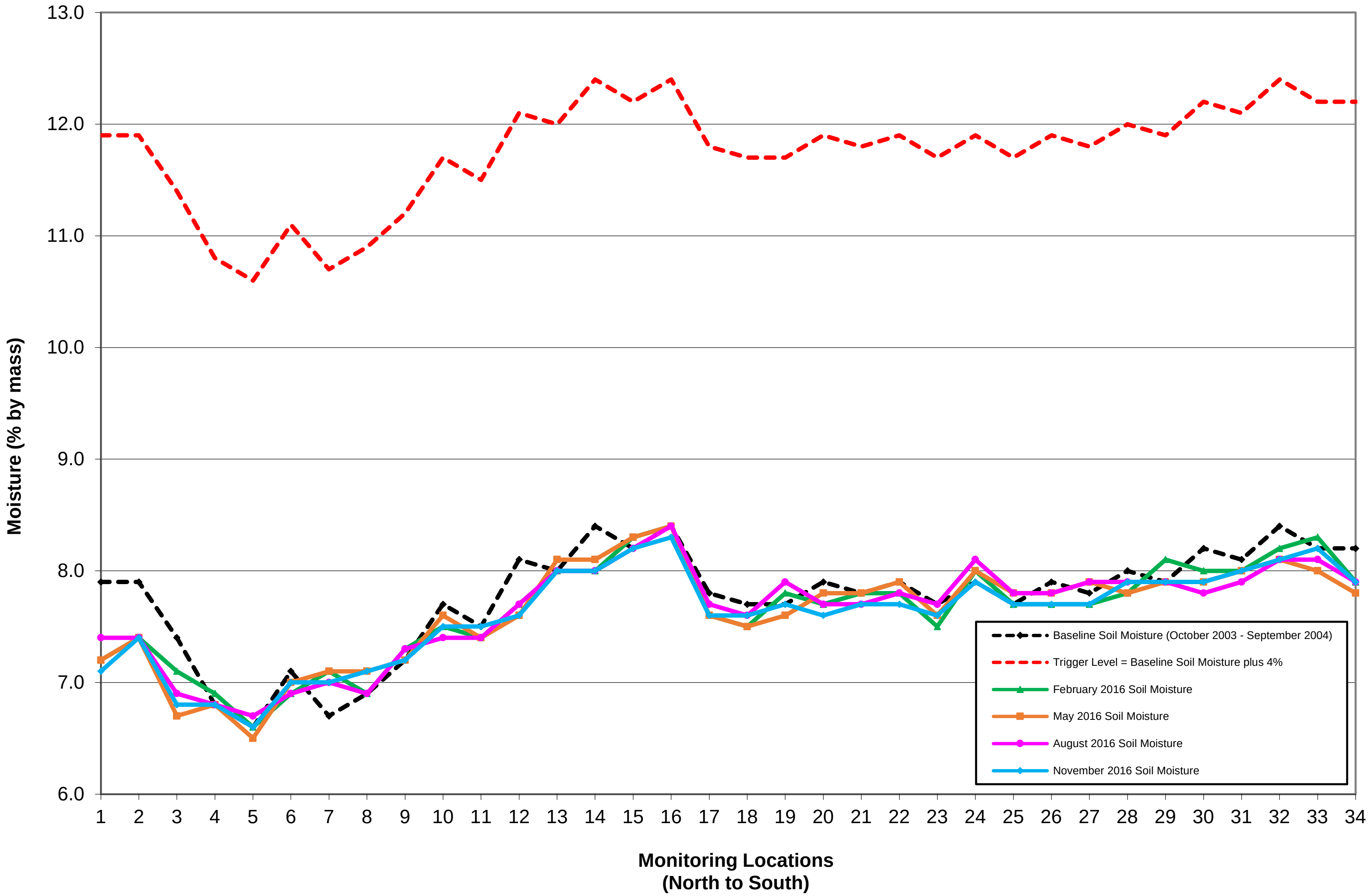

Figure C-5
Graph of Primary Subliner Soil Moisture Monitoring Results at East Access Tube
Calendar Year 2016

ANNEX D
Vertical Sensor Array Time-Domain Reflectometry Soil Moisture Monitoring Results

Table D-1
Time-Domain Reflectometry Soil Moisture Monitoring Results at Vertical Sensor Array 5-Foot Monitoring Depth
Calendar Year 2016

