403139

WSP | PARSONS BRINCKERHOFF

13530 Dulles Technology Drive
Suite 300
Herndon, VA 20171
Main: 703-742-5700
wspgroup.com/usa
pbworld.com/usa

VIA FEDERAL EXPRESS

RECEIVED
SEP 30 2015
SITE ASSESSMENT, REMEDIATION & REVITALIZATION

September 29, 2015

Tim Hornosky, P.G.
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: Revised Remedial Investigation Report Addendum
Wix Filtration Corp LLC Plant Site, Dillon
Voluntary Cleanup Contract No. 13-5996-RP

Dear Mr. Hornosky:

On behalf of Wix Filtration Corp LLC (Wix), WSP has prepared a revised version of the addendum to the August 2014 Remedial Investigation (RI) Report for the Wix facility located in Dillon, South Carolina (Site). Enclosed for your review is an electronic (compact disc) copy of the revised RI Report Addendum for the Site. WSP is submitting this revision pursuant to the comments provided during our telephone communication on September 24, 2015.

If you have any questions concerning the revised RI Report Addendum, or need any additional information, please do not hesitate to contact me or Ken McCutcheon of Wix at (843) 774-5623.

Sincerely yours,

Robert E. Johnson
Robert E. Johnson, Ph.D., P.G.
Senior Technical Manager – Environmental
South Carolina Professional Geologist #2296
#30147

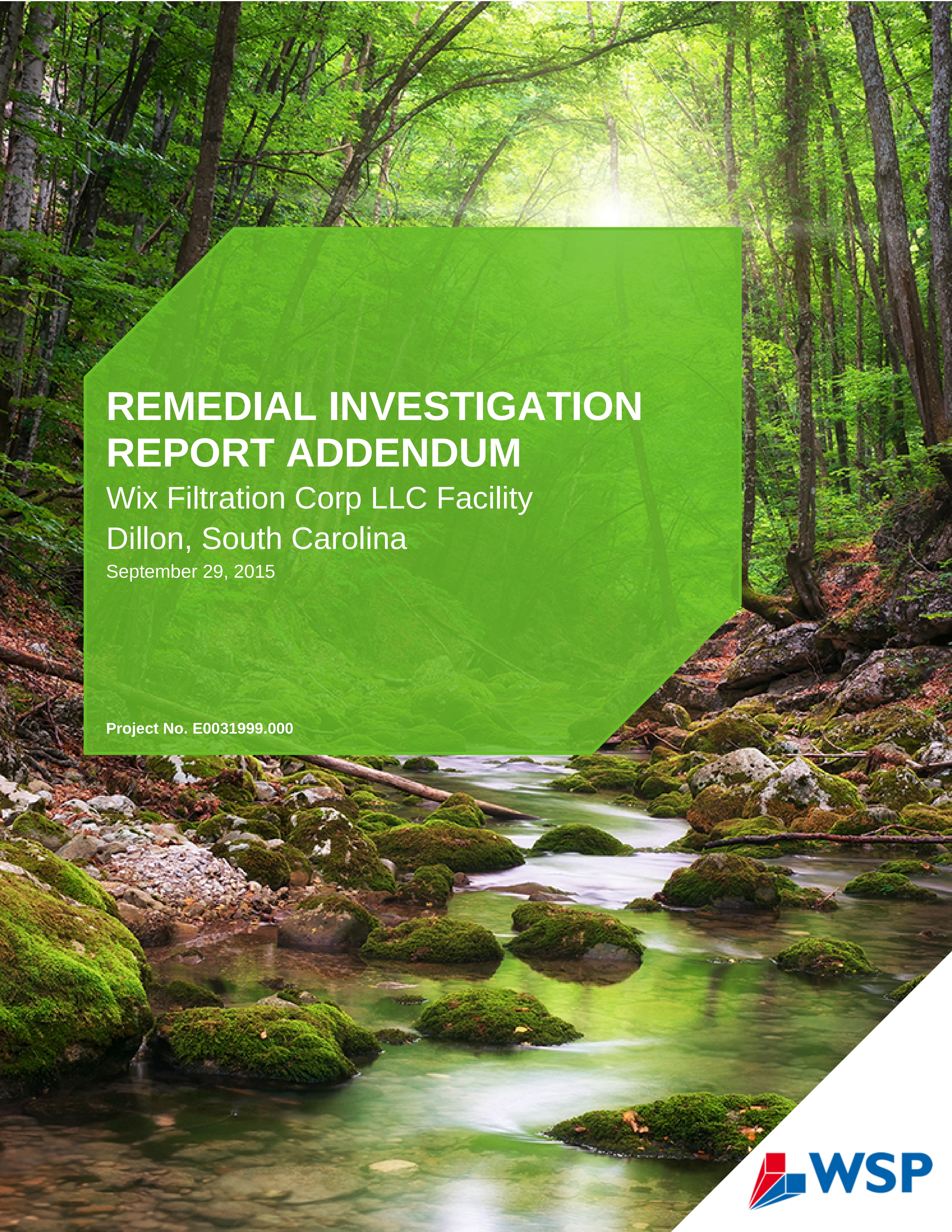
Pamela K. Groff
Pamela K. Groff, P.E.
Technical Manager
South Carolina Professional Engineer

REJ:kjb
\\ser03res1us.us wspgroup.com\es\clients\affinia\dillon sc\ri activities\reporting\00031999_092915let_dillon_rev_rir_add_submtl.docx

Enclosures

cc/encl.: Kenny McCutcheon, Wix Filtration Corp LLC (Electronic copy only)
Keith Clark, Affinia Group (Electronic copy only)
David Sturgess, Affinia Group (Electronic copy only)
James Hiller, ERM (Electronic copy only)
Weston Adams, Esquire, Nelson, Mullins, Riley & Scarborough LLP (Electronic copy only)

(50)



REMEDIAL INVESTIGATION REPORT ADDENDUM

Wix Filtration Corp LLC Facility

Dillon, South Carolina

September 29, 2015

Project No. E0031999.000

REMEDIAL INVESTIGATION REPORT ADDENDUM

Wix Filtration Corp LLC Facility
Dillon, South Carolina

September 29, 2015

Client

Wix Filtration Corp LLC
1422 Wix Road
Dillon, South Carolina 29536

Consultant

WSP USA Corp.
11190 Sunrise Valley Drive, Suite 300
Reston, Virginia 20191
Tel: (703) 709-6500

WSP Contacts

R. Eric Johnson, PhD
Senior Technical Manager
South Carolina Professional Geologist #2296
eric.johnson@wspgroup.com

ROBERT E. JOHNSON
NO. 2296

Robert E. Johnson
South Carolina Professional Geologist #2296

Pamela K. Groff
No. 30147
9/29/15
PAMELA K. GROFF

Pamela K. Groff
South Carolina Professional Engineer #30147

Table of Contents

Figures

Tables

Appendices

1 Introduction

On behalf of Wix Filtration Corp LLC (Wix), WSP has prepared this Remedial Investigation (RI) Report Addendum for the Wix facility in Dillon, South Carolina (Site) in fulfillment of Item 3.B of Voluntary Cleanup Contract Number 13-5996-RP and WSP's RI Work Plan Addendum, dated February 27, 2015 (WSP 2015). The objectives of the supplemental RI was to gather additional site data to further characterize the extent of volatile organic compounds (VOCs) in sub-slab vapor and assess the performance and effectiveness of the existing air sparge/soil vapor extraction (AS/SVE) system in the toluene-affected area at the site. This additional information would allow for an updated evaluation of the risks related to VOC impacts to sub-slab vapor underneath the building and determine, if necessary, the remedial approach for mitigating any unacceptable risk associated with the vapor intrusion exposure pathway. In addition, this report discusses the abandonment of monitoring well MW-13 and installation of replacement well MW-13R. The structural integrity of MW-13 was compromised and affected the collection of water level data or groundwater samples. All additional investigation work was conducted in accordance with the South Carolina Department of Health and Environmental Control (SCDHEC)-approved Sampling and Analysis Plan (WSP 2014a).

2 Site Background

2.1 Site Description

The Site is located at 1422 Wix Road in Dillon, Dillon County, South Carolina (Figure 2-1) and consists of approximately 80 acres of land. The facility includes a 376,000-square-foot manufacturing building (Figure 2-2) and several small ancillary structures located to the east (hazardous waste and tractor shed), north (fire water pump house), and west (paint storage building). Paved parking and loading areas are located to the north and south of the manufacturing building. Fifteen acres of the property, located to the north and east of the manufacturing building, are leased to a local farmer. According to facility personnel, Progress Energy owns and operates a power substation on approximately 4 acres of land in the northeast portion of the Wix property.

The Site is located in a mixed industrial, agricultural, and residential area. The property is bordered to the north by farmland and the Franco Manufacturing facility, to the east by cultivated and wooded farmland, to the south by farmland and a small number of residential properties, and to the west by the CSX Transportation railroad line and residence/small business.

The plant obtains both potable and production water from Trico Water Company, Inc., which is located in the city of Dillon. No water supply wells are located on the Wix property.

2.2 Site History

The facility was constructed in 1977 on agricultural land by Wix Filters. The Affinia Group acquired the facility in November 2004. Plant operations from 1977 to present include the manufacture of fuel filters, oil filters, and air filters for automotive, diesel, racing, agricultural, and industrial applications. Activities conducted at the facility include metal parts fabrication, element curing, assembly, painting, printing, and packaging and shipment.

During the early years of manufacturing operations, toluene-containing paints were prepared in the southwest portion of the facility. Based on available information, it is believed the toluene was stored in an underground storage tank (UST) outside of the building and dispensed via a sub-grade piping network to various locations within the manufacturing building. After closing of the UST in the mid-1980s, toluene used in the paint formulation was stored in drums inside the paint room located in the southwestern portion of the building.

No facility documentation was available for review related to the historical use of chlorinated solvents at the Wix Plant. The only record of probable chlorinated solvent use is from a July 2012 environmental database report, which lists U.S. Environmental Protection Agency (EPA) hazardous waste code D039 for one of the hazardous waste streams generated at the facility. This waste code is for material containing a characteristically hazardous concentration of tetrachloroethene (PCE).

The only other available information concerning chlorinated solvent use was obtained via conversations with long-tenured plant workers. Based on these discussions, it is believed that chlorinated solvents were used for a period of time in a production area of the plant. Using this anecdotal information, it is believed the majority of the solvent storage and use occurred in a relatively small area in the southwestern portion of the facility.

2.3 Site Characterization

2.3.1 Overview

In October 2005, workers detected a paint-like odor in shallow soil material excavated during repairs to an underground water line west of the manufacturing building. Based on this finding, eight soil samples and three groundwater samples were collected from the area and analyzed for VOCs typically associated with paint products to determine the presence/absence of these chemicals in the area (Environmental Resource Management [ERM] 2011a). The analytical results for the soil samples indicated elevated toluene concentrations, with a maximum detection of 1,630 milligrams per kilogram (mg/kg). Toluene was detected in the groundwater samples from temporary monitoring wells at concentrations ranging from 7,610 micrograms per liter (µg/l) to 184,000 µg/l. Upon receipt of the sampling data, Wix provided written notification of the discovery of a suspected release of toluene to SCDHEC in early December 2005.

Beginning in spring 2006, SCDHEC-approved activities were conducted at the site to investigate and remediate the environmental impacts from the toluene release. These activities have included the following:

- 2006 Environmental Site Assessment (ERM 2006) and supplemental assessment activities in 2010 and 2011 to evaluate the nature and the extent of impacts associated with the toluene release.
- 2008 Remedial Options Assessment and 2008 Remedial Action Plan to select and implement an applicable remedial technology to mitigate the environmental impacts (ERM 2008a and 2008b).
- 2014 RI to complete the characterization of VOC impacts to environmental media in the release area (WSP 2014b and 2014c).
- Implementation of an interim groundwater monitoring program to gather additional data on VOC concentrations in groundwater in the release area.

None of these investigation and remediation activities were conducted to address the known or potential release of chlorinated solvents on the property.

2.3.2 Soil and Sediment

A total of 56 soil samples have been collected and submitted for VOC analysis from 53 soil borings during site characterization activities performed by ERM (Figure 2-3) and WSP (Figure 2-4). Soil sampling activities and findings were summarized in the following documents:

- ERM's Data Report of Phase II Environmental Assessment, dated February 26, 2007 (ERM 2007)
- ERM's March 2011 Semi-Annual Groundwater Monitoring Report, dated March 30, 2011 (ERM 2011b)
- ERM's March 2012 Semi-Annual Groundwater Monitoring Report, dated March 28, 2012 (ERM 2012)
- WSP's RI Report, dated August 21, 2014 (WSP 2014c)

Tabulated analytical results are provided in Appendix A.

The highest toluene concentrations were detected in samples from 6-8 feet below ground surface (bgs) at the STB-2 (1,800 mg/kg) and STB-8 (2,000 mg/kg) locations during ERM's characterization activities. The highest toluene concentration detected during WSP's characterization activities was detected in the sample collected from 2.5 feet bgs at the SB-9 (1,620 mg/kg) location. In addition, other VOCs, including aromatic compounds (e.g., ethylbenzene, xylenes, and naphthalene), trimethylbenzenes, and acetone, were detected at much lower (less than 10 mg/kg) in soils during site characterization activities.

Based on the investigation results, toluene is the primary contaminant in the unsaturated soil at the Site. Shallow subsurface soils with toluene concentrations at levels of concern are present in the area south and east of the historical toluene storage and use areas. The highest toluene concentrations, which are suggestive of immiscible product phase in the soil material, were detected at 2-3 feet bgs in the area immediately east of the former toluene UST location. Based on the field screening and analytical data, the toluene-affected soil in the release area extends down to the groundwater surface, which occurs at a depth of approximately 3-4 feet bgs. Secondary contaminants (e.g., cis-1,2-dichloroethene [DCE]) were detected at concentrations above the May 2014 EPA maximum contaminant level (MCL)-based or risk-based soil screening level in some samples collected during the investigations. No compound was detected at concentrations above the May 2014 EPA industrial soil regional screening level (RSL).

Only p-isopropyltoluene (0.0049 mg/kg) was detected in one the sediment samples (SED-1) collected from the drainage ditch (Figure 2-3).

2.3.3 Groundwater

Fourteen shallow monitoring wells (MW-1 through MW-15) were installed during ERM's groundwater characterization activities. Two deep wells (MW-11-36 and MW-12-38) and one replacement monitoring well (MW-4R) were installed during WSP's groundwater characterization activities (Figure 2-5). In addition, as discussed in Section 3.2, MW-13 was replaced with MW-13R in April 2015 (Figure 2-5). SCDHEC requested Wix implement an interim, semi-annual groundwater sampling program to monitor VOC concentrations in groundwater; the sampling program commenced in August 2007. The results of the March 2015 interim groundwater sampling event is discussed below, tabulated analytical results are provided in Appendix A.

Shallow groundwater contains VOCs above the South Carolina MCLs (SCMCL), with toluene representing the primary contaminant (SCDHEC 2008). Secondary contaminants detected above the SCMCL include benzene and *cis*-1,2-DCE. The highest concentrations of toluene (above the SCMCL of 1,000 µg/l) are found in the area extending from the building to the vicinity of the former toluene UST (MW-2, MW-3, MW-4R, MW-11, MW-12, and MW-13). Toluene concentrations decrease to levels below the SCMCL a very short distance hydraulically downgradient (west and southwest) of the more impacted area. Trace levels of toluene, less than the laboratory reporting limit, were detected in the samples from the deeper monitoring wells (i.e., MW-11-36 and MW-12-38) indicating the vertical extent of toluene-affected groundwater is generally limited to the predominately clayey deposits occurring to a depth of less than 25 feet. Benzene concentrations above the SCMCL of 5 µg/l (MW-2, MW-3, MW-4R, MW-11 and MW-13) are present in a small sub-area of the toluene-impacted shallow groundwater. *Cis*-1,2-DCE concentrations above the SCMCL of 70 µg/l are limited to the groundwater sample collected from the well MW-14 inside the southwestern portion of the manufacturing building. However, cis-1,2-DCE was detected in samples collected from MW-2, MW-3, MW-4R, MW-9, MW-11-36, MW-12, and MW-13 at levels below the SCMCL. In addition to the above compounds, VOCs detected in groundwater at concentrations less than the SCMCLs, if promulgated, include other aromatic compounds (ethylbenzene and xylenes) and chlorinated ethenes such as PCE and trichloroethylene (TCE).

2.3.4 Sub-Slab Vapor

Evaluation of the historical groundwater sampling results indicated elevated concentrations of toluene and the presence of ancillary VOCs (e.g., benzene) in the vicinity of the former paint room and area immediately west of the manufacturing building. Given the potential for vapor intrusion of these compounds, three sub-slab vapor samples (SSV-1 through SSV-3) were collected to evaluate VOC concentrations in the sub-slab vapor underneath the southwestern portion of the manufacturing building as part of the 2014 RI (Figure 2-6).

The 2014 Human Health Risk Assessment (HHRA) (see section 7 of the RI Report) identified compounds of potential concern (COPCs) in sub-slab vapor by comparison of the vapor sample results to the May 2014 industrial air RSLs. The industrial air RSLs were developed for industrial exposure to indoor or outdoor air for human receptors. Comparison of sub-slab vapor sample results to the RSLs was for the purpose of identifying COPCs for the HHRA and does not represent remedial action levels. The results of the April 2014 sub-slab vapor sampling is discussed below, tabulated analytical results are provided in Appendix A.

Toluene was not detected above the industrial air RSL in any of the sub-slab vapor samples. However, other volatile compounds were detected at concentrations greater than the industrial air RSLs in the sub-slab vapor samples and were evaluated in the HHRA for the volatilization to indoor air pathway.

2.4 Human Health Risk Assessment

The 2014 HHRA in the RI Report was prepared to estimate the nature and probability of adverse health effects in humans who may be exposed to toluene and other volatile chemicals in affected environmental media at the Site under current and potential future land use scenarios. The HHRA is based on a series of health-protective assumptions about exposure characteristics. The assumptions used in the HHRA are intentionally conservative and therefore tend to overestimate the calculated non-cancer and theoretical excess cancer risks for the Site.

Based on the applicable 2014 risk assessment guidance, the potential effects of exposure to affected soil, groundwater, and sub-slab vapor at the Site were assessed, as appropriate, and unacceptable risk was noted for utility/construction workers potentially exposed to toluene and cis-1,2-DCE in shallow groundwater and to benzene, toluene, TCE, and xylenes in trench air while conducting sub-grade work in the toluene-impacted area. In addition, unacceptable risk was identified for facility workers potentially exposed to the hypothetical concentrations of PCE and TCE in indoor air as a result of vapor intrusion into the manufacturing building.

The evaluation of the vapor intrusion exposure pathway in the 2014 HHRA was based on only three sub-slab vapor samples. Given the results of this limited set of sub-slab vapor samples, a data gap existed to adequately assess the potential vapor intrusion exposure pathway for the site. As part of the supplemental RI activities, ten additional sub-slab vapor samples were collected to further characterize the extent of VOCs in sub-slab vapor underneath the building and allow for a more refined analysis of the vapor intrusion exposure pathway. Using both the April 2014 and April 2015 sub-slab vapor data provides for a more technically sound assessment of the potential risks from the vapor intrusion exposure pathway, rather than just using the April 2014 data. The implementation of the April 2015 sub-slab vapor sampling program and the sample results are discussed in Sections 3 and 4 of this report.

3 Supplemental Remedial Investigation Activities

3.1 Building Sub-Slab Vapor Sampling

The 2014 RI sampling results indicate that PCE and TCE in sub-slab vapor samples from the southwest corner of the manufacturing building may potentially affect indoor air quality as a result of vapor intrusion. The SCDHEC indicated in its September 23, 2014, Approval of Remedial Investigation Report that future remedial actions would be needed to address chlorinated VOCs (i.e., PCE and TCE) in sub-slab vapor (SCDHEC 2014). Additional Site data was deemed necessary to further characterize the extent of the chlorinated VOCs in sub-slab vapor.

Ten Vapor Pin™ sample ports were installed inside the manufacturing building for the collection of sub-slab vapor samples in April 2015 (Figure 3-1). Four of the sample points (SSV-7, SSV-10, SSV-12 and SSV-13) were located in what is believed to be the former PCE use and storage area in the southwestern portion of the building. The other six Vapor Pin™ sample ports (SSV-5, SSV-6, SSV-8, SSV-9, SSV-11, and SSV-14) were installed in other areas of the building (e.g., office areas). After installing the samplers in the floor slab, the ports were leak checked with a water dam and purged using a personal air sampling pump. The purged air was screened for organic vapors with a photoionization detector. Vapor samples for VOC analysis were collected over an approximate 1-hour period using 6-liter Summa® canisters in accordance with EPA Test Method TO-15 and submitted under strict chain-of-custody procedures to Pace Analytical Services, Inc. of Minneapolis, Minnesota, for analysis. After collecting the samples, the ports were removed, and the hole in the building floor slab filled with cement.

Following completion of the sampling activities, the horizontal coordinates and ground surface elevation of each sub-slab sample location was surveyed by Taylor, Wiseman & Taylor of Charlotte, North Carolina.

3.2 MW-13 Replacement

During the February 2015 monitoring event, Wix facility personnel noted the partial collapse of the polyvinyl chloride casing for monitoring well MW-13. Given the apparent loss of structural integrity to the polyvinyl chloride casing, MW-13 was abandoned on April 30, 2015. The abandonment involved removing the well pad and protective cover and sealing of the inside of the well casing by tremie grouting with a cement-bentonite mixture from the bottom to the ground surface.

A replacement well (MW-13R) was installed approximately 3 feet south of the abandoned well (Figure 2-5). The well borehole was installed to a depth of 12 feet bgs using 4.25-inch inside diameter hollow stem augers. Well MW-13R was constructed of 2-inch inner diameter stainless steel riser and 0.01-inch slot stainless steel screen to prevent potential future casing collapse due to the high toluene concentrations in the source area. The well was constructed such that the well screen (2 feet to 12 feet bgs) extended into the vadose zone to facilitate the detection of free-phase product at this location (Table 3-1; Appendix B).

The monitoring well was developed by pumping water with an electric submersible pump. The well was purged until the groundwater discharged was relatively free of suspended particulates. Approximately 8 gallons of water (approximately 6 well volumes) were purged from the well during the development process. The development log for replacement well MW-13R is provided in Appendix B.

Following completion of the well installation activities, the horizontal coordinates, ground surface elevation, and top-of-casing elevation of MW-13R were surveyed by Taylor, Wiseman & Taylor of Charlotte, North Carolina.

4 Sub-Slab Vapor Results and Risk Evaluation

The April 2015 sub-slab vapor sample results are provided in Figure 4-1 and Table 4-1; the validated analytical laboratory data report is provided in Appendix C. In general, the VOC concentrations in the April 2015 sub-slab vapor samples were lower than those detected in the April 2014 samples, and the highest concentrations were found in samples collected from the manufacturing area in the southwest portion of the building. Toluene was detected in 10 of the 10 sub-slab vapor sample locations at concentrations ranging from 9.5 micrograms per cubic meter (µg/m^3) in sample SSV-14 to 172 µg/m^3 in sample SSV-5. PCE was detected in 8 of the 10 sub-slab vapor sample locations at concentrations ranging from 1.3 µg/m^3 in sample SSV-6 to 765 µg/m^3 in sample SSV-10. TCE was detected at 3 of the 10 sub-slab vapor sample locations, with a maximum concentration of 4.2 µg/m^3 in sample SSV-12. Other VOCs that were detected in sub-slab vapor and other Site media included aromatic compounds (e.g., ethylbenzene and xylenes), acetone, 2-butanone, and trimethylbenzenes.

As mentioned in Section 2.4 of this report, the 2014 HHRA identified an unacceptable risk for facility workers potentially exposed to the hypothetical concentrations of PCE and TCE in indoor air as a result of vapor intrusion into the manufacturing building. However, the 2014 risk characterization of the vapor intrusion exposure pathway was based only on three sub-slab vapor samples. Given the additional April 2015 sub-slab vapor data, an updated risk characterization of the vapor intrusion exposure pathway for the Wix facility was completed and is provided in Appendix D. The updated risk characterization not only includes both the April 2014 and April 2015 sub-slab vapor data but also incorporates technical information presented in EPA's June 2015 "Office of Solid Waste and Emergency Response (OSWER) Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air" (Technical Guide; EPA 2015). The EPA's 2015 Technical Guide supersedes and replaces EPA's previous draft vapor intrusion guidance (EPA 2002), which was used to prepare the 2014 HHRA included in the RI Report.

Consistent with the 2014 HHRA, the updated risk characterization of the vapor intrusion exposure pathway assumed conservative assumptions, such as using EPA default exposure assumptions and deriving potential indoor air concentrations from the maximum concentrations of COPCs detected in sub-slab vapor samples collected in April 2014 and April 2015. Based on the updated risk characterization presented in Appendix D, potential risks posed by the vapor intrusion exposure pathway at the Wix facility are within EPA's acceptable excess cancer risk range, and no adverse non-cancer health effects are likely associated with potential exposures to COPCs in indoor air by vapor intrusion. Therefore, evaluation of the sub-slab vapor data from the 2014 and 2015 investigations indicates the vapor intrusion exposure pathway at the Wix facility does not pose a human health concern.

5 Evaluation of AS/SVE Remedial System

As requested in SCDHEC's January 12, 2015, Approval of Focused Feasibility Study and Response to Comments letter, WSP performed an engineering evaluation of the AS/SVE remedial system. The purpose of the evaluation was to determine whether the AS/SVE system is effectively removing toluene mass from the source area. The evaluation included an assessment of the technology's suitability for the site conditions and a review of the system's design and operating capabilities, based on background information provided by ERM. The following provides a summary of the findings from this remedial system evaluation; more detailed information concerning the engineering evaluation is provided in Appendix E.

The engineering evaluation indicates the AS/SVE system has low suitability for the site conditions (e.g., soil permeability, depth to groundwater, contaminant concentrations) in the impacted area. The low permeability of the soils and high water table (typically above the depth of the SVE wells) limit the system's ability to capture and treat VOC-containing soil vapors. In addition to the deficiencies in the vertical configuration of the system, the system's horizontal configuration limits its capture of toluene-affected mass to the western portion of the source area. An estimated 22 percent reduction in toluene mass has occurred within the system's radius of influence since system start-up; however, there was insufficient toluene concentration data from the system to determine if the mass reduction is due to migration, dilution, biodegradation, or AS/SVE system operation. Although the AS/SVE components are appropriately sized for the assumed design conditions, a site inspection identified several deficiencies in system operation, including the short-circuiting of sparged air to the ground surface, submergence of SVE wells and lack of air flow through the system, and malfunctioning pressure gages.

The evaluation recommends the completion of a focused feasibility study to evaluate remedial alternatives, including potential enhancements to the AS/SVE system, for the toluene source area. However, based on the technology's low suitability under the site conditions, enhancements to the system may result in only limited improvements in mass removal capability.

6 References

Environmental Resources Management. 2006. Environmental Site Assessment, Affinia Group Inc. – Wix Filtration Corp., Dillon, South Carolina.

Environmental Resources Management. 2007. Data Report of Phase II Environmental Assessment, Affinia Group Inc. – Wix Filtration Corp., Dillon, South Carolina. February 26.

Environmental Resources Management. 2008a. Remedial Options Assessment – Wix Filtration Corp., Dillon, South Carolina. January.

Environmental Resources Management. 2008b. Remedial Action Plan – Wix Filtration Corp., Dillon, South Carolina.

Environmental Resources Management. 2010. Additional Environmental Assessment Work Plan, Wix Filtration Facility, Dillon, South Carolina.

Environmental Resources Management. 2011a. Additional Environmental Assessment Work Plan, Wix Filtration Facility, Dillon, South Carolina. October

Environmental Resources Management. 2011b. Ground Water Monitoring Report, Wix Filtration Facility, Dillon, South Carolina. March 30.

Environmental Resources Management. 2012. Ground Water Monitoring Report, Wix Filtration Facility, Dillon, South Carolina. March 28.

South Carolina Department of Health and Environmental Control. 2008. R. 61-58, State Primary Drinking Water Regulations. April 25.

South Carolina Department of Health and Environmental Control. 2014. Approval of Remedial Investigation Report. September 23.

U.S. Environmental Protection Agency. 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). Office of Solid Waste and Emergency Response, Washington, D.C. EPA- 530-D-02-004. November

U.S. Environmental Protection Agency. 2015. OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air. Office of Solid Waste and Emergency Response. OSWER Publication 9200.2-154. June.

WSP 2014a. Sampling and Analysis Plan – Version 1.0. January 31.

WSP 2014b. Remedial Investigation Work Plan – Version 1.0. January 31.

WSP 2014c. Remedial Investigation Report. August 21.

WSP 2015. Remedial Investigation Work Plan Addendum and AS/SVE System Evaluation. February 27.

.

7 Acronyms List

µg/l	micrograms per liter
µg/m^3	micrograms per cubic meter
AS/SVE	air sparge/soil vapor extraction
bgs	below ground surface
COPCs	chemicals of potential concern
DCE	dichloroethene
EPA	U.S. Environmental Protection Agency
ERM	Environmental Resource Management
HHRA	human health risk assessment
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
PCE	tetrachloroethene
RI	Remedial Investigation
RSL	Regional Screening Levels
SCDHEC	South Carolina Department of Health and Environmental Control
SCMCL	South Carolina Maximum Contaminant Level
TCE	trichloroethene
UST	underground storage tank
VOCs	volatile organic compounds
Wix	Wix Filtration Corp LLC

Figures

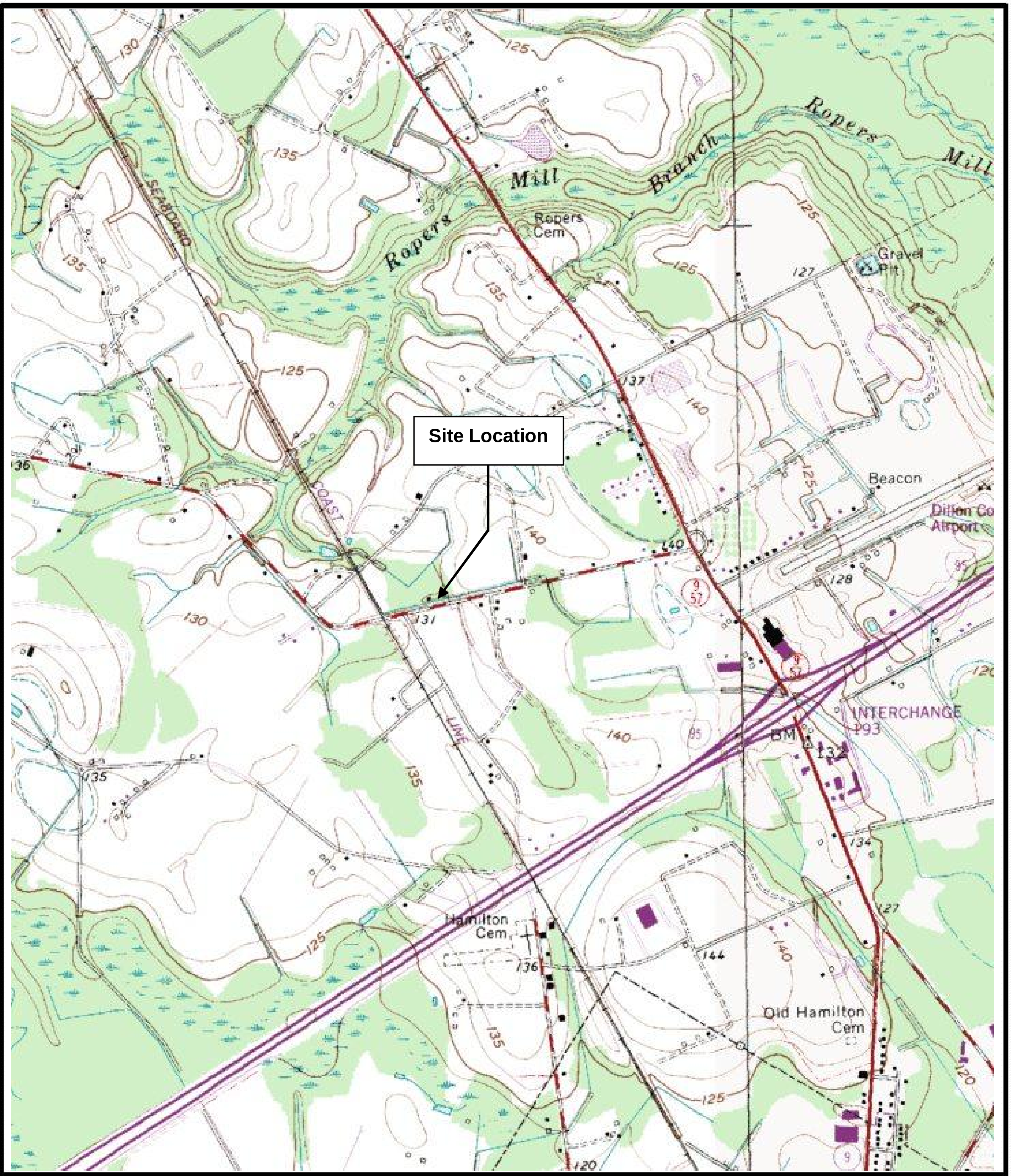
DWG Name: 00031999-a05 Figure 2-1.pub

Drawn By: EMH

Checked: EMH

Approved: REJ

A



REFERENCE:
7.5 MINUTE SERIES TOPOGRAPHIC QUADRANGLE
DILLON WEST, SOUTH CAROLINA
PHOTOREVISED 1983 SCALE 1:24,000

N

0	1000	2000	4000

SCALE, FEET

WSP

WSP USA Corp.
11190 Sunrise Valley Drive, Suite 300
Reston, Virginia 20191
(703) 709-6500

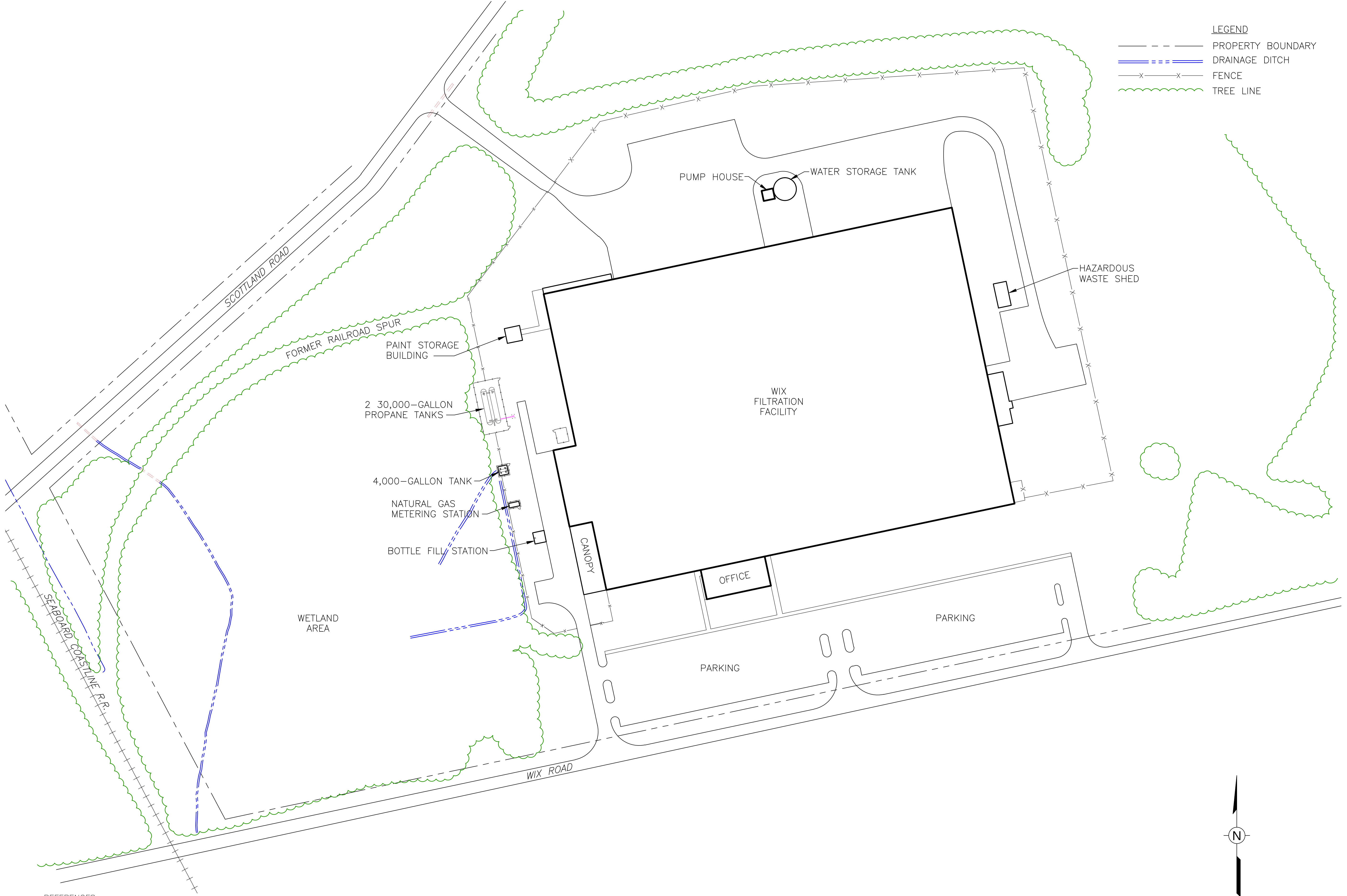
FIGURE 2-1

SITE LOCATION MAP

WIX FILTRATION FACILITY
DILLON, SOUTH CAROLINA

PREPARED FOR

WIX FILTRATION CORP LLC
DILLON, SOUTH CAROLINA



0 160 320

SCALE IN FEET

REFERENCES:

1. ERM FIGURE TITLED AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM LAYOUT, DRAWING S–1, DATED SEPTEMBER 22, 2008, 86002SRS.DWG.
2. GOOGLE EARTH PRO AERIAL.

THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK AND WHITE COPIES MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A PROFESSIONAL. DO NOT ALTER THIS DOCUMENT IN ANY WAY WITHOUT THE WRITTEN CONSENT OF WSP ENVIRONMENT & ENERGY, LLC.

B

\\ser02pit1us.us.wspgroup.com\GISCAD\Shared_GISCAD\CAD\Acad\CADD\00030\00031999-Dillon_SC\CAD\00031999-B02.dwg 8/18/2015 1:10 PM Usrz01165

Drawn By: RAZ 08082014
Checked: Emk 08082014
Approved: REJ 08142014
DWG Name: 00031999–B02

WIX FILTRATION FACILITY
DILLON, SOUTH CAROLINA

PREPARED FOR
WIX FILTRATION CORP LLC
DILLON, SOUTH CAROLINA

FIGURE 2–2

SITE LAYOUT

WSP

WSP USA Corp.
11190 Sunrise Valley Drive, Suite 300
Reston, Virginia 20191
(703) 709-6500
www.wspgroup.com/usa

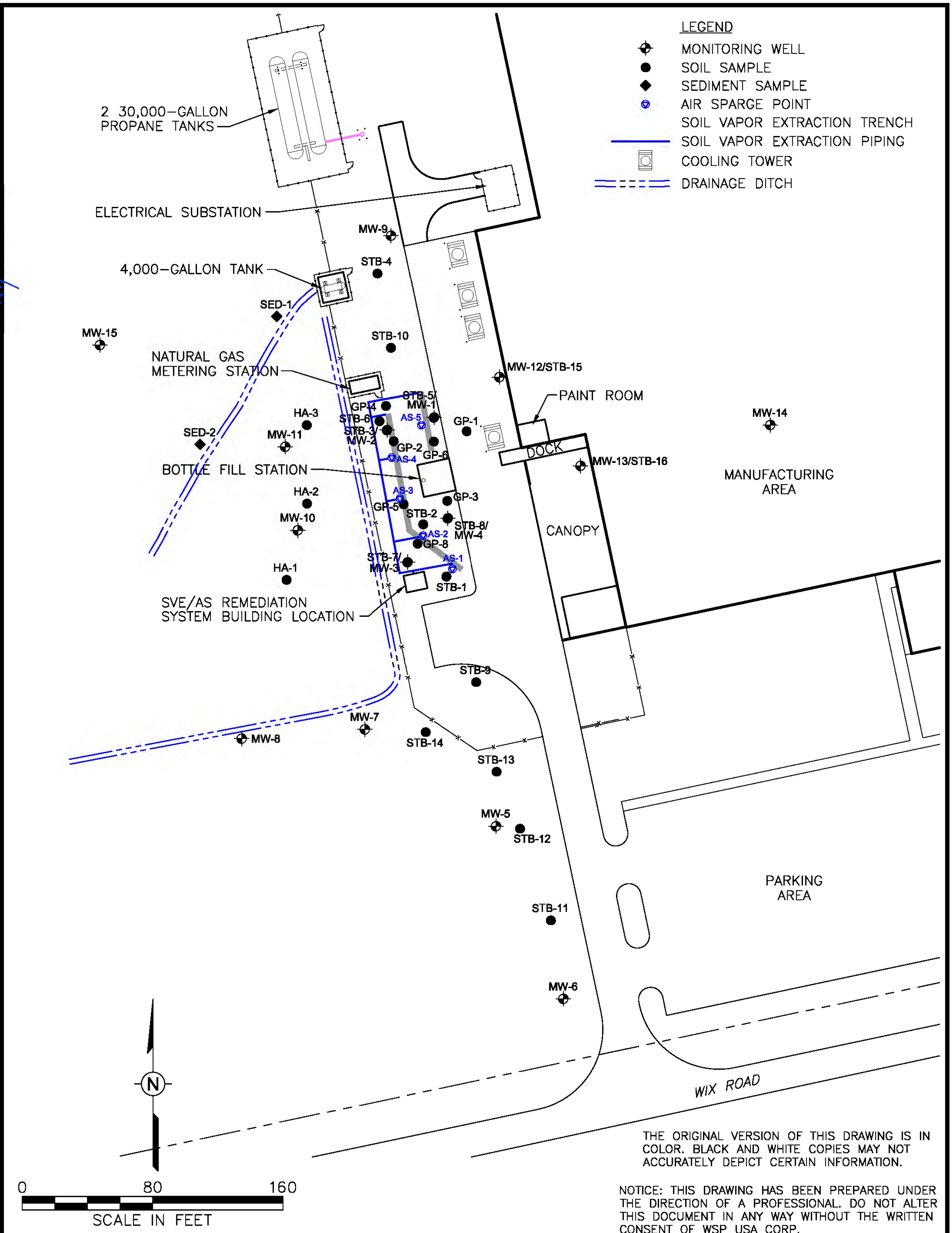
DWG Name: 00031999-040

Checked: 7/8/2015

Approved:

Drawn By: EGC

A



THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK AND WHITE COPIES MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A PROFESSIONAL. DO NOT ALTER THIS DOCUMENT IN ANY WAY WITHOUT THE WRITTEN CONSENT OF WSP USA CORP.

WSP

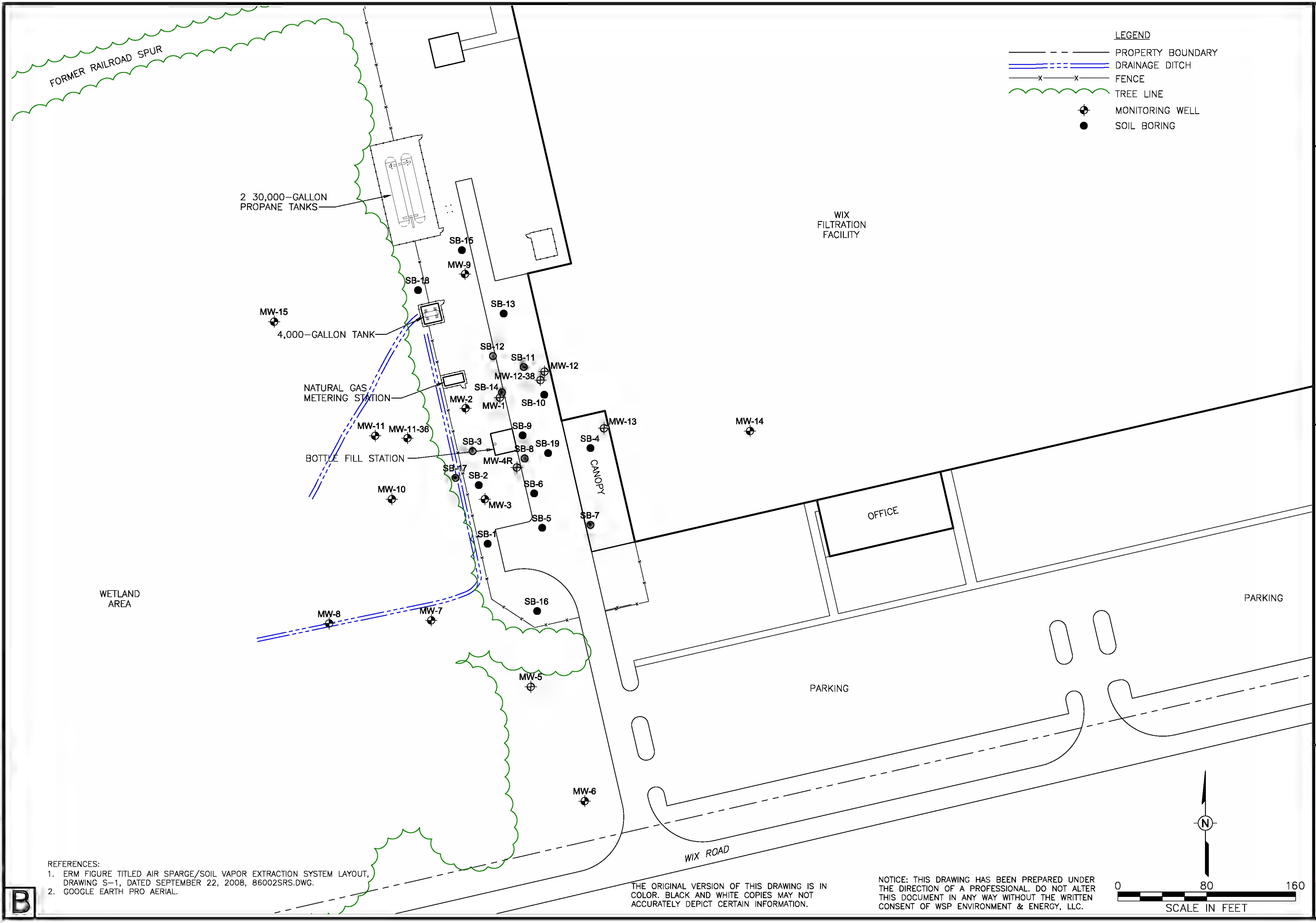
WSP USA Corp.
11190 Sunrise Valley Drive, Suite 300
Reston, Virginia 20191
(703) 709-6500
www.wspgroup.com/usa

FIGURE 2-3

PRE-REMEDIAL INVESTIGATION
SOIL BORING LOCATIONS

WIX FILTRATION FACILITY
DILLON, SOUTH CAROLINA
PREPARED FOR
WIX FILTRATION CORP LLC
DILLON, SOUTH CAROLINA

R:\ACAD\CADD\00031999\CAD\00031999-040.dwg 7/8/2015 3:05 PM USEC01012



REFERENCES:
1. ERM FIGURE TITLED AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM LAYOUT, DRAWING S-1, DATED SEPTEMBER 22, 2008, 86002SRS.DWG.
2. GOOGLE EARTH PRO AERIAL.

THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK AND WHITE COPIES MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A PROFESSIONAL. DO NOT ALTER THIS DOCUMENT IN ANY WAY WITHOUT THE WRITTEN CONSENT OF WSP ENVIRONMENT & ENERGY, LLC.