Collection Date	Instrument Location (5-Foot Monitoring Depth)										
	VSA-1	VSA-2	VSA-3	VSA-4	VSA-5	VSA-6	VSA-7	VSA-8	VSA-9	VSA-10	VSA-11
	Moisture (% by volume)										
February	11.7	8.7	8.2	12.9	13.5	8.7	7.3	6.0	8.4	5.9	7.7
May	11.6	8.7	8.1	12.9	13.7	8.7	7.3	6.0	8.7	5.8	7.6
August	11.6	8.7	8.3	13.4	13.6	8.8	7.6	6.3	8.8	5.7	7.7
November	11.6	8.6	8.2	12.8	12.9	8.6	7.4	6.2	8.8	5.7	7.7
Reporting Period Minimum	11.6	8.6	8.1	12.8	12.9	8.6	7.3	6.0	8.4	5.7	7.6
Reporting Period Maximum	11.7	8.7	8.3	13.4	13.7	8.8	7.6	6.3	8.8	5.9	7.7
Reporting Period Average	11.6	8.7	8.2	13.0	13.4	8.7	7.4	6.1	8.7	5.8	7.7
Collection Period Std Dev	0.0	0.0	0.1	0.3	0.3	0.1	0.1	0.1	0.2	0.1	0.0
Baseline Average (10/2003-9/2004)	12.4	7.8	6.5	14.0	14.6	9.4	6.8	5.9	7.7	5.2	8.4
Difference between Baseline Average & Reporting Period Average	-0.8	0.9	1.7	-1.0	-1.2	-0.7	0.6	0.2	1.0	0.6	-0.7
Trigger Level (Baseline plus 4%)	16.4	11.8	10.5	18.0	18.6	13.4	10.8	9.9	11.7	9.2	12.4

Notes:
Std Dev = Standard deviation.
VSA = Vertical sensor array.

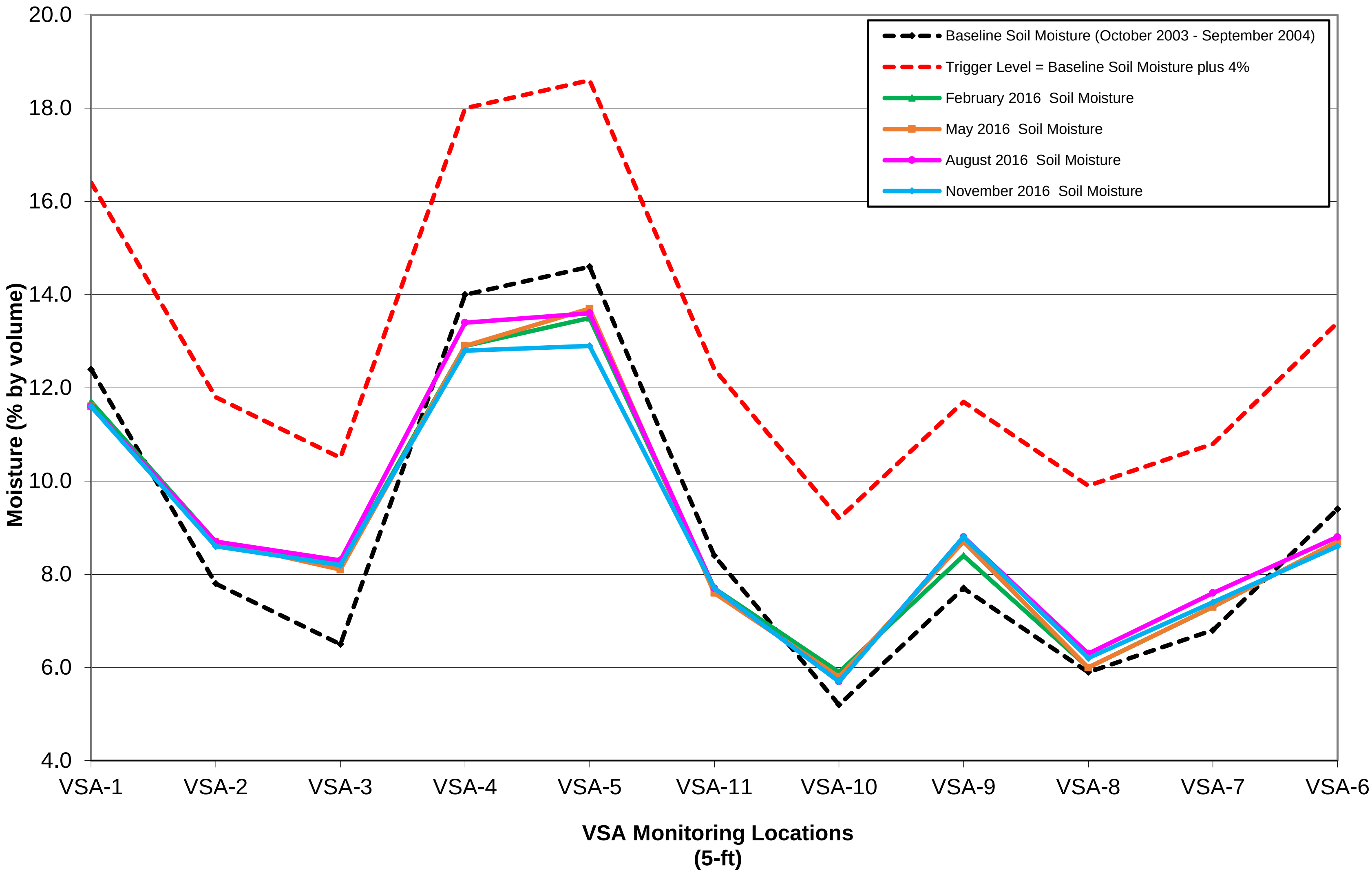

Figure D-1
Graph of Vertical Sensor Array Soil Moisture Monitoring Results (5-Foot Monitoring Depth)
Calendar Year 2016

Table D-2
Time-Domain Reflectometry Soil Moisture Monitoring Results at Vertical Sensor Array 15-Foot Monitoring Depth
Calendar Year 2016

Collection Date	Instrument Location (15-Foot Monitoring Depth)										
	VSA-1	VSA-2	VSA-3	VSA-4	VSA-5	VSA-6	VSA-7	VSA-8	VSA-9	VSA-10	VSA-11
	Moisture (% by volume)										
February	8.3	7.9	7.0	7.6	7.9	7.9	6.6	6.6	5.1	7.2	5.4
May	8.3	7.9	7.0	7.6	7.9	7.9	6.6	6.6	5.1	7.2	5.4
August	8.4	7.8	6.7	7.7	8.0	7.8	6.7	6.6	5.0	7.2	5.5
November	8.4	7.8	6.7	7.6	7.9	7.8	6.7	6.5	5.0	7.2	5.4
Reporting Period Minimum	8.3	7.8	6.7	7.6	7.9	7.8	6.6	6.5	5.0	7.2	5.4
Reporting Period Maximum	8.4	7.9	7.0	7.7	8.0	7.9	6.7	6.6	5.1	7.2	5.5
Reporting Period Average	8.4	7.9	6.9	7.6	7.9	7.9	6.7	6.6	5.1	7.2	5.4
Collection Period Std Dev	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0
Baseline Average (10/2003-9/2004)	8.2	7.7	6.7	7.5	7.6	7.7	6.6	6.5	4.9	7.2	5.7
Difference between Baseline Average & Reporting Period Average	0.2	0.2	0.2	0.1	0.3	0.2	0.1	0.1	0.2	0.0	-0.3
Trigger Level (Baseline plus 4%)	12.2	11.7	10.7	11.5	11.6	11.7	10.6	10.5	8.9	11.2	9.7

Notes:
Std Dev = Standard deviation.
VSA = Vertical sensor array.