B

7/8/2015 3:07 PM USEC01012

Drawn By: EGC
Checked: 7/8/2015
Approved:
DWG Name: 00031999-041

WIX FILTRATION FACILITY
DILLON, SOUTH CAROLINA
PREPARED FOR
WIX FILTRATION CORP LLC
DILLON, SOUTH CAROLINA

FIGURE 2-4

REMEDIAL INVESTIGATION
SOIL BORING LOCATIONS

WSP
WSP USA Corp.
11190 Sunrise Valley Drive, Suite 300
Reston, Virginia 20191
(703) 709-6500
www.wspgroup.com/usa

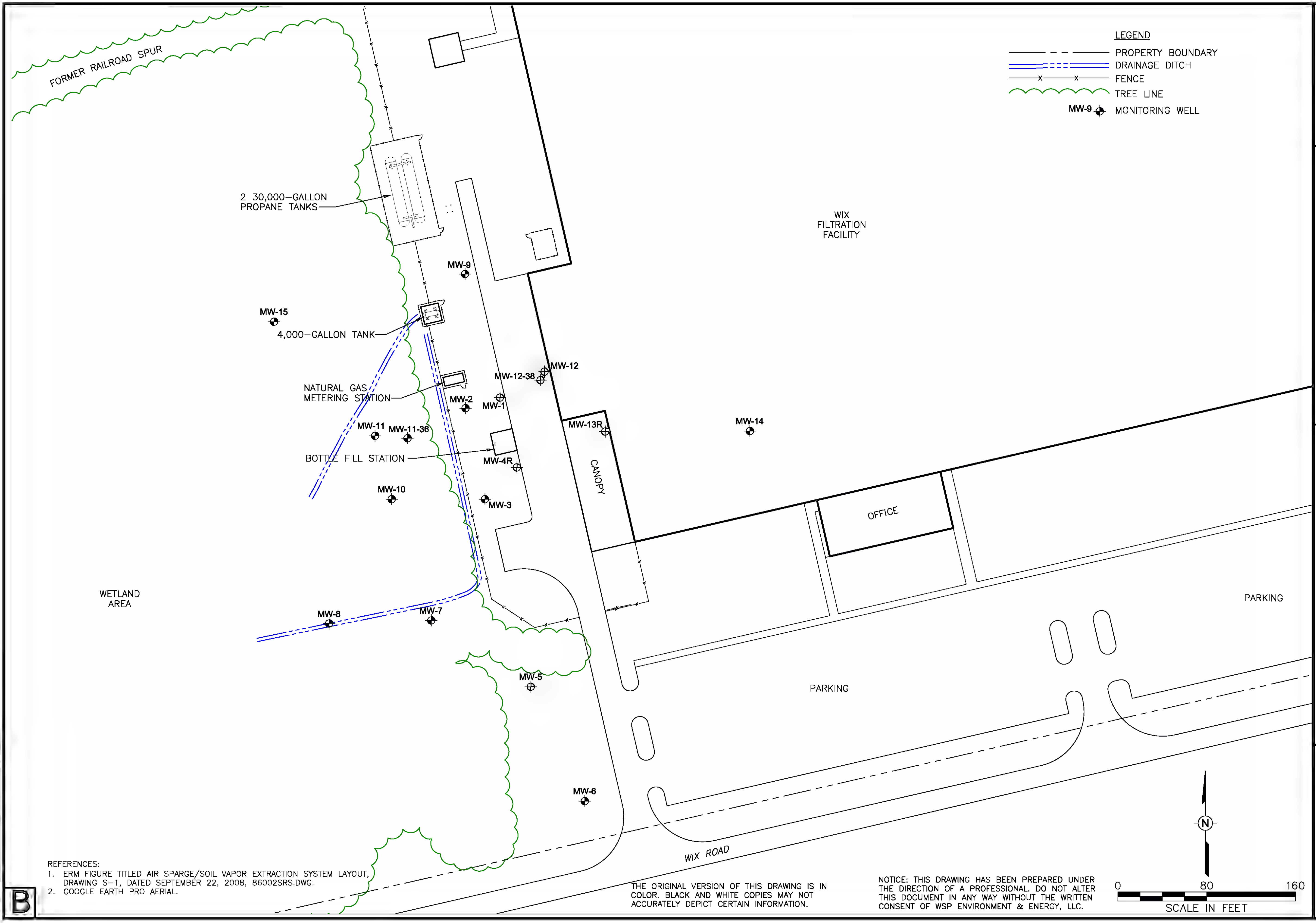
FIGURE 2–5

MONITORING WELL LOCATIONS

WIX FILTRATION FACILITY
DILLON, SOUTH CAROLINA
PREPARED FOR
WIX FILTRATION CORP LLC
DILLON, SOUTH CAROLINA

Drawn By: EGC
Checked: EgC 7/8/2015
Approved:
DWG Name: 00031999–042

WSP USA Corp.
11190 Sunrise Valley Drive, Suite 300
Reston, Virginia 20191
(703) 709-6500
www.wspgroup.com/usa

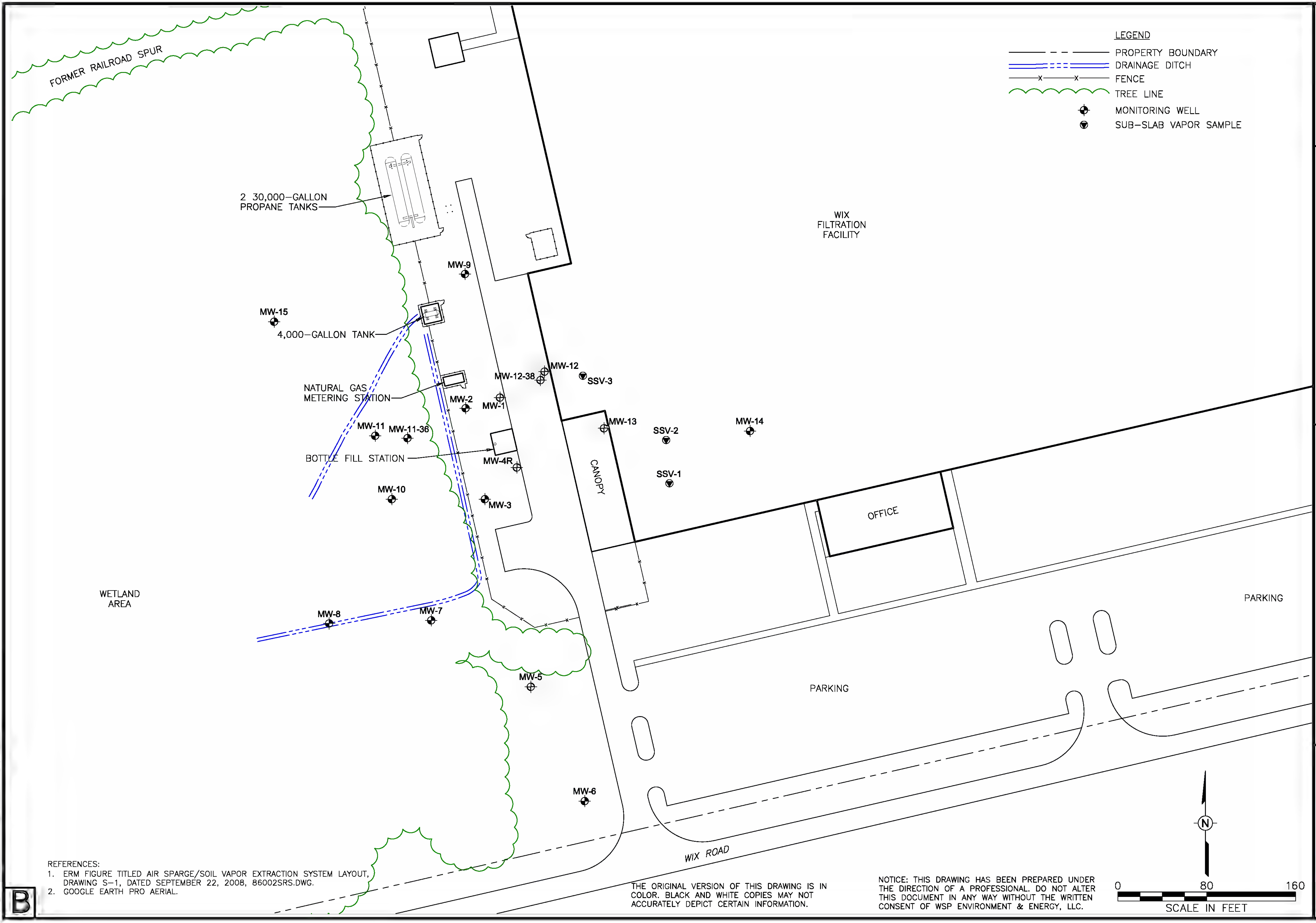


REFERENCES:
1. ERM FIGURE TITLED AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM LAYOUT, DRAWING S–1, DATED SEPTEMBER 22, 2008, 86002SRS.DWG.
2. GOOGLE EARTH PRO AERIAL.

THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK AND WHITE COPIES MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A PROFESSIONAL. DO NOT ALTER THIS DOCUMENT IN ANY WAY WITHOUT THE WRITTEN CONSENT OF WSP ENVIRONMENT & ENERGY, LLC.

7/8/2015 3:16 PM USEC01012



LEGEND

— — —	PROPERTY BOUNDARY
═══	DRAINAGE DITCH
—x—x—	FENCE
⌒⌒⌒	TREE LINE
⊕	MONITORING WELL
▼	SUB–SLAB VAPOR SAMPLE

REFERENCES:
1. ERM FIGURE TITLED AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM LAYOUT, DRAWING S–1, DATED SEPTEMBER 22, 2008, 86002SRS.DWG.
2. GOOGLE EARTH PRO AERIAL.

THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK AND WHITE COPIES MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A PROFESSIONAL. DO NOT ALTER THIS DOCUMENT IN ANY WAY WITHOUT THE WRITTEN CONSENT OF WSP ENVIRONMENT & ENERGY, LLC.

Drawn By: EGC
Checked: 7/8/2015
Approved:
DWG Name: 00031999-041

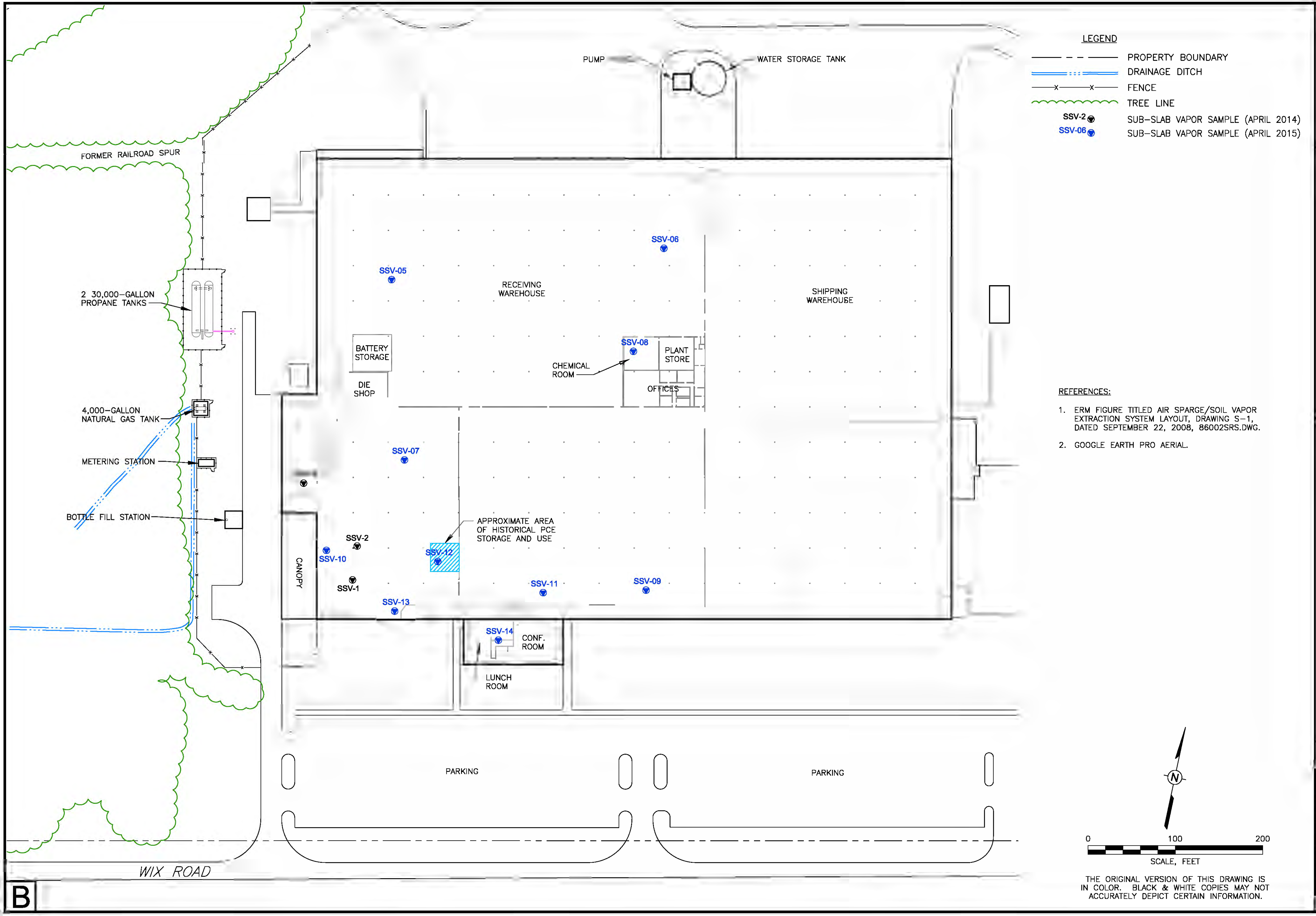
WIX FILTRATION FACILITY
DILLON, SOUTH CAROLINA
PREPARED FOR
WIX FILTRATION CORP LLC
DILLON, SOUTH CAROLINA

FIGURE 2–6
REMEDIAL INVESTIGATION
SUB–SLAB VAPOR SAMPLE LOCATIONS

WSP
WSP USA Corp.
11190 Sunrise Valley Drive, Suite 300
Reston, Virginia 20191
(703) 709-6500
www.wspgroup.com/usa

7/9/2015 8:10 AM USEC01012

B



LEGEND

— — —	PROPERTY BOUNDARY
═ ═	DRAINAGE DITCH
—x—x—	FENCE
⁀⁀⁀	TREE LINE
SSV-2 ●	SUB-SLAB VAPOR SAMPLE (APRIL 2014)
SSV-06 ●	SUB-SLAB VAPOR SAMPLE (APRIL 2015)

REFERENCES:

1. ERM FIGURE TITLED AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM LAYOUT, DRAWING S-1, DATED SEPTEMBER 22, 2008, 86002SRS.DWG.
2. GOOGLE EARTH PRO AERIAL.

THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK & WHITE COPIES MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

R:\ACAD\CADD\00031999\CAD\00031999-043.dwg 7/9/2015 8:11 AM USEC01012

Drawn By: EGC
Checked: 7/8/2015
Approved:
DWG Name: 00031999-043

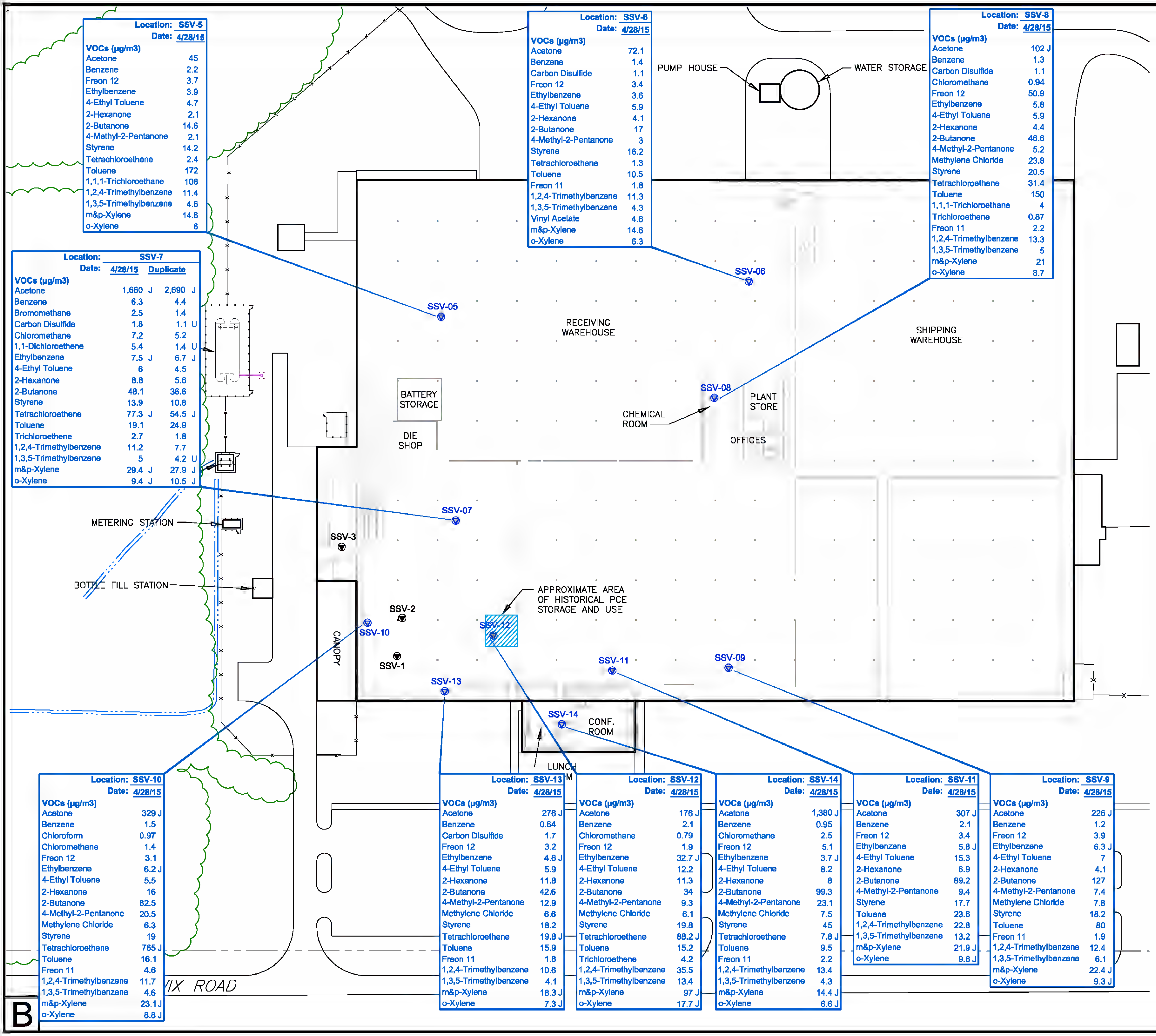
WIX FILTRATION FACILITY
DILLON, SOUTH CAROLINA

PREPARED FOR
WIX FILTRATION CORP LLC
DILLON, SOUTH CAROLINA

FIGURE 3-1

SUPPLEMENTAL REMEDIAL INVESTIGATION
SUB-SLAB VAPOR SAMPLE LOCATIONS

WSP USA Corp.
11190 Sunrise Valley Drive, Suite 300
[illegible] Virginia 20191
[illegible]3) 709-6500



	Location: SSV-5
	Date: 4/28/15
VOCs (µg/m3)	
Acetone	45
Benzene	2.2
Freon 12	3.7
Ethylbenzene	3.9
4-Ethyl Toluene	4.7
2-Hexanone	2.1
2-Butanone	14.6
4-Methyl-2-Pentanone	2.1
Styrene	14.2
Tetrachloroethene	2.4
Toluene	172
1,1,1-Trichloroethane	108
1,2,4-Trimethylbenzene	11.4
1,3,5-Trimethylbenzene	4.6
m&p-Xylene	14.6
o-Xylene	6

	Location: SSV-6
	Date: 4/28/15
VOCs (µg/m3)	
Acetone	72.1
Benzene	1.4
Carbon Disulfide	1.1
Freon 12	3.4
Ethylbenzene	3.6
4-Ethyl Toluene	5.9
2-Hexanone	4.1
2-Butanone	17
4-Methyl-2-Pentanone	3
Styrene	16.2
Tetrachloroethene	1.3
Toluene	10.5
Freon 11	1.8
1,2,4-Trimethylbenzene	11.3
1,3,5-Trimethylbenzene	4.3
Vinyl Acetate	4.6
m&p-Xylene	14.6
o-Xylene	6.3

	Location: SSV-8
	Date: 4/28/15
VOCs (µg/m3)	
Acetone	102 J
Benzene	1.3
Carbon Disulfide	1.1
Chloromethane	0.94
Freon 12	50.9
Ethylbenzene	5.8
4-Ethyl Toluene	5.9
2-Hexanone	4.4
2-Butanone	46.6
4-Methyl-2-Pentanone	5.2
Methylene Chloride	23.8
Styrene	20.5
Tetrachloroethene	31.4
Toluene	150
1,1,1-Trichloroethane	4
Trichloroethene	0.87
Freon 11	2.2
1,2,4-Trimethylbenzene	13.3
1,3,5-Trimethylbenzene	5
m&p-Xylene	21
o-Xylene	8.7

Location:	SSV-7	
Date:	4/28/15	Duplicate
VOCs (µg/m3)		
Acetone	1,660 J	2,690 J
Benzene	6.3	4.4
Bromomethane	2.5	1.4
Carbon Disulfide	1.8	1.1 U
Chloromethane	7.2	5.2
1,1-Dichloroethene	5.4	1.4 U
Ethylbenzene	7.5 J	6.7 J
4-Ethyl Toluene	6	4.5
2-Hexanone	8.8	5.6
2-Butanone	48.1	36.6
Styrene	13.9	10.8
Tetrachloroethene	77.3 J	54.5 J
Toluene	19.1	24.9
Trichloroethene	2.7	1.8
1,2,4-Trimethylbenzene	11.2	7.7
1,3,5-Trimethylbenzene	5	4.2 U
m&p-Xylene	29.4 J	27.9 J
o-Xylene	9.4 J	10.5 J

	Location: SSV-10
	Date: 4/28/15
VOCs (µg/m3)	
Acetone	329 J
Benzene	1.5
Chloroform	0.97
Chloromethane	1.4
Freon 12	3.1
Ethylbenzene	6.2 J
4-Ethyl Toluene	5.5
2-Hexanone	16
2-Butanone	82.5
4-Methyl-2-Pentanone	20.5
Methylene Chloride	6.3
Styrene	19
Tetrachloroethene	765 J
Toluene	16.1
Freon 11	4.6
1,2,4-Trimethylbenzene	11.7
1,3,5-Trimethylbenzene	4.6
m&p-Xylene	23.1 J
o-Xylene	8.8 J

	Location: SSV-13
	Date: 4/28/15
VOCs (µg/m3)	
Acetone	276 J
Benzene	0.64
Carbon Disulfide	1.7
Freon 12	3.2
Ethylbenzene	4.6 J
4-Ethyl Toluene	5.9
2-Hexanone	11.8
2-Butanone	42.6
4-Methyl-2-Pentanone	12.9
Methylene Chloride	6.6
Styrene	18.2
Tetrachloroethene	19.8 J
Toluene	15.9
Freon 11	1.8
1,2,4-Trimethylbenzene	10.6
1,3,5-Trimethylbenzene	4.1
m&p-Xylene	18.3 J
o-Xylene	7.3 J

	Location: SSV-12
	Date: 4/28/15
VOCs (µg/m3)	
Acetone	176 J
Benzene	2.1
Chloromethane	0.79
Freon 12	1.9
Ethylbenzene	32.7 J
4-Ethyl Toluene	12.2
2-Hexanone	11.3
2-Butanone	34
4-Methyl-2-Pentanone	9.3
Methylene Chloride	6.1
Styrene	19.8
Tetrachloroethene	88.2 J
Toluene	15.2
Trichloroethene	4.2
1,2,4-Trimethylbenzene	35.5
1,3,5-Trimethylbenzene	13.4
m&p-Xylene	97 J
o-Xylene	17.7 J

	Location: SSV-14
	Date: 4/28/15
VOCs (µg/m3)	
Acetone	1,380 J
Benzene	0.95
Chloromethane	2.5
Freon 12	5.1
Ethylbenzene	3.7 J
4-Ethyl Toluene	8.2
2-Hexanone	8
2-Butanone	99.3
4-Methyl-2-Pentanone	23.1
Methylene Chloride	7.5
Styrene	45
Tetrachloroethene	7.8 J
Toluene	9.5
Freon 11	2.2
1,2,4-Trimethylbenzene	13.4
1,3,5-Trimethylbenzene	4.3
m&p-Xylene	14.4 J
o-Xylene	6.6 J

	Location: SSV-11
	Date: 4/28/15
VOCs (µg/m3)	
Acetone	307 J
Benzene	2.1
Freon 12	3.4
Ethylbenzene	5.8 J
4-Ethyl Toluene	15.3
2-Hexanone	6.9
2-Butanone	89.2
4-Methyl-2-Pentanone	9.4
Styrene	17.7
Toluene	23.6
1,2,4-Trimethylbenzene	22.8
1,3,5-Trimethylbenzene	13.2
m&p-Xylene	21.9 J
o-Xylene	9.6 J

	Location: SSV-9
	Date: 4/28/15
VOCs (µg/m3)	
Acetone	226 J
Benzene	1.2
Freon 12	3.9
Ethylbenzene	6.3 J
4-Ethyl Toluene	7
2-Hexanone	4.1
2-Butanone	127
4-Methyl-2-Pentanone	7.4
Methylene Chloride	7.8
Styrene	18.2
Toluene	80
Freon 11	1.9
1,2,4-Trimethylbenzene	12.4
1,3,5-Trimethylbenzene	6.1
m&p-Xylene	22.4 J
o-Xylene	9.3 J

LEGEND

— — —	PROPERTY BOUNDARY
═ ═	DRAINAGE DITCH
—x—x—	FENCE
∿∿∿	TREE LINE
SSV-2 ●	SUB-SLAB VAPOR SAMPLE (APRIL 2014)
SSV-06 ●	SUB-SLAB VAPOR SAMPLE (APRIL 2015)
VOCs	VOLATILE ORGANIC COMPOUNDS
ug/m3	MICROGRAMS PER CUBIC METER
U	NOT DETECTED
J	ESTIMATED CONCENTRATION

REFERENCES:

1. ERM FIGURE TITLED AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM LAYOUT, DRAWING S-1, DATED SEPTEMBER 22, 2008, 86002SRS.DWG.
2. GOOGLE EARTH PRO AERIAL.

THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK & WHITE COPIES MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

Drawn By: EGC
Checked:
Approved: REJ 8/13/2015
DWG Name: 00031999-046

WIX FILTRATION FACILITY
DILLON, SOUTH CAROLINA

PREPARED FOR
WIX FILTRATION CORP LLC
DILLON, SOUTH CAROLINA

FIGURE 4-1

SUB-SLAB VAPOR SAMPLE RESULTS
APRIL 2015

WSP
WSP USA Corp.
11190 Sunrise Valley Drive, Suite 300
Reston, Virginia 20191
(703) 709-6500
www.wspgroup.com/usa

R:\ACAD\CAD\00031999\CAD\00031999-046.dwg 8/13/2015 12:31 PM USEC01012

Tables

Table 3-1

Well Construction
Wix Filtration Facility
Dillon, South Carolina (a)

Monitoring Well	Installation Date	Northing	Easting	Ground Surface	Top-of-Casing	Diameter	Material	Screened Interval	
				(feet-msl)	(feet-msl)	(inches)		(feet-bgs)	(feet-msl)
MW-1	May 17, 2006	954878.01	2486307.08	132.32	131.85	2	PVC	6.9 - 16.9	125.42 - 115.42
MW-2	May 17, 2006	954868.49	2486276.21	130.19	129.91	2	PVC	7.1 - 17.1	123.09 - 113.09
MW-3	May 17, 2006	954786.58	2486293.64	129.27	129.24	2	PVC	6.5 - 16.5	122.77 - 112.77
MW-4	*May 17, 2006*	*-*	*-*	*-*	*130.47* (b)	*2*	*PVC*	*6.8 - 16.7*	*123.7 - 113.8*
MW-4R	May 8, 2014	954815.15	2486322.28	131.11	133.92	2	SS	2 - 12	129.11 - 119.11
MW-5	December 6, 2006	954617.76	2486334.89	129.24	129.20	2	PVC	5.6 - 15.2	123.64 - 114.04
MW-6	December 6, 2006	954514.94	2486383.44	129.97	129.97	2	PVC	6.4 - 16	123.57 - 113.97
MW-7	December 4, 2006	954677.44	2486245.27	128.38	128.48	2	PVC	7.7 - 17.4	120.68 - 110.98
MW-8	December 5, 2006	954674.78	2486153.39	127.46	130.73	2	PVC	10.3 - 19.9	117.16 - 107.56
MW-9	December 7, 2006	954989.31	2486275.68	132.11	132.01	2	PVC	5.2 - 15.2	126.91 - 116.91
MW-10	February 15, 2011	954786.63	2486209.75	127.88	130.78	2	PVC	5 - 15	122.88 - 112.88
MW-11	February 15, 2011	954843.72	2486194.80	127.63	131.01	2	PVC	5 - 14.95	122.63 - 112.68
MW-11-36	May 7, 2014	954841.56	2486223.97	129.04	131.63	2	PVC	25 - 35	104.04 - 94.04
MW-12	February 15, 2011	954901.41	2486347.26	134.81	134.46	2	PVC	3 - 13	131.81 - 121.81
MW-12-38	May 6, 2014	954893.80	2486343.61	134.51	134.15	2	PVC	28 - 38	106.51 - 96.51
MW-13	*February 15, 2011*	*954850.39*	*2486400.74*	*131.50*	*131.10*	*2*	*PVC*	*3 - 13*	*128.5 - 118.5*
MW-13R	April 30, 2015	954847.48	2486401.82	131.40	131.07	2	SS	2 - 12	129.40 - 119.40
MW-14	February 12, 2012	954847.97	2486532.10	135.51	135.25	1.5	PVC	10 - 20	125.51 - 115.51
MW-15	February 12, 2012	954946.34	2486103.83	128.82	131.11	2	PVC	5 - 15	123.82 - 113.82

---

a/ ft-bgs = feet below ground surface; ft-MSL = feet mean sea level; PVC = polyvinyl chloride; SS = stainless steel.
b/ Well abandoned. Historical survey data provided by ERM.

Gray italic text indicates monitoring well plugged and abandoned

Table 4-1

Supplemental Remedial Investigation
Sub-Slab Vapor 2015 Sample Results
Wix Filtration Facility
Dillon, South Carolina (a)

	SSV-5	SSV-6	SSV-7	SSV-17 (b)	SSV-8	SSV-9	SSV-10	SSV-11	SSV-12	SSV-13	SSV-14
	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015
Volatile Organic Compounds (µg/m^3)											
Acetone	45	72.1	1,660 J	2,690 J	102 J	226 J	329 J	307 J	176 J	276 J	1,380 J
Benzene	2.2	1.4	6.3	4.4	1.3	1.2	1.5	2.1	2.1	0.64	0.95
Benzyl Chloride	4.2 U	4.1 U	4.4 U	4.4 U	4.1 U	4.2 U	3.9 U	8.5 U	4.2 U	4.1 U	3.9 U
Bromodichloromethane	2.2 U	2.1 U	2.3 U	2.3 U	2.1 U	2.2 U	2 U	4.4 U	2.2 U	2.1 U	2 U
Bromoform	3.4 U	3.3 U	3.5 U	3.5 U	3.3 U	3.4 U	3.1 U	6.8 U	3.4 U	3.3 U	3.1 U
Bromomethane	1.3 U	1.2 U	2.5	1.4	1.2 U	1.3 U	1.2 U	2.5 U	1.3 U	1.2 U	1.2 U
Carbon Disulfide	1 U	1.1	1.8	1.1 U	1.1	1 U	0.94 U	2 U	1 U	1.7	0.94 U
Carbon Tetrachloride	1 U	0.99 U	1.1 U	1.1 U	0.99 U	1 U	0.95 U	2.1 U	1 U	0.99 U	0.95 U
Chlorobenzene	1.5 U	1.5 U	1.6 UJ	1.6 UJ	1.5 UJ	1.5 UJ	1.4 UJ	3 UJ	1.5 UJ	1.5 UJ	1.4 UJ
Chloroform	0.8 U	0.77 U	0.83 U	0.83 U	0.77 U	0.8 U	0.97	1.6 U	0.8 U	0.77 U	0.74 U
Chloromethane	0.68 U	0.65 U	7.2	5.2	0.94	0.68 U	1.4	1.4 U	0.79	0.65 U	2.5
Dibromochloromethane	2.8 U	2.7 U	2.9 U	2.9 U	2.7 U	2.8 U	2.6 U	5.6 U	2.8 U	2.7 U	2.6 U
1,2-Dibromoethane	2.5 U	2.4 U	2.6 U	2.6 U	2.4 U	2.5 U	2.3 U	5 U	2.5 U	2.4 U	2.3 U
1,2-Dichlorobenzene	2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.8 U	3.9 U	2 U	1.9 U	1.8 U
1,3-Dichlorobenzene	4.9 U	4.7 U	5.1 U	5.1 U	4.7 U	4.9 U	4.6 U	9.8 U	4.9 U	4.7 U	4.6 U
1,4-Dichlorobenzene	4.9 U	4.7 U	5.1 U	5.1 U	4.7 U	4.9 U	4.6 U	9.8 U	4.9 U	4.7 U	4.6 U
Dichlorodifluoromethane (12)	3.7	3.4	1.7 U	1.7 U	50.9	3.9	3.1	3.4	1.9	3.2	5.1
1,1-Dichloroethane	1.3 U	1.3 U	1.4 U	1.4 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
1,2-Dichloroethane	0.66 U	0.64 U	0.69 U	0.69 U	0.64 U	0.66 U	0.61 U	1.3 U	0.66 U	0.64 U	0.61 U
1,1-Dichloroethene	1.3 U	1.3 U	5.4	1.4 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
cis-1,2-Dichloroethene	1.3 U	1.3 U	1.4 U	1.4 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
trans-1,2-Dichloroethene	1.3 U	1.3 U	1.4 U	1.4 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
1,2-Dichloropropane	1.5 U	1.5 U	1.6 U	1.6 U	1.5 U	1.5 U	1.4 U	3 U	1.5 U	1.5 U	1.4 U
cis-1,3-Dichloropropene	1.5 U	1.4 U	1.5 U	1.5 U	1.4 U	1.5 U	1.4 U	3 U	1.5 U	1.4 U	1.4 U
trans-1,3-Dichloropropene	1.5 U	1.4 U	1.5 U	1.5 U	1.4 U	1.5 U	1.4 U	3 U	1.5 U	1.4 U	1.4 U
Chloroethane	0.87 U	0.84 U	0.91 U	0.91 U	0.84 U	0.87 U	0.8 U	1.7 U	0.87 U	0.84 U	0.8 U
Ethylbenzene	3.9	3.6	7.5 J	6.7 J	5.8	6.3 J	6.2 J	5.8 J	32.7 J	4.6 J	3.7 J
4-Ethyl Toluene	4.7	5.9	6	4.5	5.9	7	5.5	15.3	12.2	5.9	8.2
Hexachlorobutadiene	8.7 U	8.4 U	9.1 U	9.1 U	8.4 U	8.7 U	8.1 U	17.5 U	8.7 U	8.4 U	8.1 U
2-Hexanone	2.1	4.1	8.8	5.6	4.4	4.1	16	6.9	11.3	11.8	8
2-Butanone	14.6	17	48.1	36.6	46.6	127	82.5	89.2	34	42.6	99.3
4-Methyl-2-Pentanone	2.1	3	1.4 U	1.4 U	5.2	7.4	20.5	9.4	9.3	12.9	23.1
t-Butyl Methyl Ether (MTBE)	1.2 U	1.1 U	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U	2.4 U	1.2 U	1.1 U	1.1 U
Methylene Chloride	5.7 U	5.5 U	5.9 U	5.9 U	23.8	7.8	6.3	11.4 U	6.1	6.6	7.5
Styrene	14.2	16.2	13.9	10.8	20.5	18.2	19	17.7	19.8	18.2	45
1,1,2,2-Tetrachloroethane	1.1 U	1.1 U	1.2 UJ	1.2 UJ	1.1 U	1.1 UJ	1 UJ	2.2 UJ	1.1 UJ	1.1 UJ	1 UJ
Tetrachloroethene	2.4	1.3	77.3 J	54.5 J	31.4	1.1 UJ	765 J	2.2 UJ	88.2 J	19.8 J	7.8 J
Toluene	172	10.5	19.1	24.9	150	80	16.1	23.6	15.2	15.9	9.5
1,1,2-Cl 1,2,2-F ethane (113)	2.6 U	2.5 U	2.7 U	2.7 U	2.5 U	2.6 U	2.4 U	5.2 U	2.6 U	2.5 U	2.4 U
1,2,4-Trichlorobenzene	6.1 U	5.8 U	6.3 U	6.3 U	5.8 U	6.1 U	5.6 U	12.1 U	6.1 U	5.8 U	5.6 U

Table 4-1

Supplemental Remedial Investigation
Sub-Slab Vapor 2015 Sample Results
Wix Filtration Facility
Dillon, South Carolina (a)

	SSV-5	SSV-6	SSV-7	SSV-17 (b)	SSV-8	SSV-9	SSV-10	SSV-11	SSV-12	SSV-13	SSV-14
	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015
Volatile Organic Compounds (µg/m^3)											
1,1,1-Trichloroethane	108	1.7 U	1.9 U	1.9 U	4	1.8 U	1.7 U	3.6 U	1.8 U	1.7 U	1.7 U
1,1,2-Trichloroethane	0.89 U	0.85 U	0.92 U	0.92 U	0.85 U	0.89 U	0.82 U	1.8 U	0.89 U	0.85 U	0.82 U
Trichloroethene	0.89 U	0.85 U	2.7	1.8	0.87	0.89 U	0.82 U	1.8 U	4.2	0.85 U	0.82 U
Trichlorofluoromethane (11)	1.8 U	1.8	1.9 U	1.9 U	2.2	1.9	4.6	3.7 U	1.8 U	1.8	2.2
1,2,4-Trimethylbenzene	11.4	11.3	11.2	7.7	13.3	12.4	11.7	22.8	35.5	10.6	13.4
1,3,5-Trimethylbenzene	4.6	4.3	5	4.2 U	5	6.1	4.6	13.2	13.4	4.1	4.3
Vinyl Acetate	1.2 U	4.6	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U	2.3 U	1.2 U	1.1 U	1.1 U
Vinyl Chloride	0.42 U	0.4 U	0.44 U	0.44 U	0.4 U	0.42 U	0.39 U	0.84 U	0.42 U	0.4 U	0.39 U
1,2-Cl-1,1,2,2-F ethane (114)	2.3 U	2.2 U	2.4 U	2.4 U	2.2 U	2.3 U	2.1 U	4.6 U	2.3 U	2.2 U	2.1 U
m&p-Xylene	14.6	14.6	29.4 J	27.9 J	21	22.4 J	23.1 J	21.9 J	97 J	18.3 J	14.4 J
o-Xylene	6	6.3	9.4 J	10.5 J	8.7	9.3 J	8.8 J	9.6 J	17.7 J	7.3 J	6.6 J

---

a/ µg/m3 = micrograms per cubic meter; "-" = not promulgated or not analyzed.

b/ Duplicate of previous sample.

c/ Data Qualifiers:

U = compound not detected

J = estimated concentration

Appendix A – Historical Analytical Data Tables

TABLE 3. GROUND WATER ANALYTICAL RESULTS

EPA 8260 (ug/l) Monitor Well	Sample Date	Acetone	Benzene	cis-1,2-DCE	trans-1,2-DCE	Ethylbenzene	Isopropylbenzene	1,1-DCE	PCE	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	sec-Butylbenzene	Xylene (Total)	Carbon disulfide	2-Butanone (MEK)	N-Propylbenzene	Methylene Chloride	Naphthalene	p-Isopropyltoluene	Trichloroethene	n-Butylbenzene
SC GW Std. (MCL)			5	70	100	700		7	5	1,000				10K	360						5	
MW-1	03/04/15	ND	ND	ND	ND	ND	ND	ND	ND	16.6(*)(**)	ND	ND	ND	ND	ND	ND	ND	ND	0.917(J)	ND	ND	ND
DUP-01	03/04/15	ND	ND	ND	ND	ND	ND	ND	ND	81.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	03/04/15	90.8	40.5	1.08	ND	17.2	ND	ND	0.304(J)	85,100	1.6	0.560(J)	ND	20.2	ND	2.83(J)	0.953(J)	ND	0.304(J)	2.76	ND	ND
MW-3	03/04/15	ND	17.3	1.29	ND	11.9	7.22	ND	ND	4,960	63	21.2	0.680(J)	16.7	0.306(J)	ND	11.9	ND	0.427(J)	1.73	ND	ND
MW-4R	03/04/15	629	79	12.3	0.410(J)	46.8	8.81	ND	3.81	449,000	74.3	24.8	ND	97.9	3.85	48.8(J)	17.8	ND	0.866(J)	4.01	ND	0.423(J)
MW-7	03/04/15	ND	ND	ND	ND	ND	ND	ND	ND	0.199(J)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-10	03/04/15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11	03/04/15	ND	11.2	ND	ND	19	1.21	ND	ND	65,700	8.01	2.8	ND	25.6	ND	ND	2.28	ND	ND	1.96	ND	ND
MW-11D	03/04/15	ND	1.68	17.2	0.354(J)	ND	ND	ND	ND	0.248(J)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-12	03/05/15	ND	1.1	9.24	ND	97	0.532(J)	ND	0.721(J)	32,500	10.3	4.75	0.479(J)	81	ND	ND	1.37	ND	0.371(J)	1.94	0.502(J)	ND
MW-12D	03/04/15	ND	ND	ND	ND	ND	ND	ND	ND	0.213(J)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-13	03/05/15	18,700(J)	71.6	44.5	1.3	47.7	18.2	ND	4.77	441,000	137	47.1	0.760(J)	183	4.83	393	31.8	0.236(J)	1.03(J)	1.07	1.23	1.22
MW-14	03/05/15	ND	ND	918	1.14	ND	ND	1.46	1.08	0.223(J)	ND	ND	0.685(J)	ND	ND	ND	ND	ND	ND	ND	0.346(J)	1.08
MW-15	03/04/15	ND	ND	ND	ND	.202(J)	ND	ND	ND	256	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TB-01	03/04/15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Only detected compounds are shown in table

J - Result less than RL but greater than or equal MDL

* - MS and/or MSD Exceeds Control Limits

** - MS or MSD RPD Exceeds Control Limits

NE - Not established

Blue font - exceeds SC MCL where an MCL is established

ND - Not detected

Table 5-1

Remedial Investigation Soil Sample Results
Wix Filtration Facility
Dillon, South Carolina (a)

Location:					SB-1	SB-2	SB-3	SB-4	SB-4	SB-5	SB-6	SB-7	SB-8	SB-9	SB-10	SB-11	SB-12
Depth (ft-bgs):					**2.5**	**2.5**	**2.5**	**1**	**2**	**2**	**2**	**2**	**1.5**	**2.5**	**2.5**	**3**	**2**
Sample Date:					**5/1/2014**	**5/1/2014**	**5/1/2014**	**5/1/2014**	**5/1/2014**	**5/1/2014**	**5/1/2014**	**5/1/2014**	**5/1/2014**	**5/1/2014**	**5/1/2014**	**5/1/2014**	**5/1/2014**
	Screening Levels (c)																
	C_{sat}	RSL_I	SSL_{MCL}	SSL_{RISK}													
Volatile Organic Compounds (µg/kg)																	
Acetone	114,000,000	67,000,000	-	290	2,450 U (f)	19.7 J	13.7 J	1,810 U	2,180 U	4,660 U	18.9 J	***1,150 J***	85.2 U	46,800 U	89.3 U	83.8 U	12.1 J
Benzene	1,820,000	5,100	2.6	0.23	122 U	***1.2 J***	3.5 U	90.6 U	109 U	233 U	***7.3***	212 U	***4 J***	2,340 U	4.5 U	4.2 U	5.2 U
Bromochloromethane	4,040,000	63,000	-	2.1	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Bromodichloromethane	931,000	1,300	22	0.036	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Bromoform	-	290,000	21	2.4	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Bromomethane	3,590,000	3,000	-	0.19	245 U	7.3 U	7.1 U	181 U	218 U	466 U	8.7 U	424 U	8.5 U	4,680 U	8.9 U	8.4 U	10.3 U
Carbon disulfide	738,000	350,000	-	24	245 U	7.3 U	7.1 U	181 U	218 U	466 U	8.7 U	424 U	8.5 U	4,680 U	8.9 U	8.4 U	10.3 U
Carbon tetrachloride	458,000	2,900	1.9	0.18	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Chlorobenzene	761,000	130,000	68	5.3	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Chloroform	2,540,000	1,400	22	0.061	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Chloromethane	1,320,000	46,000	-	4.9	245 U	7.3 U	7.1 U	181 U	218 U	466 U	8.7 U	424 U	8.5 U	4,680 U	8.9 U	8.4 U	10.3 U
Isopropylbenzene (Cumene)	268,000	990,000	-	74	122 U	3.6 U	3.5 U	90.6 U	51.7 J	233 U	1.9 J	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Cyclohexane	117,000	2,700,000	-	1,300	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,2-Dibromo-3-chloropropane	979,000	64	0.086	0.00014	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Dibromochloromethane	802,000	3,200	21	0.045	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,2-Dibromoethane (EDB)	1,340,000	160	0.014	0.0021	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,2-Dichlorobenzene	376,000	930,000	580	30	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,3-Dichlorobenzene	-	-	-	-	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,4-Dichlorobenzene	-	11,000	72	0.46	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Dichlorodifluoromethane	845,000	37,000	-	30	245 U	7.3 U	7.1 U	181 U	218 U	466 U	8.7 U	424 U	8.5 U	4,680 U	8.9 U	8.4 U	10.3 U
1,1-Dichloroethane	1,690,000	16,000	-	0.78	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,2-Dichloroethane	2,980,000	2,000	1.4	0.048	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,1-Dichloroethene	1,190,000	100,000	2.5	10	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
cis-1,2-Dichloroethene	2,370,000	230,000	21	1.1	122 U	3.6 U	3.5 U	***78.9 J***	***45.4 J***	233 U	***1.3 J***	***464***	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
trans-1,2-Dichloroethene	1,670,000	2,300,000	29	11	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,2-Dichloropropane	1,360,000	4,400	1.7	0.15	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
cis-1,3-Dichloropropene	1,570,000	8,200	-	0.17	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
trans-1,3-Dichloropropene	1,570,000	8,200	-	0.17	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,4-Dioxane (p-Dioxane)	-	23,000	-	0.16	3,670 UJ	109 UJ	106 UJ	2,720 UJ	3,270 UJ	6,990 UJ	130 UJ	6,350 UJ	128 UJ	70,100 UJ	134 U	126 UJ	155 UJ
Chloroethane	2,120,000	5,700,000	-	590	245 U	7.3 U	7.1 U	181 U	218 U	466 U	8.7 U	424 U	8.5 U	4,680 U	8.9 U	8.4 U	10.3 U
Ethylbenzene	480,000	25,000	780	1.7	122 U	3.6 U	***2.5 J***	90.6 U	***44 J***	233 U	1.6 J	212 U	***2 J***	2,340 U	4.5 U	4.2 U	5.2 U
2-Hexanone	3,280,000	130,000	-	0.88	1,220 U	36.4 U	35.4 U	906 U	1,090 U	2,330 U	43.4 U	2,120 U	42.6 U	23,400 U	44.7 U	41.9 U	51.6 U
Methyl acetate	29,000,000	120,000,000	-	410	245 U	7.3 U	7.1 U	181 U	218 U	466 U	8.7 U	424 U	8.5 U	4,680 U	8.9 U	8.4 U	10.3 U
2-Butanone (MEK)	28,400,000	19,000,000	-	120	2,450 U	72.8 U	70.8 U	1,810 U	2,180 U	4,660 U	86.7 U	4,240 U	85.2 U	46,800 U	89.3 U	83.8 U	103 U
Methylcyclohexane	-	-	-	-	245 U	7.3 U	7.1 U	181 U	218 U	466 U	8.7 U	424 U	8.5 U	4,680 U	8.9 U	8.4 U	10.3 U
4-Methyl-2-pentanone (MIBK)	3,360,000	5,600,000	-	28	1,220 U	36.4 U	35.4 U	906 U	1,090 U	2,330 U	43.4 U	2,120 U	42.6 U	23,400 U	44.7 U	41.9 U	51.6 U
Methyl-tert-butyl ether	8,870,000	210,000	-	3.2	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Methylene Chloride	3,320,000	320,000	1.3	2.7	489 U	14.6 U	14.2 U	363 U	436 U	932 U	17.3 U	847 U	17 U	9,350 U	17.9 U	16.8 U	20.6 U
Styrene	867,000	3,500,000	110	130	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,1,2,2-Tetrachloroethane	1,900,000	2,700	-	0.03	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Tetrachloroethene	166,000	39,000	2.3	1.8	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Toluene	818,000	4,700,000	690	76	***27,000***	53.7	***957***	***26,200***	***67,200***	***37,900***	21.2	***62,800***	8.4	***1,620,000***	2.3 J	12.4	5.2 U
1,1,2-Trichlorotrifluoroethane	910,000	17,000,000	-	14,000	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,2,3-Trichlorobenzene	-	66,000	-	2.1	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,2,4-Trichlorobenzene	404,000	26,000	200	1.2	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,1,1-Trichloroethane	640,000	3,600,000	70	280	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
1,1,2-Trichloroethane	2,160,000	630	1.6	0.013	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Trichloroethene	692,000	1,900	1.8	0.1	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Trichlorofluoromethane	1,230,000	310,000	-	73	122 U	3.6 U	3.5 U	90.6 U	109 U	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
Vinyl chloride	3,920,000	1,700	0.69	0.0065	245 U	7.3 U	7.1 U	181 U	218 U	466 U	8.7 U	424 U	8.5 U	4,680 U	8.9 U	8.4 U	10.3 U
m&p-Xylene (e)	388,000	240,000	-	19	245 U	7.3 U	7.1 U	181 U	***84.5 J***	466 U	8.7 U	424 U	8.5 U	4,680 U	8.9 U	8.4 U	10.3 U
o-Xylene	434,000	280,000	-	19	122 U	3.6 U	3.5 U	***48.2 J***	***79.6 J***	233 U	4.3 U	212 U	4.3 U	2,340 U	4.5 U	4.2 U	5.2 U
General Chemistry																	
Percent Moisture	-	-	-	-	21.3	7.1	10.1	11.7	16.6	16	14.2	14.9	17.4	19.8	18.5	18.6	17.4
Total Organic Carbon (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Boxed values greater than C_{sat}
Red values greater than RSL_I
Shaded values greater than SSL_{MCL}
Bold italic values greater than HHRA screening level (f)