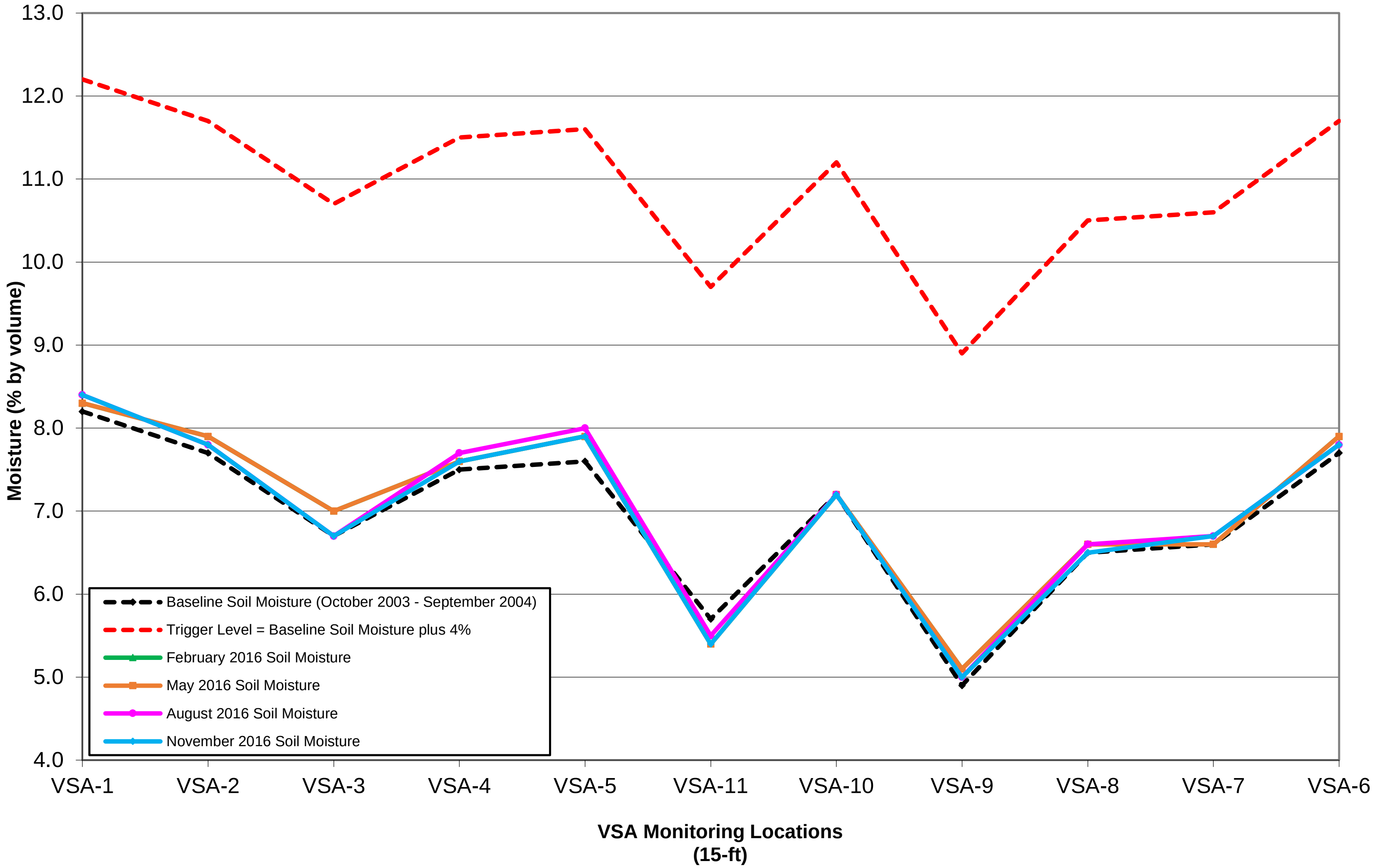

Figure D-2
Graph of Vertical Sensor Array Soil Moisture Monitoring Results (15-Foot Monitoring Depth)
Calendar Year 2016

ANNEX E
Chemical Waste Landfill Sanitary Sewer Soil Moisture Monitoring Results

Table E-1
Chemical Waste Landfill Sanitary Sewer Soil Moisture Monitoring Results at
12-Foot Monitoring Depth
Calendar Year 2016

Collection Date	Monitoring Location					
	CSS-1	CSS-2	CSS-3	CSS-4	CSS-5	CSS-6
	Moisture (% by mass)					
February	2.0	3.5	4.1	2.3	2.2	4.5
May	2.1	3.6	4.2	2.4	2.1	4.7
August	2.0	3.5	4.1	2.3	2.3	4.8
November	2.1	3.6	4.1	2.3	2.3	4.5
Reporting Period Minimum	2.0	3.5	4.1	2.3	2.1	4.5
Reporting Period Maximum	2.1	3.6	4.2	2.4	2.3	4.8
Reporting Period Average	2.1	3.6	4.1	2.3	2.2	4.6
Reporting Period Std Dev	0.1	0.1	0.1	0.1	0.1	0.2
Baseline Average (10/2003-9/2004)	2.1	2.2	3.0	2.3	2.2	4.4
Difference between Baseline Average & Reporting Period Average	0.0	1.4	1.1	0.0	0.0	0.2
Trigger Level (Baseline plus 4%)	6.1	6.2	7.0	6.3	6.2	8.4

Notes:
CSS = CWL sanitary sewer.
CWL = Chemical Waste Landfill.
Std Dev = Standard deviation.

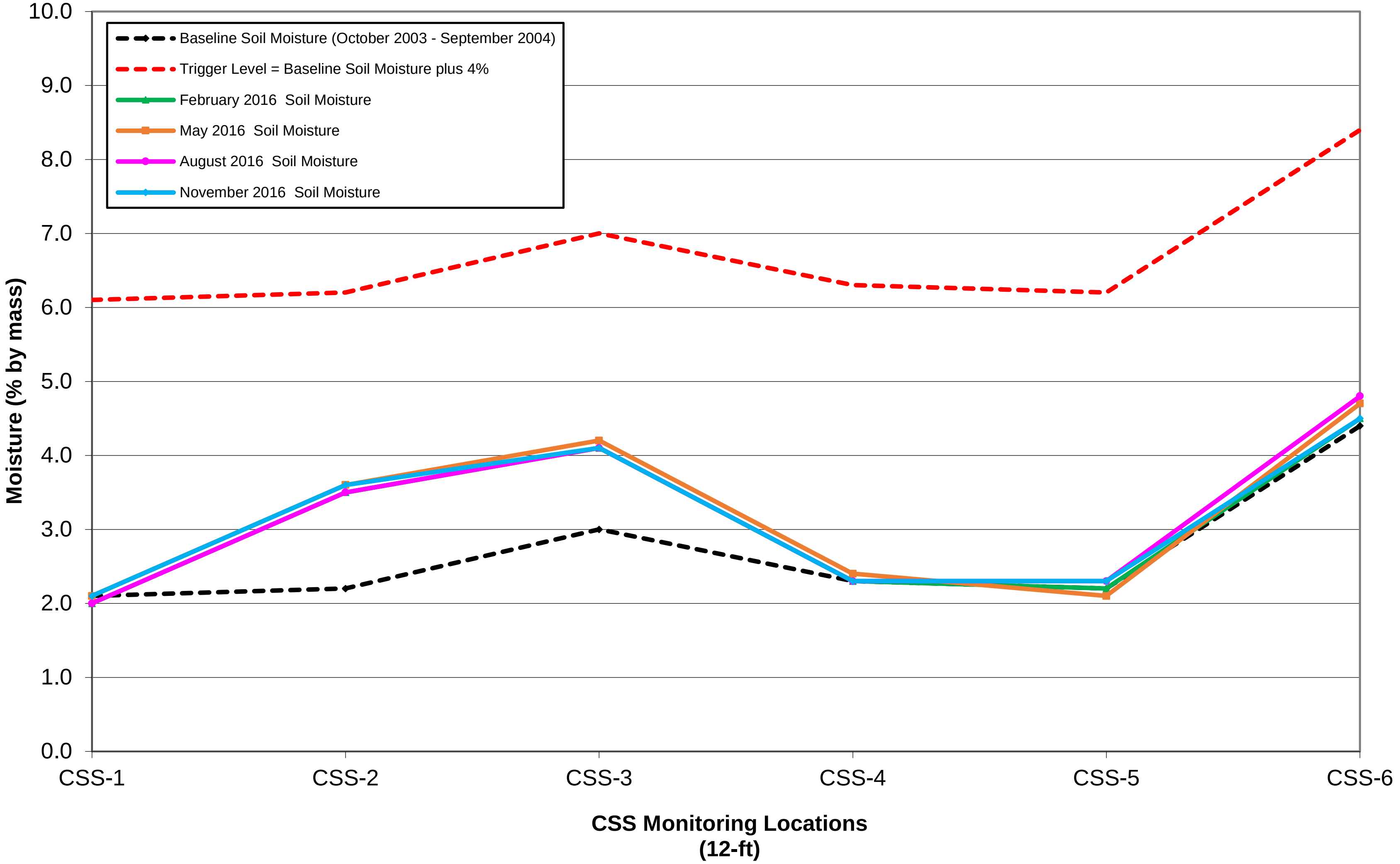

Figure E-1
Graph of Chemical Waste Landfill Sanitary Sewer Soil Moisture Monitoring Results (12-Foot Monitoring Depth)
Calendar Year 2016

Table E-2
Chemical Waste Landfill Sanitary Sewer Soil Moisture Monitoring Results at
16-Foot Monitoring Depth
Calendar Year 2016