Table 5-1

Remedial Investigation Soil Sample Results
Wix Filtration Facility
Dillon, South Carolina (a)

				Location:	SB-13	SB-100 (b)	SB-14	SB-16	SB-16	SB-17	SB-101 (b)	SB-18	SB-19	MW-11D
				Depth (ft-bgs):	3	3	2.5	6-7	14-15	2	2	2.5	3	26-28
				Sample Date:	5/1/2014	5/1/2014	5/1/2014	5/2/2014	5/2/2014	5/2/2014	5/2/2014	5/2/2014	5/7/2014	5/7/2014
	Screening Levels (c)													
	C_{sat}	RSL_I	SSL_{MCL}	SSL_{RISK}										
Volatile Organic Compounds (µg/kg)														
Acetone	114,000,000	67,000,000	-	290	14.4 J	13.1 J	24.6 J	-	-	10.3 J	9.2 J	90.5 U	31.1 U	-
Benzene	1,820,000	5,100	2.6	0.23	***1.7 J***	5.6 U	***4.2 J***	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Bromochloromethane	4,040,000	63,000	-	2.1	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Bromodichloromethane	931,000	1,300	22	0.036	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Bromoform	-	290,000	21	2.4	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Bromomethane	3,590,000	3,000	-	0.19	8.3 U	11.3 U	9.8 U	-	-	7.6 U	7.5 U	9 U	3.1 U	-
Carbon disulfide	738,000	350,000	-	24	8.3 U	11.3 U	9.8 U	-	-	7.6 U	7.5 U	9 U	3.1 U	-
Carbon tetrachloride	458,000	2,900	1.9	0.18	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Chlorobenzene	761,000	130,000	68	5.3	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Chloroform	2,540,000	1,400	22	0.061	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Chloromethane	1,320,000	46,000	-	4.9	8.3 U	11.3 U	9.8 U	-	-	7.6 U	7.5 U	9 U	3.1 U	-
Isopropylbenzene (Cumene)	268,000	990,000	-	74	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Cyclohexane	117,000	2,700,000	-	1,300	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,2-Dibromo-3-chloropropane	979,000	64	0.086	0.00014	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Dibromochloromethane	802,000	3,200	21	0.045	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,2-Dibromoethane (EDB)	1,340,000	160	0.014	0.0021	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,2-Dichlorobenzene	376,000	930,000	580	30	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,3-Dichlorobenzene	-	-	-	-	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,4-Dichlorobenzene	-	11,000	72	0.46	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Dichlorodifluoromethane	845,000	37,000	-	30	8.3 U	11.3 U	9.8 U	-	-	7.6 U	7.5 U	9 U	3.1 U	-
1,1-Dichloroethane	1,690,000	16,000	-	0.78	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,2-Dichloroethane	2,980,000	2,000	1.4	0.048	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,1-Dichloroethene	1,190,000	100,000	2.5	10	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
cis-1,2-Dichloroethene	2,370,000	230,000	21	1.1	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
trans-1,2-Dichloroethene	1,670,000	2,300,000	29	11	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,2-Dichloropropane	1,360,000	4,400	1.7	0.15	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
cis-1,3-Dichloropropene	1,570,000	8,200	-	0.17	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
trans-1,3-Dichloropropene	1,570,000	8,200	-	0.17	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,4-Dioxane (p-Dioxane)	-	23,000	-	0.16	125 UJ	169 UJ	147 UJ	-	-	114 UJ	113 UJ	136 UJ	46.7 U	-
Chloroethane	2,120,000	5,700,000	-	590	8.3 U	11.3 U	9.8 U	-	-	7.6 U	7.5 U	9 U	3.1 U	-
Ethylbenzene	480,000	25,000	780	1.7	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
2-Hexanone	3,280,000	130,000	-	0.88	41.5 U	56.3 U	49.1 U	-	-	38.1 U	37.6 U	45.2 U	15.6 U	-
Methyl acetate	29,000,000	120,000,000	-	410	8.3 U	11.3 U	9.8 U	-	-	7.6 U	7.5 U	9 U	3.1 U	-
2-Butanone (MEK)	28,400,000	19,000,000	-	120	83.1 U	113 U	98.2 U	-	-	76.2 U	75.1 U	90.5 U	31.1 U	-
Methylcyclohexane	-	-	-	-	8.3 U	11.3 U	9.8 U	-	-	7.6 U	7.5 U	9 U	3.1 U	-
4-Methyl-2-pentanone (MIBK)	3,360,000	5,600,000	-	28	41.5 U	56.3 U	49.1 U	-	-	38.1 U	37.6 U	45.2 U	15.6 U	-
Methyl-tert-butyl ether	8,870,000	210,000	-	3.2	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Methylene Chloride	3,320,000	320,000	1.3	2.7	16.6 U	22.5 U	19.6 U	-	-	15.2 U	15 U	18.1 U	6.2 U	-
Styrene	867,000	3,500,000	110	130	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,1,2,2-Tetrachloroethane	1,900,000	2,700	-	0.03	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Tetrachloroethene	166,000	39,000	2.3	1.8	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Toluene	818,000	4,700,000	690	76	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	61.9	-
1,1,2-Trichlorotrifluoroethane	910,000	17,000,000	-	14,000	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,2,3-Trichlorobenzene	-	66,000	-	2.1	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,2,4-Trichlorobenzene	404,000	26,000	200	1.2	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,1,1-Trichloroethane	640,000	3,600,000	70	280	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
1,1,2-Trichloroethane	2,160,000	630	1.6	0.013	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Trichloroethene	692,000	1,900	1.8	0.1	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Trichlorofluoromethane	1,230,000	310,000	-	73	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
Vinyl chloride	3,920,000	1,700	0.69	0.0065	8.3 U	11.3 U	9.8 U	-	-	7.6 U	7.5 U	9 U	3.1 U	-
m&p-Xylene (e)	388,000	240,000	-	19	8.3 U	11.3 U	9.8 U	-	-	7.6 U	7.5 U	9 U	3.1 U	-
o-Xylene	434,000	280,000	-	19	4.2 U	5.6 U	4.9 U	-	-	3.8 U	3.8 U	4.5 U	1.6 U	-
General Chemistry														
Percent Moisture	-	-	-	-	15.9	15.7	14.8	19.9	20.3	13.7	14.7	13.1	16.2	-
Total Organic Carbon (mg/kg)	-	-	-	-	-	-	-	1,090	2,070	-	-	-	-	8,110

Boxed values greater than C_{sat}
Red values greater than RSL_I
Shaded values greater than SSL_{MCL}
Bold italic values greater than HHRA screening level (f)

---

a/ C_{sat} = generic soil saturation concentration; RSL_I = Regional Screening Level for industrial exposure; SSL_{RISK} = risk-based protection of groundwater Soil Screening Level; SSL_{MCL} = Maximum Contaminant Level (MCL)-based Soil Screening Level; µg/kg = micrograms per kilogram; mg/kg = milligrams per kilogram; "-" = not promulgated or not analyzed; HHRA = human health risk assessment.

b/ Duplicate of previous sample.

c/ U.S. Environmental Protection Agency (EPA) RSL Summary Table. May 2014.

d/ The lower screening level for m-xylenes or p-xylenes is used.

e/ Data Qualifiers:
U = compound not detected; J = estimated concentration above the method detection limit and below the reporting limit

f/ The HHRA screening level is the minimum of the RSL_I or SSL_{RISK}.

Table 5-3

Remedial Investigation Sub-Slab Vapor Sample Results
Wix Filtration Facility
Dillon, South Carolina (a)

	Location:	SSV-1	SSV-2	SSV-3	SSV-4 (b)
	Sample Date:	4/30/2014	4/30/2014	4/30/2014	4/30/2014
	HHRA Screening Level (c)				
Volatile Organic Compounds (µg/m^3)					
Acetone	14,000	4,500	86	46	31
Benzene	1.6	***7.8***	1.2	***2.4***	***2.8***
Benzyl Chloride	0.25	4.1 U (e)	1 U	1 U	1 U
Bromodichloromethane	0.33	5.3 U	1.3 U	1.3 U	1.3 U
Bromoform	11	8.2 U	2.1 U	2.1 U	2.1 U
Bromomethane	2.2	3.1 U	0.78 U	0.78 U	0.9
Carbon Disulfide	310	110	46	220	44
Carbon Tetrachloride	2	5 U	1.3 U	1.3 U	1.3 U
Chlorobenzene	22	6.2	1.1	0.92 U	0.96
Chloroform	0.53	3.9 U	0.98 U	0.98 U	0.98 U
Chloromethane	39	3.3 U	0.83 U	0.83 U	0.83 U
Dibromochloromethane	0.45	6.8 U	1.7 U	1.7 U	1.7 U
1,2-Dibromoethane	0.02	6.1 U	1.5 U	1.5 U	1.5 U
1,2-Dichlorobenzene	88	4.8 U	1.2 U	1.2 U	1.2 U
1,3-Dichlorobenzene	-	4.8 U	1.2 U	1.2 U	1.2 U
1,4-Dichlorobenzene	1.1	4.8 U	1.2 U	1.2 U	1.2 U
Dichlorodifluoromethane (12)	44	3.9 U	3.1	2.4	1.9
1,1-Dichloroethane	7.7	***8.3***	0.81 U	0.81 U	0.81 U
1,2-Dichloroethane	0.47	3.2 U	0.81 U	0.81 U	0.81 U
1,1-Dichloroethene	88	3.2 U	0.79 U	0.79 U	0.79 U
cis-1,2-Dichloroethene	-	3.2 U	0.79 U	0.79 U	0.79 U
trans-1,2-Dichloroethene	-	3.2 U	0.79 U	0.79 U	0.79 U
1,2-Dichloropropane	1.2	3.7 U	0.92 U	0.92 U	0.92 U
cis-1,3-Dichloropropene	3.1	3.6 U	0.91 U	0.91 U	0.91 U
trans-1,3-Dichloropropene	3.1	3.6 U	0.91 U	0.91 U	0.91 U
Chloroethane	4,400	2.1 U	0.53 U	0.53 U	0.53 U
Ethylbenzene	4.9	***7***	0.87 U	0.87 U	0.87 U
4-Ethyl Toluene	-	7.5	0.98 U	1.6	1.4
Hexachlorobutadiene	0.56	8.5 U	2.1 U	2.1 U	2.1 U
2-Hexanone	13	***100***	2.5	1.9	2.3
2-Butanone	2,200	420	13	14	21
4-Methyl-2-Pentanone	1,300	130	1.9	1.8	7.3
t-Butyl Methyl Ether (MTBE)	47	2.9 U	0.72 U	0.72 U	0.72 U
Methylene Chloride	260	2.8 U	0.69 U	0.69 U	0.69 U
Styrene	440	3.5	0.85 U	0.85 U	0.85 U
1,1,2,2-Tetrachloroethane	0.21	11 U	2.7 U	2.7 U	2.7 U
Tetrachloroethene	18	***1,300***	***1,600***	6.6	7.2
Toluene	2,200	40	3.2	3.5	2.4
1,1,2-Cl 1,2,2-F ethane (113)	13,000	6.1 U	1.5 U	1.5 U	1.5 U
1,2,4-Trichlorobenzene	0.88	12 U	3 U	3 U	3 U
1,1,1-Trichloroethane	2,200	27	1.1 U	1.1 U	1.1 U
1,1,2-Trichloroethane	0.088	4.4 U	1.1 U	1.1 U	1.1 U
Trichloroethene	0.88	***64***	***15***	***3***	***4.2***
Trichlorofluoromethane (11)	310	4.5 U	1.1 U	1.1	1.1 U
1,2,4-Trimethylbenzene	3.1	7.8 UJ	2 UJ	2 UJ	2 UJ
1,3,5-Trimethylbenzene	-	7.8 U	2 U	2 U	2 U
Vinyl Acetate	88	14 U	3.5 U	3.5 U	3.5 U
Vinyl Chloride	2.8	2 U	0.51 U	0.51 U	0.51 U
1,2-Cl-1,1,2,2-F ethane (114)	-	5.6 U	1.4 U	1.4 U	1.4 U
m&p-Xylene (d)	44	28	2.1	2.4	2
o-Xylene	44	10	0.95	1.5	1.1
Field Parameters					
Purge Volume (L)	-	1	0.7	2	-
Organic Vapors (ppm)	-	6.4	2.1	1.3	-
Oxygen (ppm)	-	20.9	17.8	20.9	-
Carbon monoxide (ppm)	-	350	186	160	-

---

a/ HHRA = human health risk assessment; µg/m3 = micrograms per cubic meter; L = liters; ppm = parts per million; "-" = not promulgated or not analyzed.
b/ Duplicate of previous sample.
c/ U.S. Environmental Protection Agency (EPA) Regional Screening Level (RSL) Summary Table.Industrial exposure to indoor or outdoor air. May 2014.
d/ The lower screening level for m-xylenes or p-xylenes is used.
e/ Data Qualifiers:
U = compound not detected
J = estimated concentration above the method detection limit and below the reporting limit

Bold italics values greater than HHRA screening level

Table 1: Summary of Soil Sample Results Compared to Standards
Wix Filtration Corporation - Dillon, South Carolina
The Affinia Group, Inc.

Compounds and Constituents	Standards in µg/kg		Soil Sample Results in µg/kg				
	PQL	PRG	December 6, 2006	December 5, 2006		December 7, 2006	December 6, 2006
			Location: STB-11 Label: GP-9 (4-6)	Location: STB-12 Label: GP-10 (6-8)	Location: STB-13 Label: GP-11 (8-10)	Location: STB-14 Label: GP-12 (6-8)	Location: MW-5 Label: MW-5 (12-
cis-1,2-Dichloroethene	5	43,000	ND	ND	ND	ND	ND
p-Isopropyltoluene	NW	NL	ND	ND	ND	ND	ND
Toluene	5,000	520,000	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	NW	52	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	NW	21	ND	ND	ND	ND	ND
m&p-Xylene	NW	NL	ND	ND	ND	ND	ND
o-Xylene	NW	NL	ND	ND	ND	ND	ND
Xylenes (Total)	10,000	270,000	ND	ND	ND	ND	ND
Total VOCs	--	--	ND	ND	ND	ND	ND

Notes:

PQL = Practical Quantitation Limit - SW 846 EPA Method 8260B
PRG = Residential Preliminary Remediation Goal - EPA Region IX from October 2004 or EPA Region IV
µg/kg = Micrograms per Kilogram
ND = Not Detected above applicable reporting limit
NL = Not Listed in EPA Region IX PRG table from October 2004
NW = Not Listed with the Safe Drinking Water Act and SW 846 EPA Method 8260B
GP-9 (4-6) = Laboratory sample label with associated sample depth in parentheses

Laboratory Analysis by Pace Analytical Laboratories of Charlotte, NC for EPA Method 8260B

Table 1: Summary of Soil Sample Results Compared to Standards
Wix Filtration Corporation - Dillon, South Carolina
The Affinia Group, Inc.

Compounds and Constituents	**Standards in µg/kg**		**Soil Sample Results in µg/kg**				**Hand Auger Soil Sample Results in µg/kg**
	PQL	**PRG**	**December 6, 2006**		**December 4, 2006**	**December 5, 2006**	**December 7, 2006**
			Location: MW-6 **Label: MW-6 (8-10)**	**Location: MW-9** **Label: MW-9 (6-8)**	**Location: MW-7** **Label: MW-7 (4-6)**	**Location: MW-8** **Label: MW-8 (4-6)**	**Location: HA-1** **Label: GP-13 (0-2)**
cis-1,2-Dichloroethene	5	43,000	ND	ND	ND	ND	ND
p-Isopropyltoluene	NW	NL	ND	ND	ND	12	ND
Toluene	5,000	520,000	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	NW	52	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	NW	21	ND	ND	ND	ND	ND
m&p-Xylene	NW	NL	ND	ND	ND	ND	ND
o-Xylene	NW	NL	ND	ND	ND	ND	ND
Xylenes (Total)	10,000	270,000	ND	ND	ND	ND	ND
Total VOCs	--	--	ND	ND	ND	12	ND

Notes:

PQL = Practical Quantitation Limit - SW 846 EPA Method 8260B
PRG = Residential Preliminary Remediation Goal - EPA Region IX from October 2004 or EPA Region IV
µg/kg = Micrograms per Kilogram
ND = Not Detected above applicable reporting limit
NL = Not Listed in EPA Region IX PRG table from October 2004
NW = Not Listed with the Safe Drinking Water Act and SW 846 EPA Method 8260B
GP-9 (4-6) = Laboratory sample label with associated sample depth in parentheses

Laboratory Analysis by Pace Analytical Laboratories of Charlotte, NC for EPA Method 8260B

Table 1: Summary of Soil Sample Results Compared to Standards
Wix Filtration Corporation - Dillon, South Carolina
The Affinia Group, Inc.

Compounds and Constituents	**Standards in µg/kg**		**Hand Auger Soil Sample Results in µg/kg**	
			December 7, 2006	
	PQL	**PRG**	**Location: HA-2** **Label: GP-14 (0-2)**	**Location: HA-3** **Label: GP-15 (0-2)**
cis-1,2-Dichloroethene	5	43,000	ND	ND
p-Isopropyltoluene	NW	NL	ND	ND
Toluene	5,000	520,000	ND	ND
1,2,4-Trimethylbenzene	NW	52	ND	ND
1,3,5-Trimethylbenzene	NW	21	ND	ND
m&p-Xylene	NW	NL	ND	ND
o-Xylene	NW	NL	ND	ND
Xylenes (Total)	10,000	270,000	ND	ND
Total VOCs	--	--	ND	ND

Notes:

PQL = Practical Quantitation Limit - SW 846 EPA Method 8260B
PRG = Residential Preliminary Remediation Goal - EPA Region IX from October 2004 or EPA Region IV
µg/kg = Micrograms per Kilogram
ND = Not Detected above applicable reporting limit
NL = Not Listed in EPA Region IX PRG table from October 2004
NW = Not Listed with the Safe Drinking Water Act and SW 846 EPA Method 8260B
GP-9 (4-6) = Laboratory sample label with associated sample depth in parentheses

Laboratory Analysis by Pace Analytical Laboratories of Charlotte, NC for EPA Method 8260B

Table 2: Summary of Historical Soil and Sediment Sample Results Compared to Standards
Wix Filtration Corporation - Dillon, South Carolina
The Affinia Group, Inc.

Compounds and Constituents	Standards in µg/kg		Soil Sample Results in µg/kg								
	PQL	PRG	October 18, 2005					November 18, 2005			
			Soil Pile 1	Soil Pile 2	Excavation 1	Excavation 2	Excavation 3	GP-1	GP-2	GP-3	GP-4
Acetone	20	14,000,000	ND	106	ND	ND	ND	ND	43	ND	41
Benzene	330	640	ND	5	2	ND	ND	**14**	4	ND	6
cis-1,2-Dichloroethene	5	43,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	41.1	360,000	5	3	2	ND	2	9	ND	ND	ND
Ethylbenzene	330	400,000	10	31	2	128	2	ND	9	ND	11
Isopropylbenzene	5	570,000	ND	3	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	NM	NL	2	3	ND	ND	ND	ND	**2**	ND	**6**
n-Propylbenzene	NM	240,000	2	8	2	ND	ND	ND	4	ND	21
Methylene Chloride	0.30	9,100	6	6	4	ND	ND	ND	ND	ND	ND
Naphthalene	1,600	NL	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5,000	520,000	6,900	78,400	11,100	127,000	29,200	156	9,110	**656,000**	44,900
1,2,4-Trimethylbenzene	NM	52,000	23	44	8	211	ND	ND	5	870	9
1,3,5-Trimethylbenzene	NM	21,000	5	11	3	92	ND	ND	ND	ND	ND
Xylene (Total)	10,000	270,000	17	40	5	169	ND	ND	9	ND	6
m&p-Xylene	NM	NL	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	NM	NL	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total VOCs	--	--	6,970	78,660	11,128	127,600	29,204	179	9,186	656,870	45,000
Total Organic Carbon	NM	NL	NA	NA	NA	NA	NA				

Notes:
▨ = Results above PRG comparative standard
PQL = Practical Quantitation Limit - SW 846 EPA Method 8260B
PRG = Residential Preliminary Remediation Goal - EPA Region IX from October 2004 or EPA Region IV
µg/kg = Micrograms per Kilogram
ND = Not Detected above applicable reporting limit
NA = Not Analyzed
NL = Not Listed in EPA Region IX PRG table from October 2004
NM = Not Listed with the Safe Drinking Water Act and SW 846 EPA Method 8260B
STB-DUP = Blind Duplicate sample for STB-8 (6-8)

Soil samples collected in October 2005 and November 2005 were analyzed by Test America Analytical Testing Corporation of Nashville, TN for EPA Method 8260B
Laboratory Analysis by Pace Analytical Laboratories of Charlotte, NC for EPA Method 8260B

Table 2: Summary of Historical Soil and Sediment Sample Results Compared to Standards
Wix Filtration Corporation - Dillon, South Carolina
The Affinia Group, Inc.

Compounds and Constituents	Standards in µg/kg		Soil Sample Results in µg/kg										
	PQL	PRG	November 18, 2005				May 16, 2006				May 17, 2006		
			GP-5	GP-6	GP-7	GP-8	STB-1 (4-6) ft	STB-2 (6-8) ft	STB-3 (8-10) ft	STB-4 (4-6) ft	STB-5 (4-6) ft	STB-6 (6-8) ft	STB-7 (2-4) ft
Acetone	20	14,000,000	ND	ND	ND	ND	ND	ND	ND	ND	220	ND	ND
Benzene	330	640	ND	ND	ND	ND	ND	ND	ND	ND	15	6.9	ND
cis-1,2-Dichloroethene	5	43,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	41.1	360,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	330	400,000	ND	ND	ND	ND	ND	ND	9.9	290	38	18	8.5
Isopropylbenzene	5	570,000	ND	ND	ND	ND	ND	ND	ND	ND	5	ND	9.4
p-Isopropyltoluene	NM	NL	ND	**1,710**	ND	ND	ND	ND	ND	**410**	**140**	**11**	**5.4**
n-Propylbenzene	NM	240,000	ND	ND	ND	ND	ND	ND	ND	ND	55	ND	22
Methylene Chloride	0.30	9,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	1,600	NL	ND	ND	ND	ND	1,100	ND	ND	ND	84	ND	ND
Toluene	5,000	520,000	**1,630,000**	232,000	28,000	**990,000**	410,000	**1,800,000**	30,000	66,000	370,000	25,000	140
1,2,4-Trimethylbenzene	NM	52,000	ND	3,210	83	1,950	4,000	4,100	8.2	ND	130	ND	ND
1,3,5-Trimethylbenzene	NM	21,000	ND	1,230	ND	800	1,300	ND	ND	ND	42	ND	28
Xylene (Total)	10,000	270,000	ND	ND	ND	ND	2,100	ND	14	450	84	17	11
m&p-Xylene	NM	NL	ND	ND	ND	ND	ND	ND	**12**	**450**	**55**	**14**	**9.4**
o-Xylene	NM	NL	ND	ND	ND	ND	ND	ND	ND	ND	**28**	ND	ND
Total VOCs	--	--	1,630,000	238,150	28,083	992,750	418,500	1,804,100	30,044.1	67,600	370,896	25,066.9	233.7
Total Organic Carbon	NM	NL					NA	NA	NA	NA	NA	NA	NA

Notes:

▨ = Results above PRG comparative standard
PQL = Practical Quantitation Limit - SW 846 EPA Method 8260B
PRG = Residential Preliminary Remediation Goal - EPA Region IX from October 2004 or EPA Region IV
µg/kg = Micrograms per Kilogram
ND = Not Detected above applicable reporting limit
NA = Not Analyzed
NL = Not Listed in EPA Region IX PRG table from October 2004
NM = Not Listed with the Safe Drinking Water Act and SW 846 EPA Method 8260B
STB-DUP = Blind Duplicate sample for STB-8 (6-8)

Soil samples collected in October 2005 and November 2005 were analyzed by Test America Analytical Testing Corporation of Nashville, TN for EPA Method 8260B
Laboratory Analysis by Pace Analytical Laboratories of Charlotte, NC for EPA Method 8260B

Table 2: Summary of Historical Soil and Sediment Sample Results Compared to Standards
Wix Filtration Corporation - Dillon, South Carolina
The Affinia Group, Inc.

Compounds and Constituents	Standards in µg/kg		Soil Sample Results in µg/kg						Sediment Sample Results in µg/kg	
			May 17, 2006				May 18, 2006		May 24, 2006	
	PQL	PRG	STB-8 (6-8) ft	STB-9 (8-10) ft	STB-DUP	MW-3 (8-10)* ft	STB-10 (8-10) ft	STB-10 (12-14) ft	SED-1	SED-2
Acetone	20	14,000,000	ND	ND	ND	NA	ND	NA	120	ND
Benzene	330	640	ND	13	ND	NA	ND	NA	ND	ND
cis-1,2-Dichloroethene	5	43,000	ND	4.8	ND	NA	ND	NA	ND	ND
Carbon Disulfide	41.1	360,000	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	330	400,000	ND	110	ND	NA	ND	NA	ND	ND
Isopropylbenzene	5	570,000	ND	79	ND	NA	ND	NA	ND	ND
p-Isopropyltoluene	NM	NL	ND	ND	ND	NA	ND	NA	**4.9**	ND
n-Propylbenzene	NM	240,000	ND	190	ND	NA	ND	NA	ND	ND
Methylene Chloride	0.30	9,100	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	1,600	NL	ND	5	ND	NA	ND	NA	ND	ND
Toluene	5,000	520,000	**2,000,000**	380,000	**1,700,000**	NA	ND	NA	ND	ND
1,2,4-Trimethylbenzene	NM	52,000	ND	570	ND	NA	ND	NA	ND	ND
1,3,5-Trimethylbenzene	NM	21,000	ND	230	ND	NA	ND	NA	ND	ND
Xylene (Total)	10,000	270,000	6,000	300	4,400	NA	ND	NA	ND	ND
m&p-Xylene	NM	NL	ND	**160**	ND	NA	ND	NA	ND	ND
o-Xylene	NM	NL	**4,700**	**140**	**4,400**	NA	ND	NA	ND	ND
Total VOCs	--	--	2,010,700	381,801.8	1,708,800	--	ND	--	124.9	ND
Total Organic Carbon	NL	NL	NA	NA	NA	ND	NA	2,960,000	NA	NA

Notes:

▨ = Results above PRG comparative standard
PQL = Practical Quantitation Limit - SW 846 EPA Method 8260B
PRG = Residential Preliminary Remediation Goal - EPA Region IX from October 2004 or EPA Region IV
µg/kg = Micrograms per Kilogram
ND = Not Detected above applicable reporting limit
NA = Not Analyzed
NL = Not Listed in EPA Region IX PRG table from October 2004
NM = Not Listed with the Safe Drinking Water Act and SW 846 EPA Method 8260B
STB-DUP = Blind Duplicate sample for STB-8 (6-8)
* = Location MW-3 is also location STB-7

Laboratory Analysis by Pace Analytical Laboratories of Charlotte, NC for EPA Method 8260B

Appendix B – MW-13R Boring and Development Logs

WELL DEVELOPMENT LOG

Site Name and Location Wix Filtration, Dillon, SC

Well ID MW-13R **Well Depth (feet bgs)** 12

Development Method Typhoon pump with ball valve to control flow

Initial Depth to Water 2.8' **Final Depth to Water** 3.5'

Total Volume Purged 9 gallons

Date	Reading Time	Volume Purged (Gallon)	Temperature (C)	pH (SU)	Specific Conductance (mS/cm)	Turbidity (NTU)
May 1, 2015	822	-	17.1	7.12	0.723	394
May 1, 2015	824	1.5	17.23	6.25	0.314	58.7
May 1, 2015	826	3	17.37	5.94	0.238	48.9
May 1, 2015	829	5.25	17.44	5.95	0.206	7.6
May 1, 2015	833	8.25	17.49	6.09	0.457	1.6

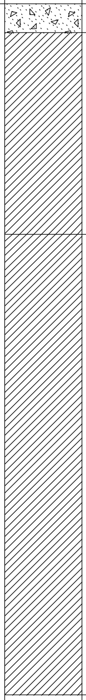
Notes

Boring Log: MW-13R

Project: Wix Filtration Plant
Project No.: 31999
Location: Dillon, South Carolina
Completion Date: April 30, 2015

Surface Elevation (feet AMSL*): 131.40
TOC Elevation (feet AMSL): 131.07
Total Depth (feet): 12
Borehole Diameter (inches): 8
**AMSL = Above Mean Sea Level*

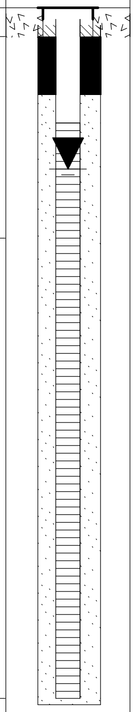
Sample Data					Subsurface Profile		
Depth	**Sample/Interval**	**PID/OVM (ppm)**	**Blow Count**	**% Recovery**	**Lithology**	**Description**	**Well Details**
						Ground Surface	



Concrete

Lean Clay (CL)
Reddish brown (2.5 YR 4/4) clay, dry to moist, soft, slight odor

Sandy Lean Clay (CL)
Strong brown (7.5 YR 5/8) clay with some fine sand, moist, soft, strong odor



Depth: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Geologist(s): Robert Wallace
Subcontractor: Parratt Wolff, Inc.
Driller/Operator: Kevin White
Method: Hollow Stem Auger

WSP
11190 Sunrise Valley Drive, Suite 300
Reston, Virginia
(703) 709-6500

Appendix C – 2015 Vapor Sample Analytical Data

Data Validation Report for Vapor Samples

WIX Filtration Corp LLC Facility
Dillon, South Carolina

April 28, 2015

Data Validation Report

Introduction

This Data Validation Report includes 11 sub-slab vapor samples collected at the Wix Filtration Corp LLC facility in Dillon, South Carolina on April 28, 2015. The samples were analyzed by Pace Analytical Services, Inc. of Minneapolis, Minnesota, for volatile organic compounds (VOCs), by U.S. Environmental Protection Agency (EPA) Method TO-15. The data were reviewed in accordance with the method and chain-of-custody criteria outlined in the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (July 2007) and Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15

SDG#	10304516
Report Date	15-May-14
Guidance	National Functional Guidelines of Organic (July 2007) Data Review Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15
Client Name	WSP
Project Name	Wix-Dillon, SC
Laboratory	Pace Analytical Services
Method Utilized	TO-15
Analytical Fraction	Volatile Organic Compounds

Date Sampled	Sample ID	Laboratory ID	Parameter	
4/28/2015	SSV-5	10304516002	VOCs	
4/28/2015	SSV-6	10304516003	VOCs	air
4/28/2015	SSV-7	10304516004	VOCs	air
4/28/2015	SSV-17(DUP)	10304516005	VOCs	air
4/28/2015	SSV-8	10304516006	VOCs	air
4/28/2015	SSV-9	10304516007	VOCs	air
4/28/2015	SSV-10	10304516008	VOCs	air
4/28/2015	SSV-11	10304516009	VOCs	air
4/28/2015	SSV-12	10304516010	VOCs	air
4/28/2015	SSV-13	10304516011	VOCs	air
4/28/2015	SSV-14	10304516012	VOCs	air

Volatile Organic Compounds

Eleven vapor samples were analyzed for VOCs by EPA Method TO-15. The samples were reviewed for surrogate recovery, laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recovery, blank contamination, instrument performance, calibration, and calculation criteria.

Reviewed	**Achieved Criteria**	
■	■	Data Completeness
■	■	Holding Times
■		Calibration
■	■	Blanks
■	■	System Monitoring Compounds
■	■	Laboratory Control Sample
■	■	Internal Standards
■	■	Target Compound Identification
■	■	Compound Quantification and Reported Quantitation Limits
■	■	System Performance

Calibration

Several analyses exceeded the criteria for the continuing calibrations on May 4 and 5, 2015. These results were qualified with a ”J”, as estimated, for the samples associated with these calibrations.

	CCAL 5/4/2015 1101 p1251	**CCAL 5/5/2015 0904 p1293**
1,1,2,2-tetrachloroethane		28
acetone	25.4	
chlorobenzene	25	30
isopropylbenzene	27	31
methylcyclohexane		'26
tetrachloroethene		26
ethylbenzene		27
m&p-xylene		30
o-xylene		28
	SSV-12 SSV-10 SSV-8 SSV-14 SSV-14 SSV-13 SSV-9	SSV-7 SSV-7(DUP) SSV-11

Blanks

No analytes were detected in any method blank or the trip blank.

Field duplicate

Sample SSV-17 is a duplicate of SSV-7. There was good agreement between SSV-7 and its duplicate results. It was not necessary to qualify any of the results.

Matrix Spike/Matrix Spike Duplicates

There is no matrix spike/matrix spike duplicate associated with these samples.

Laboratory Control Sample/Laboratory Control Sample Duplicates

The spike recoveries in the LCS/LCSD were within acceptable limits.

Compound Quantification

The samples listed below were diluted as indicated to bring the acetone levels into the instrument calibration range. It was not necessary to further qualify any of the results.

Sample ID	Dilution Factor
SSV-7	20x 20X
SSV-7(DUP)	10x 10X
SSV-10	20x 20X
SSV-14	20x 20X

<u>Overall Assessment of the Data</u>

The data presented are acceptable, as qualified, for characterization of site conditions.

Annotated Form 1's

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-5 **Lab ID: 10304516002** Collected: 04/28/15 17:13 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
Acetone	**45.0**	ug/m3	3.9	1.3	1.61		05/04/15 01:41	67-64-1	
Benzene	**2.2**	ug/m3	0.52	0.20	1.61		05/04/15 01:41	71-43-2	
Benzyl chloride	ND	ug/m3	4.2	0.27	1.61		05/04/15 01:41	100-44-7	
Bromodichloromethane	ND	ug/m3	2.2	0.31	1.61		05/04/15 01:41	75-27-4	
Bromoform	ND	ug/m3	3.4	1.5	1.61		05/04/15 01:41	75-25-2	
Bromomethane	ND	ug/m3	1.3	0.50	1.61		05/04/15 01:41	74-83-9	
2-Butanone (MEK)	**14.6**	ug/m3	0.97	0.37	1.61		05/04/15 01:41	78-93-3	
Carbon disulfide	ND	ug/m3	1.0	0.16	1.61		05/04/15 01:41	75-15-0	
Carbon tetrachloride	ND	ug/m3	1.0	0.31	1.61		05/04/15 01:41	56-23-5	
Chlorobenzene	ND	ug/m3	1.5	0.22	1.61		05/04/15 01:41	108-90-7	
Chloroethane	ND	ug/m3	0.87	0.31	1.61		05/04/15 01:41	75-00-3	
Chloroform	ND	ug/m3	0.80	0.31	1.61		05/04/15 01:41	67-66-3	
Chloromethane	ND	ug/m3	0.68	0.17	1.61		05/04/15 01:41	74-87-3	
Dibromochloromethane	ND	ug/m3	2.8	1.4	1.61		05/04/15 01:41	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.5	1.2	1.61		05/04/15 01:41	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.0	0.82	1.61		05/04/15 01:41	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	4.9	0.85	1.61		05/04/15 01:41	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	4.9	0.80	1.61		05/04/15 01:41	106-46-7	
Dichlorodifluoromethane	**3.7**	ug/m3	1.6	0.77	1.61		05/04/15 01:41	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.3	0.25	1.61		05/04/15 01:41	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.66	0.33	1.61		05/04/15 01:41	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.3	0.38	1.61		05/04/15 01:41	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.3	0.40	1.61		05/04/15 01:41	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.3	0.62	1.61		05/04/15 01:41	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.5	0.43	1.61		05/04/15 01:41	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.5	0.59	1.61		05/04/15 01:41	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.5	0.42	1.61		05/04/15 01:41	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.3	0.50	1.61		05/04/15 01:41	76-14-2	
Ethylbenzene	**3.9**	ug/m3	1.4	0.68	1.61		05/04/15 01:41	100-41-4	
4-Ethyltoluene	**4.7**	ug/m3	4.0	0.30	1.61		05/04/15 01:41	622-96-8	
Hexachloro-1,3-butadiene	ND	ug/m3	8.7	1.0	1.61		05/04/15 01:41	87-68-3	
2-Hexanone	**2.1**	ug/m3	1.3	0.66	1.61		05/04/15 01:41	591-78-6	
Methylene Chloride	ND	ug/m3	5.7	0.87	1.61		05/04/15 01:41	75-09-2	
4-Methyl-2-pentanone (MIBK)	**2.1**	ug/m3	1.3	0.35	1.61		05/04/15 01:41	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.2	0.49	1.61		05/04/15 01:41	1634-04-4	
Styrene	**14.2**	ug/m3	3.5	0.31	1.61		05/04/15 01:41	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.1	0.53	1.61		05/04/15 01:41	79-34-5	
Tetrachloroethene	**2.4**	ug/m3	1.1	0.45	1.61		05/04/15 01:41	127-18-4	
Toluene	**172**	ug/m3	1.2	0.25	1.61		05/04/15 01:41	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	6.1	1.5	1.61		05/04/15 01:41	120-82-1	
1,1,1-Trichloroethane	**108**	ug/m3	1.8	0.40	1.61		05/04/15 01:41	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.89	0.40	1.61		05/04/15 01:41	79-00-5	
Trichloroethene	ND	ug/m3	0.89	0.44	1.61		05/04/15 01:41	79-01-6	
Trichlorofluoromethane	ND	ug/m3	1.8	0.21	1.61		05/04/15 01:41	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.6	0.48	1.61		05/04/15 01:41	76-13-1	
1,2,4-Trimethylbenzene	**11.4**	ug/m3	4.0	0.20	1.61		05/04/15 01:41	95-63-6	

JKJ
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-5 **Lab ID: 10304516002** Collected: 04/28/15 17:13 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
1,3,5-Trimethylbenzene	**4.6**	ug/m3	4.0	0.29	1.61		05/04/15 01:41	108-67-8	
Vinyl acetate	ND	ug/m3	1.2	0.53	1.61		05/04/15 01:41	108-05-4	
Vinyl chloride	ND	ug/m3	0.42	0.31	1.61		05/04/15 01:41	75-01-4	
m&p-Xylene	**14.6**	ug/m3	2.8	1.3	1.61		05/04/15 01:41	179601-23-1	
o-Xylene	**6.0**	ug/m3	1.4	0.57	1.61		05/04/15 01:41	95-47-6	

JKT
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-6 **Lab ID: 10304516003** Collected: 04/28/15 15:34 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
Acetone	**72.1**	ug/m3	3.7	1.3	1.55		05/04/15 02:42	67-64-1	
Benzene	**1.4**	ug/m3	0.50	0.19	1.55		05/04/15 02:42	71-43-2	
Benzyl chloride	ND	ug/m3	4.1	0.26	1.55		05/04/15 02:42	100-44-7	
Bromodichloromethane	ND	ug/m3	2.1	0.30	1.55		05/04/15 02:42	75-27-4	
Bromoform	ND	ug/m3	3.3	1.4	1.55		05/04/15 02:42	75-25-2	
Bromomethane	ND	ug/m3	1.2	0.48	1.55		05/04/15 02:42	74-83-9	
2-Butanone (MEK)	**17.0**	ug/m3	0.93	0.35	1.55		05/04/15 02:42	78-93-3	
Carbon disulfide	**1.1**	ug/m3	0.98	0.16	1.55		05/04/15 02:42	75-15-0	
Carbon tetrachloride	ND	ug/m3	0.99	0.30	1.55		05/04/15 02:42	56-23-5	
Chlorobenzene	ND	ug/m3	1.5	0.21	1.55		05/04/15 02:42	108-90-7	
Chloroethane	ND	ug/m3	0.84	0.30	1.55		05/04/15 02:42	75-00-3	
Chloroform	ND	ug/m3	0.77	0.29	1.55		05/04/15 02:42	67-66-3	
Chloromethane	ND	ug/m3	0.65	0.17	1.55		05/04/15 02:42	74-87-3	
Dibromochloromethane	ND	ug/m3	2.7	1.3	1.55		05/04/15 02:42	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.4	1.2	1.55		05/04/15 02:42	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	1.9	0.79	1.55		05/04/15 02:42	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	4.7	0.82	1.55		05/04/15 02:42	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	4.7	0.77	1.55		05/04/15 02:42	106-46-7	
Dichlorodifluoromethane	**3.4**	ug/m3	1.6	0.74	1.55		05/04/15 02:42	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.3	0.24	1.55		05/04/15 02:42	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.64	0.32	1.55		05/04/15 02:42	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.3	0.37	1.55		05/04/15 02:42	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.3	0.38	1.55		05/04/15 02:42	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.3	0.60	1.55		05/04/15 02:42	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.5	0.42	1.55		05/04/15 02:42	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.4	0.57	1.55		05/04/15 02:42	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.4	0.40	1.55		05/04/15 02:42	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.2	0.48	1.55		05/04/15 02:42	76-14-2	
Ethylbenzene	**3.6**	ug/m3	1.4	0.66	1.55		05/04/15 02:42	100-41-4	
4-Ethyltoluene	**5.9**	ug/m3	3.9	0.29	1.55		05/04/15 02:42	622-96-8	
Hexachloro-1,3-butadiene	ND	ug/m3	8.4	1.0	1.55		05/04/15 02:42	87-68-3	
2-Hexanone	**4.1**	ug/m3	1.3	0.64	1.55		05/04/15 02:42	591-78-6	
Methylene Chloride	ND	ug/m3	5.5	0.84	1.55		05/04/15 02:42	75-09-2	
4-Methyl-2-pentanone (MIBK)	**3.0**	ug/m3	1.3	0.34	1.55		05/04/15 02:42	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.1	0.47	1.55		05/04/15 02:42	1634-04-4	
Styrene	**16.2**	ug/m3	3.4	0.30	1.55		05/04/15 02:42	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.1	0.51	1.55		05/04/15 02:42	79-34-5	
Tetrachloroethene	**1.3**	ug/m3	1.1	0.43	1.55		05/04/15 02:42	127-18-4	
Toluene	**10.5**	ug/m3	1.2	0.24	1.55		05/04/15 02:42	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	5.8	1.4	1.55		05/04/15 02:42	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	1.7	0.38	1.55		05/04/15 02:42	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.85	0.38	1.55		05/04/15 02:42	79-00-5	
Trichloroethene	ND	ug/m3	0.85	0.43	1.55		05/04/15 02:42	79-01-6	
Trichlorofluoromethane	**1.8**	ug/m3	1.8	0.20	1.55		05/04/15 02:42	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.5	0.47	1.55		05/04/15 02:42	76-13-1	
1,2,4-Trimethylbenzene	**11.3**	ug/m3	3.9	0.19	1.55		05/04/15 02:42	95-63-6	

JKT
6/4/15

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-6 **Lab ID: 10304516003** Collected: 04/28/15 15:34 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
1,3,5-Trimethylbenzene	**4.3**	ug/m3	3.9	0.28	1.55		05/04/15 02:42	108-67-8	
Vinyl acetate	**4.6**	ug/m3	1.1	0.51	1.55		05/04/15 02:42	108-05-4	
Vinyl chloride	ND	ug/m3	0.40	0.30	1.55		05/04/15 02:42	75-01-4	
m&p-Xylene	**14.6**	ug/m3	2.7	1.2	1.55		05/04/15 02:42	179601-23-1	
o-Xylene	**6.3**	ug/m3	1.4	0.54	1.55		05/04/15 02:42	95-47-6	

JKT
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-7 **Lab ID: 10304516004** Collected: 04/28/15 19:25 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
Acetone	**1660**	ug/m3	81.1	28.0	33.6		05/05/15 11:43	67-64-1	
Benzene	**6.3**	ug/m3	0.55	0.20	1.68		05/04/15 08:42	71-43-2	
Benzyl chloride	ND	ug/m3	4.4	0.28	1.68		05/04/15 08:42	100-44-7	
Bromodichloromethane	ND	ug/m3	2.3	0.33	1.68		05/04/15 08:42	75-27-4	
Bromoform	ND	ug/m3	3.5	1.5	1.68		05/04/15 08:42	75-25-2	
Bromomethane	**2.5**	ug/m3	1.3	0.52	1.68		05/04/15 08:42	74-83-9	
2-Butanone (MEK)	**48.1**	ug/m3	1.0	0.38	1.68		05/04/15 08:42	78-93-3	
Carbon disulfide	**1.8**	ug/m3	1.1	0.17	1.68		05/04/15 08:42	75-15-0	
Carbon tetrachloride	ND	ug/m3	1.1	0.32	1.68		05/04/15 08:42	56-23-5	
Chlorobenzene	ND J	ug/m3	1.6	0.23	1.68		05/04/15 08:42	108-90-7	
Chloroethane	ND	ug/m3	0.91	0.33	1.68		05/04/15 08:42	75-00-3	
Chloroform	ND	ug/m3	0.83	0.32	1.68		05/04/15 08:42	67-66-3	
Chloromethane	**7.2**	ug/m3	0.71	0.18	1.68		05/04/15 08:42	74-87-3	
Dibromochloromethane	ND	ug/m3	2.9	1.4	1.68		05/04/15 08:42	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.6	1.3	1.68		05/04/15 08:42	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.0	0.86	1.68		05/04/15 08:42	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	5.1	0.89	1.68		05/04/15 08:42	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.1	0.84	1.68		05/04/15 08:42	106-46-7	
Dichlorodifluoromethane	ND	ug/m3	1.7	0.81	1.68		05/04/15 08:42	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.4	0.26	1.68		05/04/15 08:42	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.69	0.34	1.68		05/04/15 08:42	107-06-2	
1,1-Dichloroethene	**5.4**	ug/m3	1.4	0.40	1.68		05/04/15 08:42	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.4	0.41	1.68		05/04/15 08:42	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.4	0.65	1.68		05/04/15 08:42	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.6	0.45	1.68		05/04/15 08:42	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.5	0.62	1.68		05/04/15 08:42	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.5	0.44	1.68		05/04/15 08:42	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.4	0.52	1.68		05/04/15 08:42	76-14-2	
Ethylbenzene	**7.5** J	ug/m3	1.5	0.71	1.68		05/04/15 08:42	100-41-4	
4-Ethyltoluene	**6.0**	ug/m3	4.2	0.32	1.68		05/04/15 08:42	622-96-8	
Hexachloro-1,3-butadiene	ND	ug/m3	9.1	1.1	1.68		05/04/15 08:42	87-68-3	
2-Hexanone	**8.8**	ug/m3	1.4	0.69	1.68		05/04/15 08:42	591-78-6	
Methylene Chloride	ND	ug/m3	5.9	0.91	1.68		05/04/15 08:42	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	1.4	0.36	1.68		05/04/15 08:42	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.2	0.51	1.68		05/04/15 08:42	1634-04-4	
Styrene	**13.9**	ug/m3	3.6	0.32	1.68		05/04/15 08:42	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.2	0.55	1.68		05/04/15 08:42	79-34-5	
Tetrachloroethene	**773** J	ug/m3	1.2	0.47	1.68		05/04/15 08:42	127-18-4	
Toluene	**191**	ug/m3	1.3	0.26	1.68		05/04/15 08:42	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	6.3	1.5	1.68		05/04/15 08:42	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	1.9	0.41	1.68		05/04/15 08:42	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.92	0.41	1.68		05/04/15 08:42	79-00-5	
Trichloroethene	**2.7**	ug/m3	0.92	0.46	1.68		05/04/15 08:42	79-01-6	
Trichlorofluoromethane	ND	ug/m3	1.9	0.22	1.68		05/04/15 08:42	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.7	0.51	1.68		05/04/15 08:42	76-13-1	
1,2,4-Trimethylbenzene	**11.2**	ug/m3	4.2	0.21	1.68		05/04/15 08:42	95-63-6	

JKS
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-7 **Lab ID: 10304516004** Collected: 04/28/15 19:25 Received: 04/30/15 09:30 Matrix: Air

TO15 MSV AIR Analytical Method: TO-15

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1,3,5-Trimethylbenzene	**5.0**	ug/m3	4.2	0.31	1.68		05/04/15 08:42	108-67-8	
Vinyl acetate	ND	ug/m3	1.2	0.55	1.68		05/04/15 08:42	108-05-4	
Vinyl chloride	ND	ug/m3	0.44	0.33	1.68		05/04/15 08:42	75-01-4	
m&p-Xylene	**29.4** J	ug/m3	3.0	1.3	1.68		05/04/15 08:42	179601-23-1	
o-Xylene	**9.4** J	ug/m3	1.5	0.59	1.68		05/04/15 08:42	95-47-6	

JKT
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-17 (DUP) **Lab ID: 10304516005** Collected: 04/28/15 19:25 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
Acetone	**2690**	ug/m3	40.6	14.0	16.8		05/05/15 12:09	67-64-1	E,IS
Benzene	**4.4**	ug/m3	0.55	0.20	1.68		05/04/15 09:11	71-43-2	
Benzyl chloride	ND	ug/m3	4.4	0.28	1.68		05/04/15 09:11	100-44-7	
Bromodichloromethane	ND	ug/m3	2.3	0.33	1.68		05/04/15 09:11	75-27-4	
Bromoform	ND	ug/m3	3.5	1.5	1.68		05/04/15 09:11	75-25-2	
Bromomethane	**1.4**	ug/m3	1.3	0.52	1.68		05/04/15 09:11	74-83-9	
2-Butanone (MEK)	**36.6**	ug/m3	1.0	0.38	1.68		05/04/15 09:11	78-93-3	
Carbon disulfide	ND	ug/m3	1.1	0.17	1.68		05/04/15 09:11	75-15-0	
Carbon tetrachloride	ND	ug/m3	1.1	0.32	1.68		05/04/15 09:11	56-23-5	
Chlorobenzene	ND J	ug/m3	1.6	0.23	1.68		05/04/15 09:11	108-90-7	
Chloroethane	ND	ug/m3	0.91	0.33	1.68		05/04/15 09:11	75-00-3	
Chloroform	ND	ug/m3	0.83	0.32	1.68		05/04/15 09:11	67-66-3	
Chloromethane	**5.2**	ug/m3	0.71	0.18	1.68		05/04/15 09:11	74-87-3	
Dibromochloromethane	ND	ug/m3	2.9	1.4	1.68		05/04/15 09:11	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.6	1.3	1.68		05/04/15 09:11	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.0	0.86	1.68		05/04/15 09:11	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	5.1	0.89	1.68		05/04/15 09:11	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.1	0.84	1.68		05/04/15 09:11	106-46-7	
Dichlorodifluoromethane	ND	ug/m3	1.7	0.81	1.68		05/04/15 09:11	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.4	0.26	1.68		05/04/15 09:11	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.69	0.34	1.68		05/04/15 09:11	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.4	0.40	1.68		05/04/15 09:11	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.4	0.41	1.68		05/04/15 09:11	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.4	0.65	1.68		05/04/15 09:11	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.6	0.45	1.68		05/04/15 09:11	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.5	0.62	1.68		05/04/15 09:11	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.5	0.44	1.68		05/04/15 09:11	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.4	0.52	1.68		05/04/15 09:11	76-14-2	
Ethylbenzene	**6.7** J	ug/m3	1.5	0.71	1.68		05/04/15 09:11	100-41-4	
4-Ethyltoluene	**4.5**	ug/m3	4.2	0.32	1.68		05/04/15 09:11	622-96-8	
Hexachloro-1,3-butadiene	ND	ug/m3	9.1	1.1	1.68		05/04/15 09:11	87-68-3	
2-Hexanone	**5.6**	ug/m3	1.4	0.69	1.68		05/04/15 09:11	591-78-6	
Methylene Chloride	ND	ug/m3	5.9	0.91	1.68		05/04/15 09:11	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	1.4	0.36	1.68		05/04/15 09:11	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.2	0.51	1.68		05/04/15 09:11	1634-04-4	
Styrene	**10.8**	ug/m3	3.6	0.32	1.68		05/04/15 09:11	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.2	0.55	1.68		05/04/15 09:11	79-34-5	
Tetrachloroethene	**54.5** J	ug/m3	1.2	0.47	1.68		05/04/15 09:11	127-18-4	
Toluene	**24.9**	ug/m3	1.3	0.26	1.68		05/04/15 09:11	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	6.3	1.5	1.68		05/04/15 09:11	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	1.9	0.41	1.68		05/04/15 09:11	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.92	0.41	1.68		05/04/15 09:11	79-00-5	
Trichloroethene	**1.8**	ug/m3	0.92	0.46	1.68		05/04/15 09:11	79-01-6	
Trichlorofluoromethane	ND	ug/m3	1.9	0.22	1.68		05/04/15 09:11	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.7	0.51	1.68		05/04/15 09:11	76-13-1	
1,2,4-Trimethylbenzene	**7.7**	ug/m3	4.2	0.21	1.68		05/04/15 09:11	95-63-6	

TK
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-17 (DUP) **Lab ID: 10304516005** Collected: 04/28/15 19:25 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
1,3,5-Trimethylbenzene	ND	ug/m3	4.2	0.31	1.68		05/04/15 09:11	108-67-8	
Vinyl acetate	ND	ug/m3	1.2	0.55	1.68		05/04/15 09:11	108-05-4	
Vinyl chloride	ND	ug/m3	0.44	0.33	1.68		05/04/15 09:11	75-01-4	
m&p-Xylene	**27.9** J	ug/m3	3.0	1.3	1.68		05/04/15 09:11	179601-23-1	
o-Xylene	**10.5** J	ug/m3	1.5	0.59	1.68		05/04/15 09:11	95-47-6	

JKJ
6/11/15

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-8 **Lab ID: 10304516006** Collected: 04/28/15 16:17 Received: 04/30/15 09:30 Matrix: Air

TO15 MSV AIR Analytical Method: TO-15

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Acetone	**102** J	ug/m3	3.7	1.3	1.55		05/04/15 17:38	67-64-1	
Benzene	**1.3**	ug/m3	0.50	0.19	1.55		05/04/15 17:38	71-43-2	
Benzyl chloride	ND	ug/m3	4.1	0.26	1.55		05/04/15 17:38	100-44-7	
Bromodichloromethane	ND	ug/m3	2.1	0.30	1.55		05/04/15 17:38	75-27-4	
Bromoform	ND	ug/m3	3.3	1.4	1.55		05/04/15 17:38	75-25-2	
Bromomethane	ND	ug/m3	1.2	0.48	1.55		05/04/15 17:38	74-83-9	
2-Butanone (MEK)	**46.6**	ug/m3	0.93	0.35	1.55		05/04/15 17:38	78-93-3	
Carbon disulfide	**1.1**	ug/m3	0.98	0.16	1.55		05/04/15 17:38	75-15-0	
Carbon tetrachloride	ND	ug/m3	0.99	0.30	1.55		05/04/15 17:38	56-23-5	
Chlorobenzene	ND J	ug/m3	1.5	0.21	1.55		05/04/15 17:38	108-90-7	
Chloroethane	ND	ug/m3	0.84	0.30	1.55		05/04/15 17:38	75-00-3	
Chloroform	ND	ug/m3	0.77	0.29	1.55		05/04/15 17:38	67-66-3	
Chloromethane	**0.94**	ug/m3	0.65	0.17	1.55		05/04/15 17:38	74-87-3	
Dibromochloromethane	ND	ug/m3	2.7	1.3	1.55		05/04/15 17:38	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.4	1.2	1.55		05/04/15 17:38	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	1.9	0.79	1.55		05/04/15 17:38	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	4.7	0.82	1.55		05/04/15 17:38	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	4.7	0.77	1.55		05/04/15 17:38	106-46-7	
Dichlorodifluoromethane	**50.9**	ug/m3	1.6	0.74	1.55		05/04/15 17:38	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.3	0.24	1.55		05/04/15 17:38	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.64	0.32	1.55		05/04/15 17:38	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.3	0.37	1.55		05/04/15 17:38	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.3	0.38	1.55		05/04/15 17:38	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.3	0.60	1.55		05/04/15 17:38	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.5	0.42	1.55		05/04/15 17:38	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.4	0.57	1.55		05/04/15 17:38	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.4	0.40	1.55		05/04/15 17:38	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.2	0.48	1.55		05/04/15 17:38	76-14-2	
Ethylbenzene	**5.8**	ug/m3	1.4	0.66	1.55		05/04/15 17:38	100-41-4	
4-Ethyltoluene	**5.9**	ug/m3	3.9	0.29	1.55		05/04/15 17:38	622-96-8	
Hexachloro-1,3-butadiene	ND	ug/m3	8.4	1.0	1.55		05/04/15 17:38	87-68-3	
2-Hexanone	**4.4**	ug/m3	1.3	0.64	1.55		05/04/15 17:38	591-78-6	
Methylene Chloride	**23.8**	ug/m3	5.5	0.84	1.55		05/04/15 17:38	75-09-2	
4-Methyl-2-pentanone (MIBK)	**5.2**	ug/m3	1.3	0.34	1.55		05/04/15 17:38	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.1	0.47	1.55		05/04/15 17:38	1634-04-4	
Styrene	**20.5**	ug/m3	3.4	0.30	1.55		05/04/15 17:38	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.1	0.51	1.55		05/04/15 17:38	79-34-5	
Tetrachloroethene	**31.4**	ug/m3	1.1	0.43	1.55		05/06/15 16:55	127-18-4	
Toluene	**150**	ug/m3	1.2	0.24	1.55		05/04/15 17:38	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	5.8	1.4	1.55		05/04/15 17:38	120-82-1	
1,1,1-Trichloroethane	**4.0**	ug/m3	1.7	0.38	1.55		05/04/15 17:38	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.85	0.38	1.55		05/04/15 17:38	79-00-5	
Trichloroethene	**0.87**	ug/m3	0.85	0.43	1.55		05/04/15 17:38	79-01-6	
Trichlorofluoromethane	**2.2**	ug/m3	1.8	0.20	1.55		05/04/15 17:38	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.5	0.47	1.55		05/04/15 17:38	76-13-1	
1,2,4-Trimethylbenzene	**13.3**	ug/m3	3.9	0.19	1.55		05/04/15 17:38	95-63-6	

JKT
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-8 **Lab ID: 10304516006** Collected: 04/28/15 16:17 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
1,3,5-Trimethylbenzene	**5.0**	ug/m3	3.9	0.28	1.55		05/04/15 17:38	108-67-8	
Vinyl acetate	ND	ug/m3	1.1	0.51	1.55		05/04/15 17:38	108-05-4	
Vinyl chloride	ND	ug/m3	0.40	0.30	1.55		05/04/15 17:38	75-01-4	
m&p-Xylene	**21.0**	ug/m3	2.7	1.2	1.55		05/04/15 17:38	179601-23-1	
o-Xylene	**8.7**	ug/m3	1.4	0.54	1.55		05/04/15 17:38	95-47-6	

JKT
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-9 **Lab ID: 10304516007** Collected: 04/28/15 18:48 Received: 04/30/15 09:30 Matrix: Air

TO15 MSV AIR Analytical Method: TO-15

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Acetone	**226** J	ug/m3	3.9	1.3	1.61		05/04/15 20:11	67-64-1	E
Benzene	**1.2**	ug/m3	0.52	0.20	1.61		05/04/15 20:11	71-43-2	
Benzyl chloride	ND	ug/m3	4.2	0.27	1.61		05/04/15 20:11	100-44-7	
Bromodichloromethane	ND	ug/m3	2.2	0.31	1.61		05/04/15 20:11	75-27-4	
Bromoform	ND	ug/m3	3.4	1.5	1.61		05/04/15 20:11	75-25-2	
Bromomethane	ND	ug/m3	1.3	0.50	1.61		05/04/15 20:11	74-83-9	
2-Butanone (MEK)	**127**	ug/m3	0.97	0.37	1.61		05/04/15 20:11	78-93-3	
Carbon disulfide	ND	ug/m3	1.0	0.16	1.61		05/04/15 20:11	75-15-0	
Carbon tetrachloride	ND	ug/m3	1.0	0.31	1.61		05/04/15 20:11	56-23-5	
Chlorobenzene	ND J	ug/m3	1.5	0.22	1.61		05/04/15 20:11	108-90-7	
Chloroethane	ND	ug/m3	0.87	0.31	1.61		05/04/15 20:11	75-00-3	
Chloroform	ND	ug/m3	0.80	0.31	1.61		05/04/15 20:11	67-66-3	
Chloromethane	ND	ug/m3	0.68	0.17	1.61		05/04/15 20:11	74-87-3	
Dibromochloromethane	ND	ug/m3	2.8	1.4	1.61		05/04/15 20:11	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.5	1.2	1.61		05/04/15 20:11	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.0	0.82	1.61		05/04/15 20:11	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	4.9	0.85	1.61		05/04/15 20:11	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	4.9	0.80	1.61		05/04/15 20:11	106-46-7	
Dichlorodifluoromethane	**3.9**	ug/m3	1.6	0.77	1.61		05/04/15 20:11	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.3	0.25	1.61		05/04/15 20:11	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.66	0.33	1.61		05/04/15 20:11	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.3	0.38	1.61		05/04/15 20:11	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.3	0.40	1.61		05/04/15 20:11	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.3	0.62	1.61		05/04/15 20:11	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.5	0.43	1.61		05/04/15 20:11	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.5	0.59	1.61		05/04/15 20:11	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.5	0.42	1.61		05/04/15 20:11	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.3	0.50	1.61		05/04/15 20:11	76-14-2	
Ethylbenzene	**6.3**	ug/m3	1.4	0.68	1.61		05/04/15 20:11	100-41-4	
4-Ethyltoluene	**7.0**	ug/m3	4.0	0.30	1.61		05/04/15 20:11	622-96-8	
Hexachloro-1,3-butadiene	ND	ug/m3	8.7	1.0	1.61		05/04/15 20:11	87-68-3	
2-Hexanone	**4.1**	ug/m3	1.3	0.66	1.61		05/04/15 20:11	591-78-6	
Methylene Chloride	**7.8**	ug/m3	5.7	0.87	1.61		05/04/15 20:11	75-09-2	
4-Methyl-2-pentanone (MIBK)	**7.4**	ug/m3	1.3	0.35	1.61		05/04/15 20:11	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.2	0.49	1.61		05/04/15 20:11	1634-04-4	
Styrene	**18.2**	ug/m3	3.5	0.31	1.61		05/04/15 20:11	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.1	0.53	1.61		05/04/15 20:11	79-34-5	
Tetrachloroethene	ND	ug/m3	1.1	0.45	1.61		05/04/15 20:11	127-18-4	
Toluene	**80.0**	ug/m3	1.2	0.25	1.61		05/04/15 20:11	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	6.1	1.5	1.61		05/04/15 20:11	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	1.8	0.40	1.61		05/04/15 20:11	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.89	0.40	1.61		05/04/15 20:11	79-00-5	
Trichloroethene	ND	ug/m3	0.89	0.44	1.61		05/04/15 20:11	79-01-6	
Trichlorofluoromethane	**1.9**	ug/m3	1.8	0.21	1.61		05/04/15 20:11	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.6	0.48	1.61		05/04/15 20:11	76-13-1	
1,2,4-Trimethylbenzene	**12.4**	ug/m3	4.0	0.20	1.61		05/04/15 20:11	95-63-6	

JKJ
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-9 **Lab ID: 10304516007** Collected: 04/28/15 18:48 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
1,3,5-Trimethylbenzene	**6.1**	ug/m3	4.0	0.29	1.61		05/04/15 20:11	108-67-8	
Vinyl acetate	ND	ug/m3	1.2	0.53	1.61		05/04/15 20:11	108-05-4	
Vinyl chloride	ND	ug/m3	0.42	0.31	1.61		05/04/15 20:11	75-01-4	
m&p-Xylene	**22.4**	ug/m3	2.8	1.3	1.61		05/04/15 20:11	179601-23-1	
o-Xylene	**9.3**	ug/m3	1.4	0.57	1.61		05/04/15 20:11	95-47-6	

JKT
6/4/15

Pace Analytical
www.pacelabs.com

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-10 **Lab ID: 10304516008** Collected: 04/28/15 20:03 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
Acetone	**329** J	ug/m3	71.0	24.5	29.4		05/06/15 18:20	67-64-1	
Benzene	**1.5**	ug/m3	0.48	0.18	1.49		05/04/15 17:07	71-43-2	
Benzyl chloride	ND	ug/m3	3.9	0.25	1.49		05/04/15 17:07	100-44-7	
Bromodichloromethane	ND	ug/m3	2.0	0.29	1.49		05/04/15 17:07	75-27-4	
Bromoform	ND	ug/m3	3.1	1.3	1.49		05/04/15 17:07	75-25-2	
Bromomethane	ND	ug/m3	1.2	0.46	1.49		05/04/15 17:07	74-83-9	
2-Butanone (MEK)	**82.5**	ug/m3	0.89	0.34	1.49		05/04/15 17:07	78-93-3	
Carbon disulfide	ND	ug/m3	0.94	0.15	1.49		05/04/15 17:07	75-15-0	
Carbon tetrachloride	ND	ug/m3	0.95	0.29	1.49		05/04/15 17:07	56-23-5	
Chlorobenzene	ND J	ug/m3	1.4	0.20	1.49		05/04/15 17:07	108-90-7	
Chloroethane	ND	ug/m3	0.80	0.29	1.49		05/04/15 17:07	75-00-3	
Chloroform	**0.97**	ug/m3	0.74	0.28	1.49		05/04/15 17:07	67-66-3	
Chloromethane	**1.4**	ug/m3	0.63	0.16	1.49		05/04/15 17:07	74-87-3	
Dibromochloromethane	ND	ug/m3	2.6	1.3	1.49		05/04/15 17:07	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.3	1.2	1.49		05/04/15 17:07	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	1.8	0.76	1.49		05/04/15 17:07	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	4.6	0.79	1.49		05/04/15 17:07	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	4.6	0.74	1.49		05/04/15 17:07	106-46-7	
Dichlorodifluoromethane	**3.1**	ug/m3	1.5	0.72	1.49		05/04/15 17:07	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.2	0.23	1.49		05/04/15 17:07	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.61	0.31	1.49		05/04/15 17:07	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.2	0.35	1.49		05/04/15 17:07	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.2	0.37	1.49		05/04/15 17:07	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.2	0.57	1.49		05/04/15 17:07	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.4	0.40	1.49		05/04/15 17:07	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.4	0.55	1.49		05/04/15 17:07	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.4	0.39	1.49		05/04/15 17:07	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.1	0.46	1.49		05/04/15 17:07	76-14-2	
Ethylbenzene	**6.2**	ug/m3	1.3	0.63	1.49		05/04/15 17:07	100-41-4	
4-Ethyltoluene	**5.5**	ug/m3	3.7	0.28	1.49		05/04/15 17:07	622-96-8	
Hexachloro-1,3-butadiene	ND	ug/m3	8.1	0.97	1.49		05/04/15 17:07	87-68-3	
2-Hexanone	**16.0**	ug/m3	1.2	0.61	1.49		05/04/15 17:07	591-78-6	
Methylene Chloride	**6.3**	ug/m3	5.3	0.81	1.49		05/04/15 17:07	75-09-2	
4-Methyl-2-pentanone (MIBK)	**20.5**	ug/m3	1.2	0.32	1.49		05/04/15 17:07	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.1	0.45	1.49		05/04/15 17:07	1634-04-4	
Styrene	**19.0**	ug/m3	3.2	0.29	1.49		05/04/15 17:07	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.0	0.49	1.49		05/04/15 17:07	79-34-5	
Tetrachloroethene	**765**	ug/m3	20.3	8.2	29.4		05/06/15 18:20	127-18-4	
Toluene	**16.1**	ug/m3	1.1	0.23	1.49		05/04/15 17:07	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	5.6	1.4	1.49		05/04/15 17:07	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	1.7	0.37	1.49		05/04/15 17:07	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.82	0.37	1.49		05/04/15 17:07	79-00-5	
Trichloroethene	ND	ug/m3	0.82	0.41	1.49		05/04/15 17:07	79-01-6	
Trichlorofluoromethane	**4.6**	ug/m3	1.7	0.20	1.49		05/04/15 17:07	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.4	0.45	1.49		05/04/15 17:07	76-13-1	
1,2,4-Trimethylbenzene	**11.7**	ug/m3	3.7	0.19	1.49		05/04/15 17:07	95-63-6	

TKT
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-10 **Lab ID: 10304516008** Collected: 04/28/15 20:03 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
1,3,5-Trimethylbenzene	**4.6**	ug/m3	3.7	0.27	1.49		05/04/15 17:07	108-67-8	
Vinyl acetate	ND	ug/m3	1.1	0.49	1.49		05/04/15 17:07	108-05-4	
Vinyl chloride	ND	ug/m3	0.39	0.29	1.49		05/04/15 17:07	75-01-4	
m&p-Xylene	**23.1**	ug/m3	2.6	1.2	1.49		05/04/15 17:07	179601-23-1	
o-Xylene	**8.8**	ug/m3	1.3	0.52	1.49		05/04/15 17:07	95-47-6	

JKT
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-11 **Lab ID: 10304516009** Collected: 04/28/15 18:07 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
Acetone	**307**	ug/m3	7.8	2.7	3.22		05/05/15 22:58	67-64-1	E
Benzene	**2.1**	ug/m3	1.0	0.39	3.22		05/05/15 22:58	71-43-2	
Benzyl chloride	ND	ug/m3	8.5	0.53	3.22		05/05/15 22:58	100-44-7	
Bromodichloromethane	ND	ug/m3	4.4	0.62	3.22		05/05/15 22:58	75-27-4	
Bromoform	ND	ug/m3	6.8	2.9	3.22		05/05/15 22:58	75-25-2	
Bromomethane	ND	ug/m3	2.5	1.0	3.22		05/05/15 22:58	74-83-9	
2-Butanone (MEK)	**89.2**	ug/m3	1.9	0.73	3.22		05/05/15 22:58	78-93-3	
Carbon disulfide	ND	ug/m3	2.0	0.33	3.22		05/05/15 22:58	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.1	0.62	3.22		05/05/15 22:58	56-23-5	
Chlorobenzene	ND J	ug/m3	3.0	0.43	3.22		05/05/15 22:58	108-90-7	
Chloroethane	ND	ug/m3	1.7	0.62	3.22		05/05/15 22:58	75-00-3	
Chloroform	ND	ug/m3	1.6	0.61	3.22		05/05/15 22:58	67-66-3	
Chloromethane	ND	ug/m3	1.4	0.35	3.22		05/05/15 22:58	74-87-3	
Dibromochloromethane	ND	ug/m3	5.6	2.8	3.22		05/05/15 22:58	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	5.0	2.5	3.22		05/05/15 22:58	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	3.9	1.6	3.22		05/05/15 22:58	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	9.8	1.7	3.22		05/05/15 22:58	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	9.8	1.6	3.22		05/05/15 22:58	106-46-7	
Dichlorodifluoromethane	**3.4**	ug/m3	3.3	1.5	3.22		05/05/15 22:58	75-71-8	
1,1-Dichloroethane	ND	ug/m3	2.6	0.51	3.22		05/05/15 22:58	75-34-3	
1,2-Dichloroethane	ND	ug/m3	1.3	0.66	3.22		05/05/15 22:58	107-06-2	
1,1-Dichloroethene	ND	ug/m3	2.6	0.77	3.22		05/05/15 22:58	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	2.6	0.79	3.22		05/05/15 22:58	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	2.6	1.2	3.22		05/05/15 22:58	156-60-5	
1,2-Dichloropropane	ND	ug/m3	3.0	0.87	3.22		05/05/15 22:58	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	3.0	1.2	3.22		05/05/15 22:58	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	3.0	0.84	3.22		05/05/15 22:58	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	4.6	1.0	3.22		05/05/15 22:58	76-14-2	
Ethylbenzene	**5.8** J	ug/m3	2.8	1.4	3.22		05/05/15 22:58	100-41-4	
4-Ethyltoluene	**15.3**	ug/m3	8.0	0.61	3.22		05/05/15 22:58	622-96-8	
Hexachloro-1,3-butadiene	ND	ug/m3	17.5	2.1	3.22		05/05/15 22:58	87-68-3	
2-Hexanone	**6.9**	ug/m3	2.7	1.3	3.22		05/05/15 22:58	591-78-6	
Methylene Chloride	ND	ug/m3	11.4	1.7	3.22		05/05/15 22:58	75-09-2	
4-Methyl-2-pentanone (MIBK)	**9.4**	ug/m3	2.7	0.70	3.22		05/05/15 22:58	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	2.4	0.98	3.22		05/05/15 22:58	1634-04-4	
Styrene	**17.7**	ug/m3	7.0	0.62	3.22		05/05/15 22:58	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	2.2	1.1	3.22		05/05/15 22:58	79-34-5	
Tetrachloroethene	ND J	ug/m3	2.2	0.90	3.22		05/05/15 22:58	127-18-4	
Toluene	**23.6**	ug/m3	2.5	0.50	3.22		05/05/15 22:58	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	12.1	2.9	3.22		05/05/15 22:58	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	3.6	0.80	3.22		05/05/15 22:58	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	1.8	0.79	3.22		05/05/15 22:58	79-00-5	
Trichloroethene	ND	ug/m3	1.8	0.89	3.22		05/05/15 22:58	79-01-6	
Trichlorofluoromethane	ND	ug/m3	3.7	0.43	3.22		05/05/15 22:58	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	5.2	0.97	3.22		05/05/15 22:58	76-13-1	
1,2,4-Trimethylbenzene	**22.8**	ug/m3	8.0	0.40	3.22		05/05/15 22:58	95-63-6	

JKT
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-11 **Lab ID: 10304516009** Collected: 04/28/15 18:07 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
1,3,5-Trimethylbenzene	**13.2**	ug/m3	8.0	0.59	3.22		05/05/15 22:58	108-67-8	
Vinyl acetate	ND	ug/m3	2.3	1.1	3.22		05/05/15 22:58	108-05-4	
Vinyl chloride	ND	ug/m3	0.84	0.63	3.22		05/05/15 22:58	75-01-4	
m&p-Xylene	**21.9** J	ug/m3	5.7	2.5	3.22		05/05/15 22:58	179601-23-1	
o-Xylene	**9.6** J	ug/m3	2.8	1.1	3.22		05/05/15 22:58	95-47-6	

TKT
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-12 **Lab ID: 10304516010** Collected: 04/28/15 19:11 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
Acetone	**176** J	ug/m3	3.9	1.3	1.61		05/04/15 16:37	67-64-1	E
Benzene	**2.1**	ug/m3	0.52	0.20	1.61		05/05/15 14:24	71-43-2	
Benzyl chloride	ND	ug/m3	4.2	0.27	1.61		05/04/15 16:37	100-44-7	
Bromodichloromethane	ND	ug/m3	2.2	0.31	1.61		05/04/15 16:37	75-27-4	
Bromoform	ND	ug/m3	3.4	1.5	1.61		05/04/15 16:37	75-25-2	
Bromomethane	ND	ug/m3	1.3	0.50	1.61		05/04/15 16:37	74-83-9	
2-Butanone (MEK)	**34.0**	ug/m3	0.97	0.37	1.61		05/04/15 16:37	78-93-3	
Carbon disulfide	ND	ug/m3	1.0	0.16	1.61		05/04/15 16:37	75-15-0	
Carbon tetrachloride	ND	ug/m3	1.0	0.31	1.61		05/04/15 16:37	56-23-5	
Chlorobenzene	ND J	ug/m3	1.5	0.22	1.61		05/04/15 16:37	108-90-7	
Chloroethane	ND	ug/m3	0.87	0.31	1.61		05/04/15 16:37	75-00-3	
Chloroform	ND	ug/m3	0.80	0.31	1.61		05/04/15 16:37	67-66-3	
Chloromethane	**0.79**	ug/m3	0.68	0.17	1.61		05/04/15 16:37	74-87-3	
Dibromochloromethane	ND	ug/m3	2.8	1.4	1.61		05/04/15 16:37	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.5	1.2	1.61		05/04/15 16:37	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.0	0.82	1.61		05/04/15 16:37	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	4.9	0.85	1.61		05/04/15 16:37	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	4.9	0.80	1.61		05/04/15 16:37	106-46-7	
Dichlorodifluoromethane	**1.9**	ug/m3	1.6	0.77	1.61		05/04/15 16:37	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.3	0.25	1.61		05/04/15 16:37	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.66	0.33	1.61		05/04/15 16:37	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.3	0.38	1.61		05/04/15 16:37	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.3	0.40	1.61		05/04/15 16:37	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.3	0.62	1.61		05/04/15 16:37	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.5	0.43	1.61		05/04/15 16:37	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.5	0.59	1.61		05/04/15 16:37	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.5	0.42	1.61		05/04/15 16:37	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.3	0.50	1.61		05/04/15 16:37	76-14-2	
Ethylbenzene	**32.7**	ug/m3	1.4	0.68	1.61		05/04/15 16:37	100-41-4	
4-Ethyltoluene	**12.2**	ug/m3	4.0	0.30	1.61		05/04/15 16:37	622-96-8	
Hexachloro-1,3-butadiene	ND	ug/m3	8.7	1.0	1.61		05/04/15 16:37	87-68-3	
2-Hexanone	**11.3**	ug/m3	1.3	0.66	1.61		05/04/15 16:37	591-78-6	
Methylene Chloride	**6.1**	ug/m3	5.7	0.87	1.61		05/04/15 16:37	75-09-2	
4-Methyl-2-pentanone (MIBK)	**9.3**	ug/m3	1.3	0.35	1.61		05/04/15 16:37	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.2	0.49	1.61		05/04/15 16:37	1634-04-4	
Styrene	**19.8**	ug/m3	3.5	0.31	1.61		05/04/15 16:37	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.1	0.53	1.61		05/04/15 16:37	79-34-5	
Tetrachloroethene	**88.2**	ug/m3	1.1	0.45	1.61		05/04/15 16:37	127-18-4	
Toluene	**15.2**	ug/m3	1.2	0.25	1.61		05/04/15 16:37	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	6.1	1.5	1.61		05/04/15 16:37	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	1.8	0.40	1.61		05/04/15 16:37	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.89	0.40	1.61		05/04/15 16:37	79-00-5	
Trichloroethene	**4.2**	ug/m3	0.89	0.44	1.61		05/04/15 16:37	79-01-6	
Trichlorofluoromethane	ND	ug/m3	1.8	0.21	1.61		05/04/15 16:37	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.6	0.48	1.61		05/04/15 16:37	76-13-1	
1,2,4-Trimethylbenzene	**35.5**	ug/m3	4.0	0.20	1.61		05/04/15 16:37	95-63-6	

JKS
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-12 **Lab ID: 10304516010** Collected: 04/28/15 19:11 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
1,3,5-Trimethylbenzene	**13.4**	ug/m3	4.0	0.29	1.61		05/04/15 16:37	108-67-8	
Vinyl acetate	ND	ug/m3	1.2	0.53	1.61		05/04/15 16:37	108-05-4	
Vinyl chloride	ND	ug/m3	0.42	0.31	1.61		05/04/15 16:37	75-01-4	
m&p-Xylene	**97.0**	ug/m3	2.8	1.3	1.61		05/04/15 16:37	179601-23-1	
o-Xylene	**17.7**	ug/m3	1.4	0.57	1.61		05/04/15 16:37	95-47-6	

JKS
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-13 **Lab ID: 10304516011** Collected: 04/28/15 20:13 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
Acetone	**276** J	ug/m3	3.7	1.3	1.55		05/04/15 19:41	67-64-1	E
Benzene	**0.64**	ug/m3	0.50	0.19	1.55		05/04/15 19:41	71-43-2	
Benzyl chloride	ND	ug/m3	4.1	0.26	1.55		05/04/15 19:41	100-44-7	
Bromodichloromethane	ND	ug/m3	2.1	0.30	1.55		05/04/15 19:41	75-27-4	
Bromoform	ND	ug/m3	3.3	1.4	1.55		05/04/15 19:41	75-25-2	
Bromomethane	ND	ug/m3	1.2	0.48	1.55		05/04/15 19:41	74-83-9	
2-Butanone (MEK)	**42.6**	ug/m3	0.93	0.35	1.55		05/04/15 19:41	78-93-3	
Carbon disulfide	**1.7**	ug/m3	0.98	0.16	1.55		05/04/15 19:41	75-15-0	
Carbon tetrachloride	ND	ug/m3	0.99	0.30	1.55		05/04/15 19:41	56-23-5	
Chlorobenzene	ND J	ug/m3	1.5	0.21	1.55		05/04/15 19:41	108-90-7	
Chloroethane	ND	ug/m3	0.84	0.30	1.55		05/04/15 19:41	75-00-3	
Chloroform	ND	ug/m3	0.77	0.29	1.55		05/04/15 19:41	67-66-3	
Chloromethane	ND	ug/m3	0.65	0.17	1.55		05/04/15 19:41	74-87-3	
Dibromochloromethane	ND	ug/m3	2.7	1.3	1.55		05/04/15 19:41	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.4	1.2	1.55		05/04/15 19:41	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	1.9	0.79	1.55		05/04/15 19:41	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	4.7	0.82	1.55		05/04/15 19:41	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	4.7	0.77	1.55		05/04/15 19:41	106-46-7	
Dichlorodifluoromethane	**3.2**	ug/m3	1.6	0.74	1.55		05/04/15 19:41	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.3	0.24	1.55		05/04/15 19:41	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.64	0.32	1.55		05/04/15 19:41	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.3	0.37	1.55		05/04/15 19:41	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.3	0.38	1.55		05/04/15 19:41	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.3	0.60	1.55		05/04/15 19:41	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.5	0.42	1.55		05/04/15 19:41	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.4	0.57	1.55		05/04/15 19:41	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.4	0.40	1.55		05/04/15 19:41	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.2	0.48	1.55		05/04/15 19:41	76-14-2	
Ethylbenzene	**4.6**	ug/m3	1.4	0.66	1.55		05/04/15 19:41	100-41-4	
4-Ethyltoluene	**5.9**	ug/m3	3.9	0.29	1.55		05/04/15 19:41	622-96-8	
Hexachloro-1,3-butadiene	ND	ug/m3	8.4	1.0	1.55		05/04/15 19:41	87-68-3	
2-Hexanone	**11.8**	ug/m3	1.3	0.64	1.55		05/04/15 19:41	591-78-6	
Methylene Chloride	**6.6**	ug/m3	5.5	0.84	1.55		05/04/15 19:41	75-09-2	
4-Methyl-2-pentanone (MIBK)	**12.9**	ug/m3	1.3	0.34	1.55		05/04/15 19:41	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.1	0.47	1.55		05/04/15 19:41	1634-04-4	
Styrene	**18.2**	ug/m3	3.4	0.30	1.55		05/04/15 19:41	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.1	0.51	1.55		05/04/15 19:41	79-34-5	
Tetrachloroethene	**19.8**	ug/m3	1.1	0.43	1.55		05/04/15 19:41	127-18-4	
Toluene	**15.9**	ug/m3	1.2	0.24	1.55		05/04/15 19:41	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	5.8	1.4	1.55		05/04/15 19:41	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	1.7	0.38	1.55		05/04/15 19:41	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.85	0.38	1.55		05/04/15 19:41	79-00-5	
Trichloroethene	ND	ug/m3	0.85	0.43	1.55		05/04/15 19:41	79-01-6	
Trichlorofluoromethane	**1.8**	ug/m3	1.8	0.20	1.55		05/04/15 19:41	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.5	0.47	1.55		05/04/15 19:41	76-13-1	
1,2,4-Trimethylbenzene	**10.6**	ug/m3	3.9	0.19	1.55		05/04/15 19:41	95-63-6	

JKJ
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-13 **Lab ID: 10304516011** Collected: 04/28/15 20:13 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
1,3,5-Trimethylbenzene	**4.1**	ug/m3	3.9	0.28	1.55		05/04/15 19:41	108-67-8	
Vinyl acetate	ND	ug/m3	1.1	0.51	1.55		05/04/15 19:41	108-05-4	
Vinyl chloride	ND	ug/m3	0.40	0.30	1.55		05/04/15 19:41	75-01-4	
m&p-Xylene	**18.3**	ug/m3	2.7	1.2	1.55		05/04/15 19:41	179601-23-1	
o-Xylene	**7.3**	ug/m3	1.4	0.54	1.55		05/04/15 19:41	95-47-6	

TKT
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-14 **Lab ID: 10304516012** Collected: 04/28/15 20:38 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
Acetone	**1380** J	ug/m3	71.0	24.5	29.4		05/06/15 18:46	67-64-1	
Benzene	**0.95**	ug/m3	0.48	0.18	1.49		05/04/15 18:39	71-43-2	
Benzyl chloride	ND	ug/m3	3.9	0.25	1.49		05/04/15 18:39	100-44-7	
Bromodichloromethane	ND	ug/m3	2.0	0.29	1.49		05/04/15 18:39	75-27-4	
Bromoform	ND	ug/m3	3.1	1.3	1.49		05/04/15 18:39	75-25-2	
Bromomethane	ND	ug/m3	1.2	0.46	1.49		05/04/15 18:39	74-83-9	
2-Butanone (MEK)	**99.3**	ug/m3	0.89	0.34	1.49		05/04/15 18:39	78-93-3	
Carbon disulfide	ND	ug/m3	0.94	0.15	1.49		05/04/15 18:39	75-15-0	
Carbon tetrachloride	ND	ug/m3	0.95	0.29	1.49		05/04/15 18:39	56-23-5	
Chlorobenzene	ND J	ug/m3	1.4	0.20	1.49		05/04/15 18:39	108-90-7	
Chloroethane	ND	ug/m3	0.80	0.29	1.49		05/04/15 18:39	75-00-3	
Chloroform	ND	ug/m3	0.74	0.28	1.49		05/04/15 18:39	67-66-3	
Chloromethane	**2.5**	ug/m3	0.63	0.16	1.49		05/04/15 18:39	74-87-3	
Dibromochloromethane	ND	ug/m3	2.6	1.3	1.49		05/04/15 18:39	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.3	1.2	1.49		05/04/15 18:39	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	1.8	0.76	1.49		05/04/15 18:39	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	4.6	0.79	1.49		05/04/15 18:39	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	4.6	0.74	1.49		05/04/15 18:39	106-46-7	
Dichlorodifluoromethane	**5.1**	ug/m3	1.5	0.72	1.49		05/04/15 18:39	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.2	0.23	1.49		05/04/15 18:39	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.61	0.31	1.49		05/04/15 18:39	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.2	0.35	1.49		05/04/15 18:39	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.2	0.37	1.49		05/04/15 18:39	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.2	0.57	1.49		05/04/15 18:39	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.4	0.40	1.49		05/04/15 18:39	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.4	0.55	1.49		05/04/15 18:39	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.4	0.39	1.49		05/04/15 18:39	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.1	0.46	1.49		05/04/15 18:39	76-14-2	
Ethylbenzene	**3.7**	ug/m3	1.3	0.63	1.49		05/04/15 18:39	100-41-4	
4-Ethyltoluene	**8.2**	ug/m3	3.7	0.28	1.49		05/04/15 18:39	622-96-8	
Hexachloro-1,3-butadiene	ND	ug/m3	8.1	0.97	1.49		05/04/15 18:39	87-68-3	
2-Hexanone	**8.0**	ug/m3	1.2	0.61	1.49		05/04/15 18:39	591-78-6	
Methylene Chloride	**7.5**	ug/m3	5.3	0.81	1.49		05/04/15 18:39	75-09-2	
4-Methyl-2-pentanone (MIBK)	**23.1**	ug/m3	1.2	0.32	1.49		05/04/15 18:39	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.1	0.45	1.49		05/04/15 18:39	1634-04-4	
Styrene	**45.0**	ug/m3	3.2	0.29	1.49		05/04/15 18:39	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.0	0.49	1.49		05/04/15 18:39	79-34-5	
Tetrachloroethene	**7.8**	ug/m3	1.0	0.41	1.49		05/04/15 18:39	127-18-4	
Toluene	**9.5**	ug/m3	1.1	0.23	1.49		05/04/15 18:39	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	5.6	1.4	1.49		05/04/15 18:39	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	1.7	0.37	1.49		05/04/15 18:39	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.82	0.37	1.49		05/04/15 18:39	79-00-5	
Trichloroethene	ND	ug/m3	0.82	0.41	1.49		05/04/15 18:39	79-01-6	
Trichlorofluoromethane	**2.2**	ug/m3	1.7	0.20	1.49		05/04/15 18:39	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.4	0.45	1.49		05/04/15 18:39	76-13-1	
1,2,4-Trimethylbenzene	**13.4**	ug/m3	3.7	0.19	1.49		05/04/15 18:39	95-63-6	

JKJ
6/4/15

ANALYTICAL RESULTS

Project: 31999-010 Wix FIltration
Pace Project No.: 10304516

Sample: SSV-14 **Lab ID: 10304516012** Collected: 04/28/15 20:38 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15								
1,3,5-Trimethylbenzene	**4.3**	ug/m3	3.7	0.27	1.49		05/04/15 18:39	108-67-8	
Vinyl acetate	ND	ug/m3	1.1	0.49	1.49		05/04/15 18:39	108-05-4	
Vinyl chloride	ND	ug/m3	0.39	0.29	1.49		05/04/15 18:39	75-01-4	
m&p-Xylene	**14.4**	ug/m3	2.6	1.2	1.49		05/04/15 18:39	179601-23-1	
o-Xylene	**6.6**	ug/m3	1.3	0.52	1.49		05/04/15 18:39	95-47-6	

JKJ
6/4/15

Table C-1

Remedial Investigation Sub-Slab Vapor Sample Results
Wix Filtration Facility
Dillon, South Carolina (a)

		Location:	**SSV-5**	**SSV-6**	**SSV-7**	**SSV-17 (b)**	**SSV-8**	**SSV-9**	**SSV-10**	**SSV-11**	**SSV-12**	**SSV-13**	**SSV-14**
		Sample Date:	**4/28/2015**	**4/28/2015**	**4/28/2015**	**4/28/2015**	**4/28/2015**	**4/28/2015**	**4/28/2015**	**4/28/2015**	**4/28/2015**	**4/28/2015**	**4/28/2015**
Cas	Units	**Volatile Organic Compounds ($\mu g/m^3$)**											
67-64-1	ug/m3	Acetone	45	72.1	1,660	2,690	102	226	329	307	176	276	1,380
71-43-2	ug/m3	Benzene	2.2	1.4	6.3	4.4	1.3	1.2	1.5	2.1	2.1	0.64	0.95
100-44-7	ug/m3	Benzyl Chloride	4.2 U	4.1 U	4.4 U	4.4 U	4.1 U	4.2 U	3.9 U	8.5 U	4.2 U	4.1 U	3.9 U
75-27-4	ug/m3	Bromodichloromethane	2.2 U	2.1 U	2.3 U	2.3 U	2.1 U	2.2 U	2 U	4.4 U	2.2 U	2.1 U	2 U
75-25-2	ug/m3	Bromoform	3.4 U	3.3 U	3.5 U	3.5 U	3.3 U	3.4 U	3.1 U	6.8 U	3.4 U	3.3 U	3.1 U
74-83-9	ug/m3	Bromomethane	1.3 U	1.2 U	2.5	1.4	1.2 U	1.3 U	1.2 U	2.5 U	1.3 U	1.2 U	1.2 U
75-15-0	ug/m3	Carbon Disulfide	1 U	1.1	1.8	1.1 U	1.1	1 U	0.94 U	2 U	1 U	1.7	0.94 U
56-23-5	ug/m3	Carbon Tetrachloride	1 U	0.99 U	1.1 U	1.1 U	0.99 U	1 U	0.95 U	2.1 U	1 U	0.99 U	0.95 U
108-90-7	ug/m3	Chlorobenzene	1.5 U	1.5 U	1.6 U	1.6 U	1.5 U	1.5 U	1.4 U	3 U	1.5 U	1.5 U	1.4 U
67-66-3	ug/m3	Chloroform	0.8 U	0.77 U	0.83 U	0.83 U	0.77 U	0.8 U	0.97	1.6 U	0.8 U	0.77 U	0.74 U
74-87-3	ug/m3	Chloromethane	0.68 U	0.65 U	7.2	5.2	0.94	0.68 U	1.4	1.4 U	0.79	0.65 U	2.5
124-48-1	ug/m3	Dibromochloromethane	2.8 U	2.7 U	2.9 U	2.9 U	2.7 U	2.8 U	2.6 U	5.6 U	2.8 U	2.7 U	2.6 U
106-93-4	ug/m3	1,2-Dibromoethane	2.5 U	2.4 U	2.6 U	2.6 U	2.4 U	2.5 U	2.3 U	5 U	2.5 U	2.4 U	2.3 U
95-50-1	ug/m3	1,2-Dichlorobenzene	2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.8 U	3.9 U	2 U	1.9 U	1.8 U
541-73-1	ug/m3	1,3-Dichlorobenzene	4.9 U	4.7 U	5.1 U	5.1 U	4.7 U	4.9 U	4.6 U	9.8 U	4.9 U	4.7 U	4.6 U
106-46-7	ug/m3	1,4-Dichlorobenzene	4.9 U	4.7 U	5.1 U	5.1 U	4.7 U	4.9 U	4.6 U	9.8 U	4.9 U	4.7 U	4.6 U
75-71-8	ug/m3	Dichlorodifluoromethane (12)	3.7	3.4	1.7 U	1.7 U	50.9	3.9	3.1	3.4	1.9	3.2	5.1
75-34-3	ug/m3	1,1-Dichloroethane	1.3 U	1.3 U	1.4 U	1.4 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
107-06-2	ug/m3	1,2-Dichloroethane	0.66 U	0.64 U	0.69 U	0.69 U	0.64 U	0.66 U	0.61 U	1.3 U	0.66 U	0.64 U	0.61 U
75-35-4	ug/m3	1,1-Dichloroethene	1.3 U	1.3 U	5.4	1.4 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
156-59-2	ug/m3	cis-1,2-Dichloroethene	1.3 U	1.3 U	1.4 U	1.4 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
156-60-5	ug/m3	trans-1,2-Dichloroethene	1.3 U	1.3 U	1.4 U	1.4 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
78-87-5	ug/m3	1,2-Dichloropropane	1.5 U	1.5 U	1.6 U	1.6 U	1.5 U	1.5 U	1.4 U	3 U	1.5 U	1.5 U	1.4 U
10061-01-5	ug/m3	cis-1,3-Dichloropropene	1.5 U	1.4 U	1.5 U	1.5 U	1.4 U	1.5 U	1.4 U	3 U	1.5 U	1.4 U	1.4 U
10061-02-6	ug/m3	trans-1,3-Dichloropropene	1.5 U	1.4 U	1.5 U	1.5 U	1.4 U	1.5 U	1.4 U	3 U	1.5 U	1.4 U	1.4 U
75-00-3	ug/m3	Chloroethane	0.87 U	0.84 U	0.91 U	0.91 U	0.84 U	0.87 U	0.8 U	1.7 U	0.87 U	0.84 U	0.8 U
100-41-4	ug/m3	Ethylbenzene	3.9	3.6	7.5 J	6.7 J	5.8	6.3	6.2	5.8 J	32.7	4.6	3.7
622-96-8	ug/m3	4-Ethyl Toluene	4.7	5.9	6	4.5	5.9	7	5.5	15.3	12.2	5.9	8.2
87-68-3	ug/m3	Hexachlorobutadiene	8.7 U	8.4 U	9.1 U	9.1 U	8.4 U	8.7 U	8.1 U	17.5 U	8.7 U	8.4 U	8.1 U
591-78-6	ug/m3	2-Hexanone	2.1	4.1	8.8	5.6	4.4	4.1	16	6.9	11.3	11.8	8
78-93-3	ug/m3	2-Butanone	14.6	17	48.1	36.6	46.6	127	82.5	89.2	34	42.6	99.3
108-10-1	ug/m3	4-Methyl-2-Pentanone	2.1	3	1.4 U	1.4 U	5.2	7.4	20.5	9.4	9.3	12.9	23.1
1634-04-4	ug/m3	t-Butyl Methyl Ether (MTBE)	1.2 U	1.1 U	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U	2.4 U	1.2 U	1.1 U	1.1 U
75-09-2	ug/m3	Methylene Chloride	5.7 U	5.5 U	5.9 U	5.9 U	23.8	7.8	6.3	11.4 U	6.1	6.6	7.5
100-42-5	ug/m3	Styrene	14.2	16.2	13.9	10.8	20.5	18.2	19	17.7	19.8	18.2	45
79-34-5	ug/m3	1,1,2,2-Tetrachloroethane	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1.1 U	1 U	2.2 U	1.1 U	1.1 U	1 U
127-18-4	ug/m3	Tetrachloroethene	2.4	1.3	77.3 J	54.5 J	31.4	1.1 U	765	2.2 UJ	88.2	19.8	7.8
108-88-3	ug/m3	Toluene	172	10.5	19.1	24.9	150	80	16.1	23.6	15.2	15.9	9.5
76-13-1	ug/m3	1,1,2-Cl 1,2,2-F ethane (113)	2.6 U	2.5 U	2.7 U	2.7 U	2.5 U	2.6 U	2.4 U	5.2 U	2.6 U	2.5 U	2.4 U
120-82-1	ug/m3	1,2,4-Trichlorobenzene	6.1 U	5.8 U	6.3 U	6.3 U	5.8 U	6.1 U	5.6 U	12.1 U	6.1 U	5.8 U	5.6 U
71-55-6	ug/m3	1,1,1-Trichloroethane	108	1.7 U	1.9 U	1.9 U	4	1.8 U	1.7 U	3.6 U	1.8 U	1.7 U	1.7 U
79-00-5	ug/m3	1,1,2-Trichloroethane	0.89 U	0.85 U	0.92 U	0.92 U	0.85 U	0.89 U	0.82 U	1.8 U	0.89 U	0.85 U	0.82 U
79-01-6	ug/m3	Trichloroethene	0.89 U	0.85 U	2.7	1.8	0.87	0.89 U	0.82 U	1.8 U	4.2	0.85 U	0.82 U
75-69-4	ug/m3	Trichlorofluoromethane (11)	1.8 U	1.8	1.9 U	1.9 U	2.2	1.9	4.6	3.7 U	1.8 U	1.8	2.2
95-63-6	ug/m3	1,2,4-Trimethylbenzene	11.4	11.3	11.2	7.7	13.3	12.4	11.7	22.8	35.5	10.6	13.4
108-67-8	ug/m3	1,3,5-Trimethylbenzene	4.6	4.3	5	4.2 U	5	6.1	4.6	13.2	13.4	4.1	4.3
108-05-4	ug/m3	Vinyl Acetate	1.2 U	4.6	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U	2.3 U	1.2 U	1.1 U	1.1 U
75-01-4	ug/m3	Vinyl Chloride	0.42 U	0.4 U	0.44 U	0.44 U	0.4 U	0.42 U	0.39 U	0.84 U	0.42 U	0.4 U	0.39 U
76-14-2	ug/m3	1,2-Cl-1,1,2,2-F ethane (114)	2.3 U	2.2 U	2.4 U	2.4 U	2.2 U	2.3 U	2.1 U	4.6 U	2.3 U	2.2 U	2.1 U
179601-23-1	ug/m3	m&p-Xylene	14.6	14.6	29.4 J	27.9 J	21	22.4	23.1	21.9 J	97	18.3	14.4
95-47-6	ug/m3	o-Xylene	6	6.3	9.4	10.5	8.7	9.3	8.8	9.6	17.7	7.3	6.6

Bold italics values greater than HHRA screening level

Appendix D – Updated Risk Characterization of Vapor Intrusion Exposure Pathway

Updated Risk Characterization of Vapor Intrusion Exposure Pathway

Introduction

WSP's Remedial Investigation (RI) Report, dated August 21, 2014, for the Wix Filtration Corp LLC facility in Dillon, South Carolina, included a Human Health Risk Assessment (HHRA) to estimate the nature and probability of adverse health effects in humans who may be exposed to volatile organic compounds (VOCs) in affected environmental media at the Site under current and potential future land use scenarios (WSP 2014). As part of the HHRA, an exposure assessment was conducted that identified potential human receptors and characterized their potential for exposure to chemicals of potential concern (COPCs). The exposure assessment identified a potential vapor intrusion exposure pathway for full-time facility workers, who may inhale volatile COPCs released to indoor air from sub-slab vapor. To characterize the potential risks from the vapor intrusion exposure pathway, indoor air concentrations were estimated from VOC concentrations detected in three sub-slab vapor samples collected as part of the RI. The indoor air concentrations of COPCs in sub-slab vapor were estimated using the U.S. Environmental Protection Agency's (EPA's) Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator, Version 3.3.1, May 2014 (EPA 2014a). The May 2014 version of the SGI-IAC Calculator assumed a vapor attenuation factor (i.e., the ratio of indoor air concentration to sub-slab vapor concentration) of 0.1. The attenuation factor of 0.1 was based on the EPA's November 2002 "Office of Solid Waste and Emergency Response (OSWER) Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (Draft VI Guidance; EPA 2002). Using this attenuation factor, the HHRA for the Wix facility identified unacceptable risk for onsite facility workers potentially exposed to the hypothetical concentrations of VOCs in indoor air as a result of vapor intrusion into the manufacturing building.