	Monitoring Location					
	CSS-1	CSS-2	CSS-3	CSS-4	CSS-5	CSS-6
Collection Date	Moisture (% by mass)					
February	3.3	3.7	3.0	2.7	2.9	6.2
May	3.1	3.7	3.0	2.8	2.8	6.1
August	3.2	3.8	3.0	2.8	2.8	6.2
November	3.1	3.7	3.0	2.9	2.8	6.1
Reporting Period Minimum	3.1	3.7	3.0	2.7	2.8	6.1
Reporting Period Maximum	3.3	3.8	3.0	2.9	2.9	6.2
Reporting Period Average	3.2	3.7	3.0	2.8	2.8	6.2
Reporting Period Std Dev	0.1	0.0	0.0	0.1	0.1	0.1
Baseline Average (10/2003-9/2004)	3.1	2.3	2.6	2.7	2.7	5.8
Difference between Baseline Average & Reporting Period Average	0.1	1.4	0.4	0.1	0.1	0.4
Trigger Level (Baseline plus 4%)	7.1	6.3	6.6	6.7	6.7	9.8

Notes:
CSS = CWL sanitary sewer.
CWL = Chemical Waste Landfill.
Std Dev = Standard deviation.

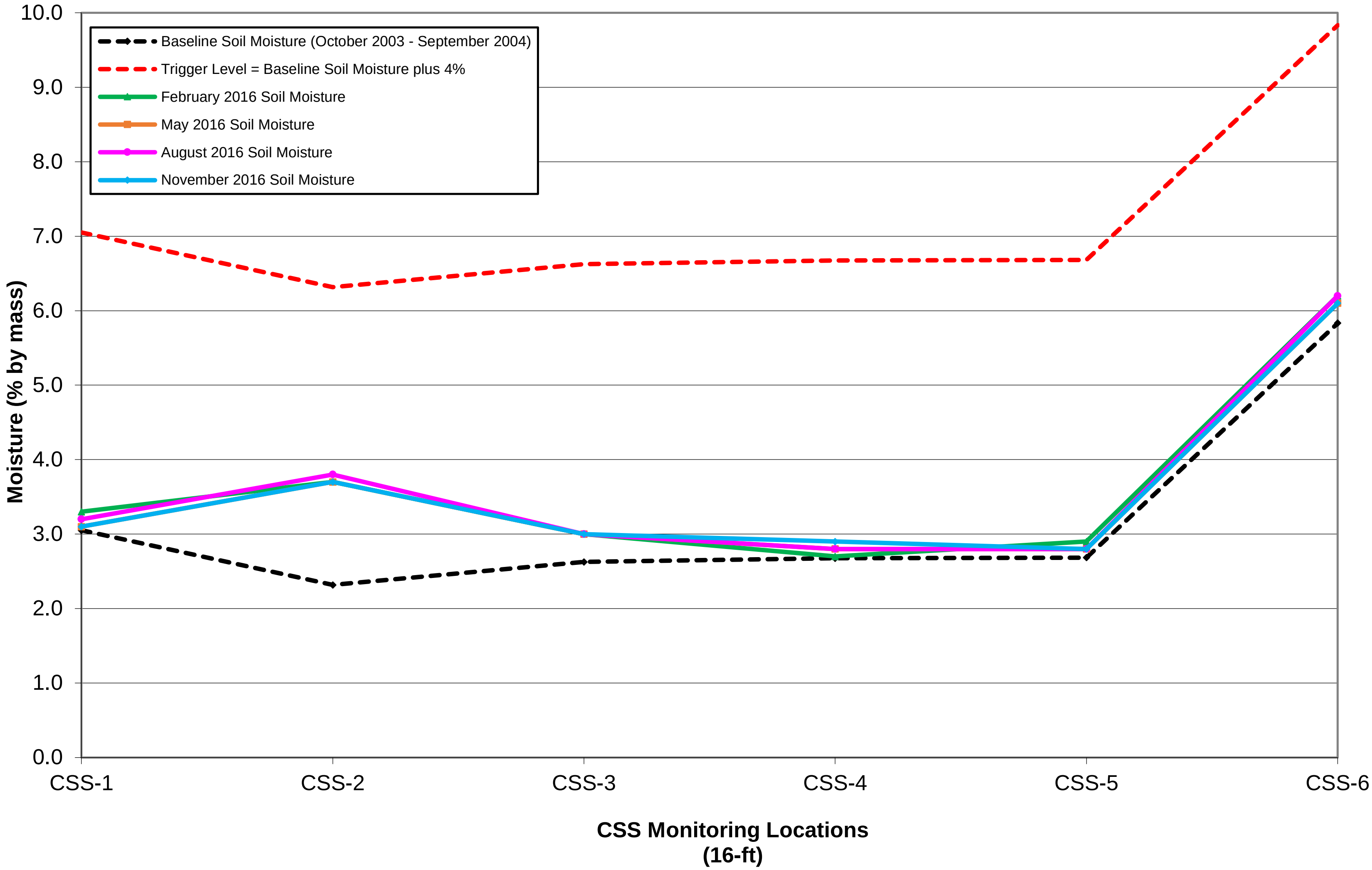

Figure E-2
Graph of Chemical Waste Landfill Sanitary Sewer Soil Moisture Monitoring Results (16-Foot Monitoring Depth)
Calendar Year 2016

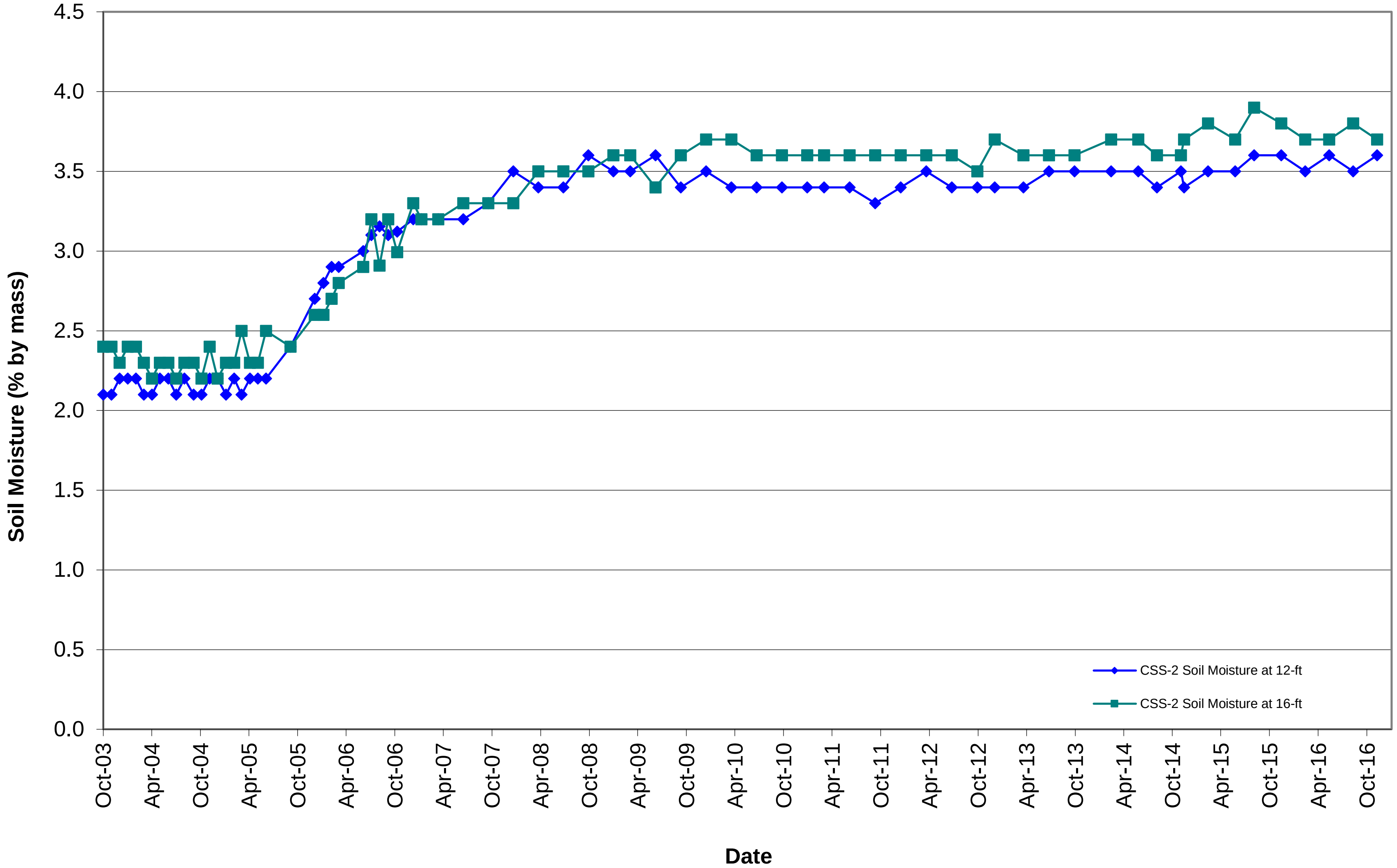

Figure E-3
Graph of CSS-2 Soil Moisture Increase (12- and 16-Foot Monitoring Depth)
October 2003 – December 2016