In April 2015, ten additional sub-slab vapor samples were collected as part of the 2015 supplemental RI activities at the site. In addition, in June 2015, the EPA issued new vapor intrusion guidance that replaced the Draft VI Guidance. As discussed further below, the risk characterization of the vapor intrusion exposure pathway for the Wix facility was updated to include the April 2015 sub-slab vapor sample results and incorporate technical information from the new EPA vapor intrusion guidance. The updated risk characterization for the vapor intrusion exposure pathway includes the following sections:

- Identification of COPCs in sub-slab vapor based on the April 2014 and April 2015 sub-slab vapor data
- Assessment of toxicity of COPCs in sub-slab vapor
- Estimation of chemical intakes for COPCs in indoor air from vapor intrusion
- Risk characterization of onsite facility worker exposures to COPCs in indoor air from vapor intrusion
- Uncertainty analysis

April 2015 Sub-slab Vapor Samples

The evaluation of the vapor intrusion exposure pathway in the 2014 HHRA was based on only three sub-slab vapor samples (SSV-1 through SSV-3). Given the results of this limited set of sub-slab vapor samples, a data gap existed to adequately assess the potential vapor intrusion exposure pathway for the site. The identification of data needs for an HHRA is an iterative process. As field data are collected and reviewed and the conceptual site model is refined, additional data needs may be identified to further evaluate potential human health risks (Interstate Technology and Regulatory Council 2015). In April 2015, ten additional sub-slab vapor samples (SSV-5 through SSV-14) were collected to further characterize the extent of VOCs in sub-slab vapor underneath the building and allow for a more refined analysis of the vapor intrusion exposure pathway. The results of the additional sub-slab vapor samples are discussed in Section 4 of the RI Report Addendum. Using both the April 2014 and April 2015 sub-slab vapor data provides for a more technically sound assessment of the potential risks from the vapor intrusion exposure pathway, rather than just using the April 2014 data.

Recent EPA Vapor Intrusion Guidance

In June 2015, the EPA issued the "OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air" (Technical Guide; EPA 2015a). The Technical Guide explains that "Since the Draft VI Guidance was released in 2002, EPA's knowledge of and experience with assessment and mitigation of the vapor intrusion pathway has increased considerably, leading to an improved understanding of and enhanced approaches for evaluating and managing vapor intrusion" (EPA 2015a). The new Technical Guide suggests that the assumptions under the old Draft VI Guidance overestimated the calculated non-cancer and theoretical excess cancer risks. Given that the Technical Guide is intended to **"**supersede and replace the Draft VI Guidance," the Technical Guide now mandates a default vapor attenuation factor of 0.03, instead of the 0.1 factor that was recommended under the 2002 Draft VI Guidance, when estimating the indoor air concentration of a COPC from a sub-slab soil gas concentration for both residential and non-residential buildings. Therefore, the estimated exposure point concentrations for the vapor intrusion exposure pathway for the Wix facility would need to be recalculated to incorporate this new attenuation factor.

Identification of COPCs in Sub-Slab Vapor

COPCs were selected to be used for quantitative evaluation of the vapor intrusion exposure pathway. Consistent with Section 7.1 of the 2014 HHRA, the process of selecting COPCs included identifying those chemicals detected in at least one sample and comparing the maximum concentrations to risk-based screening criteria. The risk-based screening criteria for sub-slab vapor are the EPA's June 2015 industrial air regional screening levels (RSLs), assuming a cancer risk of 1×10^{-6} and a hazard quotient of 0.1 (EPA 2015b). For those substances without screening criteria, any detected values were considered COPCs. Chemicals detected in sub-slab vapor samples are not considered COPCs if they were not detected in onsite soil or groundwater samples or are not breakdown products of substances detected in onsite soil or groundwater samples.

COPCs in sub-slab vapor were identified from sub-slab vapor data collected in April 2014 and April 2015 from 13 sub-slab vapor locations (SSV-1 through SSV-3 and SSV-5 through SSV-14; Table D-1). The duplicate sample results were not included in this analysis because the duplicate samples were used as a measure of data precision. A comparison of the sample results to the screening criteria is presented in Table D-1, and the identified COPCs in sub-slab vapor are as follows:

- benzene
- ethylbenzene
- 4-ethyl toluene
- 2-hexanone
- tetrachloroethene
- trichloroethene
- 1,2,4-trimethylbenzene
- 1,3,5-trimethylbenzene
- m&p-xylenes

Bromomethane, chloroform, dichlorodifluoromethane, and 1,1-dichloroethane were also detected above the screening criteria. However, these compounds are excluded as COPCs in sub-slab vapor because they were not detected in any soil or groundwater samples and are not a breakdown product of compounds detected in soil or groundwater. 4-Ethyl toluene was detected and included as a COPC as a conservative assumption because soil and groundwater samples were not analyzed for this compound. Table D-2 lists the COPCs in sub-slab vapor, their frequency of detection in the 13 sub-slab vapor samples, minimum and maximum concentrations, location of maximum concentrations, and applicable screening criteria.

Toxicity Assessment

The purpose of the toxicity assessment is to identify the types of adverse effects that each COPC can cause, and how those effects depend on exposure amount (dose), route of exposure (e.g., inhalation), and exposure duration. Quantitative estimates of the potency of COPCs include two sets of toxicity values, one for carcinogenic effects and one for non-carcinogenic effects. This two-part approach is employed because there are typically major differences in the time-course of action and the shape of the dose-response curve for cancer and non-cancer effects. Further discussion of the toxicity assessment is presented in Section 7.2 of the 2014 HHRA. Consistent with Section 7.2.3 of the 2014 HHRA, toxicity values used in this updated risk characterization were selected in accordance with the hierarchy for toxicity values presented in EPA's (2003) OSWER Directive 9285.7-53. Sources of toxicity values for the COPCs in sub-slab vapor were from EPA's Integrated Risk Information System database (EPA 2014b); EPA's Provisional Peer Reviewed Toxicity Values (EPA 2007); and California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) Toxicity Criteria Database (Cal/EPA OEHHA 2014). With the exception of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene, the same toxicity values presented in Tables 7-4 and 7-5 of the 2014 HHRA were used in this updated risk characterization. The reference concentrations and inhalation unit risk factors for the COPCS in sub-slab vapor are provided in Table D-3.

Estimation of Chemical Intakes of COPCs in Indoor Air

As explained in the Exposure Assessment (Section 7.3) of the 2014 HHRA, current and future facility workers could potentially be exposed to COPCs in sub-slab vapor as a result of vapor intrusion to indoor air. To quantify human exposure to chemicals in the environment, it is necessary to calculate the level of contact between people and each contaminated environmental medium. Consistent with the 2014 HHRA, the intake from inhalation of COPCs was calculated using the following equation:

$$\text{Intake (mg/m}^3\text{)} = (CA_{indoor} \times ET \times EF \times ED) / (AT \times 24 \text{ hours/day})$$

Where:

CA_{indoor} = Exposure point concentration in indoor air (mg/m^3)
ET = Exposure time (hours/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time (days)

Exposure point concentrations of COPCs in indoor air (CA_{indoor}) from vapor intrusion were estimated using the EPA's Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator, Version 3.4, June 2015 RSLs (EPA 2015c). The SGC-IAC Calculator incorporates the Technical Guide's vapor attenuation factor of 0.03 to derive an indoor air concentration. The maximum concentration of each COPC detected in the 13 sub-slab vapor samples (SSV-1 through SSV-3, and SSV-5 through SSV-14) collected in April 2014 and April 2015 was entered into the SGC-IAC spreadsheet to calculate the indoor air concentration. The resulting exposure point concentrations in indoor air are presented in Table D-4; the SGC-IAC output sheet is included in Attachment D-1.

Consistent with the 2014 HHRA, the exposure time (ET), exposure frequency (EF), and exposure duration (ED) for a facility worker are assumed to be the EPA default values of 8 hours/day, 250 days/year, and 25 years (EPA 2015b). The averaging time (AT) for non-carcinogens is equal to the exposure duration (ED) multiplied by 365 days per year, which is 9,125 days (EPA 2015b). The averaging time (AT) for carcinogens is equal to a lifetime in years (70 years) multiplied by 365 days per year, which is 25,550 days (EPA 2015b).

Estimated intakes from inhalation of volatiles in indoor air by facility workers are provided in Attachment D-2.

Risk Characterization

The purpose of the risk characterization is to provide a conservative estimate of the potential risk resulting from exposure to COPCs identified in affected media. Potential risks are determined by combining the information on exposure and toxicity to predict the types of effects that may occur and to provide information on the probability or severity of those effects.

The estimated risks and hazards to current and future onsite facility workers potentially exposed to COPCs in sub-slab vapor as a result of vapor intrusion to indoor air are provided in Table D-5 and in Attachment D-2. Consistent with the 2014 HHRA, the sum of the total cancer risk for the receptor group was compared to the EPA's target risk range of 1×10^{-6} to 1×10^{-4}. In general, the EPA considers excess cancer risks that are below about 1 chance in 1,000,000 (1×10^{-6}) to be so small as to be negligible, and risks above 1×10^{-4} to be sufficiently large that some sort of remediation is desirable. Excess cancer risks that range between 1×10^{-6} to 1×10^{-4} are generally considered to be acceptable. For non-carcinogens, the individual hazard quotients were summed for an overall hazard index (HI). If the HI is less than or equal to 1.0, then no adverse non-carcinogenic health effects are likely associated with exposures to COPCs (EPA 1989).

As indicated in Table D-5, the estimated total excess cancer risk from potential exposures to COPCs in sub-slab vapor as a result of vapor intrusion to indoor air is 2.0×10^{-6}, which is within EPA's acceptable cancer risk range of 1×10^{-6} to 1×10^{-4}. The estimated total non-cancer HI from potential exposures to COPCs in sub-slab vapor as a result of vapor intrusion to indoor air is 0.58, which is less than the target HI of 1.0.

Based on the updated risk characterization of the vapor intrusion exposure pathway for the Wix facility, which includes sub-slab vapor data collected in April 2014 and April 2015 and incorporates the vapor attenuation factor in EPA's recently issued Technical Guide, potential risks posed by the vapor intrusion exposure pathway are within EPA's acceptable excess cancer risk range, and no adverse non-cancer health effects are likely associated with potential exposures to COPCs in indoor air by vapor intrusion. Therefore, the vapor intrusion exposure pathway does not present an unacceptable health risk to facility workers at the Wix facility.

Uncertainty Analysis

The procedures and inputs used to assess potential human health risks in this updated risk characterization of the vapor intrusion exposure pathway are subject to a variety of uncertainties. In general, there are five main sources of uncertainty and variability in HHRAs of well-characterized sites:

- environmental chemistry sampling and analysis
- exposure assumptions
- fate and transport modelling
- toxicological data and dose-response extrapolations
- combinations of the above

Environmental Chemistry Sampling and Analysis

For vapor samples, variability in environmental chemistry sampling and analysis error can stem from the sampling and analysis procedures. To limit uncertainties associated with such variability, the April 2014 and April 2015 sub-slab vapor samples were collected and analyzed in accordance with the procedures presented in WSP's Sampling and Analysis Plan (SAP) for the Wix facility, dated October 18, 2013 (WSP 2013). The SAP is comprised of the Field Sampling Plan, which identifies the protocols for the collection and handling of samples and the data to be generated, and the Quality Assurance Project Plan, which outlines the procedures to be used to ensure the integrity of the results. Field and laboratory personnel followed the SAP and therefore, minimized any errors associated with the sampling and analysis of the sub-slab vapor samples.

Exposure Assumptions

Exposure estimation is another potential source of variability and uncertainty. Exposure estimates in many cases are highly dependent on the prediction of intake values, exposure frequency, exposure duration, and other exposure assumptions used in the assessment. Consistent with EPA guidance, the exposure parameters used in this updated risk characterization were selected to ensure that potential exposures were not underestimated. In addition, the maximum concentrations of the COPCs detected in sub-slab vapor samples collected over two different sampling events were assumed as the exposure point concentrations. Actual exposures are likely less than the estimates contained in this updated risk characterization.

Fate and Transport Modelling

The EPA's (2015c) SGC-IAC Calculator was used to estimate indoor air concentrations of COPCs detected in sub-slab vapor samples. This calculator is a source of uncertainty because sub-slab vapor data are used to estimate corresponding concentrations in indoor air. However, according to EPA guidance, the calculator uses empirically-based conservative generic attenuation factors that reflect generally reasonable worst-case conditions. Therefore, it is unlikely that the calculated indoor air concentrations are underestimated. Specifically, the EPA selected a 0.03 vapor attenuation factor in the SGC-IAC Calculator based on data presented in EPA's "Vapor Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings" (EPA 2012). The 0.03 vapor attenuation factor was based on sub-slab vapor data from 431 homes at 12 different sites across the U.S. (EPA 2012); whereas, the attenuation factor of 0.1 presented in EPA's outdated Draft VI Guidance was based on sub-slab data from 12 homes at one site, the Lowry Air Force Base in Colorado (EPA 2002). Therefore, EPA's most recent vapor attenuation factor is based on a more extensive data set than the previous attenuation factor. In addition, EPA conducted a theoretical analysis that also confirmed the appropriateness of the 0.03 vapor attenuation factor (EPA 2012).

Furthermore, the vapor attenuation factor of 0.03 was based on information from residential buildings but, as recommended by EPA, is also applicable to non-residential buildings. The EPA's (2015a) Technical Guide states the following:

"There are theoretical considerations to support expectations that larger nonresidential buildings that are constructed on thick slabs will have lower attenuation factors than residential buildings [and, thus, result in a lower indoor air concentration]. These considerations include:

- Given that the size (e.g., interior height and footprint area) and air exchange rate tend to be larger for many nonresidential buildings…,it is expected that building ventilation rates for many nonresidential buildings would be higher than those for residential buildings. A higher ventilation rate is expected to result in greater overall vapor dilution as vapors migrate from a subsurface vapor source into a building…
- Comparing buildings with slab-on-grade construction, nonresidential buildings tend to have thicker slabs than residential buildings. With thicker slabs, a given amount of differential settling would be expected to lead to less cracking in the slab and would be less likely to create cracks that extend across the entire slab thickness. Buildings with thicker slabs would, therefore, be expected to exhibit lower soil gas entry rates, all else being equal."

Because EPA's default vapor attenuation factor of 0.03 is based on information from residential buildings, the application of this attenuation factor to the Wix facility is a conservative assumption. The Wix building is likely to have a larger air exchange rate due to its size and a thicker slab than a residential building, which would result in lower indoor air concentrations. Therefore, it is unlikely that the calculated indoor air concentrations assuming an attenuation factor of 0.03 were underestimated.

Toxicological Data and Dose-Response Extrapolations

Uncertainty factors are applied to extrapolate doses from animal studies to humans. Extrapolation of toxicological data from animal tests is a large source of uncertainty in any risk assessment. There may be important, but unidentified differences in uptake, metabolism, and distribution in the body between the test species and humans. Typically, the animals are administered high doses of a chemical in a standard diet while humans are generally exposed too much lower doses in a highly variable diet. Humans have a 70-year lifetime and may be exposed intermittently for an exposure period ranging from months to a full lifetime. Because of these differences, extrapolation error is typically a large source of uncertainty in a risk assessment. Even when epidemiological studies in humans are available, uncertainties can be large because the diet, activity patterns, exposure duration and frequency, and individual susceptibility may not be the same in the study populations as in the site-specific receptors.

Combinations of Uncertainties

Uncertainties from different sources are compounded in this updated risk characterization of the vapor intrusion exposure pathway for the Wix facility. However, to ensure that human health is adequately protected, the updated risk characterization of the vapor intrusion exposure pathway incorporates conservative (i.e., overestimated) risk approaches and uncertainty factors. Therefore, the actual risk associated with potential onsite exposures of facility workers to a COPC in indoor air as a result of vapor intrusion is unlikely to be larger than the risk predicted in this updated risk characterization of the vapor intrusion exposure pathway. Based on the updated risk characterization of the vapor intrusion exposure pathway for the Wix facility, potential risks posed by the vapor intrusion exposure pathway are within EPA's acceptable risk-based criteria.

References

California Environmental Protection Agency. 2014. Office of Environmental Health Hazard Assessment. 2014. OEHHA Toxicity Criteria Database. http://oehha.ca.gov/tcdb/index.asp. Accessed on August 8, 2014.

Interstate Technology and Regulatory Council. 2015. Decision Making at Contaminated Sites: Issues and Options in Human Health Risk Assessment. http://www.itrcweb.org/RISK-3/

U.S. Environmental Protection Agency. 1989. Risk Assessment Guidance for Superfund Volume I, Human Health Evaluation Manual (Part A). Interim Final. Office of Emergency and Remedial Response. EPA/540/1-89/002. December.

U.S. Environmental Protection Agency. 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). Office of Solid Waste and Emergency Response, Washington, D.C. EPA- 530-D-02-004. November.

U.S. Environmental Protection Agency. 2003. Memorandum - Human Health Toxicity Values in Superfund Risk Assessments. OSWER Directive 9285.7-53. December 5.

U.S. Environmental Protection Agency. 2007. Provisional Peer Reviewed Toxicity Values for 1,2,4-Trimethylbenzene (CASRN 95-63-6). Superfund Health Risk Technical Support Center National Center for Environmental Assessment. Office of Research and Development. June 11.

U.S. Environmental Protection Agency. 2012. EPA's Vapor Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings. EPA-530-R-10-002. March 16.

U.S. Environmental Protection Agency. 2014a. Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator, Version 3.3.1, May 2014.

U.S. Environmental Protection Agency. 2014b. Integrated Risk Information System. http://www.epa.gov/iris/index.html. Accessed on August 8, 2014.

U.S. Environmental Protection Agency. 2015a. OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air. OSWER Publication 9200.2-154. June.

U.S. Environmental Protection Agency. 2015b. Regional Screening Levels for Chemical Contaminants at Superfund Sites. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_Table/index.htm. May. Accessed on August 11, 2015.

U.S. Environmental Protection Agency. 2015c. OSWER Vapor Intrusion Assessment. Sub-slab or Soil Gas Concentrations to Indoor Air Concentrations (SGC-IAC) Calculator Version 3.4, June 2015 RSLs. http://www.epa.gov/oswer/vaporintrusion/documents/VISL-Calculator.xlsm Accessed on August 11, 2015.

WSP. 2013. Sampling and Analysis Plan, Wix Filtration Corp. LLC Plant – Dillon, South Carolina. October 18.

WSP. 2014. Remedial Investigation Report, Wix Filtration Corp. LLC Plant – Dillon, South Carolina. August 21.

Tables

Table D-1

Remedial Investigation (RI) and Supplemental RI Sub-Slab Vapor Sample Results
Wix Filtration Facility
Dillon, South Carolina (a)

Location:		SSV-1	SSV-2	SSV-3	SSV-5	SSV-6	SSV-7	SSV-8	SSV-9	SSV-10	SSV-11	SSV-12	SSV-13	SSV-14
Sample Date:		4/30/2014	4/30/2014	4/30/2014	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015	4/28/2015
	Screening Criteria (b)													
Volatile Organic Compounds (μg/m^3)														
Acetone	14,000	4,500	86	46	45	72.1	1,660	102 J	226 J	329 J	307 J	176 J	276 J	1,380 J
Benzene	1.6	***7.8***	1.2	***2.4***	***2.2***	1.4	***6.3***	1.3	1.2	1.5	***2.1***	***2.1***	0.64	0.95
Benzyl Chloride	0.25	4.1 U	1 U	1 U	4.2 U	4.1 U	4.4 U	4.1 U	4.2 U	3.9 U	8.5 U	4.2 U	4.1 U	3.9 U
Bromodichloromethane	0.33	5.3 U	1.3 U	1.3 U	2.2 U	2.1 U	2.3 U	2.1 U	2.2 U	2 U	4.4 U	2.2 U	2.1 U	2 U
Bromoform	11.0	8.2 U	2.1 U	2.1 U	3.4 U	3.3 U	3.5 U	3.3 U	3.4 U	3.1 U	6.8 U	3.4 U	3.3 U	3.1 U
Bromomethane	2.2	3.1 U	0.78 U	0.78 U	1.3 U	1.2 U	***2.5***	1.2 U	1.3 U	1.2 U	2.5 U	1.3 U	1.2 U	1.2 U
Carbon Disulfide	310	110	46	220	1 U	1.1	1.8	1.1	1 U	0.94 U	2 U	1 U	1.7	0.94 U
Carbon Tetrachloride	2.0	5 U	1.3 U	1.3 U	1 U	0.99 U	1.1 U	0.99 U	1 U	0.95 U	2.1 U	1 U	0.99 U	0.95 U
Chlorobenzene	22.0	6.2	1.1	0.92 U	1.5 U	1.5 U	1.6 UJ	1.5 UJ	1.5 UJ	1.4 UJ	3 UJ	1.5 UJ	1.5 UJ	1.4 UJ
Chloroform	0.53	3.9 U	0.98 U	0.98 U	0.8 U	0.77 U	0.83 U	0.77 U	0.8 U	***0.97***	1.6 U	0.8 U	0.77 U	0.74 U
Chloromethane	39.0	3.3 U	0.83 U	0.83 U	0.68 U	0.65 U	7.2	0.94	0.68 U	1.4	1.4 U	0.79	0.65 U	2.5
Dibromochloromethane	0.45	6.8 U	1.7 U	1.7 U	2.8 U	2.7 U	2.9 U	2.7 U	2.8 U	2.6 U	5.6 U	2.8 U	2.7 U	2.6 U
1,2-Dibromoethane	0.02	6.1 U	1.5 U	1.5 U	2.5 U	2.4 U	2.6 U	2.4 U	2.5 U	2.3 U	5 U	2.5 U	2.4 U	2.3 U
1,2-Dichlorobenzene	88.0	4.8 U	1.2 U	1.2 U	2 U	1.9 U	2 U	1.9 U	2 U	1.8 U	3.9 U	2 U	1.9 U	1.8 U
1,3-Dichlorobenzene	-	4.8 U	1.2 U	1.2 U	4.9 U	4.7 U	5.1 U	4.7 U	4.9 U	4.6 U	9.8 U	4.9 U	4.7 U	4.6 U
1,4-Dichlorobenzene	1.1	4.8 U	1.2 U	1.2 U	4.9 U	4.7 U	5.1 U	4.7 U	4.9 U	4.6 U	9.8 U	4.9 U	4.7 U	4.6 U
Dichlorodifluoromethane	44.0	3.9 U	3.1	2.4	3.7	3.4	1.7 U	***50.9***	3.9	3.1	3.4	1.9	3.2	5.1
1,1-Dichloroethane	7.7	***8.3***	0.81 U	0.81 U	1.3 U	1.3 U	1.4 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
1,2-Dichloroethane	0.47	3.2 U	0.81 U	0.81 U	0.66 U	0.64 U	0.69 U	0.64 U	0.66 U	0.61 U	1.3 U	0.66 U	0.64 U	0.61 U
1,1-Dichloroethene	88.0	3.2 U	0.79 U	0.79 U	1.3 U	1.3 U	5.4	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
cis-1,2-Dichloroethene	-	3.2 U	0.79 U	0.79 U	1.3 U	1.3 U	1.4 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
trans-1,2-Dichloroethene	-	3.2 U	0.79 U	0.79 U	1.3 U	1.3 U	1.4 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	1.3 U	1.2 U
1,2-Dichloropropane	1.2	3.7 U	0.92 U	0.92 U	1.5 U	1.5 U	1.6 U	1.5 U	1.5 U	1.4 U	3 U	1.5 U	1.5 U	1.4 U
cis-1,3-Dichloropropene	3.1	3.6 U	0.91 U	0.91 U	1.5 U	1.4 U	1.5 U	1.4 U	1.5 U	1.4 U	3 U	1.5 U	1.4 U	1.4 U
trans-1,3-Dichloropropene	3.1	3.6 U	0.91 U	0.91 U	1.5 U	1.4 U	1.5 U	1.4 U	1.5 U	1.4 U	3 U	1.5 U	1.4 U	1.4 U
Chloroethane	4,400	2.1 U	0.53 U	0.53 U	0.87 U	0.84 U	0.91 U	0.84 U	0.87 U	0.8 U	1.7 U	0.87 U	0.84 U	0.8 U
Ethylbenzene	4.9	***7***	0.87 U	0.87 U	3.9	3.6	***7.5 J***	***5.8***	***6.3***	***6.2***	***5.8 J***	***32.7***	4.6	3.7
4-Ethyl Toluene	-	7.5	0.98 U	1.6	4.7	5.9	6	5.9	7	5.5	15.3	12.2	5.9	8.2
Hexachlorobutadiene	0.56	8.5 U	2.1 U	2.1 U	8.7 U	8.4 U	9.1 U	8.4 U	8.7 U	8.1 U	17.5 U	8.7 U	8.4 U	8.1 U
2-Hexanone	13.0	***100***	2.5	1.9	2.1	4.1	8.8	4.4	4.1	***16***	6.9	11.3	11.8	8
2-Butanone	2,200	420	13	14	14.6	17	48.1	46.6	127	82.5	89.2	34	42.6	99.3
4-Methyl-2-Pentanone	1,300	130	1.9	1.8	2.1	3	1.4 U	5.2	7.4	20.5	9.4	9.3	12.9	23.1
t-Butyl Methyl Ether	47.0	2.9 U	0.72 U	0.72 U	1.2 U	1.1 U	1.2 U	1.1 U	1.2 U	1.1 U	2.4 U	1.2 U	1.1 U	1.1 U
Methylene Chloride	260	2.8 U	0.69 U	0.69 U	5.7 U	5.5 U	5.9 U	23.8	7.8	6.3	11.4 U	6.1	6.6	7.5
Styrene	440	3.5	0.85 U	0.85 U	14.2	16.2	13.9	20.5	18.2	19	17.7	19.8	18.2	45
1,1,2,2-Tetrachloroethane	0.21	11 U	2.7 U	2.7 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1 U	2.2 U	1.1 U	1.1 U	1 U
Tetrachloroethene	18.0	***1,300***	***1,600***	6.6	2.4	1.3	***77.3 J***	***31.4***	1.1 U	***765***	2.2 UJ	***88.2***	***19.8***	7.8
Toluene	2,200	40	3.2	3.5	172	10.5	19.1	150	80	16.1	23.6	15.2	15.9	9.5
1,1,2-Cl 1,2,2-F ethane	13,000	6.1 U	1.5 U	1.5 U	2.6 U	2.5 U	2.7 U	2.5 U	2.6 U	2.4 U	5.2 U	2.6 U	2.5 U	2.4 U
1,2,4-Trichlorobenzene	0.88	12 U	3 U	3 U	6.1 U	5.8 U	6.3 U	5.8 U	6.1 U	5.6 U	12.1 U	6.1 U	5.8 U	5.6 U
1,1,1-Trichloroethane	2,200	27	1.1 U	1.1 U	108	1.7 U	1.9 U	4	1.8 U	1.7 U	3.6 U	1.8 U	1.7 U	1.7 U
1,1,2-Trichloroethane	0.088	4.4 U	1.1 U	1.1 U	0.89 U	0.85 U	0.92 U	0.85 U	0.89 U	0.82 U	1.8 U	0.89 U	0.85 U	0.82 U
Trichloroethene	0.88	***64***	***15***	***3***	0.89 U	0.85 U	***2.7***	0.87	0.89 U	0.82 U	1.8 U	***4.2***	0.85 U	0.82 U
Trichlorofluoromethane	310	4.5 U	1.1 U	1.1	1.8 U	1.8	1.9 U	2.2	1.9	4.6	3.7 U	1.8 U	1.8	2.2
1,2,4-Trimethylbenzene	3.1	7.8 UJ	2 UJ	2 UJ	***11.4***	***11.3***	***11.2***	***13.3***	***12.4***	***11.7***	***22.8***	***35.5***	***10.6***	***13.4***
1,3,5-Trimethylbenzene	-	7.8 U	2 U	2 U	4.6	4.3	5	5	6.1	4.6	13.2	13.4	4.1	4.3
Vinyl Acetate	88.0	14 U	3.5 U	3.5 U	1.2 U	4.6	1.2 U	1.1 U	1.2 U	1.1 U	2.3 U	1.2 U	1.1 U	1.1 U
Vinyl Chloride	2.8	2 U	0.51 U	0.51 U	0.42 U	0.4 U	0.44 U	0.4 U	0.42 U	0.39 U	0.84 U	0.42 U	0.4 U	0.39 U
1,2-Cl-1,1,2,2-F ethane	-	5.6 U	1.4 U	1.4 U	2.3 U	2.2 U	2.4 U	2.2 U	2.3 U	2.1 U	4.6 U	2.3 U	2.2 U	2.1 U
m&p-Xylene (c)	44.0	28	2.1	2.4	14.6	14.6	29.4 J	21	22.4	23.1	21.9 J	***97***	18.3	14.4
o-Xylene	44.0	10	0.95	1.5	6	6.3	9.4 J	8.7	9.3	8.8	9.6 J	17.7	7.3	6.6

a/ μg/m3 = micrograms per cubic meter; "-" = no screening criteria available; U = compounds not detected above the reporting limit; J = estimated concentration.

b/ The screening criteria are the U.S. Environmental Protection Agency's (2015b) industrial air regional screening levels, assuming a cancer risk of 1 x 10-6 and a hazard quotient of 0.1.

c/ The lower screening level for m-xylenes or p-xylenes is used.

Bold italics values greater than screening criteria

Table D-2

Chemicals of Potential Concern in Sub-Slab Vapor
Wix Filtration Plant
Dillon, South Carolina (a)

Constituent ($\mu g/m^3$) (b)	CASRN	Number of Samples (b)	Number of Detects	Detection Frequency (%)	Minimum of Detected Concentrations	Maximum of Detected Concentrations	Location of Maximum Concentration	Screening Criteria (c)
Benzene	71-43-2	13	13	100	0.64	7.8	SSV-1	1.6
Ethylbenzene	100-41-4	13	11	85	3.6	32.7	SSV-12	4.9
4-Ethyl toluene	622-96-8	13	12	92	1.6	15.3	SSV-11	NA
2-Hexanone	591-78-6	13	13	100	1.9	100	SSV-1	13
Tetrachloroethene	127-18-4	13	11	85	1.3	1,600	SSV-2	18
Trichloroethene	79-01-6	13	6	46	0.87	64	SSV-1	0.88
1,2,4-Trimethylbenzene	95-63-6	13	10	77	10.6	35.5	SSV-12	3.1
1,3,5-Trimethylbenzene	108-67-8	13	10	77	4.1	13.4	SSV-12	NA
m&p-Xylenes	108-38-3; 106-42-3	13	13	100	2.1	97	SSV-12	44

a/ $\mu g/m^3$ = micrograms per cubic meter; CASRN = Chemical Abstracts Service Registry Number; NA = not available.

b/ Duplicate samples were not included in the total number of samples because the duplicate samples were used as a measure of data precision.

c/ The screening criteria are the U.S. Environmental Protection Agency's (2015b) industrial air RSLs, assuming a cancer risk of 1 x 10-6 and a hazard quotient of 0.1.

Table D-3

Inhalation Toxicity Values for Chemicals of Potential Concern in Sub-Slab Vapor
Wix Filtration Plant
Dillon, South Carolina (a)

Constituent	CASRN	Chronic Inhalation Reference Concentration (mg/m^3)	Toxicity Source (b)	Inhalation Chronic Reference Concentration Critical Effect	Inhalation Chronic Reference Concentration Target Organ	Inhalation Chronic Reference Concentration Modifying Factor	Inhalation Chronic Reference Concentration Uncertainty Factor	Inhalation Unit Risk (µg/m3)$^{-1}$	Toxicity Source (b)	EPA Cancer Classification	Inhalation Unit Risk Tumor Type	Inhalation Unit Risk Target Organ
Benzene	71-43-2	3.00E-02	IRIS	Decreased lymphocyte count	Blood	1	300	7.80E-06	IRIS	Carcinogen	Leukemia	Blood
Ethylbenzene	100-41-4	1.00E+00	IRIS	Developmental toxicity	Developmental	1	300	2.50E-06	Cal/EPA	NA	NA	NA
4-Ethyl toluene (c)	622-96-8	4.00E-01	IRIS	Increased average kidney weights in female rats and adrenal weights in male and female rats	Kidney	1	1000	NA	NA	NA	NA	NA
2-Hexanone	591-78-6	3.00E-02	IRIS	Motor conduction velocity of the sciatic-tibial nerve	Nervous system	1	3000	NA	NA	NA	NA	NA
Tetrachloroethene	127-18-4	4.00E-02	IRIS	Neurotoxicity (color vision; reaction time, cognitive effects)	Nervous system	1	1000	2.60E-07	IRIS	Likely to be carcinogenic in humans by all routes of exposure	Hepatocellular adenomas or carcinomas	Liver
Trichloroethene	79-01-6	2.00E-03	IRIS	Multiple	Multiple	1	Multiple	4.10E-06	IRIS	Carcinogenic to humans	Multiple	Multiple
1,2,4-Trimethylbenzene	95-63-6	7.00E-03	PPRTV	Decreased clotting time	Blood	NA	3000	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	108-67-8	6.00E-03	PPRTV Archive	Effects	Respiratory, Neurological, and Hematological	NA	3000	NA	NA	NA	NA	NA
m&p-Xylenes (d)	108-38-3; 106-42-3	1.00E-01	IRIS	Impaired motor coordination (decreased rotarod performance)	Neurological	1	300	NA	NA	NA	NA	NA

a/ CASRN = Chemical Abstracts Service Registry Number; mg/m^3 = milligrams per cubic meter; ug/m3 = micrograms per cubic meter; NA = not available.

b/ IRIS = U.S. Environmental Protection Agency's (EPA's) Integrated Risk Information System (EPA 2014b); Cal/EPA = California Environmental Protection Agency's Office of Environmental Health Hazard Assessment's (OEHHA) Criteria Database (Cal/EPA OEHHA 2014); PPRTV = EPA's Provisional Peer Reviewed Toxicity Values (EPA 2007); PPRTV Archive = EPA's Archived Provisional Peer Reviewed Toxicity Values as presented in EPA (2015b).

c/ No toxicity value available. The toxicity value for isopropylbenzene is assumed as a surrogate for 4-ethyl toluene.

d/ Toxicity information is for xylenes (CASRN 1330-20-7).

Table D-4

Exposure Point Concentrations for Chemicals of Potential Concern in Indoor Air from Sub-Slab Vapor
Wix Filtration Plant
Dillon, South Carolina (a)

Constituent (μg/m^3)	CASRN	Maximum Concentration in Sub-slab Soil Vapor	Exposure Point Concentration in Indoor Air (b)
Benzene	71-43-2	7.8	0.23
Ethylbenzene	100-41-4	32.7	0.98
4-Ethyl toluene	622-96-8	15.3	0.46
2-Hexanone	591-78-6	100	3.0
Tetrachloroethene	127-18-4	1,600	48
Trichloroethene	79-01-6	64	1.9
1,2,4-Trimethylbenzene	95-63-6	35.5	1.1
1,3,5-Trimethylbenzene	108-67-8	13.4	0.40
m&p-Xylenes	108-38-3; 106-42-3	97	2.91

a/ CASRN = Chemical Abstracts Service Registry Number; μg/m^3 = micrograms per cubic meter.

b/ Calculated using the U.S. Environmental Protection Agency's Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator, Version 3.4, June 2015 RSLS (EPA 2015c).

Table D-5

Summary of Risk Estimates for Potential Onsite Facility Worker Receptors
Wix Filtration Plant
Dillon, South Carolina

Receptor	Exposure Medium	Exposure Route	Excess Lifetime Cancer Risk (a)	Non-Cancer Hazard Index (b)
Onsite Facility Worker	Indoor Air	Inhalation	2.01E-06	5.75E-01
		Exposure Pathway Total	***2.01E-06***	***5.75E-01***
		Risk/Hazard Index Total	**2.0E-06**	**5.8E-01**

a/ Excess cancer risks that range between 1 x 10^{-6} to 1 x 10^{-4} are generally considered to be acceptable.

b/ A hazard index less than or equal to 1.0 means no adverse health effects are likely associated with exposures to compounds of potential concern.

Attachment D-1 – SGC-IAC Calculator Output

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.4, June 2015 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-04	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
			Csg	Cia	CR	HQ
			(ug/m^3)	(ug/m^3)		
x	71-43-2	Benzene	7.8E+00	2.34E-01	1.5E-07	1.8E-03
x	100-41-4	Ethylbenzene	3.27E+01	9.81E-01	2.0E-07	2.2E-04
x	622-96-8	4-Ethyltoluene (a) (b)	1.53E+01	4.59E-01	No IUR	2.6E-04
x	591-78-6	Hexanone, 2-	1.0E+02	3.00E+00	No IUR	2.3E-02
x	127-18-4	Tetrachloroethylene	1.6E+03	4.80E+01	1.0E-06	2.7E-01
x	79-01-6	Trichloroethylene	6.4E+01	1.92E+00	6.4E-07	2.2E-01
x	95-63-6	Trimethylbenzene, 1,2,4-	3.55E+01	1.07E+00	No IUR	3.5E-02
x	108-67-8	Trimethylbenzene, 1,3,5- (a)	1.34E+01	4.02E-01	No IUR	1.5E-02
x	1330-20-7	Xylenes	9.70E+01	2.91E+00	No IUR	6.6E-03
			RELEVANT SECTION OF MODEL			

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
IUR		RfC		
(ug/m^3)$^{-1}$		(mg/m^3)		i
7.80E-06	I	3.00E-02	I	
2.50E-06	CA	1.00E+00	I	
		4.00E-01	I	
		3.00E-02	I	
2.60E-07	I	4.00E-02	I	
4.10E-06	I	2.00E-03	I	Mut
		7.00E-03	P	TCE
		6.00E-03	P Archive	
		1.00E-01	I	

a/ 4-Ethyltoluene and 1,3,5-trimethylbenzene were added to the list of chemicals included in the SGC-IAC calculator.

b/ The toxicity value for isopropylbenzene is assumed as a surrogate for 4-ethyltoluene.

Attachment D-2 – Facility Worker Exposure and Risk Estimates

Attachment D-2 - Exposure and Risk Calculations for a Facility Worker - Inhalation (Indoor Air) Pathway

Medium:	Sub-slab Vapor
Exposure Medium:	Indoor Air
Receptor Population:	**Facility Worker**
Exposure Route:	Inhalation

Exposure Concentration:

EC = (CA x ET x EF x ED)/(AT x 24 hours/day)

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference (a)
CA	Chemical Concentration in Indoor Air	mg/m^3	Chemical-specific	Calculated (see Table D-4 and Attachment D-1)
EF	Exposure Frequency	days/year	250	EPA 2015b
ED	Exposure Duration	years	25	EPA 2015b
ET	Exposure Time	hours/day	8	EPA 2015b
AT-C	Averaging Time (Cancer)	days	25,550	EPA 2015b
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA 2015b

a/ See report for full reference.

Chemical of Potential Concern	Exposure Point Concentration (CA) mg/m^3 (a)	Exposure Concentration (EC) cancer mg/m^3	Inhalation Unit Risk (IUR) (mg/m^3)$^{-1}$ (b)	Cancer Risk (EC*IUR) unitless	Exposure Concentration (EC) non-cancer mg/m^3	Inhalation Reference Concentration (chronic) (RfCi) mg/m^3	Hazard Quotient (EC/RfCi) unitless
Benzene	2.34E-04	1.91E-05	7.80E-03	1.49E-07	5.34E-05	3.00E-02	1.78E-03
Ethylbenzene	9.81E-04	8.00E-05	2.50E-03	2.00E-07	2.24E-04	1.00E+00	2.24E-04
4-Ethyl toluene	4.59E-04	3.74E-05	-	-	1.05E-04	4.00E-01	2.62E-04
2-Hexanone	3.00E-03	2.45E-04	-	-	6.85E-04	3.00E-02	2.28E-02
Tetrachloroethene	4.80E-02	3.91E-03	2.60E-04	1.02E-06	1.10E-02	4.00E-02	2.74E-01
Trichloroethene	1.92E-03	1.57E-04	4.10E-03	6.42E-07	4.38E-04	2.00E-03	2.19E-01
1,2,4-Trimethylbenzene	1.07E-03	8.68E-05	-	-	2.43E-04	7.00E-03	3.47E-02
1,3,5-Trimethylbenzene	4.02E-04	3.28E-05	-	-	9.18E-05	6.00E-03	1.53E-02
m&p-Xylenes	2.91E-03	2.37E-04	-	-	6.64E-04	1.00E-01	6.64E-03
		TOTAL INHALATION PATHWAY		**2.01E-06**			**5.75E-01**

a/ Converted from micrograms per cubic meter.

b/ Converted from 1/(micrograms per cubic meter).

WSP USA Corp.

K:\Affinia\Dillon SC\RI Report Addendum\App D\Attachment D-2 - Estimated Intakes and Doses and Supporting Calcs for Updated 2015 VI Exposure Pathway

Revised: 08/20/2015

Appendix E – Engineering Evaluation of Existing Air Sparge/Soil Vapor Extraction System

11190 Sunrise Valley Drive
Suite 300
Reston, VA 20191
Main: 703 709 6500
www.wspgroup.com/usa

Engineering Evaluation of Existing Air Sparge/Soil Vapor Extraction
Wix Plant Site
Dillon, South Carolina
August 20, 2015

On behalf of Wix Filtration Corp LLC (Wix), WSP USA Corp is submitting this evaluation of the existing air sparge/ soil vapor extraction (AS/SVE) system for the Wix Plant located in Dillon, South Carolina (Site). The engineering evaluation has been prepared in accordance with WSP's February 27, 2015, *Remedial Investigation Work Plan Addendum and AS/SVE System Evaluation* (RI Work Plan Addendum and AS/SVE Evaluation Letter), approved by the South Carolina Department of Health and Environmental Control (SCDHEC) on March 4, 2015.

Background

Toluene-affected soils were identified while repairing an underground water line west of the main facility in 2005. Environmental Resources Management (ERM) performed site investigations to delineate the toluene-impacted soils and evaluated remedial options. Following the August 2007 AS pilot test, ERM selected AS/SVE as the remedial technology to capture and treat toluene-containing vapors from the release. ERM completed installation of the system in November 2009 and began operating the AS/SVE system in December 2009. The AS/SVE system's design drawings, as provided by ERM in the March 2010 *Ground Water Monitoring Report* to document the installation, are presented in this summary as Enclosure A.

The system configuration consists of five AS wells installed to the top of the clay layer (approximately 8 feet below ground surface [bgs]) and two horizontal SVE wells installed at a depth of 3.5 feet bgs.[1] Air is injected into the five AS wells to release toluene-containing vapors into the vadose, or unsaturated zone, which are then removed via the SVE wells. The designed radius of influence (ROI) of the AS/SVE system (6,400 square feet) encompasses monitoring wells MW-1 through MW-4/4R[2] (Enclosure A; Sheet S-1). The design assumes a vertical treatment zone extending 4.5 feet, from the depth of the SVE wells (3.5 feet bgs) to a maximum depth of the air sparge wells (8 feet bgs). Based on the estimated area and vertical extent of treatment, the ROI is approximately 28,800 cubic feet (1,067 cubic yards [CY]).

To ensure capture of the toluene-containing vapors, the SVE system was designed to extract vapors at twice the flow rate the air is injected. The combined AS flow rate is designed at 7.5 standard cubic feet per minute (scfm), and the SVE flow rate is designed at 15 scfm. The SVE off-gas is piped to an equipment trailer for treatment using activated carbon and discharged to the atmosphere.

ERM performs operations and maintenance (O&M) for the AS/SVE systems, with site inspections approximately once per month. Data recorded during the site visits includes AS and SVE wellhead pressure readings and photoionization detector (PID) readings for the SVE influent and effluent. ERM also monitors groundwater elevations and quality on a semi-annual basis at the network of site-wide monitoring wells. The AS/SVE system O&M and groundwater monitoring data are provided to SCDHEC

---

[1] ERM's March 2010 Ground Water Monitoring Report text states that the system includes only one SVE well. However, the preliminary drawings attached to the report include two SVE wells, which is consistent with onsite observations and other site documents.
[2] MW-4 replaced with MW-4R in May 2015.

in semi-annual ground water monitoring reports. The historic AS/SVE system, groundwater elevation, and groundwater quality data excerpted from ERM's most recent (March 2015) *Ground Water Monitoring Report* are provided in Enclosure B.

Evaluation Resources

The following sources were reviewed as part of this evaluation:

- ERM's AS/SVE System Preliminary Drawings provided as Attachment A in ERM's March 2010 *Ground Water Monitoring Report* (Enclosure A).
- Historic groundwater elevation, groundwater quality, and operations and maintenance records provided as Appendices A, B, and E, respectively, in ERM's March 2015 *Ground Water Monitoring Report* (Enclosure B).
- Physiochemical properties and soil organic carbon sample results provided in WSP's August 21, 2014, *Remedial Investigation Report* (RI Report).
- WSP's February 27, 2015, *Remedial Investigation Work Plan Addendum and AS/SVE System Evaluation* (RI Work Plan Addendum and AS/SVE Evaluation Letter).
- U.S. Environmental Protection Agency's (EPA) Office of Underground Storage Tanks (OUST) guidance document, *How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites: A Guide for Corrective Action Plan Reviewers*.
- Analytical results for the April 28, 2015 SVE influent vapor sample (Enclosure C), and WSP's AS/SVE system operations inspection performed April 27 through 29, 2015; site inspection photographs provided as Enclosure D.
- AS/SVE Equipment Specifications:
  - ROTRON® Regenerative Blowers, Models EN 454M & CP 454M, Sealed Regenerative Blower w/Explosion-Proof Motor. www.ametektmd.com (Accessed June 30, 2015).
  - Grainger 5 HP, 14.6, 60 gal. Vertical Splash Lubricated Tank Mounted Electric Air Compressor. http://www.grainger.com/product/SPEEDAIRE-Electric-Air-Compressor-3VB60 (Accessed June 30, 2015).
  - CARBTROL® Activated Carbon Canisters. http://www.carbtrol.com/carbon.html?gclid=CNHLn7zvt8YCFcHPcgodyFICug (Accessed June 30, 2015).

AS/SVE Evaluation

In accordance with the AS/SVE Evaluation Letter, the AS/SVE system evaluation included the following criteria:

- Review of the technology's suitability for the site characteristics (e.g., groundwater depth, soil permeability, toluene concentrations) using regulatory guidance.
- Compare the estimated mass of toluene in the system's ROI to the system's mass removal of toluene.
- Perform equipment sizing calculations for AS/SVE components (e.g., compressor, blower, vapor-phase treatment equipment) to confirm if the existing components are appropriately sized for maximum treatment capacity.
- Confirm the remedial system configuration optimizes the influence on the plume, thereby maximizing the removal efficiency of the system.

- Review site operations to confirm the existing equipment is operating properly and at the appropriate settings.

The evaluation findings are provided below.

Site Characterization and Feasibility Analysis

WSP evaluated the AS/SVE suitability for site characteristics using Chapter VII of U.S. EPA OUST's guidance document, *How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites: A Guide for Corrective Action Plan Reviewers*. The recommended characteristics for several key suitability parameters are compared to the Wix site conditions below.

Geology

- EPA OUST Guidance: Relatively homogeneous subsurface, not stratified; sandy soils; recommended intrinsic permeability (k) value greater than or equal to 1 x 10^{-9} square centimeters (cm^2).
- Site Characteristic: Interbedded clay and sand; k assumed to be less than 1 x 10^{-9} cm^2.

Groundwater Depth

- EPA OUST Guidance: Recommended depth to groundwater is greater than 5 feet bgs to prevent submergence of SVE wells and less than 50 feet bgs (to optimize air flow).
- Site Characteristic: Depth to groundwater at monitoring wells within the ROI of the AS/SVE system is typically less than 5 feet bgs; the historical average depth to groundwater within the ROI is 3.22 feet bgs. The water level measurements at monitoring wells within the AS/SVE system ROI are tabulated in Table E-1.

Contaminant Chemical Properties

- EPA OUST Guidance: The contaminant to be treated should have a relatively high Henry's law constant (greater than 1 x 10^{-05} atmospheres cubic meter per mole [atm-m^3/mole]).
- Site Characteristic: Toluene, the contaminant targeted for treatment, has a Henry's law constant of 0.00664 atm-m^3/mole.

Chemical Concentration

- EPA OUST Guidance: Technology not recommended for free product applications.
- Site Characteristic: Toluene concentrations in monitoring wells within the ROI of the AS/SVE system have been near its solubility limit 520 milligrams per liter, which is indicative of potential presence of free product (Enclosure B).

In summary, none of the site characteristics evaluated except for the contaminant chemical properties met the EPA OUST's recommended properties for suitability of AS/SVE technology, thereby limiting the potential effectiveness of the system.

Toluene Mass Removal and Mass within ROI

The system's effectiveness at mass removal was evaluated by comparing the mass in the AS/SVE system's ROI, both pre-system startup and in present day, to the mass removed by the system.

Toluene Mass within ROI

The toluene mass within the ROI was estimated before system startup and in the most recent monitoring event using groundwater concentration data. As shown on Table E-2, the toluene mass within the ROI before the system startup (based on September 2009 groundwater sampling results) was compared to the toluene mass today (based on March 2015 groundwater sampling results). To account for variability in the groundwater concentrations at monitoring wells within the ROI, the ROI was split into four equally-sized quadrants, with one monitoring well per quadrant (MW-1 through MW-4/4R). The quadrant's groundwater concentrations were represented by the groundwater sampling results from the monitoring well in the quadrant. The following assumptions were made in the calculations:

- Soil density is 1.7 tons per CY.
- Based on historical groundwater level measurements collected at monitoring wells within the ROI (Table E-1), the entire treatment interval (3.5 feet bgs to 8 feet bgs) is assumed to be saturated.
- As provided in the RI Report, the following site parameters are assumed for estimating the sorbed mass from the groundwater concentrations:
  - Specific yield is 0.2.
  - Organic carbon partition coefficient is 140 liters per kilogram.
  - Fraction of organic carbon in the upper clay zone is 0.16%.

This calculation estimates approximately 202 pounds of toluene were present within the ROI pre-system startup, as compared with approximately 158 pounds of toluene present in March 2015 (Table E-2). Therefore, the toluene mass within the ROI has decreased approximately 44 pounds over the lifetime of the system. The decrease in mass in the ROI is mainly attributed to decreases in toluene concentrations at MW-1 and MW-3. The mass reduction at these monitoring wells is likely attributable in part to migration, dilution, and biodegradation, in addition to AS/SVE system operations.

AS/SVE System Mass Removal

The mass removal based on AS/SVE system data was calculated using the SVE influent air flow rate, provided from ERM O&M inspection records (Table E-3), and available concentration data. Due to the limited concentration data available for the SVE system, the toluene concentration was estimated by two methods:

- The toluene concentration detected in the April 28, 2015, vapor sample result to represent the average historical toluene concentration in the system influent.
- SVE influent and effluent PID measurements to represent toluene concentrations at each O&M monitoring event.

Method 1: April 28, 2015 Toluene Concentration Basis

Vapor samples from the influent and effluent of the SVE system are not collected for laboratory analysis of VOCs as part of ERM's O&M; therefore, the concentrations of individual compounds (e.g., toluene) have not been analyzed over the lifetime of the system. In order to quantify the toluene concentration in the SVE system influent, WSP collected a vapor sample on April 28, 2015. The sampled was collected over a 1-hour period in a 6 liter SUMMA canister, and analyzed by Pace Analytical Services, Inc. for benzene, toluene, ethylbenzene, and xylene using U.S. EPA Method TO-15. The full analytical report is provided in Enclosure C and results by compound are copied below:

- Benzene: 4.2 microgram per cubic meter ($\mu g/m^3$)
- Toluene: 235 $\mu g/m^3$
- Ethylbenzene: 5.8 $\mu g/m^3$
- Xylene (total): 27.3 $\mu g/m^3$

To calculate the toluene mass removed by the AS/SVE system since startup, it was assumed the toluene concentration measured in the April 28, 2015 sample is representative of the influent toluene concentrations throughout the system's lifetime. The concentration was then converted to pounds per cubic foot, and multiplied by the historic average air flow rate for the SVE system and total time in operation through the most recent system inspection (February 26, 2015). The toluene mass removed using this data is estimated at 1.71 pounds (Table E-4). However, this estimate may be inaccurate due to the following:

- Historical PID readings show a sharp decline over time from start up to current day, with an expected similar decline in toluene concentration (Table E-3); therefore, the toluene concentration on April 28, 2015 was likely well below the historical average.
- WSP personnel did not observe any vacuum pressure at the SVE wells, and the depths to groundwater measured at monitoring wells within the ROI on April 30, 2015 were above the depth of the SVE horizontal pipe (3.5 feet bgs), indicating the pipe was likely submerged during the sample collected (Table E-1). Therefore, this vapor sample may represent residual vapor concentrations absorbed to the inside of the SVE pipe header, not the actual soil vapor concentrations.

Method 2: SVE Influent and Effluent PID Readings Basis

Field screening of organic constituents in the SVE influent and effluent vapor streams is performed by ERM each site visit using a PID. To account for fluctuations in SVE influent concentrations over time, WSP also estimated the toluene mass removal using the PID data. Based on the prevalence of toluene in groundwater samples from monitoring wells within the ROI, it is assumed that all of the organic vapors measured by the PID are toluene. These readings from system startup (December 1, 2009) through February 26, 2015 are shown in Table E-5. The difference in the PID influent and effluent concentrations per monitoring event (in parts per million [ppm]) was converted to a toluene concentration in ppm by volume (ppmv), using a conversion factor of 2.6[3]. The toluene concentration (ppmv) was then multiplied by the SVE system flow rate to estimate the mass removal. This calculation estimates approximately 1,200 pounds of toluene have been removed by the AS/SVE system since system startup (Table E-4). The toluene concentrations and estimated mass removal based on historical PID readings

---

[3] PID reading (ppm) converted to toluene concentration (ppmv) using RAE document Technical Note 158, "Conversion of PID Readings to Methane Equivalent of Hexane Equivalent FID Response." January 2006.

are inconsistent with other site data and observations. This may be attributed to inaccurate PID measurements, contributions from other organic compounds in the PID readings, or inaccuracies with other site data.

Inconsistencies include:

- At toluene’s absorption capacity of 20% per unit weight of carbon, the two CARBTROL vessels, each containing 200 pounds of activated carbon, have a combined adsorption capacity of 80 pounds of toluene. If 1,200 pounds of toluene were actually removed by the AS/SVE system, approximately 14 carbon replacement events would have been required throughout the system’s lifetime to continue toluene treatment. However, there are no records of carbon replacement.
- PID measurements of the AS/SVE System effluent have remained consistently at 0 ppm since system startup, while PID measurements of the influent indicate toluene mass is present. As the activated carbon reaches its adsorption capacity, the removal efficiency of the carbon decreases, and the effluent vapor concentrations would therefore increase until the carbon is replaced.
- The estimated toluene mass removed using PID measurements (1,200 pounds) represents nearly 6 times the estimated mass within the ROI pre-system startup (202 pounds).
- PID influent measurements have decreased 90%, from a historic maximum of 210 ppm (April 28, 2010) to a maximum of 20 ppm since August 30, 2012. However, estimated toluene mass within the ROI has only decreased 22%, based on groundwater concentrations in September 2009 compared to March 2015.

Summary

The estimated mass within the ROI was calculated pre-system startup using September 2009 groundwater sampling results and present day using the most recent (March 2015) groundwater sampling results. The present day estimated mass of toluene (158 pounds) is approximately 22% less than the estimated mass within the ROI at system start-up (202 pounds; Table E-2). The mass reduction may be related to migration, dilution, biodegradation, AS/SVE system operations, or a combination thereof.

Toluene mass removal was estimated by two methods:

- the toluene concentration detected in the April 28, 2015, vapor sample result was used to represent the average historical toluene concentration

- SVE influent and effluent PID measurements were used to derive the concentration of toluene removed.

The toluene mass removal estimate varied by over 1,198 pounds between the two methods, from 1.71 pounds (Method 1) to 1,200 pounds (Method 2). Both estimates of toluene mass removal are considered unreliable as they do not correlate to the observed 22% reduction in the estimated mass within the ROI of the system or with the limited mass of carbon consumed during operation.

Performance Sizing Calculations

WSP performed equipment sizing calculations for AS/SVE components (e.g., compressor, blower, vapor-phase treatment equipment) as proposed in the AS/SVE evaluation letter to confirm if the existing components are appropriately sized for maximum treatment capacity. WSP evaluated the hydrostatic pressure to determine if the air compressor was providing adequate air pressure and SVE blower had sufficient capacity to capture the induced air flow. The hydrostatic pressure (P_w) is the minimum air pressure to overcome the water pressure and induce flow, and is calculated as:

$$P_w = \rho_w * g * h_w$$

Where:

P_w	Minimum air pressure to overcome water pressure (pounds per square foot [psf])
ρ_w	Density of water (slugs per cubic foot [slugs/ft^3])
h_w	Height of water above top of well screen (ft)
g	the gravitational constant (32.17405 feet per second [ft/s^2])

Parameter h_w is estimated at 4 feet, assuming a top of AS well screen at 7 feet bgs and the top of the saturated interval at 3.22 feet bgs, based on the average depth to groundwater within the ROI (Table E-1). Using the calculation above, P_w is estimated at 236 psf (1.64 pounds per square inch [psi]). The Westward air compressor is a 2 stage, 5 horsepower model, capable of generating a maximum of 175 psi at 17 scfm. Based on the calculated P_w and the design AS air flow rates (8.75 scfm), the air compressor is sized appropriately to overcome the P_w and attain the design flow rate.
ERM's AS/SVE preliminary drawings note that the SVE flow rate is designed to extract air at twice the flow rate as the air sparge system. The SVE blower is a ROTRON® EN 454 regenerative blower, which is capable of providing 50 inches of water column (1.8 psi) at the SVE design flow rate of 17.5 scfm. Therefore, the blower is sized appropriately to provide the design air flow rate. However, given the interbedded clay and sand present, the vacuum rating of the SVE blower is likely too low to provide the design ROI.

The extracted soil vapor is treated through two, in-line CARBTROL vessels, model G-1S. The vessels each contain 200 pounds of activated carbon, and can operate up to a maximum flow of 200 cfm at a design pressure of 2 psi. The vapor treatment equipment is capable of operating under the design flow rate (17.5 scfm)

In summary, the AS air compressor, SVE blower, and carbon treatment equipment were confirmed to be sized appropriately for the design flow rates. However, the application of the design flow rates under the site-specific conditions do not provide an effective remediation system, as discussed further in the following section.

Remedial System Configuration

The AS/SVE system configuration was assessed to determine if the horizontal and vertical placement of the AS/SVE wells optimized removal of toluene-affected vapors.

As discussed in WSP's RI Report, the toluene-affected groundwater occurs as a small, slightly elongated area with the highest concentrations in the vicinity of well MW-13 and the area to the west (MW-2, MW-3, and MW-4/4R). Samples collected from MW-4/4R and MW-13 had toluene concentrations near the aqueous solubility limit for toluene – 520 milligrams per liter at 25 degrees Celsius – suggesting the probable presence of residual product in the saturated zone at these locations. The AS/SVE system's ROI includes the western portion of the area with maximum toluene concentrations (MW-2, MW-3, and

MW-4/4R) but does not include the area to the east in the vicinity of MW-13. Therefore, the horizontal configuration only targets a portion of the area with the highest toluene concentrations.

As mentioned in previous sections, the historical average depth to groundwater at the monitoring wells within the ROI is 3.22 feet bgs. The design drawings document the depth of the SVE wells as approximately 3.5 feet, suggesting that the SVE wells are normally submerged, which limits the ability for vapor extraction. In addition, the shallow depth of the SVE wells likely result in short circuiting of the air from the surface, limiting the ROI of the system.

The evaluation of the remedial system configuration concludes that the horizontal and vertical placement of extraction wells does not optimize the removal of toluene-affected vapors.

Operations Evaluation

AS/SVE system operations were evaluated to determine if equipment was operating properly and at appropriate settings. Data reviewed included the historical O&M records provided in ERM's March 2015 *Ground Water Monitoring Report* (Enclosure B), including air pressure readings at AS and SVE wells and PID readings of the system influent and effluent. WSP also performed an onsite inspection of the AS/SVE system operations to gather additional information on April 27 through 29, 2015.

The operations evaluation identified the following key findings:

- Based on available data, the AS/SVE system has been in continuous operation since system startup (December 1, 2009). ERM did not provide any information on system shutdowns for system alarms or maintenance.
- No information was provided on whether or not the activated carbon has been replaced since system startup (December 1, 2009). If the system were operating as designed, multiple carbon replacements would be anticipated to treat the toluene concentrations remaining within the ROI.
- AS and SVE flow rates in the ERM O&M records show that although the SVE system is operating at a higher flow rate than the AS combined flow, the SVE flow rate is typically less than the design value of twice the AS combined flow (Table E-3). Operating the SVE system below the design ratio with the AS system will decrease the ability to capture and treat toluene vapors.
- PID Readings from the SVE system influent and effluent appear inappropriate for the estimated mass of toluene within the ROI. As mentioned previously, although the estimated reduction in groundwater mass within the ROI is 22% (Table E-2), the PID readings for the SVE influent indicate a 90% reduction in toluene mass extracted (Table E-5). This may be due to inaccurate PID readings, other volatile chemicals contributing to the PID concentrations, operating deficiencies with the AS/SVE system, or a combination thereof.
  - The historic maximum PID reading in the system influent is 210 ppm (April 28, 2010), with an average PID reading from system startup through February 26, 2015 at 27 ppm. PID readings remain at or below 20 ppm since August 30, 2012. The average PID reading of the system influent is 27 ppm.
  - The PID readings for the SVE system effluent have been recorded consistently at 0 ppm. Based on the mass remaining within the ROI, effluent PID readings are anticipated to fluctuate as mass is absorbed to carbon, thereby decreasing the removal efficiency until the carbon is replaced. No information was available on whether any carbon replacements have been performed.

- Groundwater elevations indicate that the AS/SVE system has likely been submerged during the majority of its operating life.
- Short-circuiting of the AS system, including water bubbling at the ground surface within the ROI, was observed during WSP's site visits in April, May, and September 2014, as well as WSP's AS/SVE inspection in April 2015. This is likely attributed to the AS system being submerged.

- During WSP's April 2015 onsite inspection, the following additional observations were made:
  - Depths to groundwater at MW-1 through MW-4/4R ranged from 1.59 feet bgs (MW-4/4R) to 3.5 feet bgs (MW-1), and wells SVE-1 and SVE-2 appeared fully submerged, which prohibits the ability to extract soil vapors.
  - No vacuum pressure was physically observed at SVE-1 or SVE-2 wellheads during the inspection period, which is consistent with the observation of the wells fully submerged, but inconsistent with the historical SVE wellhead pressure readings provided in ERM O&M records.
  - Several pressure gages appeared broken at the AS and SVE wellheads and the equipment in the equipment trailer.
  - Observations of limited AS and SVE flow indicate minimal air flow through the subsurface and treatment equipment.

Overall, the evaluation of AS/SVE system operations identified several deficiencies, including ineffective operating pressures, short-circuiting of the AS system due to the submergence of the AS/SVE system wells, and inadequate removal of toluene-affected vapors through the SVE system.

Conclusion and Recommendation

The following conclusions are reached on the AS/SVE system:

- The site characteristics failed to meet the EPA OUST's suitability criteria except for the contaminant chemical properties, thereby limiting the potential effectiveness of the system.
- Approximately 158 pounds of toluene mass remain present within the ROI, based on March 2015 groundwater sampling results, which compares to 202 pounds pre-system startup, based on September 2009 groundwater sampling results. The reduction in toluene mass (44 pounds) within the ROI is attributed to decreased toluene concentrations at MW-1 and MW-3.
- Although the estimated mass of toluene removed by the AS/SVE system was performed using two different methods, neither estimated is presumed accurate due to limited concentration data and inconsistencies with other site information.
- The AS/SVE components appear to be appropriately sized for the design flow rates.
- The AS/SVE configuration encompasses only the western portion of the source area, and the SVE wells are installed below the average depth to groundwater within the ROI (3.22 feet bgs). Therefore, the configuration does not optimize the removal of toluene-affected vapors.
- A review of site operations and WSP's April 2015 onsite inspection identified several deficiencies in system operations, including the short-circuiting of sparged air bubbling at the ground surface, submerged SVE wells, broken pressure gages, and lack of air flow through the system.

WSP recommends evaluating remedial alternatives, including an enhanced AS/SVE system, for the toluene source area through a focused feasibility study (FFS). Enhancements to the AS/SVE system, including a system expansion to the east (toward MW-13), a conversion to a dual phase extraction system to extract the shallow groundwater and enhance vapor recovery, a treatment system for recovered groundwater, and O&M improvements to correct deficiencies identified in the evaluation, may improve the system's removal efficiency. However, the evaluation found the technology has low suitability under the site conditions, thereby continuing to limit its overall effectiveness. The FFS will be conducted in accordance with the October 29, 2014, *Focused Feasibility Study Work Plan and Response to Comments* letter, which was approved by SCDHEC.

The components of the FFS include the following:

- Remedial Action Objectives – the FFS will identify media-specific goals to protect human health and the environment and address the unacceptable risks to constituents of concern exposure identified in the Human Health Risk Assessment conducted as part of the RI.

- Screening of Remedial and Institutional Control Alternatives – the FFS will conduct a screening of removal, treatment, and control options for potential effectiveness in achieving the remedial action objectives. The screening of treatment options will include an analysis of the AS/SVE system currently in operation to evaluate its effectiveness in reducing mass and concentrations across the affected portion of the Site. At the conclusion of the screening step, three alternatives that are determined to be most appropriate for the Site will be retained for evaluation, ranging from a single option to a combination of options.

- Detailed Evaluation of Alternatives – the FFS will provide a description of the three retained alternatives to provide a clear understanding of the scope and approach to applying each alternative at the Site. Then, the alternatives will be evaluated individually and compared with one another using the nine CERCLA remedial evaluation criteria. The nine criteria are divided into three subcategories:
  - Threshold Criteria – overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements.
  - Balancing Criteria – long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost.
  - Modifying Criteria – state acceptance, community acceptance.

The FFS will be summarized in a report submitted to SCDHEC for review. As stated in the October 2014 FFS Work Plan letter, the proposed schedule for submittal of the FFS is 60 days after completion of the activities covered by the Amendment to the RI Work Plan.

Tables

Table E-1

Historic Groundwater Elevations
Wix Filtration Facility
Dillon, South Carolina (a)

		May 2014 Survey Data				Well Construction												
Monitoring Well	Installation Date	Northing	Easting	Ground Surface (ft-msl)	Top-of-Casing (ft-msl)	Diameter (inches)	Screened Interval (ft-bgs)		March 2010 Depth (ft-toc)	March 2010 Elevation (ft-msl)	February 2011 Depth (ft-toc)	February 2011 Elevation (ft-msl)	August 2011 Depth (ft-toc)	August 2011 Elevation (ft-msl)	February 2012 Depth (ft-toc)	February 2012 Elevation (ft-msl)	August 2012 Depth (ft-toc)	August 2012 Elevation (ft-msl)
MW-1	5/17/2006	954878.01	2486307.08	132.32	131.85	2	6.9	16.9	-	-	2.51	129.34	6.21	125.64	5.13	126.72	5.42	126.43
MW-2	5/17/2006	954868.49	2486276.21	130.19	129.91	2	7.1	17.1	1.77	128.14	2.35	127.56	7.66	122.25	4.29	125.62	5.71	124.20
MW-3	5/17/2006	954786.58	2486293.64	129.27	129.24	2	6.5	16.5	1.15	128.09	1.75	127.49	6.94	122.30	4.27	124.97	5.03	124.21
MW-4 (b)	5/17/2006	-	-	-	130.47	2	6.8	16.7	2.84	127.63	3.04	127.43	9.04	121.43	5.21	125.26	-	-
MW-4R	5/8/2014	954815.15	2486322.28	131.11	133.92	2	2	12	-	-	-	-	-	-	-	-	-	-

Table E-1

Historic Groundwater Elevations
Wix Filtration Facility
Dillon, South Carolina (a)

		May 2014 Survey Data				Well Construction										
									February 2013		August 2013		February 2014		May 2014	
Monitoring Well	Installation Date	Northing	Easting	Ground Surface (ft-msl)	Top-of-Casing (ft-msl)	Diameter (inches)	Screened Interval (ft-bgs)		Depth (ft-toc)	Elevation (ft-msl)	Depth (ft-toc)	Elevation (ft-msl)	Depth (ft-toc)	Elevation (ft-msl)	Depth (ft-toc)	Elevation (ft-msl)
MW-1	5/17/2006	954878.01	2486307.08	132.32	131.85	2	6.9	16.9	3.00	128.85	3.66	128.19	0.4	131.45	5.25	126.60
MW-2	5/17/2006	954868.49	2486276.21	130.19	129.91	2	7.1	17.1	4.66	125.25	1.99	127.92	0.51	129.40	3.25	126.66
MW-3	5/17/2006	954786.58	2486293.64	129.27	129.24	2	6.5	16.5	3.43	125.81	1.38	127.86	0.63	128.61	2.51	126.73
MW-4 (b)	5/17/2006	-	-	-	130.47	2	6.8	16.7	-	-	-	-	-	-	-	-
MW-4R	5/8/2014	954815.15	2486322.28	131.11	133.92	2	2	12	-	-	-	-	-	-	7.75 (c)	126.17

Table E-1

Historic Groundwater Elevations
Wix Filtration Facility
Dillon, South Carolina (a)

		May 2014 Survey Data				Well Construction			September 2014		March 2015		April 2015		Historical Average		
Monitoring Well	Installation Date	Northing	Easting	Ground Surface (ft-msl)	Top-of-Casing (ft-msl)	Diameter (inches)	Screened Interval (ft-bgs)		Depth (ft-toc)	Elevation (ft-msl)	Depth (ft-toc)	Elevation (ft-msl)	Depth (ft-toc)	Elevation (ft-msl)	Depth (ft-toc)	Elevation (ft-msl)	Depth (ft-bgs)
MW-1	5/17/2006	954878.01	2486307.08	132.32	131.85	2	6.9	16.9	5.07	126.78	1.35	130.50	3.03	128.82	3.73	128.12	4.20
MW-2	5/17/2006	954868.49	2486276.21	130.19	129.91	2	7.1	17.1	3.91	126.00	1.10	128.81	2.10	127.81	3.41	126.50	3.69
MW-3	5/17/2006	954786.58	2486293.64	129.27	129.24	2	6.5	16.5	4.01	125.23	0.40	128.84	1.56	127.68	2.90	126.34	2.93
MW-4 (b)	5/17/2006	-	-	-	130.47	2	6.8	16.7	-	-	-	-	-	-	5.76	124.71	-
MW-4R	5/8/2014	954815.15	2486322.28	131.11	133.92	2	2	12	2.73	131.19	4.20	129.72	4.86	129.06	4.89	129.04	2.08
														Average:	4.14	126.94	3.22

---

a/ ft-msl = feet mean sea level; ft-toc = feet top-of-casing; ft-bgs = feet below ground surface; "-" = not measured.
Elevations provided by ERM, except for May 2014 and May 2015, which were measured by WSP.

b/ Well abandoned.

c/ Does not reflect static water level, well did not recover after development.

Table E-2

Mass of Toluene within AS/SVE System Radius of Influence
Wix Filtration Facility
Dillon, South Carolina (a)

1. AS/SVE System - Volume of ROI

AS/SVE System ROI^{b}	**AS/SVE System Vertical Treatment Interval (assume 100% saturated)**^{c}			**Treatment Volume**	
Sq Ft	Ft bgs	to	Ft bgs	Cu Ft	Cu Yds
6,400	3.5	to	8	28,800	1,067

2. Split AS/SVE System's ROI into Quadrants to Account for Toluene Concentration Variability

MW-1 Area (Northeast Quadrant of ROI)		**MW-2 Area (N-Central Quadrant of ROI)**		**MW-3 Area (South-Central Quadrant of ROI)**		**MW-4/4R**^{d} **Area (Southeast Quadrant of ROI)**	
Area Sq Ft	Volume Cu Yds	Area Sq Ft	Volume Cu Yds	Area Sq Ft	Volume Cu Yds	Area Sq Ft	Volume Cu Yds
1,600	267	1,600	267	1,600	267	1,600	267

3. Mass of Soil and Groundwater in ROI

3a. SOIL

Soil Density, Assumed	**Mass of Soil, Total**		**MW-1 Area**		**MW-2 Area**		**MW-3 Area**		**MW-4/4R Area**	
Tons/CY	Lbs	Tons	Lbs	Tons	Lbs	Tons	Lbs	Tons	Lbs	Tons
1.7	3,626,667	1,813	906,667	453	906,667	453	906,667	453	906,667	453

3b. GROUNDWATER

Specific Yield	**Saturated Thickness**^{c}	**Volume of Groundwater, Total**		**Mass Groundwater, Total**	
-	Ft	Gals	L	Lbs	Tons
0.2	4.5	43,087.8	163,105.0	359,352	179.7

MW-1 Area			**MW-2 Area**			**MW-3 Area**			**MW-4/4R Area**		
Volume	Mass		Volume	Mass		Volume	Mass		Volume	Mass	
L	Lbs	Tons	L	Lbs	Tons	L	Lbs	Tons	L	Lbs	Tons
40,776	89,838	45	40,776	89,838	45	40,776	89,838	45	40,776	89,838	45

Table E-2

Mass of Toluene within AS/SVE System Radius of Influence
Wix Filtration Facility
Dillon, South Carolina (a)

<u>4. Calculate Mass of Toluene in Groundwater</u>

4a. Toluene Groundwater Concentrations in AS/SVE ROI

Location:	**MW-1** ug/L	**MW-2** ug/L	**MW-3** ug/L	**MW-4/4R** ug/L
9/1/2009 (pre-startup)	286,000	91,800	41,000	272,000
3/4/2015 (current)	17	85,100	4,960	449,000

4b. Estimate Mass of Toluene in Groundwater within ROI ^{e} *(calculated using groundwater volume and toluene concentrations by area)*

Location:	**MW-1 Area** Lbs	**MW-2 Area** Lbs	**MW-3 Area** Lbs	**MW-4/4R Area** Lbs	**Total** Lbs
9/1/2009 (pre-startup)	25.7	8.3	3.7	24.5	62.1
3/4/2015 (current)	0.0015	7.65	0.45	40.4	48.5

<u>5. Calculate Mass of Toluene in Soil</u>

5a. Calculate Kop from Foc and Koc Values

Foc^f %	**Toluene Koc**^{g} L/Kg	**Kop (=foc*Koc)** L/Kg
0.16%	140	0.224

5b. Estimate Toluene Soil Concentrations in ROI *(calculated using groundwater concentration and Kop)*

Cs = Cw Kop

Location:	**MW-1 Area** ug/kg	**MW-2 Area** ug/kg	**MW-3 Area** ug/kg	**MW-4/4R Area** ug/kg
9/1/2009 (pre-startup)	64,064	20,563	9,184	60,928
3/4/2015 (current)	4	19,062	1,111	100,576

5c. Estimate Mass of Toluene in Soil within ROI

(calculated using mass of soil and toluene concentrations by area)

Location:	**MW-1 Area** Lbs	**MW-2 Area** Lbs	**MW-3 Area** Lbs	**MW-4R Area** Lbs	**Total** Lbs
9/1/2009 (pre-startup)	58.1	18.6	8.3	55.2	140.3
3/4/2015 (current)	0.0034	17.28	1.01	91.19	109.48

Table E-2

Mass of Toluene within AS/SVE System Radius of Influence
Wix Filtration Facility
Dillon, South Carolina (a)

6. Estimate Mass of Toluene in Soil and Groundwater within ROI

(Sum of Mass of Toluene in Soil and Mass of Toluene in Groundwater from Steps 4 and 5)

Location:	**MW-1 Area** Lbs	**MW-2 Area** Lbs	**MW-3 Area** Lbs	**MW-4R Area** Lbs	**Total** Lbs
9/1/2009 (pre-startup)	83.7949	26.90	12.01	79.69	202
3/4/2015 (current)	0.0049	24.93	1.45	131.55	158

---

a/ AS/SVE = Air Sparge / Soil Vapor Extraction; ROI = AS/SVE System Radius of Influence; sq ft = square feet; Ft bgs = feet below ground surface; Cu Ft = cubic feet; Cu Yd = cubic yard; Gals = gallons; L = liters; ug/l = microgram per liter; ug/kg = microgram per kilogram; Lbs = pounds

b/ AS/SVE System ROI estimated from ROI depiction on Sheet S-1 of the AS/SVE Design Plans, provided by Environmental Resources Management (ERM) in the March 2010 Ground Water Monitoring Report.

c/ Based on historic water levels provided in ERM Ground Water Monitoring Reports, assume entire treatment interval (3.5 ft bgs to 8 ft bgs) is saturated.

d/ MW-4 replaced with MW-4R in May 2015.

e/ Groundwater results for September 1, 2009 (pre-startup) and March 4, 2015 (current) provided in Appendix B of ERM's March 2015 Groundwater Monitoring Report.

f/ Foc value for upper clay zone was estimated by averaging the total organic carbon values for samples collected from soil boring location SB-16 (0.0016), as provided in WSP's August 21, 2014 Remedial Investigation Report.

g/ U.S. Environmental Protection Agency. Soil Organic Carbon (Koc) / Water (Kow) Partition Coefficients.

Table E-3

AS/SVE System Operations Monitoring Records
Wix Filtration Facility
Dillon, South Carolina (a)

													PID		Combined		
	AS-1		AS-2		AS-3		AS-4		AS-5		SVE		IN	OUT	AS Flow	SVE Flow	
Date	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	ppm	ppm	SCFM	ft/min	SCFM
DESIGN	-	1.75	-	1.75	-	1.75	-	1.75	-	1.75	-	17.5	-	-	8.75	-	17.5
12/1/2009	50	1.1	30	0.7	25	0.5	55	1.2	45	1	125	10.9	60	0	4.5	125	10.9
1/22/2010	52	1.1	25	0.5	22	0.5	53	1.2	48	1	110	9.6	62	0	4.3	110	9.6
2/8/2010	55	1.2	30	0.7	30	0.7	55	1.2	50	1.1	115	10.1	65	0	4.9	115	10.1
3/10/2010	320	7	320	7	325	7.1	330	7.2	315	6.9	100	8.8	160	0	35.2	100	8.8
3/30/2010	330	7.2	325	7.1	330	7.2	325	7.1	320	7	160	14	155	0	35.6	160	14
4/28/2010	310	6.8	320	7	335	7.3	320	7	310	6.8	140	12.3	210	0	34.9	140	12.3
5/31/2010	325	7.1	320	7	300	6.5	320	7	330	7.2	115	10.1	107	0	34.8	115	10.1
6/30/2010	320	7	320	7	310	6.8	330	7.2	325	7.1	120	10.5	55	0	35.1	120	10.5
7/23/2010	325	7.1	320	7	325	7.1	320	7	330	7.2	145	12.7	11	0	35.4	145	12.7
8/24/2010	345	7.5	325	7.1	310	6.8	310	6.8	330	7.2	150	13.1	22	0	35.4	150	13.1
9/9/2010	320	7	315	6.9	320	7	315	6.9	325	7.1	120	10.5	24	0	34.9	120	10.5
10/20/2010	315	6.9	320	7	325	7.1	350	7.6	310	6.8	82	7.2	22	0	35.4	82	7.2
11/24/2010	310	6.8	310	6.8	330	7.2	330	7.2	320	7	92	8.1	145	0	35	92	8.1
12/23/2010	320	7	325	7.1	320	7	315	6.9	320	7	88	7.7	1	0	35	88	7.7
2/2/2011	335	7.3	325	7.1	335	7.3	310	6.8	350	7.6	110	9.6	0	0	36.1	110	9.6
3/3/2011	310	6.8	330	7.2	310	6.8	320	7	350	7.6	115	10.1	2	0	35.4	115	10.1
4/5/2011	310	6.8	310	6.8	300	6.5	275	6	300	6.5	500	43.8	12	0	32.6	500	43.8
5/12/2011	310	6.8	305	6.7	295	6.4	305	6.7	300	6.5	450	39.4	4	0	33.1	450	39.4
6/8/2011	330	7.2	330	7.2	305	6.7	300	6.5	330	7.2	480	42	28	0	34.8	480	42
7/7/2011	340	7.4	340	7.4	315	6.9	300	6.5	330	7.2	400	35	18	0	35.4	400	35
8/1/2011	310	6.8	300	6.5	300	6.5	310	6.8	330	7.2	400	35	18	0	33.8	400	35
8/31/2011	340	7.4	335	7.3	325	7.1	315	6.9	300	6.5	400	35	14	0	35.2	400	35
9/30/2011	300	6.5	300	6.5	305	6.7	315	6.9	315	6.9	425	37.2	22	0	33.5	425	37.2
11/2/2011	330	7.2	300	6.5	300	6.5	330	7.2	300	6.5	400	35	21	0	33.9	400	35
11/30/2011	315	6.9	310	6.8	300	6.5	320	7	325	7.1	420	36.8	22	0	34.3	420	36.8
12/29/2011	325	7.1	345	7.5	320	7	340	7.4	330	7.2	850	74.4	47	0	36.2	850	74.4
1/31/2012	310	6.8	275	6	265	5.8	275	6	270	5.9	270	23.6	9	0	30.5	270	23.6
3/1/2012	285	6.2	325	7.1	250	5.4	325	7.1	225	4.9	350	30.7	5	0	30.7	350	30.7
3/29/2012	310	6.8	325	7.1	320	7	320	7	330	7.2	680	59.5	32	0	35.1	680	59.5
5/21/2012	330	7.2	300	6.5	300	6.5	325	7.1	315	6.9	710	62.2	12	0	34.2	710	62.2
6/29/2012	325	7.1	335	7.3	300	6.5	330	7.2	300	6.5	600	52.5	24	0	34.6	600	52.5
7/26/2012	325	7.1	345	7.5	340	7.4	325	7.1	325	7.1	328	28.7	45	0	36.2	328	28.7
8/30/2012	320	7	315	6.9	310	6.8	325	7.1	290	6.3	700	61.3	12	0	34.1	700	61.3
10/4/2012	335	7.3	310	6.8	320	7	300	6.5	300	6.5	580	50.8	16	0	34.1	580	50.8
11/1/2012	305	6.6	300	6.5	300	6.5	325	7.1	320	7	800	70.1	10	0	33.7	800	70.1

Table E-3

AS/SVE System Operations Monitoring Records
Wix Filtration Facility
Dillon, South Carolina (a)

	AS-1		AS-2		AS-3		AS-4		AS-5		SVE		PID IN	PID OUT	Combined AS Flow	SVE Flow	
Date	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	ppm	ppm	SCFM	ft/min	SCFM
DESIGN	-	1.75	-	1.75	-	1.75	-	1.75	-	1.75	-	17.5	-	-	8.75	-	17.5
12/6/2012	330	7.2	330	7.2	320	7	325	7.1	300	6.5	900	78.8	10	0	35	900	78.8
1/8/2013	295	6.4	330	7.2	300	6.5	295	6.4	300	6.5	870	76.2	7	0	33	870	76.2
1/31/2013	300	6.5	295	6.4	310	6.8	315	6.9	310	6.8	650	56.9	5	0	33.4	650	56.9
1/31/2013	300	6.5	295	6.4	310	6.8	315	6.9	310	6.8	650	56.9	5	0	33.4	650	56.9
3/8/2013	330	7.2	310	6.8	300	6.5	320	7	300	6.5	900	78.8	2	0	34	900	78.8
4/1/2013	350	7.6	350	7.6	340	7.4	300	6.5	340	7.4	320	28	6	0	36.5	320	28
5/2/2013	335	7.3	340	7.4	335	7.3	315	6.9	330	7.2	500	43.8	12	0	36.1	500	43.8
5/30/2013	335	7.3	330	7.2	335	7.3	340	7.4	350	7.6	700	61.3	6	0	36.8	700	61.3
7/11/2013	340	7.4	335	7.3	330	7.2	320	7	315	6.9	800	70.1	13	0	35.8	800	70.1
8/6/2013	330	7.2	300	6.5	315	6.9	325	7.1	320	7	650	56.9	8	0	34.7	650	56.9
9/5/2013	340	7.4	310	6.8	310	6.8	310	6.8	300	6.5	750	65.7	16	0	34.3	750	65.7
10/3/2013	355	7.7	345	7.5	330	7.2	340	7.4	330	7.2	800	70.1	9	0	37	800	70.1
11/6/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/5/2013	335	7.3	325	7.1	325	7.1	305	6.6	315	6.9	755	66.1	14	0	35	755	66.1
1/9/2014	300	6.5	320	7	315	6.9	315	6.9	300	6.5	800	70.1	13	0	33.8	800	70.1
2/4/2014	320	7	340	7.4	305	6.6	300	6.5	300	6.5	500	43.8	13	0	34	500	43.8
3/13/2014	290	6.3	300	6.5	310	6.8	315	6.9	300	6.5	800	70.1	10	0	33	800	70.1
4/4/2014	300	6.5	320	7	300	6.5	350	7.6	360	7.8	1100	96.3	10	0	35.4	1100	96.3
5/1/2014	315	6.9	295	6.4	275	6	325	7.1	315	6.9	900	78.8	13	0	33.3	900	78.8
6/4/2014	290	6.3	330	7.2	300	6.5	335	7.3	330	7.2	1000	87.6	3	0	34.5	1000	87.6
7/1/2014	360	7.8	300	6.5	330	7.2	300	6.5	320	7	380	33.3	4	0	35	380	33.3
8/4/2014	300	6.5	335	7.3	320	7	305	6.6	300	6.5	600	52.5	4	0	33.9	600	52.5
9/4/2014	295	6.4	315	6.9	310	6.8	310	6.8	305	6.6	650	56.9	10	0	33.5	650	56.9
10/1/2014	300	6.5	320	7	300	6.5	350	7.6	360	7.8	1100	96.3	10	0	35.4	1100	96.3
11/3/2014	335	7.3	330	7.2	290	6.3	305	6.6	300	6.5	650	56.9	10	0	33.9	650	56.9
12/3/2014	330	7.2	300	6.5	315	6.9	325	7.1	275	6	200	17.5	8	0	33.7	200	17.5
1/7/2015	300	6.5	300	6.5	300	6.5	275	6	300	6.5	300	26.3	9	0	32	300	26.3
2/5/2015	285	6.2	300	6.5	290	6.3	295	6.4	305	6.6	400	35	13	0	32	400	35
2/26/2015	300	6.5	275	6	295	6.4	300	6.5	275	6	600	52.5	13	0	31.4	600	52.5
AVERAGE:		6.6	299.1	6.5	292.8	6.4	299.2	6.5	296.5	6.5	482.1	42.2	27.0	0.0	32.5	482.1	42.2

---

a/ ft = feet; min = minute; SCFM = standard cubic feet per minute; PID = photoionization detector; ppm = parts per million
Air sparge well diameter is 1 inch; SVE well diameter is 2 inch
Data excerpted from ERM's October 2014 Groundwater Monitoring Report
Cells in red highlight indicate SVE flow is less than the design flow rate of twice the combined AS flow.

Table E-4

AS/SVE System Estimated Toluene Mass Removal Using April 28, 2015 Vapor Sample Results
Wix Filtration Facility
Dillon, South Carolina (a)

Toluene Concentration, Air Sample (b) ug/m^3	**SVE Influent Flow Rate, Historical Average (c)** SCFM	**Day of System Operation (c)** Days	**Estimated Mass Removed (d)** Lbs
235	42.2	1,913	1.71

---

a/ ug/m3 = micrograms per cubic meter; SCFM = standard cubic feet per minute; lbs = pounds
b/ Toluene concentration based on vapor sample collected on April 28, 2015 by WSP.
c/ Average SVE influent flow rate and days of system operation based on the average SVE influen
flow rate from ERM's O&M records provided in ERM's March 2015 Ground Water Monitoring Report.
d/ Calculated the estimated toluene mass removed using the following equations:

Step 1 - Convert concentration to pounds per cubic feet:
ug/m3 * [(0.000062427961 lbs/cu ft)/ (1,000,000 ug/m3)] = lbs/cu ft

Step 2- Calculate pounds removed using lbs/cu ft concentration and flow rate
lbs/cu ft * SCFM * 1440 min/d * (# days of operation) = lbs removed

Table E-5

AS/SVE System Estimated Toluene Mass Removal Using SVE Influent and Effluent PID Readings
Wix Filtration Facility
Dillon, South Carolina (a)

	PID				Toluene Vapor Concentration (b)		Toluene Mass Removed (c)		Cumulative Mass Removed
	IN	OUT	SVE Flow		IN	OUT	IN	OUT	
Date	ppm	ppm	ft/min	SCFM	ppmv	ppmv	lbs	lbs	lbs
DESIGN	-	-	-	17.5					
12/1/2009	60	0	125	10.9	156	0	-	-	
1/22/2010	62	0	110	9.6	161.2	0	28	0	28
2/8/2010	65	0	115	10.1	169	0	10	0	38
3/10/2010	160	0	100	8.8	416	0	38	0	77
3/30/2010	155	0	160	14	403	0	39	0	116
4/28/2010	210	0	140	12.3	546	0	68	0	184
5/31/2010	107	0	115	10.1	278.2	0	32	0	217
6/30/2010	55	0	120	10.5	143	0	16	0	233
7/23/2010	11	0	145	12.7	28.6	0	3	0	236
8/24/2010	22	0	150	13.1	57.2	0	8	0	244
9/9/2010	24	0	120	10.5	62.4	0	4	0	248
10/20/2010	22	0	82	7.2	57.2	0	6	0	253
11/24/2010	145	0	92	8.1	377	0	37	0	291
12/23/2010	1	0	88	7.7	2.6	0	0	0	291
2/2/2011	0	0	110	9.6	0	0	0	0	291
3/3/2011	2	0	115	10.1	5.2	0	1	0	292
4/5/2011	12	0	500	43.8	31.2	0	16	0	307
5/12/2011	4	0	450	39.4	10.4	0	5	0	313
6/8/2011	28	0	480	42	72.8	0	29	0	342
7/7/2011	18	0	400	35	46.8	0	17	0	358
8/1/2011	18	0	400	35	46.8	0	14	0	373
8/31/2011	14	0	400	35	36.4	0	13	0	386
9/30/2011	22	0	425	37.2	57.2	0	22	0	408
11/2/2011	21	0	400	35	54.6	0	22	0	430
11/30/2011	22	0	420	36.8	57.2	0	21	0	451
12/29/2011	47	0	850	74.4	122.2	0	92	0	543
1/31/2012	9	0	270	23.6	23.4	0	6	0	550
3/1/2012	5	0	350	30.7	13	0	4	0	554
3/29/2012	32	0	680	59.5	83.2	0	49	0	602
5/21/2012	12	0	710	62.2	31.2	0	36	0	638
6/29/2012	24	0	600	52.5	62.4	0	45	0	683
7/26/2012	45	0	328	28.7	117	0	32	0	715
8/30/2012	12	0	700	61.3	31.2	0	23	0	738
10/4/2012	16	0	580	50.8	41.6	0	26	0	764
11/1/2012	10	0	800	70.1	26	0	18	0	782
12/6/2012	10	0	900	78.8	26	0	25	0	807
1/8/2013	7	0	870	76.2	18.2	0	16	0	823
1/31/2013	5	0	650	56.9	13	0	6	0	829
1/31/2013	5	0	650	56.9	13	0	0	0	829
3/8/2013	2	0	900	78.8	5.2	0	5	0	834
4/1/2013	6	0	320	28	15.6	0	4	0	838
5/2/2013	12	0	500	43.8	31.2	0	15	0	853
5/30/2013	6	0	700	61.3	15.6	0	9	0	862
7/11/2013	13	0	800	70.1	33.8	0	35	0	897
8/6/2013	8	0	650	56.9	20.8	0	11	0	908
9/5/2013	16	0	750	65.7	41.6	0	29	0	936
10/3/2013	9	0	800	70.1	23.4	0	16	0	952
11/6/2013	0	0	0	0	0	0	0	0	952
12/5/2013	14	0	755	66.1	36.4	0	24	0	977
1/9/2014	13	0	800	70.1	33.8	0	29	0	1,006

Table E-5

AS/SVE System Estimated Toluene Mass Removal Using SVE Influent and Effluent PID Readings
Wix Filtration Facility
Dillon, South Carolina (a)

	PID				Toluene Vapor Concentration (b)		Toluene Mass Removed (c)		Cumulative Mass Removed
	IN	OUT	SVE Flow		IN	OUT	IN	OUT	
Date	ppm	ppm	ft/min	SCFM	ppmv	ppmv	lbs	lbs	lbs
DESIGN	-	-	-	17.5					
2/4/2014	13	0	500	43.8	33.8	0	13	0	1,019
3/13/2014	10	0	800	70.1	26	0	24	0	1,043
4/4/2014	10	0	1100	96.3	26	0	19	0	1,062
5/1/2014	13	0	900	78.8	33.8	0	25	0	1,087
6/4/2014	3	0	1000	87.6	7.8	0	8	0	1,095
7/1/2014	4	0	380	33.3	10.4	0	3	0	1,099
8/4/2014	4	0	600	52.5	10.4	0	6	0	1,105
9/4/2014	10	0	650	56.9	26	0	16	0	1,121
10/1/2014	10	0	1100	96.3	26	0	24	0	1,145
11/3/2014	10	0	650	56.9	26	0	17	0	1,162
12/3/2014	8	0	200	17.5	20.8	0	4	0	1,166
1/7/2015	9	0	300	26.3	23.4	0	8	0	1,173
2/5/2015	13	0	400	35	33.8	0	12	0	1,185
2/26/2015	13	0	600	52.5	33.8	0	13	0	1,198
						TOTAL:	**1,200**	**0**	

---

a/ ft = feet; min = minute; SCFM = standard cubic feet per minute; ppm = parts per million; ppmv = parts per million by volume; lbs = pounds.