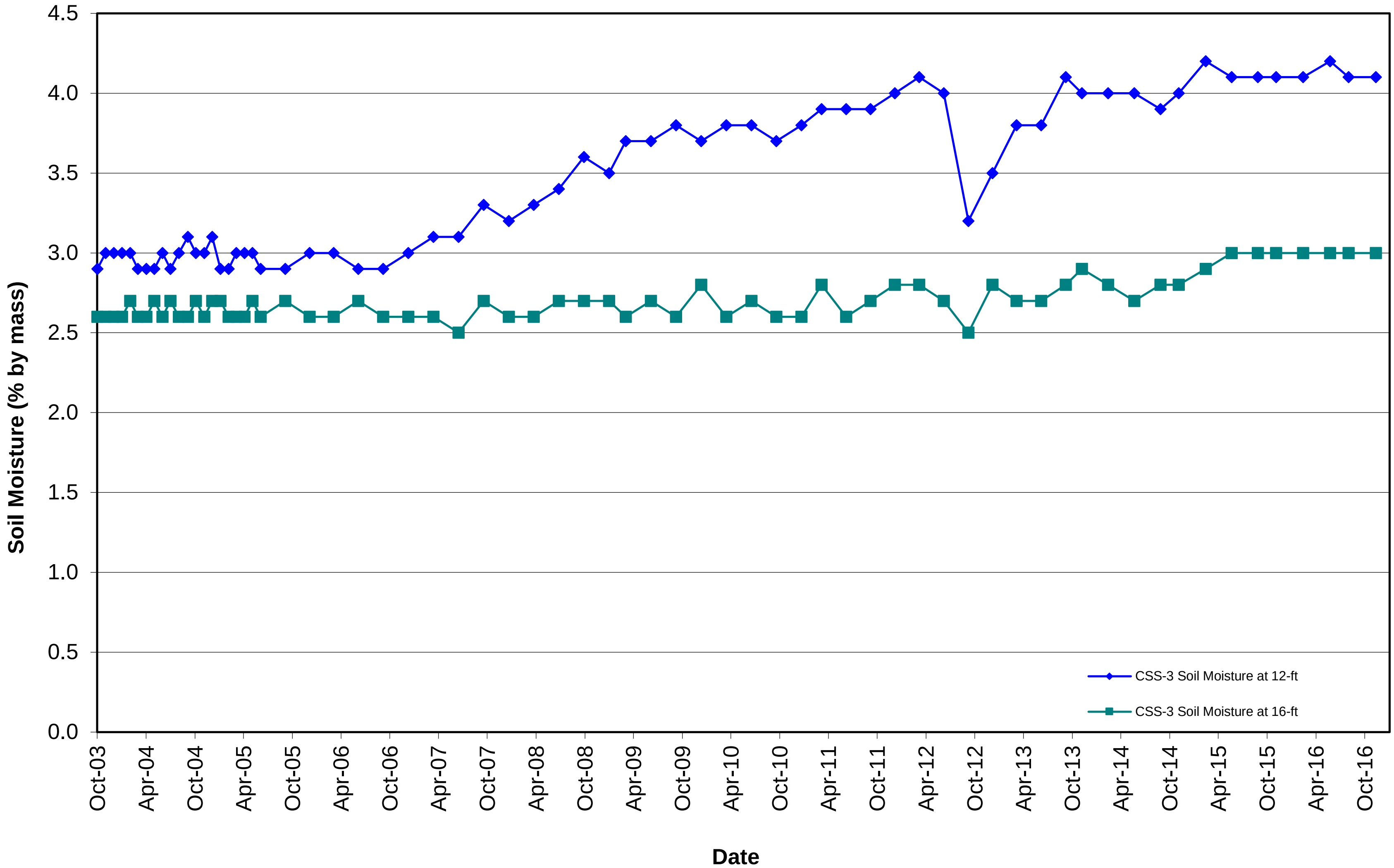

Figure E-4
Graph of CSS-3 Soil Moisture Increase (12- and 16-Foot Monitoring Depth)
October 2003 – December 2016