PID and SVE flow readings excerpted from ERM's October 2014 Groundwater Monitoring Report
Cells in red highlight indicate SVE flow is less than the design flow rate of twice the combined AS flow.

b/ PID concentrations are assumed to be pure toluene vapor. During data analysis of nearby groundwater analytical data (MW-1, MW-2, MW-3, and MW-4) it was observed that a majority of the VOCs are toluene.

c/ Estimated toluene concentrations were calculated using RAE document Technical Note 158, *"Conversion of PID Readings to Methane Equivalent of Hexane Equivalent FID Response."* January 2006.

Convert ppmv to lbs removed

PPMV * MW * SCFM * (1.0 lb-mole/379 SCF) * 1440 min/d * (1/1000000) * (# days) = lbs removed

$MW_{toluene}$ = 92.1 lbs/mol

Standard Conditions => 1 lb-mole/ 379 SCF

Enclosure A
AS/SVE System Drawings

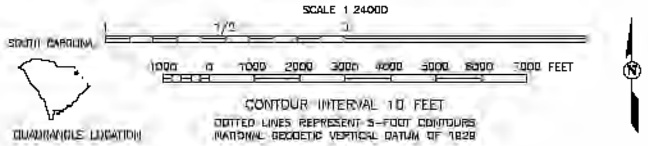
Attachment A
Air Sparge/Soil Vapor Extraction Design Drawings

SOIL AND GROUND WATER REMEDIATION SYSTEM

WIX FILTRATION CORPORATION
DILLON, SOUTH CAROLINA

SITE LOCATION MAP

SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE: DILLON WEST, SOUTH CAROLINA – 1983



CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

INDEX OF DRAWINGS

1 COVER SHEET - (1)
2 AS / SVE SYSTEM LAYOUT - (S-1)
3 **SVE SYSTEM EQUIPMENT LAYOUT AND PROCESS FLOW DIAGRAM - (P-1)**
4 PROCESS & INSTRUMENTATION DIAGRAM - (P-2)
5 CONSTRUCTION DETAILS - (D-1)
6 ELECTRICAL & WIRING PLAN - (E-1)

86002SRS.DWG 9/19/08 MGH REV. 10/14/08

NO	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION

SOIL AND GROUND WATER
REMEDIATION SYSTEM

WIX FILTRATION CORPORATION **DILLON, SOUTH CAROLINA**

DRAWN BY M. HYRE	PROJECT ENGINEER H. SARTAIN
DESIGN ENGINEER T. HARBAGE	PROJECT MANAGER M. EASTERBROOK

ERM

COVER SHEET

SCALE AS NOTED	DATE SEPTEMBER 22, 2008
PROJECT NO. 0086002	AutoCAD 2007 86002SRS.DWG

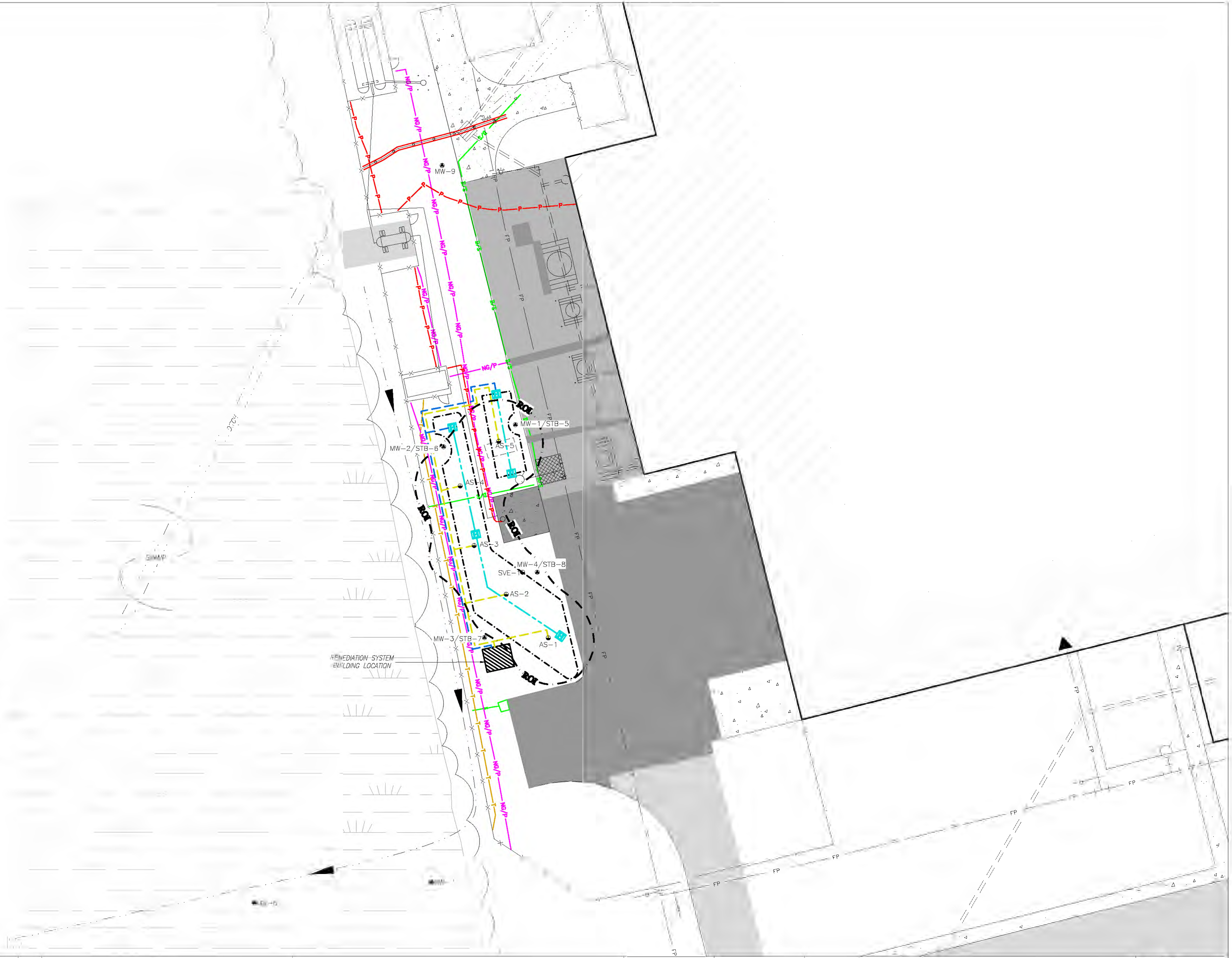
DRAWING NO. 1
REV. NO. 0
SHEET 1 OF 6

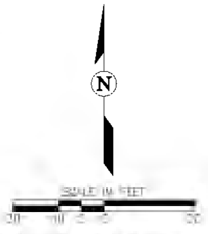
LEGEND

● MW-1	MONITORING WELL
● AS-5	AIR SPARGE WELL
○	FIRE HYDRANT
▒	ASPHALT PAVING
■	CONCRETE PAVING
☐	CONCRETE
☐	MARSH / WETLAND AREA
⊞	HORIZONTAL SVE WELL VAULT
⊞	HORIZONTAL SVE WELL END VAULT
— — —	SVE HEADER
	AS SUPPLY HOSES
——●——	FIRE PROTECTION (WATER)
- - - - -	COLLECTION TRENCH
—— · · ——	STREAM OR DITCH
——x——	FENCE
— - - —	PROPOSED HORIZONTAL SVE WELL
～～～	TREE LINE
═══	MAIN POWER
—P—P—P—	ELECTRICAL POWER
—NG/P—	NATURAL GAS/ PROPANE
—T—T—	TELEPHONE LINE
—D/S—	DRAIN LINE AND SEWERS
══ ══ ══	UNDERGROUND PIPING
— — ROI — —	APPROXIMATE RADIUS OF INFLUENCE BASED ON AUGUST 2007 AIR SPARGE PILOT TEST

NOTES

1. THE CONTRACTOR SHALL ESTABLISH SEDIMENT AND EROSION CONTROLS PRIOR TO INITIATING CONSTRUCTION ACTIVITIES.
2. CONTAMINATED SOIL SHALL BE STOCKPILED PRIOR TO OFF-SITE DISPOSAL. THE CONTAMINATED SOIL STOCKPILE AREA SHALL BE BERMED WITH SANDBAGS OR HAY BAILS TO PREVENT EROSION OF CONTAMINATED SOILS OUTSIDE THE DESIGNATED AREA.
3. AIR SPARGE WELLS SHALL BE SCREENED IN THE SILTY CLAY LAYER, WITH THE BOTTOM OF THE SCREEN AT THE TOP OF THE CONFINING CLAY LAYER. THIS DEPTH IS EXPECTED TO BE 8 FEET.
4. AIR SPARGE WELL DIAMETER IS ONE INCH.
5. AIR SPARGE SUPPLY HOSE AND SVE HEADER PIPE LOCATIONS ARE APPROXIMATE. CONTRACTOR TO DETERMINE EXACT HEADER LOCATIONS PRIOR TO CONSTRUCTION. WHERE POSSIBLE, CONTRACTOR TO PLACE HEADERS IN COMMON TRENCHES. AIR SPARGE SUPPLY HOSE TO BE LABELED EVERY 50 FT.
6. TO RECOVER THE AIR INJECTION FLOW, THE NATIVE SOIL SVE SYSTEM WILL EXTRACT 2 TIMES THE TOTAL AIR FLOW RATE OF THE AIR SPARGE SYSTEM.





PRELIMINARY

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

SOIL AND GROUND WATER REMEDIATION SYSTEM

WIX FILTRATION CORPORATION
DILLON, SOUTH CAROLINA

DRAWN BY: M. HIRE
PROJECT ENGINEER: R. SARTAIN
DESIGN ENGINEER: T. HARBAGE
PROJECT MANAGER: M. EASTERBROOK

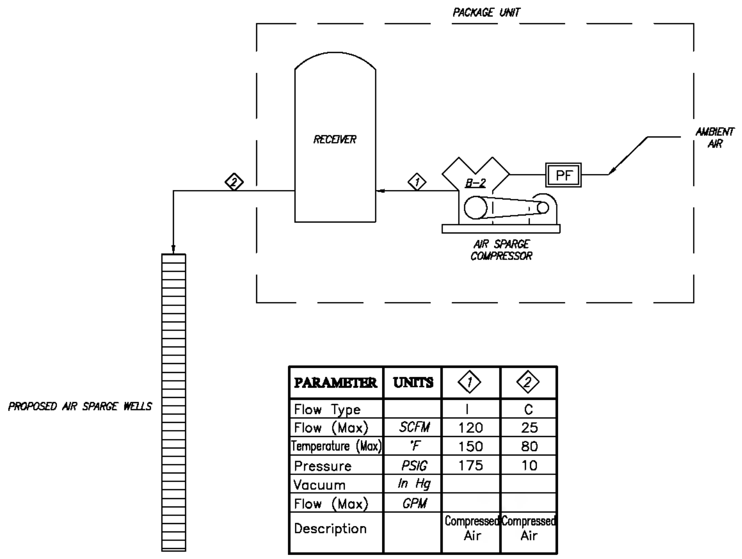
ERM

NOT FOR CONSTRUCTION

AIR SPARGE / SOIL VAPOR EXTRACTION SYSTEM LAYOUT

SCALE: 1"=20'
DATE: SEPTEMBER 22, 2008
PROJECT NO.: 0088802
AutoCAD DWG: 88002SRS.DWG

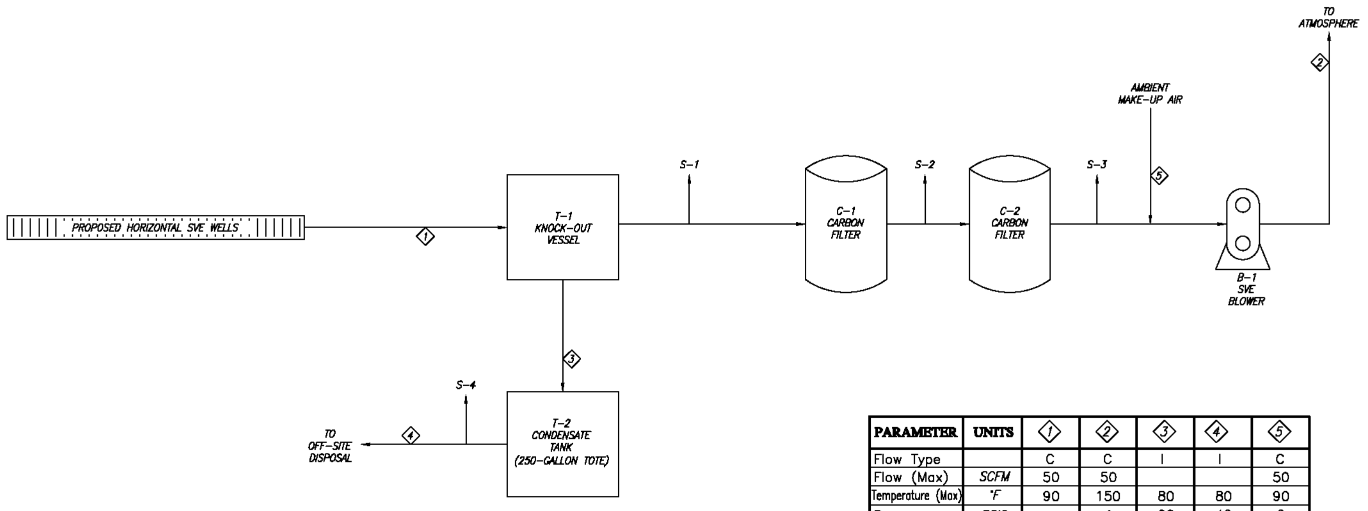
DRAWING NO.: S-1
REV. NO.:
SHEET 2 OF 6



PARAMETER	UNITS	①	②
Flow Type		I	C
Flow (Max)	SCFM	120	25
Temperature (Max)	°F	150	80
Pressure	PSIG	175	10
Vacuum	In Hg		
Flow (Max)	GPM		
Description		Compressed Air	Compressed Air

C = CONTINUOUS
I = INTERMITENT

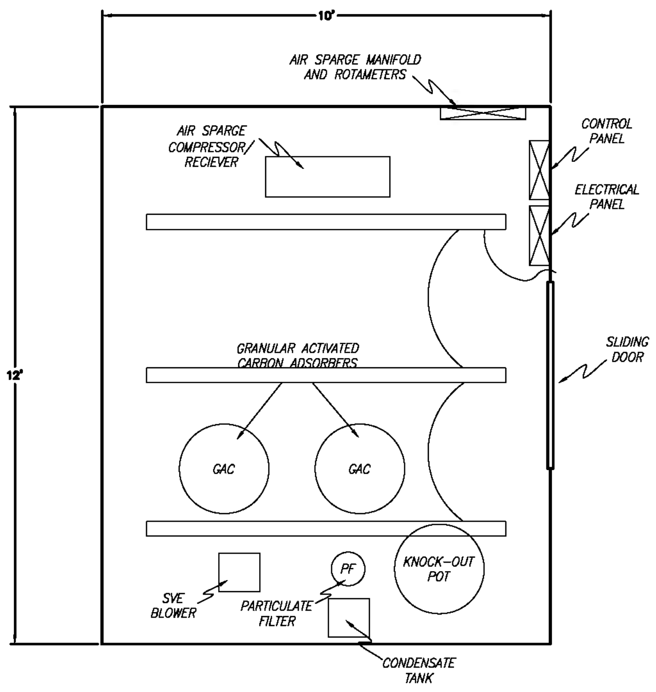
AIR SPARGE SYSTEM PROCESS FLOW DIAGRAM

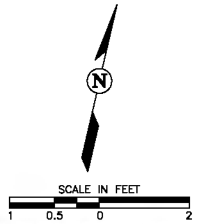


PARAMETER	UNITS	①	②	③	④	⑤
Flow Type		C	C	I	I	C
Flow (Max)	SCFM	50	50			50
Temperature (Max)	°F	90	150	80	80	90
Pressure	PSIG		1	20	40	0
Vacuum	In Hg	5				
Flow (Max)	GPM			5	20	
Description		SVE Air	SVE Exhaust	Condensate Blow Down	Condensate Disposal	Make-Up Air

C = CONTINUOUS
I = INTERMITENT

SOIL VAPOR EXTRACTION SYSTEM





EQUIPMENT LAYOUT

NOTES

BUILDING TO BE PRE-ENGINEERED GALVANIZED STEEL
(McMASTER CARR MODEL # 6749T42 OR EQUIVALENT)

86002SRS_R1.DWG 9/19/08 MDH REV 3/30/09 1700

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

**SOIL AND GROUND WATER
REMEDIATION SYSTEM**

WIX FILTRATION CORPORATION **DILLON, SOUTH CAROLINA**

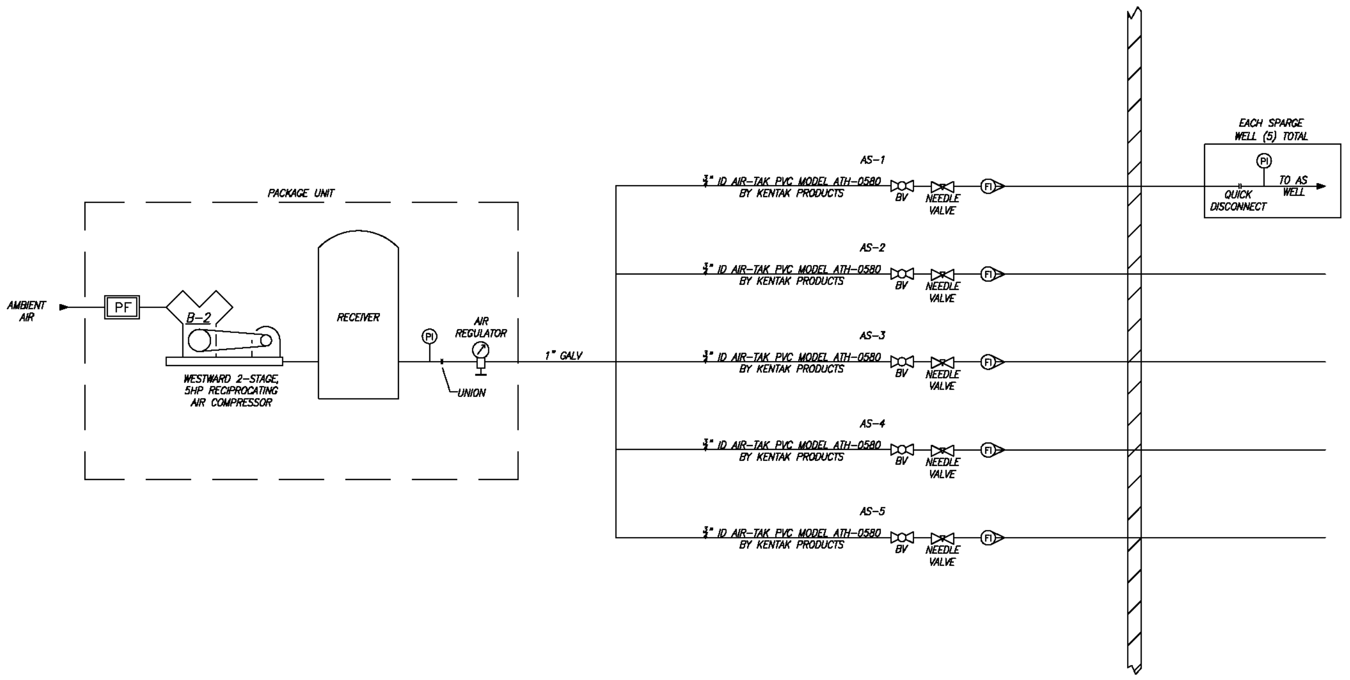
DRAWN BY M. HYRE
PROJECT ENGINEER H. SARTAIN
DESIGN ENGINEER T. HARBAGE
PROJECT MANAGER M. EASTERBROOK

ERM

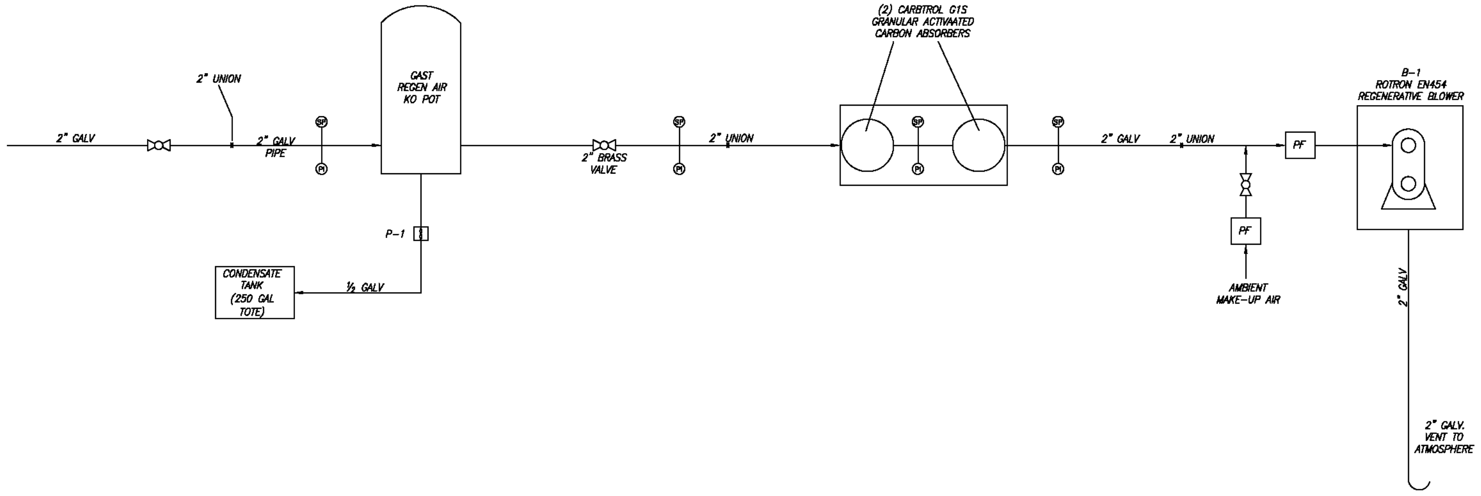
**SVE SYSTEM EQUIPMENT LAYOUT AND
PROCESS FLOW DIAGRAM**

SCALE 1"=2'
DATE MARCH 30, 2009
PROJECT NO. 0086002
AutoCAD 2007 86002SRS_R1.DWG

DRAWING NO. **P-1**
REV. NO.
SHEET **3** OF **6**



AIR SPARGE SYSTEM PIPING & INSTRUMENTATION DETAIL



NOTE: ALL CONNECTIONS REOUIRE VACUUM TIGHT
BULKHEAD FITTINGS WITH VACUUM SEALS

SVE SYSTEM PROCESS & INSTRUMENTATION DIAGRAM

LEGEND

⋈	BRASS BALL VALVE
Ⓟ	PRESSURE INDICATOR (McMASTER CARR 3941K53)
Ⓢ	SAMPLE PORT
─┤├─	PIPE ADAPTOR
─╫─	PIPE UNION

NOTES

1. ALL INSTALLATIONS SHALL COMPLY WITH APPLICABLE ASME, NIST, NFPA, NEC CODES AND MANUFACTURER'S RECOMMENDATIONS
2. PIPING SYSTEMS SHALL BE VACUUM TESTED FOR TIGHTNESS AND LEAKS SHALL BE REPAIRED AT NO ADDITIONAL COSTS

86002SRS_R1.DWG 9/19/08 MDH REV 3/30/09

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

SOIL AND GROUND WATER
REMEDIATION SYSTEM

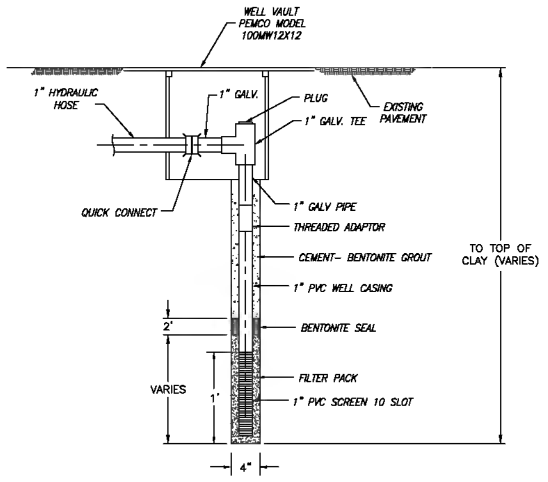
WIX FILTRATION CORPORATION **DILLON, SOUTH CAROLINA**

DRAWN BY M. HYRE
PROJECT ENGINEER H. SARTAIN
DESIGN ENGINEER T. HARBAGE
PROJECT MANAGER M. EASTERBROOK

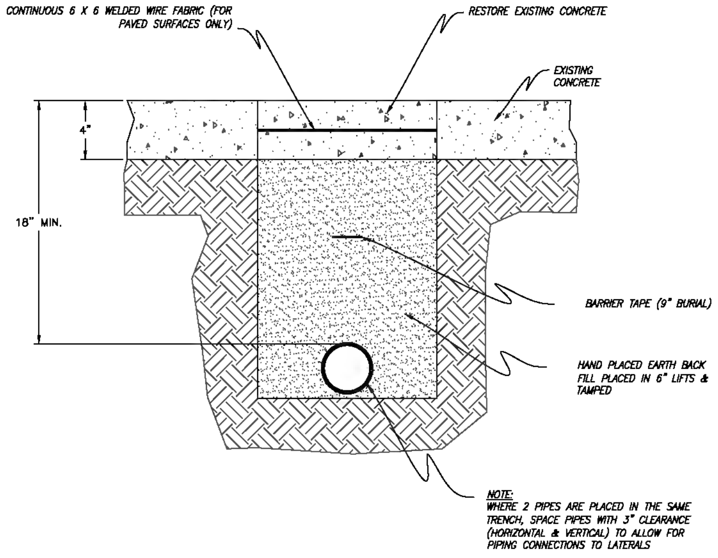
ERM

PROCESS AND INSTRUMENTATION DIAGRAMS

SCALE 1"=20'
DATE MARCH 30, 2009
PROJECT NO. 0086002
AutoCAD 2007 86002SRS_R1.DWG
DRAWING NO. **P-2**
REV. NO. **0**
SHEET **4** OF **6**

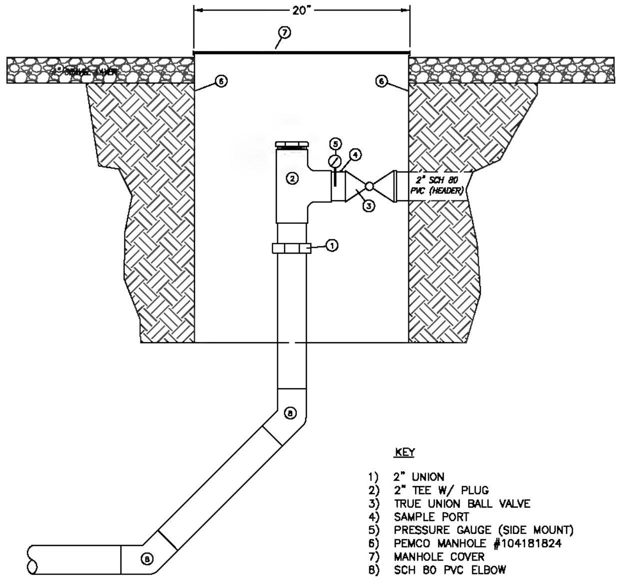


AIR SPARGE WELL COMPLETION DETAIL
NOT TO SCALE



NOTE:
WHERE 2 PIPES ARE PLACED IN THE SAME TRENCH, SPACE PIPES WITH 3" CLEARANCE (HORIZONTAL & VERTICAL) TO ALLOW FOR PIPING CONNECTIONS TO LATERALS

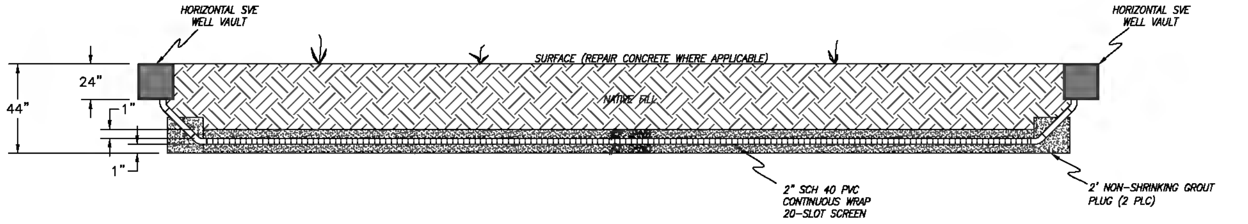
TYPICAL HEADER CROSS-SECTION
IN EXISTING CONCRETE
1" = 6"



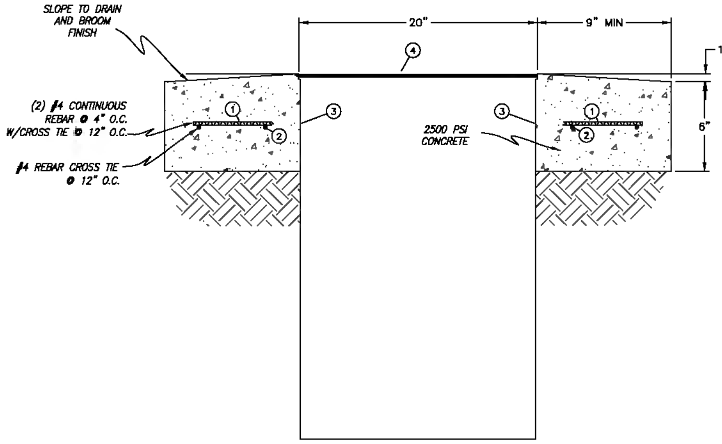
KEY

1) 2" UNION
2) 2" TEE W/ PLUG
3) TRUE UNION BALL VALVE
4) SAMPLE PORT
5) PRESSURE GAUGE (SIDE MOUNT)
6) PEMCO MANHOLE #104181824
7) MANHOLE COVER
8) SCH 80 PVC ELBOW

HORIZONTAL SVE DETAIL H
NOT TO SCALE



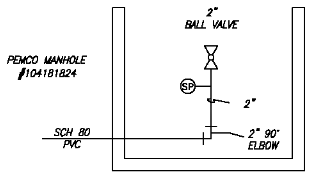
HORIZONTAL SVE WELL DETAIL
(NOT TO SCALE)



KEY

1) (2) #4 REBAR CONTINUOUS 4" O.C.
2) #4 REBAR CROSS TIE @12" O.C.
3) PEMCO MANHOLE #104202024
4) MANHOLE COVER

CONCRETE REPAIR FOR SVE VAULTS
NOT TO SCALE



HORIZONTAL SVE WELL END VAULT E
(CROSS–SECTION)

MDH REV 12/5/08 1635

86002SRS.DWG 9/19/08

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

SOIL REMEDIATION SYSTEM

WIX FILTRATION CORPORATION **DILLON, SOUTH CAROLINA**

DRAWN BY M. HYRE
PROJECT ENGINEER H. SARTAIN
DESIGN ENGINEER T. HARBAGE
PROJECT MANAGER M. EASTERBROOK

ERM

CONSTRUCTION DETAILS

SCALE AS NOTED
DATE SEPTEMBER 22, 2008
PROJECT NO. 0086002
AutoCAD 2007 86002SRS.DWG

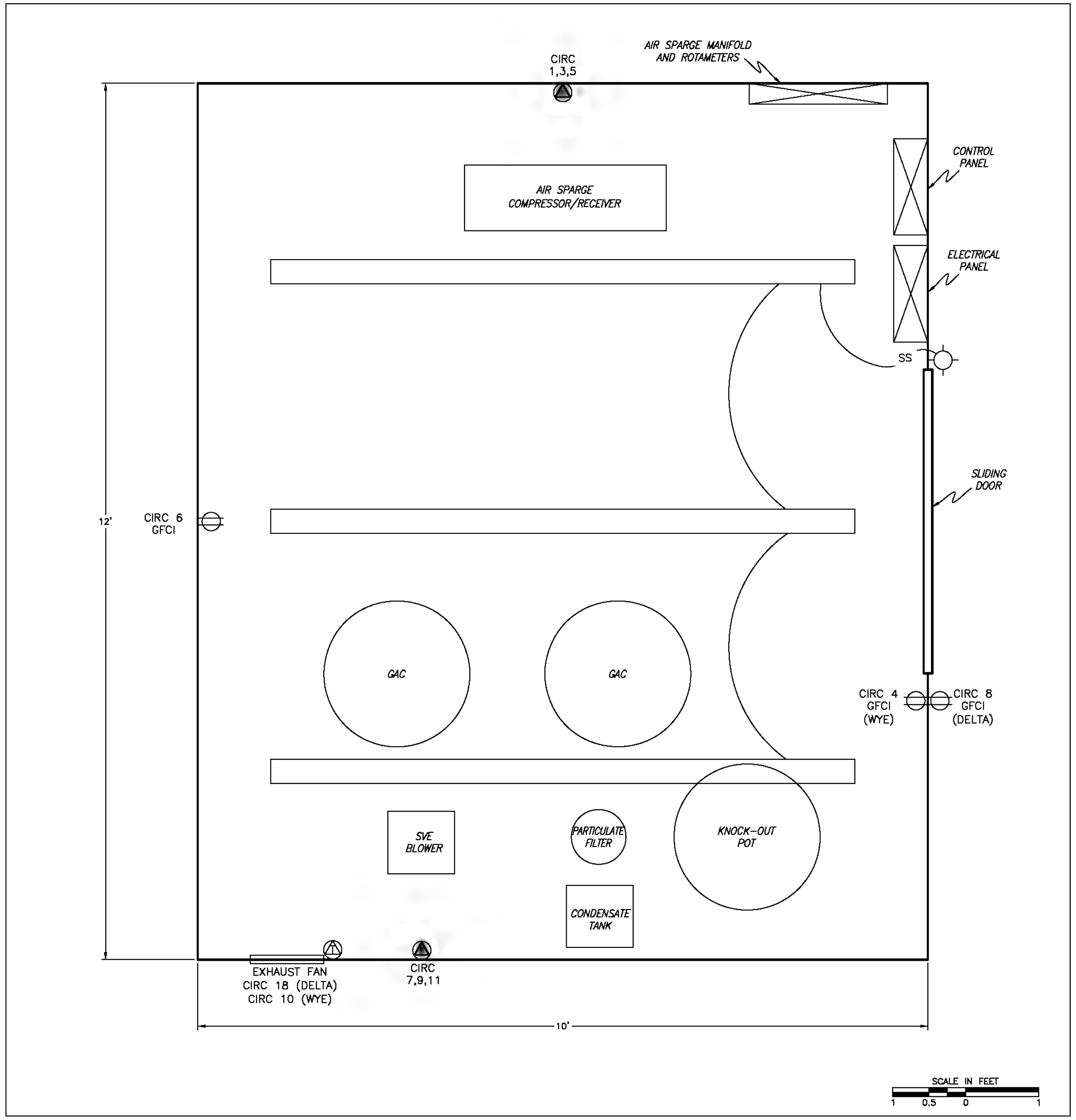
DRAWING NO. **D-1**
REV. NO.
SHEET 5 OF 6

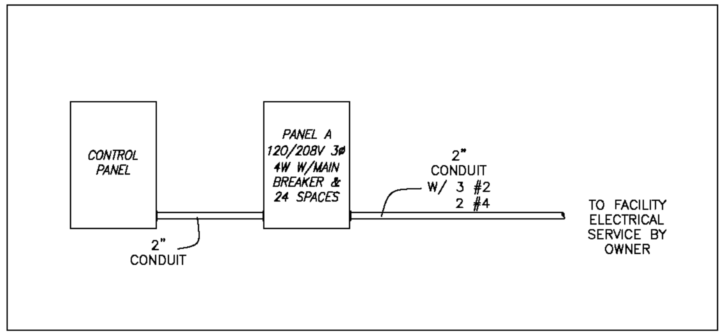
LEGEND:

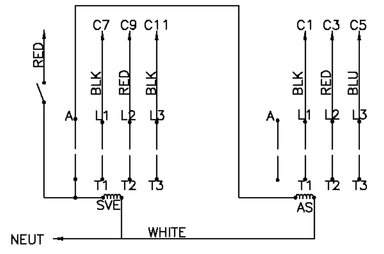
▭	8' FLUORESCENT LIGHT
⏀	20A, 125V, 3W RECEPTACLE (NEMA 5-20R)
Ⓐ	THERMOSTAT
⌖	OUTDOOR FLOOD LIGHT
⌒	CONDUIT RUN EXPOSED
S	SINGLE POLE SWITCH

ELECTRICAL NOTES

1. All general purpose duplex receptacles to be 20 Amp GFCI, both exterior and interior. Mounting height shall be 24" AFF to center of device.. Exterior receptacles shall have a metallic in use cover.
2. All general purpose light switches shall be 20 Amp. Mounting height shall be 48" AFF to center of device.
3. Fluorescent fixtures to be eight feet 2 Lite 120 Volt, and equipped with a disconnecting means in each fixture for both phase and neutral conductors.
4. Conduit shall be type EMT with steel fittings, except where RMC is specified. All horizontal conduit runs shall be fastened by means of Unistrut channel (or equal) spaced a maximum of four feet apart.
5. All conductors shall be type THHN/THWN 19 strand copper.
6. Electrician to provide and install a motor starter for the SVE Blower. Starter and protective devices (heaters) shall be sized per the NEC, Article 430.







LOGIC: SWITCH S1 STARTS SVE BLOWER. AUXILLARY CONTACT STARTS AIR SPARGE COMPRESSOR.

NOTE: LOAD SIDE OF CONTROL RELAY CONNECIONS NOT DRAWN. ASSUME STARTER WITH OVERLOAD DEVICES AT UNIT. IF NOT, USE STARTERS HERE IN LIEU OF RELAYS

COLOR: CONDUCTORS COLORED FOR WYE SYSTEM 208/120V IF DELTA SYSTEM USED COLORS SHALL BE AS FOLLOWS

A – BLACK
B – ORANGE
C – RED

DELTA PANEL LAYOUT

WYE PANEL LAYOUT

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

**SOIL AND GROUND WATER
REMEDIATION SYSTEM**

WIX FILTRATION CORPORATION **DILLON, SOUTH CAROLINA**

DRAWN BY M. HYRE
PROJECT ENGINEER H. SARTAIN
DESIGN ENGINEER T. HARBAGE
PROJECT MANAGER M. EASTERBROOK

ERM

ELECTRICAL PLAN

SCALE 1"=2'
DATE MARCH 30, 2009
PROJECT NO. 0086002
AutoCAD 2007 86002SRS_R1.DWG

DRAWING NO. **E-1**
REV. NO.
SHEET 6 OF 6

86002SRS_R1.DWG 9/23/08 MDH REV 3/30/09 1730

Enclosure B

Historic Groundwater Elevation, Groundwater Quality, and Operations and Maintenance Records

Appendix A
Ground Water Gauging Data Summary

APPENDIX A. GROUND WATER GAUGING DATA SUMMARY - WIX FILTRATION FACILITY, DILLON, SC

Monitor Well	Gauging Date	TOC Elevation (ft NAVD)	Depth to Product (ft BTOC)	Depth to Water (ft BTOC)	Ground Water Elevation (ft NAVD)	Monitor Well	Gauging Date	TOC Elevation (ft NAVD)	Depth to Product (ft BTOC)	Depth to Water (ft BTOC)	Ground Water Elevation (ft NAVD)	Monitor Well	Gauging Date	TOC Elevation (ft NAVD)	Depth to Product (ft BTOC)	Depth to Water (ft BTOC)	Ground Water Elevation (ft NAVD)
MW-1	05/24/06	131.56	--	3.85	127.71	MW-2	05/24/06	129.58	--	3.58	126.00	MW-3	05/24/06	129.06	--	2.82	126.24
MW-1	01/04/07	131.56	--	3.25	128.31	MW-2	01/04/07	129.58	--	1.65	127.93	MW-3	01/04/07	129.06	--	1.10	127.96
MW-1	01/11/08	131.56	--	5.69	125.87	MW-2	01/11/08	129.58	--	5.54	124.04	MW-3	01/11/08	129.06	--	4.61	124.45
MW-1	03/12/09	131.56	--	3.09	128.47	MW-2	03/12/09	129.58	--	1.87	127.71	MW-3	03/12/09	129.06	--	1.32	127.74
MW-1	09/01/09	131.56	--	5.45	126.11	MW-2	09/01/09	129.58	--	5.99	123.59	MW-3	09/01/09	129.06	--	4.76	124.30
MW-1	03/10/10	131.56	--	--	--	MW-2	03/10/10	129.58	--	1.77	127.81	MW-3	03/10/10	129.06	--	1.15	127.91
MW-1	09/09/10	131.56	--	5.69	125.87	MW-2	09/09/10	129.58	--	6.74	122.84	MW-3	09/09/10	129.06	--	5.87	123.19
MW-1	02/23/11	131.56	--	2.51	129.05	MW-2	02/23/11	129.58	--	2.35	127.23	MW-3	02/23/11	129.06	--	1.75	127.31
MW-1	08/11/11	131.56	--	6.21	125.35	MW-2	08/11/11	129.58	--	7.66	121.92	MW-3	08/11/11	129.06	--	6.94	122.12
MW-1	02/13/12	131.56	--	5.13	126.43	MW-2	02/13/12	129.58	--	4.29	125.29	MW-3	02/13/12	129.06	--	4.27	124.79
MW-1	08/09/12	131.56	--	5.42	126.14	MW-2	08/09/12	129.58	--	5.71	123.87	MW-3	08/09/12	129.06	--	5.03	124.03
MW-1	02/12/13	131.56	--	3.00	128.56	MW-2	02/12/13	129.58	--	4.66	124.92	MW-3	02/12/13	129.06	--	3.43	125.63
MW-1	08/06/13	131.56	--	3.66	127.90	MW-2	08/06/13	129.58	--	1.99	127.59	MW-3	08/06/13	129.06	--	1.38	127.68
MW-1	02/24/14	131.56	--	0.40	131.16	MW-2	02/24/14	129.58	--	0.51	129.07	MW-3	02/24/14	129.06	--	0.63	128.43
MW-1	09/03/14	131.56	--	5.07	126.49	MW-2	09/03/14	129.58	--	3.91	125.67	MW-3	09/03/14	129.06	--	4.01	125.05
MW-1	03/04/15	131.56	--	1.35	130.21	MW-2	03/04/15	129.58	--	1.10	128.48	MW-3	03/04/15	129.06	--	0.40	128.66
MW-4	05/24/11	130.47	--	4.30	126.17	MW-5	05/24/11	128.97	--	--	--	MW-6	05/24/11	129.73	--	--	--
MW-4	01/04/07	130.47	--	2.71	127.76	MW-5	01/04/07	128.97	--	1.22	127.75	MW-6	01/04/07	129.73	--	1.64	128.09
MW-4	01/11/08	130.47	--	6.39	124.08	MW-5	01/11/08	128.97	--	5.03	123.94	MW-6	01/11/08	129.73	--	5.86	123.87
MW-4	03/12/09	130.47	--	2.82	127.65	MW-5	03/12/09	128.97	--	1.21	127.76	MW-6	03/12/09	129.73	--	2.09	127.64
MW-4	09/01/09	130.47	--	6.70	123.77	MW-5	09/01/09	128.97	--	5.36	123.61	MW-6	09/01/09	129.73	--	6.23	123.50
MW-4	03/10/10	130.47	--	2.84	127.63	MW-5	03/10/10	128.97	--	1.07	127.90	MW-6	03/10/10	129.73	--	--	--
MW-4	09/09/10	130.47	--	7.77	122.70	MW-5	09/09/10	128.97	--	6.39	122.58	MW-6	09/09/10	129.73	--	6.74	122.99
MW-4	02/23/11	130.47	--	3.04	127.43	MW-5	02/23/11	128.97	--	1.75	127.22	MW-6	02/23/11	129.73	--	2.57	127.16
MW-4	08/11/11	130.47	--	9.04	121.43	MW-5	08/11/11	128.97	--	7.49	121.48	MW-6	08/11/11	129.73	--	8.23	121.50
MW-4	02/13/12	130.47	--	5.21	125.26	MW-5	02/13/12	128.97	--	5.39	123.58	MW-6	02/13/12	129.73	--	4.62	125.11
MW-4	08/09/12	130.47	--	Well damaged		MW-5	08/09/12	128.97	--	5.28	123.69	MW-6	08/09/12	129.73	--	6.20	123.53
MW-4	02/12/13	130.47	--	Well damaged		MW-5	02/12/13	128.97	--	2.47	126.50	MW-6	02/12/13	129.73	--	3.62	126.11
MW-4	08/06/13	130.47	--	Well damaged		MW-5	08/06/13	128.97	--	1.67	127.30	MW-6	08/06/13	129.73	--	3.06	126.67
MW-4	02/24/14	130.47	--	Well damaged		MW-5	02/24/14	128.97	--	0.60	128.37	MW-6	02/24/14	129.73	--	1.30	128.43
MW-4R	09/03/14	133.92	--	2.73	131.19	MW-5	09/03/14	128.97	--	4.15	124.82	MW-6	09/03/14	129.73	--	4.71	125.02
MW-4R	03/04/15	133.92	--	4.20	129.72	MW-5	03/04/15	128.97	--	0.30	128.67	MW-6	03/04/15	129.73	--	1.21	128.52
MW-7	01/04/07	128.24	--	0.55	127.69	MW-8	01/04/07	130.91	--	4.22	126.69	MW-9	01/04/07	131.76	--	3.55	128.21
MW-7	01/11/08	128.24	--	4.90	123.34	MW-8	01/11/08	130.91	--	8.01	122.90	MW-9	01/11/08	131.76	--	5.67	126.09
MW-7	03/12/09	128.24	--	1.21	127.03	MW-8	03/12/09	130.91	--	4.28	126.63	MW-9	03/12/09	131.76	--	3.58	128.18
MW-7	09/01/09	128.24	--	5.00	123.24	MW-8	09/01/09	130.91	--	5.85	125.06	MW-9	09/01/09	131.76	--	6.19	125.57
MW-7	03/10/10	128.24	--	1.42	126.82	MW-8	03/10/10	130.91	--	2.84	128.07	MW-9	03/10/10	131.76	--	3.00	128.76
MW-7	09/09/10	128.24	--	6.16	122.08	MW-8	09/09/10	130.91	--	9.18	121.73	MW-9	09/09/10	131.76	--	6.98	124.78
MW-7	02/23/11	128.24	--	1.38	126.86	MW-8	02/23/11	130.91	--	4.28	126.63	MW-9	02/23/11	131.76	--	3.61	128.15
MW-7	08/11/11	128.24	--	6.74	121.50	MW-8	08/11/11	130.91	--	10.50	120.41	MW-9	08/11/11	131.76	--	7.29	124.47

APPENDIX A. GROUND WATER GAUGING DATA SUMMARY - WIX FILTRATION FACILITY, DILLON, SC

Monitor Well	Gauging Date	TOC Elevation (ft NAVD)	Depth to Product (ft BTOC)	Depth to Water (ft BTOC)	Ground Water Elevation (ft NAVD)
MW-7	02/13/12	128.24	--	3.50	124.74
MW-7	08/09/12	128.24	--	5.22	123.02
MW-7	02/12/13	128.24	--	2.69	125.55
MW-7	08/06/13	128.24	--	1.12	127.12
MW-7	02/24/14	128.24	--	0.10	128.14
MW-7	09/03/14	128.24	--	4.63	123.61
MW-7	03/04/15	128.24	--	0.01	128.23
MW-8	02/13/12	130.91	--	5.63	125.28
MW-8	08/09/12	130.91	--	5.44	125.47
MW-8	02/12/13	130.91	--	4.42	126.49
MW-8	08/06/13	130.91	--	5.37	125.54
MW-8	02/24/14	130.91	--	3.89	127.02
MW-8	09/03/14	130.91	--	7.91	123.00
MW-8	03/04/15	130.91	--	3.77	127.14
MW-9	02/13/12	131.76	--	4.71	127.05
MW-9	08/09/12	131.76	--	6.29	125.47
MW-9	02/12/13	131.76	--	5.62	126.14
MW-9	08/06/13	131.76	--	4.53	127.23
MW-9	02/24/14	131.76	--	2.76	129.00
MW-9	09/03/14	131.76	--	5.86	125.90
MW-9	03/04/15	131.76	--	3.70	128.06
MW-10	02/23/11	130.34	--	3.72	126.62
MW-10	08/11/11	130.34	--	8.29	122.05
MW-10	02/13/12	130.34	--	5.48	124.86
MW-10	08/09/12	130.34	--	4.41	125.93
MW-10	02/12/13	130.34	--	4.00	126.34
MW-10	08/06/13	130.34	--	5.60	124.74
MW-10	02/24/14	130.34	--	4.27	126.07
MW-10	09/03/14	130.34	--	6.59	123.75
MW-10	03/04/15	130.34	--	4.12	126.22
MW-11	02/23/11	130.59	--	3.49	127.10
MW-11	08/11/11	130.59	--	8.99	121.60
MW-11	02/13/12	130.59	--	5.47	125.12
MW-11	08/09/12	130.59	--	4.09	126.50
MW-11	02/12/13	130.59	--	3.79	126.80
MW-11	08/06/13	130.59	--	5.56	125.03
MW-11	02/24/14	130.59	--	4.05	126.54
MW-11	09/03/14	130.59	--	7.24	123.35
MW-11	03/04/15	130.59	--	4.02	126.57
MW-12	02/23/11	134.56	--	1.79	132.77
MW-12	08/11/11	134.56	--	4.26	130.30
MW-12	02/13/12	134.56	--	5.39	129.17
MW-12	08/09/12	134.56	--	8.32	126.24
MW-12	02/12/13	134.56	--	5.09	129.47
MW-12	08/06/13	134.56	--	4.55	130.01
MW-12	08/06/13	134.56	--	3.58	130.98
MW-12	09/03/14	134.56	--	4.74	129.82
MW-12	03/04/15	134.56	--	3.63	130.93
MW-13	02/23/11	131.42	--	3.10	128.32
MW-13	08/11/11	131.42	--	8.30	123.12
MW-13	02/13/12	131.42	--	5.72	125.70
MW-13	08/09/12	131.42	--	7.00	124.42
MW-13	02/12/13	131.42	--	6.87	124.55
MW-13	08/06/13	131.42	--	2.32	129.1
MW-13	02/24/14	131.42	--	2.39	129.03
MW-13	09/03/14	131.42	--	2.39	129.03
MW-13	03/04/15	131.42	--	2.56	128.86
MW-14	02/13/12	135.01	--	10.42	124.59
MW-14	08/09/12	135.01	--	11.1	123.91
MW-14	02/12/13	135.01	--	11.53	123.48
MW-14	08/06/13	135.01	--	6.75	128.26
MW-14	02/24/14	135.01	--	6.25	128.76
MW-14	09/03/14	135.01	--	6.25	128.76
MW-14	03/04/15	135.01	--	5.75	129.26
MW-15	02/13/12	130.84	--	6.78	124.06
MW-15	08/09/12	130.84	--	8.32	122.52
MW-15	02/12/13	130.84	--	6.10	124.74
MW-15	08/06/13	130.84	--	4.85	125.99
MW-15	02/24/14	130.84	--	4.30	126.54
MW-15	09/03/14	130.84	--	4.30	126.54
MW-15	03/04/15	130.84	--	3.99	126.85
MW-11D	09/03/14	131.63	--	6.95	124.68
MW-11D	03/04/15	131.63	--	2.76	128.87
MW-12D	09/03/14	134.15	--	9.13	125.02
MW-12D	03/04/15	134.15	--	5.40	128.75

NGVD = National Geodetic Vertical Datum of 1929

TOC = Top of PVC Casing

"--" = Not detected or no data available

Appendix B
Ground Water Analytical Data Summary

APPENDIX B. GROUND WATER ANALYTICAL DATA SUMMARY - WIX FILTRATION FACILITY, DILLON, SC

EPA 8260 (ug/l) Sample Location	Sample Date	Acetone	Benzene	cis-1,2-DCE	trans-1,2-DCE	1,2-DCE (Total)	1,1-DCE	Ethylbenzene	2-Hexanone	Isopropylbenzene	p-Isopropyltoluene	n-Propylbenzene	Toluene	TCE	PCE	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,1-TCA	Xylene (Total)	m&p-Xylene	o-Xylene	Carbon disulfide	2-Butanone	sec-Butylbenzene	n-Butylbenzene	tert-Butylbenzene	Styrene	2-Chlorotoluene	4-Chlorotoluene	Methylene Chloride	Naphthalene	Vinyl Chloride
SC GWr Std (MCL)		NE	5	70	100	170	7	700	NE	NE	NE	NE	1,000	5	5	NE	NE	200	10K	NE	NE	360	NE	NE	NE	NE	100	NE	NE	NE	NE	2
MW-1	05/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	340,000	ND	ND	ND	ND	ND	230	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	08/08/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	260,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	01/10/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	231,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	08/14/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	254,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	03/12/09	ND	69.8	4.02	ND	4.02	ND	45.9	ND	ND	4.1	ND	286,000	ND	ND	2.18	ND	ND	44	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	09/01/09	ND	57.9	2.85	ND	2.85	ND	25.4	ND	ND	3.3	ND	229,000	ND	ND	1.86	1.57	ND	26	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	03/10/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	326,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	09/09/10	62	ND	2.66	ND	ND	ND	48.4	ND	1.02	8.13	3.81	332,000	ND	1.24	10.8	4.05	ND	51.4	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	02/23/11	ND	60.3	2.8	ND	2.8	ND	ND	ND	ND	6.75	1.91	282,000	ND	ND	6.39	2.31	ND	ND	--	--	2.93	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	08/12/11	ND	63.2	2.92	ND	ND	ND	35.6	ND	ND	6.02	1.43	364,000	ND	2.08	3.81	1.56	ND	37	--	--	1.52	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-01	08/12/11	ND	58.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	338,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	02/13/12	ND	20.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	18,100	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	08/10/12	ND	54.3	1.95	ND	ND	ND	9.28	ND	ND	0.988(j)	0.436(J)	66,700	ND	0.353(J)	1.56	0.614(j)	ND	10.4	--	--	0.292(J)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-01	08/10/12	ND	53	2.2	ND	ND	ND	10.8	ND	ND	0.33(J)	ND	44,200	ND	0.404	3.47	1.23	ND	12.7	--	--	0.351(J)	ND	ND	ND	ND	0.422(J)	0.754(J)	ND	ND	ND	ND
MW-1	02/12/13	ND	25.6	1.01	ND	ND	ND	0.72(J)	ND	ND	ND	ND	167	ND	ND	1.17	ND	ND	0.669(J)	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-01	02/12/13	ND	24.8	1.04	ND	ND	ND	1.4	ND	0.290(J)	ND	ND	114	ND	ND	1.47	0.287(J)	ND	1.46(J)	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.41(J)	ND
MW-1	08/07/13	ND	6.57	0.257(J)	ND	ND	ND	ND	ND	ND	ND	ND	164	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	0.359	ND	ND
MW-1	02/25/14	ND	0.321(J)	ND	ND	ND	ND	0.978	ND	ND	ND	ND	1,050	ND	ND	ND	ND	ND	1.33(J)	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-01	02/25/14	ND	0.313(J)	0.392(j)	ND	392(J)	ND	9:50 AM	ND	ND	ND	ND	1,450	ND	ND	ND	ND	ND	1.87(J)	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	09/04/14	ND	5.95	0.479(J)	ND	ND	ND	ND	ND	ND	ND	ND	19	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-01	09/04/14	ND	6.06	0.436(J)	ND	ND	ND	ND	ND	ND	ND	ND	20	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	03/04/15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.917(J)	ND
DUP-01	03/04/15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	81	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	05/24/06	ND	21	ND	ND	ND	ND	3.0	ND	ND	ND	ND	11,000	ND	ND	ND	ND	ND	2.8	2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	08/08/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	31,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	01/10/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	127,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	08/14/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	81,500	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	03/12/09	ND	56.4	1.89	ND	1.89	ND	27.9	ND	ND	1.24	1.21	141,400	ND	ND	1.1	ND	ND	18.9	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	09/01/09	ND	44.8	1.39	ND	1.39	ND	11.9	ND	ND	1.74	ND	91,800	ND	ND	ND	ND	ND	12.4	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	03/10/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	99,400	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	09/09/10	ND	69.1	1.72	ND	ND	ND	25.5	ND	ND	7.48	1.69	167,000	ND	ND	2.81	ND	ND	24.3	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	02/23/11	ND	60	1.72	ND	ND	ND	21	ND	ND	2.94	1.57	115,000	ND	ND	1.73	ND	ND	20.7	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	08/12/11	ND	61.6	1.44	ND	ND	ND	10.4	ND	ND	1.03	ND	96,600	ND	ND	ND	ND	ND	11	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	02/13/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	222,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	08/10/12	18.6(J)	64.2	1.84	ND	ND	ND	23.8	ND	0.303(J)	3.82	1.32	137,000		0.295(J)	2.22	0.722(J)	ND	24.4	--	--	0.629(J)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	02/12/13	29.5(J)	61.4	1.97	ND	ND	ND	20.1	ND	0.295(J)	3.02	1.23	131,000	0.266(J)	0.303(J)	2.08	0.587(J)	ND	22.3	--	--	1.36	ND	ND	ND	ND	ND	ND	ND	ND	1.36(J)	ND
MW-2	08/07/13	46.4	52.6	1.35	ND	ND	ND	15.1	ND	ND	2.41	0.787(J)	112,000	ND	ND	1.39	0.450(J)	ND	16.9	--	--	0.449(J)	ND	ND	ND	ND	ND	ND		0.349(J)	ND	ND
DUP-01	08/07/13	49.5	49.6	1.43	ND	ND	ND	15.1	ND	ND	2.22	0.733(J)	101,000	ND	ND	1.57	0.580(J)	ND	17.2	--	--	0.394(J)	ND	ND	ND	ND	ND	ND		0.583(J)	ND	ND
MW-2	02/25/14	10.8(J)	50.3	1.39	ND	ND	ND	19	ND	ND	2.95	1.03	105,000	ND	0.260(J)	2.53	0.736(J)	ND	19.1	--	--	0.603(J)	ND	ND	ND	ND	ND	ND	ND	ND	1.49(J)	ND
MW-2	09/04/14	30.1	51.4	1.48	ND	ND	ND	12.8	ND	0.851(J)	1.62	0.747(J)	63,300	ND	ND	1.33	0.752(J)	ND	13.9	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	03/04/15	90.8	40.5	1.08	ND	ND	ND	17.2	ND	ND	2.76	0.953(J)	85,100	0.304(J)	ND	1.6	0.560(J)	ND	20.2	--	--	ND	2.83(J)	ND	ND	ND	ND	ND	ND	ND	0.304(J)	ND
MW-3	05/24/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	210,000	ND	ND	2,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-1	05/24/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	220,000	ND	ND	2,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	08/08/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	142,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-1	08/08/07	ND	25.3	2.3	ND	2.3	ND	28.5	5.7	16.3	ND	ND	132,000	ND	ND	134	ND	ND	86.4	39.7	46.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	01/10/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	78,300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-1	01/10/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	90,300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	08/14/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	57,800	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

APPENDIX B. GROUND WATER ANALYTICAL DATA SUMMARY - WIX FILTRATION FACILITY, DILLON, SC

EPA 8260 (ug/l) Sample Location	Sample Date	Acetone	Benzene	cis-1,2-DCE	trans-1,2-DCE	1,2-DCE (Total)	1,1-DCE	Ethylbenzene	2-Hexanone	Isopropylbenzene	p-Isopropyltoluene	n-Propylbenzene	Toluene	TCE	PCE	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,1,1-TCA	Xylene (Total)	m&p-Xylene	o-Xylene	Carbon disulfide	2-Butanone	sec-Butylbenzene	n-Butylbenzene	tert-Butylbenzene	Styrene	2-Chlorotoluene	4-Chlorotoluene	Methylene Chloride	Naphthalene	Vinyl Chloride
SC GWr Std (MCL)		NE	5	70	100	170	7	700	NE	NE	NE	NE	1,000	5	5	NE	NE	200	10K	NE	NE	360	NE	NE	NE	NE	100	NE	NE	NE	NE	2
MW-3	03/12/09	ND	9.85	ND	ND	ND	ND	15.2	ND	23.8	5.43	35.8	14,200	ND	ND	173	60.2	ND	30.1	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	09/01/09	ND	13.8	1.09	ND	1.09	ND	22.7	ND	22.3	7.55	50.1	41,000	ND	ND	159	69.6	ND	63.9	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	03/10/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	112	6,470	ND	ND	150	184	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	09/09/10	ND	ND	ND	ND	ND	ND	23.7	ND	21.3	6.1	36.2	65,300	ND	ND	156	55.3	ND	68.0	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	02/23/11	474	29.4	1.67	ND	ND	ND	38.4	ND	25	5.19	48.1	156,000	ND	ND	165	60.7	ND	113.0	--	--	1.27	66.2	1.46	3.5	25.7	3.5	25.7	66.2	1.46	3.5	25.7
MW-3	08/13/11	ND	20.2	1.13	ND	ND	ND	13.9	ND	8.38	1.49	15	104,000	ND	ND	70.6	21	ND	42.2	--	--	ND	ND	ND	1.26	ND	1.26	ND	ND	ND	1.26	ND
MW-3	02/13/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	161,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	08/10/12	43.6(J)	21.4	1.29	ND	ND	ND	21.5	ND	11.6	2.41	20.6	93,500	ND	0.465(J)	93.4	30.9	ND	66.5	--	--	ND	5.82(J)	0.797(J)	ND	ND	1	ND	ND	ND	ND	ND
MW-3	02/12/13	58.7	25.5	1.73	ND	ND	ND	33.2	ND	18.6	4.15	33.8	128,000	0.377(J)	0.742(J)	173	57.3	ND	111	--	--	0.417(J)	ND	ND	ND	ND	ND	ND	ND	ND	2.04(J)	ND
MW-3	08/07/13	ND	16.8	1.04	ND	ND	ND	12.5	ND	7.21	1.5	8.89	25,400	ND	ND	65.4	21.7	ND	33.4	--	--	ND	ND	ND	ND	ND	ND	ND		0.789(J)	ND	ND
MW-3	02/25/14	ND	19.3	1.39	ND	ND	ND	17	ND	9.35	2.95	14.9	20,000	0.281(J)	ND	92.8	34.5	ND	40.6	--	--	ND	ND	ND	1.52	ND	ND	ND	ND	ND	0.664(J)	ND
MW-3	09/04/14	6.71(J)	21.80	1.22	ND	ND	ND	16.40	ND	7.42	2.15	14.90	52,700	0.309(J)	ND	74	23.8	ND	49.8	--	--	ND	ND	0.912(J)	1.27	ND	ND	17.2	ND	ND	1.85(J)	ND
MW-3	03/04/15	ND	17.30	1.29	ND	ND	ND	11.90	ND	7.22	1.73	11.90	4,960	ND	ND	63	21.2	ND	16.7	--	--	0.306(J)	ND	0.680(J)	ND	ND	ND	ND	ND	ND	0.427	ND
MW-4	05/24/06	27	27	4.8	ND	5.1	ND	3.4	ND	ND	ND	1.1	41,000	ND	ND	ND	1.6	ND	9.3	4.1	5.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	08/08/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	169,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	01/10/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	321,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	08/14/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	321,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-1	08/14/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	333,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	03/12/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	340,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-1	03/13/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	349,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	09/01/09	64.7	81.1	12.9	ND	12.9	ND	25.5	ND	4.07	2.06	ND	272,000	ND	1.03	33.1	9.09	ND	56.2	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	03/10/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	112	450,000	ND	ND	150	184	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-1	03/10/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	112	447,000	ND	ND	150	184	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	09/09/10	72.8	93.4	13.4	ND	ND	ND	27.4	ND	5.32	1.5	8.31	296,000	ND	1.31	37.4	11.5	ND	59.2	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUP-1	09/09/10	70.0	93.1	13.6	ND	ND	ND	25.1	ND	4.71	1.23	6.98	304,000	ND	1.26	32.4	9.87	ND	54.6	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	02/24/11	157	95	14	ND	ND	ND	33.3	ND	5.89	1.83	9.44	267,000	ND	ND	40.4	12.8	ND	71.1	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	08/12/11	230	118	14	ND	ND	ND	36.8	ND	8.49	3.65	13.6	449,000	ND	2.4	61.5	18.8	ND	79.4	--	--	2.11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	02/13/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	384,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	08/10/12	287	20.2	14.1	ND	ND	ND	34.8	ND	5.81	1.5	8.25	404,000	ND	ND	37.4	11.8	ND	72	--	--	2.71	24.7(J)	ND	ND	ND	0.954(J)	ND	ND	ND	ND	ND
MW-4	09/04/14	607	76.5	12.20	0.839(j)	ND	ND	45.4	ND	13.1	9.3	ND	327,000	ND	2.65	115	36.5	ND	105	--	--	2.65	63.5	1.04	1.77	ND	ND	27.2	ND	ND	2.77(J)	ND
MW-4	03/04/15	629	40.5	12.30	0.410(J)	ND	ND	46.8	ND	8.81	4.01	17.8	449,000	0.416(J)	3.81	74.3	24.8	ND	97.9	--	--	3.85	ND	ND	0.423(J)	ND	ND	ND	ND	ND	0.866(J)	ND
MW-5	01/04/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-6	01/04/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	01/04/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	DUP-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	08/08/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	59.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	08/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	01/10/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	08/14/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	03/13/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	09/01/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	03/10/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	09/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	02/23/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.76	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	08/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	02/13/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

APPENDIX B. GROUND WATER ANALYTICAL DATA SUMMARY - WIX FILTRATION FACILITY, DILLON, SC

EPA 8260 (ug/l) Sample Location	Sample Date	Acetone	Benzene	cis-1,2-DCE	trans-1,2-DCE	1,2-DCE (Total)	1,1-DCE	Ethylbenzene	2-Hexanone	Isopropylbenzene	p-Isopropyltoluene	n-Propylbenzene	Toluene	TCE	PCE	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,1,1-TCA	Xylene (Total)	m&p-Xylene	o-Xylene	Carbon disulfide	2-Butanone	sec-Butylbenzene	n-Butylbenzene	tert-Butylbenzene	Styrene	2-Chlorotoluene	4-Chlorotoluene	Methylene Chloride	Naphthalene	Vinyl Chloride
SC GWr Std (MCL)		NE	5	70	100	170	7	700	NE	NE	NE	NE	1,000	5	5	NE	NE	200	10K	NE	NE	360	NE	NE	NE	NE	100	NE	NE	NE	NE	2
DUP-01	02/13/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	08/09/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	02/12/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	08/06/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	.586(J,B)	ND	ND	0.229(J)	ND	ND	0.437(J)	--	--	ND	ND	ND	ND	ND	ND	ND	ND	0.800J	ND	ND
MW-7	02/24/14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	09/03/14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.569(J)	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	09/03/14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.199(J)	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8	01/04/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-9	01/04/07	ND	ND	3.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
			ND																													
MW-10	02/23/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.38	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-10	08/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.31	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-10	02/13/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.26	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-10	08/09/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-10	02/12/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-10	08/06/13	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	.614(J,B)	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	0.670(J)	ND	ND
MW-10	02/24/14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-10	09/03/14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.553(J)	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-10	03/04/15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11	02/23/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13,200	ND	ND	1.9	ND	ND	5.19	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11	08/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	16,300	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11	02/12/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	42,900	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11	08/09/12	ND	0.443(J)	ND	ND	ND	ND	0.845(J)	ND	ND	ND	ND	3,070	ND	ND	0.400(J)	ND	ND	1.04(J)	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11	02/12/13	ND	0.650(J)	ND	ND	ND	ND	1.06	ND	ND	ND	ND	1,910	ND	ND	0.593(J)	ND	ND	1.14(J)	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11	08/06/13	ND	13.3	ND	ND	ND	ND	18.1	ND	0.931(J)	1.16	1.29	19,900	ND	ND	5.42	1.88	ND	19.1	--	--	ND	ND	ND	ND	ND	ND	ND	ND	1.71(J)	ND	ND
MW-11	02/24/14	ND	10.1	ND	ND	ND	ND	16.9	ND	1.01	1.99	1.94	47,900	ND	ND	8.2	ND	2.59	20.8	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11	09/04/14	ND	4.32	ND	ND	ND	ND	1.04	ND	0.883(J)	0.566(J)	0.23(J)	792	ND	ND	1.4	0.668(J)	ND	2.56	--	--	ND	ND	0.437	ND	ND	ND	ND	ND	ND	ND	ND
MW-11	03/04/15	ND	11.2		0.410(J)	ND	ND	19	ND	1.21	1.96	2.28	65,700	0.416(J)	ND	8.01	2.8	ND	25.6	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11D	09/03/14	ND	1.8	14.7	0.611(J)	ND	ND	ND	ND	ND	ND	ND	0.574(J)	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11D	03/04/15	ND	1.68	17.2	0.354(J)	ND	ND	ND	ND	ND	ND	ND	0.248(J)	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-12	02/24/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	494	ND	ND	1.05	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-12	08/11/11	ND	0.528(J)	13.3	ND	ND	ND	191	ND	1.48	5.94	2.84	94,500	ND	ND	27	13.2	ND	230	--	--	ND	ND	ND	1.54	ND	1.54	ND	ND	ND	1.54	ND
MW-12	02/13/12	ND	0.742(J)	ND	ND	ND	ND	62.6	ND	ND	ND	ND	5,770	ND	ND	ND	ND	ND	66.8	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-12	08/09/12	ND	1.04	10.1	ND	ND	ND	91.9	ND	0.588(J)	3.53	1.29	7,060	ND	ND	11.7	6.15	ND	94.5	--	--	ND	ND	0.263(J)	1.09	ND	ND	ND	ND	ND	ND	ND
MW-12	02/12/13	ND	2.00	8.06	ND	ND	ND	82.9	ND	0.520(J)	2.85	1.03	498	ND	ND	9.35	5.15	ND	69.8	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.52(J)	ND
MW-12	08/07/13	ND	ND	1.03	ND	ND	ND	126	ND	0.664(J)	2.94	1.43	46,100	0.671(J)	ND	15.5	7.53	ND	138	--	--	ND	ND	ND	ND	ND	ND	ND	ND	0.528(J)	1.52(J)	ND
MW-12	02/25/14	ND	ND	19.6	ND	ND	ND	127	ND	0.652(J)	ND	1.86	58,100	ND	0.294(J)	17.7	8.65	ND	134	--	--	ND	ND	0.229(J)	1.3		0.577(J)	ND	ND	ND	0.843(J)	ND
MW-12	09/04/14	ND	1.5	12.0	ND	ND	ND	87.4	ND	1	1.8	0.638(J)	98.1	ND	ND	8.53	4.82	ND	78.9	--	--	ND	ND	0.538(J)	0.979(J)	ND	ND	ND	ND	ND	1.74(J)	ND
MW-12	03/05/15	ND	1.05	9.2	ND	ND	ND	97	ND	0.532(J)	1.94	1.37	32,500	0.502(J)	0.721(J)	10.3	4.75	ND	81	--	--	ND	ND	0.479(J)	ND	ND	ND	ND	ND	ND	0.371(J)	ND
MW-12D	09/04/14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.62	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-12D	03/04/15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.213(J)	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-13	02/24/11	35800	ND	86.5	7.07	ND	ND	ND	ND	14.8	ND	21.8	371,000	ND	ND	99.3	30.4	ND	187	--	--	7.04	695	ND	ND	ND	ND	ND	695	ND	ND	ND
MW-13	08/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	446,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

APPENDIX B. GROUND WATER ANALYTICAL DATA SUMMARY - WIX FILTRATION FACILITY, DILLON, SC

EPA 8260 (ug/l) Sample Location	Sample Date	Acetone	Benzene	cis-1,2-DCE	trans-1,2-DCE	1,2-DCE (Total)	1,1-DCE	Ethylbenzene	2-Hexanone	Isopropylbenzene	p-Isopropyltoluene	n-Propylbenzene	Toluene	TCE	PCE	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,1,1-TCA	Xylene (Total)	m&p-Xylene	o-Xylene	Carbon disulfide	2-Butanone	sec-Butylbenzene	n-Butylbenzene	tert-Butylbenzene	Styrene	2-Chlorotoluene	4-Chlorotoluene	Methylene Chloride	Naphthalene	Vinyl Chloride
SC GWr Std (MCL)		NE	5	70	100	170	7	700	NE	NE	NE	NE	1,000	5	5	NE	NE	200	10K	NE	NE	360	NE	NE	NE	NE	100	NE	NE	NE	NE	2
MW-13	02/13/12	86,800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	459,000	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-13	08/09/12	66,100	80.6	62	7.27	ND	ND	52.8	ND	89.5	6.97	156	666,000	ND	9	501(E)	218(E)	ND	402	--	--	7.15	741	0.545(J)	7.06	80.8	7.03	142	23.1	1.51(J)	3.23(J)	0.439(J)
MW-13	02/12/13	75,300	77.7	63.3	4.62	ND	ND	51.6	ND	22.6	1.42	38.6	395,000	3.08	ND	177	56.7	ND	219	--	--	7.34	962	ND	ND	ND	ND	ND	ND	2.65(J)	2.41(J)	0.541(J)
MW-13	08/07/13	36,700	69	62.3	6.01	ND	ND	ND	ND	ND	0.829(J)	22.3	533,000	ND	ND	120	41.2	ND	ND	--	--	3.48	516	0.654(J)	ND	ND	ND	ND	ND	1.53(J)	1.02(J)	ND
MW-13	02/25/14	26,800	76.2	62.5	4.38	ND	ND	43.3	ND	19.2	1.2	31	545,000	2.42	4.82	128	48.3	ND	171	--	--	4.27	407	ND	1.69	ND	ND	ND	ND	1.42(J)	1.09(J)	0.393(J)
MW-13	09/04/14	14,100	78.2	42.2	2.15	44.35	ND	45.8	ND	16.6	1.32	32.8	490,000	2.37	ND	135	44.5	ND	182	--	--	3.52	185	0.936(J)	1.18	ND	ND	ND	ND	0.799(J)	2.59(J)	ND
MW-13	03/05/15	18,700	71.6	44.5	1.3	ND	ND	47.7	3.88(J)	18.2	1.07	31.8	441,000	1.23	4.77	137	47.1	ND	183	--	--	4.83	393	0.760(J)	1.22	ND	ND	ND	ND	0.236(J)	1.03(J)	0.356(J)
MW-14	02/12/12	ND	ND	436	ND	ND	1.27	ND	ND	ND	ND	ND	ND	ND	1.24	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-14	08/09/12	ND	ND	447	ND	ND	87(J)	ND		0.293(J)		0.865(J)	23		0.864(J)	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-14	02/12/13	ND	ND	513	8.67	ND	1.58	ND	ND	ND	ND	ND	1.34	ND	1.06	0.584(J)	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.274(J)
MW-14	08/07/13	23	0.260(J)	994	491	ND	2.4	ND	ND	ND	ND	ND	2.03(B)	0.244(J)	1.28	0.341(J)	ND	ND	ND	--	--	ND	ND	0.248(J)	ND	ND	ND	ND	ND	0.667(J)	ND	0.580(J)
MW-14	02/24/14	ND	0.286(J)	1,310	0.659(J)	ND	3.14	ND	ND	ND	ND	ND	1.00	0.351(J)	1.45	ND	ND	ND	ND	--	--	ND	ND	0.215(J)	ND	ND	ND	ND	ND	ND	ND	0.887(J)
MW-14	09/04/14	ND	0.365(J)	1,300	25.2	ND	3.81	ND	ND	ND	ND	ND	1	0.346(J)	1.12	ND	ND	ND	ND	--	--	ND	ND	0.685(J)	0.54(J)	ND	ND	ND	ND	ND	ND	0.887(J)
MW-14	03/05/14	ND	ND	918	1.14	ND	146	ND	ND	ND	ND	ND	0.223(J)	ND	1.08	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.471(J)
MW-15	02/12/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-15	08/09/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.624(J)	0.731(J)	3	ND	ND	0.541(J)	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-15	02/12/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.303(J)	0.290(J)	0.684(J)	ND	ND	0.884(J)	0.283(J)	ND	0.279(J)	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-15	08/06/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	.594(J,B)	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	0.898(J)	ND	ND
MW-15	02/24/14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-15	09/03/14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	32.5	ND	ND	0.473(J)	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-15	03/04/15	ND	ND	ND	ND	ND	ND	0.202(J)	ND	ND	ND	ND	256	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Temporary Monitor Wells																																
TW-1	11/18/05	ND	54.1	3.93	ND	ND	8.02	39.3	ND	ND	1.88	2.58	140,000	ND	ND	ND	ND	7.52	30.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TW-2	11/18/05	ND	23.7	2.68	ND	ND	ND	13.8	ND	2.8	3.75	6.49	7,610	ND	ND	28.4	6.64	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TW-3	11/18/05	ND	55.0	9.15	ND	ND	1.51	21.9	ND	5.9	1.03	9.85	184,000	ND	1.26	61.1	12.7	ND	44.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TW-3	DUP-1	51.6	57.8	13.3	ND	ND	ND	43.4	ND	12.8	2.48	24.1	184,000	ND	2.07	137	32.3	ND	88.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
QA/QC Samples	**Equipment blanks**																															
EB-1	11/18/05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.41	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-1	05/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-1	01/04/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-1	08/08/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-1	01/10/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
QA/QC Samples	**Field blanks**																															
FB-1	11/18/05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FB-1	05/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FB-1	01/04/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FB-1	08/08/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FB-2	08/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FB-1	01/10/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
QA/QC Samples	**Laboratory trip blanks**																															
TB-1	11/18/05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.73	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TB-1	01/04/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TB-2	08/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TB	01/10/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	08/14/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	03/13/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.6	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	09/01/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

APPENDIX B. GROUND WATER ANALYTICAL DATA SUMMARY - WIX FILTRATION FACILITY, DILLON, SC

EPA 8260 (ug/l) Sample Location	Sample Date	Acetone	Benzene	cis-1,2-DCE	trans-1,2-DCE	1,2-DCE (Total)	1,1-DCE	Ethylbenzene	2-Hexanone	Isopropylbenzene	p-Isopropyltoluene	n-Propylbenzene	Toluene	TCE	PCE	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,1,1-TCA	Xylene (Total)	m&p-Xylene	o-Xylene	Carbon disulfide	2-Butanone	sec-Butylbenzene	n-Butylbenzene	tert-Butylbenzene	Styrene	2-Chlorotoluene	4-Chlorotoluene	Methylene Chloride	Naphthalene	Vinyl Chloride
SC GWr Std (MCL)		NE	5	70	100	170	7	700	NE	NE	NE	NE	1,000	5	5	NE	NE	200	10K	NE	NE	360	NE	NE	NE	NE	100	NE	NE	NE	NE	2
Trip Blank	03/10/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	09/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	02/23/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	46.8	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	08/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	46.8	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	02/12/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	46.8	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	08/09/12	3.25(J)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	46.8	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	02/12/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	46.8	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TB-01	08/07/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	46.8	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	0.427	ND	ND
TB-01	02/25/14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TB-01	09/03/14	38.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TB-01	03/04/15	38.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not detected above analytical method quantitation limit NE = Not established "--" - Not analyzed J - Approximate Value E - Exceeded Calibration Range NS - Not Sampled

Blue font - compound exceeds South Carolina MCL if an MCL has been established

Appendix E
Remediation System Performance

APPENDIX E. REMEDIATION SYSTEM PERFORMANCE

Date	AS-1		AS-2		AS-3		AS-4		AS-5		SVE		PID (ppm)	
	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	ft/min	SCFM	IN	OUT
12/01/09	50	1.1	30	0.7	25	0.5	55	1.2	45	1.0	125	10.9	60	0
01/22/10	52	1.1	25	0.5	22	0.5	53	1.2	48	1.0	110	9.6	62	0
02/08/10	55	1.2	30	0.7	30	0.7	55	1.2	50	1.1	115	10.1	65	0
03/10/10	320	7.0	320	7.0	325	7.1	330	7.2	315	6.9	100	8.8	160	0
03/30/10	330	7.2	325	7.1	330	7.2	325	7.1	320	7.0	160	14.0	155	0
04/28/10	310	6.8	320	7.0	335	7.3	320	7.0	310	6.8	140	12.3	210	0
05/31/10	325	7.1	320	7.0	300	6.5	320	7.0	330	7.2	115	10.1	107	0
06/30/10	320	7.0	320	7.0	310	6.8	330	7.2	325	7.1	120	10.5	55	0
07/23/10	325	7.1	320	7.0	325	7.1	320	7.0	330	7.2	145	12.7	11	0
08/24/10	345	7.5	325	7.1	310	6.8	310	6.8	330	7.2	150	13.1	22	0
09/09/10	320	7.0	315	6.9	320	7.0	315	6.9	325	7.1	120	10.5	24	0
10/20/10	315	6.9	320	7.0	325	7.1	350	7.6	310	6.8	82	7.2	22	0
11/24/10	310	6.8	310	6.8	330	7.2	330	7.2	320	7.0	92	8.1	145	0
12/23/10	320	7.0	325	7.1	320	7.0	315	6.9	320	7.0	88	7.7	1	0
02/02/11	335	7.3	325	7.1	335	7.3	310	6.8	350	7.6	110	9.6	0	0
03/03/11	310	6.8	330	7.2	310	6.8	320	7.0	350	7.6	115	10.1	2	0
04/05/11	310	6.8	310	6.8	300	6.5	275	6.0	300	6.5	500	43.8	12	0
05/12/11	310	6.8	305	6.7	295	6.4	305	6.7	300	6.5	450	39.4	4	0
06/08/11	330	7.2	330	7.2	305	6.7	300	6.5	330	7.2	480	42.0	28	0
07/07/11	340	7.4	340	7.4	315	6.9	300	6.5	330	7.2	400	35.0	18	0
08/01/11	310	6.8	300	6.5	300	6.5	310	6.8	330	7.2	400	35.0	18	0
08/31/11	340	7.4	335	7.3	325	7.1	315	6.9	300	6.5	400	35.0	14	0
09/30/11	300	6.5	300	6.5	305	6.7	315	6.9	315	6.9	425	37.2	22	0
11/02/11	330	7.2	300	6.5	300	6.5	330	7.2	300	6.5	400	35.0	21	0
11/30/11	315	6.9	310	6.8	300	6.5	320	7.0	325	7.1	420	36.8	22	0
12/29/11	325	7.1	345	7.5	320	7.0	340	7.4	330	7.2	850	74.4	47	0
01/31/12	310	6.8	275	6.0	265	5.8	275	6.0	270	5.9	270	23.6	9	0
03/01/12	285	6.2	325	7.1	250	5.4	325	7.1	225	4.9	350	30.7	5	0
03/29/12	310	6.8	325	7.1	320	7.0	320	7.0	330	7.2	680	59.5	32	0
05/21/12	330	7.2	300	6.5	300	6.5	325	7.1	315	6.9	710	62.2	12	0
06/29/12	325	7.1	335	7.3	300	6.5	330	7.2	300	6.5	600	52.5	24	0
07/26/12	325	7.1	345	7.5	340	7.4	325	7.1	325	7.1	328	28.7	45	0
08/30/12	320	7.0	315	6.9	310	6.8	325	7.1	290	6.3	700	61.3	12	0
10/04/12	335	7.3	310	6.8	320	7.0	300	6.5	300	6.5	580	50.8	16	0
11/01/12	305	6.6	300	6.5	300	6.5	325	7.1	320	7.0	800	70.1	10	0
12/06/12	330	7.2	330	7.2	320	7.0	325	7.1	300	6.5	900	78.8	10	0
01/08/13	295	6.4	330	7.2	300	6.5	295	6.4	300	6.5	870	76.2	7	0
01/31/13	300	6.5	295	6.4	310	6.8	315	6.9	310	6.8	650	56.9	5	0
01/31/13	300	6.5	295	6.4	310	6.8	315	6.9	310	6.8	650	56.9	5	0
03/08/13	330	7.2	310	6.8	300	6.5	320	7.0	300	6.5	900	78.8	2	0
04/01/13	350	7.6	350	7.6	340	7.4	300	6.5	340	7.4	320	28.0	6	0
05/02/13	335	7.3	340	7.4	335	7.3	315	6.9	330	7.2	500	43.8	12	0
05/30/13	335	7.3	330	7.2	335	7.3	340	7.4	350	7.6	700	61.3	6	0
07/11/13	340	7.4	335	7.3	330	7.2	320	7.0	315	6.9	800	70.1	13	0
08/06/13	330	7.2	300	6.5	315	6.9	325	7.1	320	7.0	650	56.9	8	0
09/05/13	340	7.4	310	6.8	310	6.8	310	6.8	300	6.5	750	65.7	16	0
10/03/13	355	7.7	345	7.5	330	7.2	340	7.4	330	7.2	800	70.1	9	0
11/06/13	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0
12/05/13	335	7.3	325	7.1	325	7.1	305	6.6	315	6.9	755	66.1	14	0
01/09/14	300	6.5	320	7.0	315	6.9	315	6.9	300	6.5	800	70.1	13	0
02/04/14	320	7.0	340	7.4	305	6.6	300	6.5	300	6.5	500	43.8	13	0
03/13/14	290	6.3	300	6.5	310	6.8	315	6.9	300	6.5	800	70.1	10	0
04/04/14	300	6.5	320	7.0	300	6.5	350	7.6	360	7.8	1100	96.3	10	0
05/01/14	315	6.9	295	6.4	275	6.0	325	7.1	315	6.9	900	78.8	13	0
06/04/14	290	6.3	330	7.2	300	6.5	335	7.3	330	7.2	1000	87.6	3	0
07/01/14	360	7.8	300	6.5	330	7.2	300	6.5	320	7.0	380	33.3	4	0
08/04/14	300	6.5	335	7.3	320	7.0	305	6.6	300	6.5	600	52.5	4	0
09/04/14	295	6.4	315	6.9	310	6.8	310	6.8	305	6.6	650	56.9	10	0
10/01/14	300	6.5	320	7.0	300	6.5	350	7.6	360	7.8	1100	96.3	10	0
11/03/14	335	7.3	330	7.2	290	6.3	305	6.6	300	6.5	650	56.9	10	0
12/03/14	330	7.2	300	6.5	315	6.9	325	7.1	275	6.0	200	17.5	8	0
01/07/15	300	6.5	300	6.5	300	6.5	275	6.0	300	6.5	300	26.3	9	0
02/05/15	285	6.2	300	6.5	290	6.3	295	6.4	305	6.6	400	35.0	13	0
02/26/15	300	6.5	275	6.0	295	6.4	300	6.5	275	6.0	600	52.5	13	0

Enclosure C

Analytical Results for the SVE Influent Sample (April 28, 2015)

www.pacelabs.com

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

May 12, 2015

Greg Kimball
WSP USA Corp
123 North 3rd St
Suite 507
Minneapolis, MN 55401

RE: Project: 31999-010 WIx Filtration
Pace Project No.: 10304851

Dear Greg Kimball:

Enclosed are the analytical results for sample(s) received by the laboratory between April 30, 2015 and May 04, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kabor Xiong

Kabor Xiong
kabor.xiong@pacelabs.com
Project Manager

Enclosures

cc: Eric Johnson, WSP USA Corp.

CERTIFICATIONS

Project: 31999-010 WIx Filtration
Pace Project No.: 10304851

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

SAMPLE SUMMARY

Project: 31999-010 WIx Filtration
Pace Project No.: 10304851

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10304851001	**hold**	Air		05/04/15 08:54
10304516001	**SVE-COMB**	Air	04/28/15 11:47	04/30/15 09:30

SAMPLE ANALYTE COUNT

Project:	31999-010 WIx Filtration
Pace Project No.:	10304851

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10304516001	**SVE-COMB**	TO-15	MJL	5

ANALYTICAL RESULTS

Project: 31999-010 WIx Filtration
Pace Project No.: 10304851

Sample: SVE-COMB **Lab ID: 10304516001** Collected: 04/28/15 11:47 Received: 04/30/15 09:30 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	**4.2**	ug/m3	0.59	1.83		05/04/15 00:39	71-43-2	
Ethylbenzene	**5.8**	ug/m3	1.6	1.83		05/04/15 00:39	100-41-4	
Toluene	**235**	ug/m3	14.1	18.3		05/05/15 11:18	108-88-3	
m&p-Xylene	**20.0**	ug/m3	3.2	1.83		05/04/15 00:39	179601-23-1	
o-Xylene	**7.3**	ug/m3	1.6	1.83		05/04/15 00:39	95-47-6	

QUALITY CONTROL DATA

Project: 31999-010 WIx Filtration
Pace Project No.: 10304851

QC Batch: AIR/23160
QC Batch Method: TO-15
Analysis Method: TO-15
Analysis Description: TO15 MSV AIR Low Level
Associated Lab Samples: 10304516001

METHOD BLANK: 1955129
Matrix: Air
Associated Lab Samples: 10304516001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/m3	ND	0.32	05/03/15 16:28	
Ethylbenzene	ug/m3	ND	0.88	05/03/15 16:28	
m&p-Xylene	ug/m3	ND	1.8	05/03/15 16:28	
o-Xylene	ug/m3	ND	0.88	05/03/15 16:28	
Toluene	ug/m3	ND	0.77	05/03/15 16:28	

LABORATORY CONTROL SAMPLE: 1955130

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/m3	32.5	35.9	111	64-139	
Ethylbenzene	ug/m3	44.2	54.8	124	71-136	
m&p-Xylene	ug/m3	88.3	106	119	71-134	
o-Xylene	ug/m3	44.2	53.7	122	75-134	
Toluene	ug/m3	38.3	44.7	117	70-129	

SAMPLE DUPLICATE: 1955381

Parameter	Units	10304516002 Result	Dup Result	RPD	Max RPD	Qualifiers
Benzene	ug/m3	2.2	2.0	11	25	
Ethylbenzene	ug/m3	3.9	4.2	7	25	
m&p-Xylene	ug/m3	14.6	16.0	9	25	
o-Xylene	ug/m3	6.0	6.7	11	25	
Toluene	ug/m3	172	183	6	25	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALIFIERS

Project: 31999-010 WIx Filtration
Pace Project No.: 10304851

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

SAMPLE QUALIFIERS

Sample: 10304516001

[1] The internal standard recoveries associated with this sample exceed the lower control limit. The reported results should be considered estimated values.

Sample: 1955381

[1] The internal standard recoveries associated with this sample exceed the lower control limit. The reported results should be considered estimated values.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 31999-010 WIx Filtration
Pace Project No.: 10304851

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10304516001	**SVE-COMB**	TO-15	AIR/23160		

Pace Analytical®
www.pacelabs.com

AIR: CHAIN-OF-CUSTODY / Analytical Request Document

1030 4516

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

15487

Page: 1 of 1

Section A
Required Client Information:

Company: WSP
Address: 11190 SUNRISE VALLEY DR.
#300 RESTON, VA 20191
Email To: ERIC.JOHNSON@WSPGROUP.COM
Phone: 703-709-6500
Fax:
Requested Due Date/TAT:

Section B
Required Project Information:

Report To: ERIC JOHNSON
Copy To: GREG KIMBALL
Purchase Order No.: —
Project Name: WIX FILTRATION
Project Number: 31999-010

Section C
Invoice Information:

Attention: ENV. ACCT PAYABLE
Company Name: WSP
Address: 512 7th AVE 13th FLOOR NY, NY 10018
Pace Quote Reference: 18725
Pace Project Manager/Sales Rep. KABOA XIONG
Pace Profile #:

Program
☐ UST ☐ Superfund ☐ Emissions ☐ Clean Air Act
☒ Voluntary Clean Up ☐ Dry Clean ☐ RCRA ☐ Other____

Location of Sampling by State SC

Reporting Units
ug/m³ X mg/m³ ____
PPBV ____ PPMV ____
Other

Report Level II.____ III. X IV.____ Other____

Section D Required Client Information
AIR SAMPLE ID
Sample IDs MUST BE UNIQUE

Valid Media Codes MEDIA	CODE
Tedlar Bag	TB
1 Liter Summa Can	1LC
6 Liter Summa Can	6LC
Low Volume Puff	LVP
High Volume Puff	HVP
Other	PM10

Method:

ITEM #	AIR SAMPLE ID	MEDIA CODE	PID Reading (Client only)	COLLECTED COMPOSITE START END/GRAB DATE	TIME	COMPOSITE - DATE	TIME	Canister Pressure (Initial Field - psig)	Canister Pressure (Final Field - psig)	Summa Can Number	Flow Control Number	PM10	3C- Fixed Gas (%)	TO-3	TO-3M (Methane)	TO-4 (PCBs)	TO-13 (PAH)	TO-14	TO-15	TO15 Short List*	Pace Lab ID	
1	SVE-COMB	6LC	—	4-28-15	1059		1147	28	9	0632	—							~~X~~	X		BTEX ONLY	001
2	SSV-5	6LC			1613		1713	30	5	1498								X			VOC's (TASK ORDER)	002
3	SSV-6	6LC			1432		1534	30	4	1049								X				003
4	SSV-7	6LC			1841		1925	25	5	1266								X				004
5	SSV-17 (DUP)	6LC			1841		1925	25	5	1062								X			VOC's LIST per TASK ORDER	005
6	SSV-8				1515		1617	30	5	0730								X				006
7	SSV-9				1746		1848	30	6	1206								X				007
8	SSV-10				1900		2003	28	4	1272								X				008
9	SSV-11				1706		1807	30	5	2745								X				009
10	SSV-12				1811		1911	29	5	0657								X				010
11	SSV-13				1913		2013	29	4	5								X				011
12	SSV-14			4-28-15	1938		2038	28	3	671								X				012

Comments :

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
			PACE	4/30/15	930

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
/	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: GREG KIMBALL / ROB WALLACE
SIGNATURE of SAMPLER:
DATE Signed (MM / DD / YY) 04/29/2015

ORIGINAL

Pace Analytical	Document Name: Air Sample Condition Upon Receipt Document No.: F-MN-A-106-rev.09	Document Revised: 26Dec2013 Page 1 of 1 Issuing Authority: Pace Minnesota Quality Office

Air Sample Condition Upon Receipt

Client Name: WSP

Project #: **WO# : 10304851**

10304851

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 7805 7836 3467/3445/3456, 8006 2671 9324

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other:

Temp Blank rec: ☐ Yes ☑ No

Temp. (TO17 and TO13 samples only) (°C): — **Corrected Temp (°C):** —

Temp should be above freezing to 6°C **Correction Factor:** —

Thermom. Used: ☐ B88A912167504 ☐ B88A9132521491 ☐ 72337080 ☐ 80512447

Date & Initials of Person Examining Contents: 4/30/15 BD

Type of Ice Received ☐ Blue ☐ Wet ☑ None

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☐ Yes	☑ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Media: Cans				11.
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.

Samples Received: 12 6LC

Canisters			Flow Controllers			Stand Alone G	
Sample Number	Can ID / FC		Sample Number	Can ID / FC		Sample Number	Can ID
SVE-Comb	0632	0976	SSV-13	0005	0075		
SSV - 5	1490	0174	" - 14	0671	0422		
" - 6	1049	0162					
" - 7	1266	0182					
" - 17 (Dup)	1063	0182					
" - 8	0730	0239					
" - 9	1206	0196					
" - 10	1272	0194					
" - 11	2745	0183					
" - 12	0657	0386					

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted: Greg Kimball Date/Time: May 4, 2015

Comments/Resolution: Report and Invoice sample "SVE-Comb" separately from all other samples per client's request.

Project Manager Review: **Date:** April 30, 2015

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Enclosure D
Site Photographs from April 27 through 29, 2015 Inspection

Photo No.	
1	
Air sparge well AS-2.	

Photo No.	
2	
AS-3 **Water observed bubbling in settled area around well's concrete pad.** **Mud residue within pressure gage; therefore, reading could not be collected.**	

Photo No.

3

AS-4

Flow on wellhead gage showed 0 psi.

Photo No.

4

Soil Vapor Extraction Well SVE-1

Well appeared submerged.

No vacuum pressure when wellhead valves were opened.

Photo No. 5	
SVE-2 **Well appeared submerged.** **No vacuum pressure when wellhead valves were opened.**	

Photo No. 6	
View of AS/SVE Equipment Trailer	

Photo No.

7

AS/SVE Equipment inside Trailer

Blower, Carbon Vessels, Condensate (Knockout) Tank, and Compressor.

Photo No.

8

Gage on carbon vessel effluent – shows 0 psi and appears full of fluid.

PHOTOGRAPHIC LOG		
Wix Filtration Corp	**Wix Plant Site, Dillon, SC**	**E0031999.000**

Photo No. 9	
SVE influent sample collection; sample collected at influent port before the first carbon vessel.	

WSP
11190 Sunrise Valley Drive
Suite 300
Reston, VA 20191
Tel: +1 703 709 6500
Fax: +1 703 709 8505
www.wspgroup.com/usa