UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

REGION III

FINAL DECISION AND RESPONSE TO COMMENTS

Costco Parcel
Sperry Marine Facility
Charlottesville, VA

EPA ID: VAD 003 123 833

July 2014

I. Introduction

The United States Environmental Protection Agency (EPA) is issuing this Final Decision and Response to Comments (FDRTC or Final Decision) regarding the Costco Wholesale Corporation Parcel (Costco Parcel or Parcel), formerly a part of the Sperry Marine Facility (Facility) in Charlottesville, Virginia. The Parcel is located at 3171 District Avenue/Seminole Trail (Route 29) in Charlottesville. It is currently owned by Albemarle Place EAAP LLC (Albemarle). EPA's Final Decision for the Parcel addresses contaminated soil, soil vapor and groundwater and is described below and in Sections **V. Final Remedy** and **VI. Evaluation of EPA's Final Remedy**.

The Facility is subject to EPA's Corrective Action Program under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (RCRA), and the Hazardous and Solid Waste Amendments of 1984 (HSWA), 42 U.S.C. §§ 6901 *et seq.* (Corrective Action Program). The Corrective Action Program is designed to ensure that certain facilities subject to RCRA have investigated and cleaned up any releases of hazardous waste and hazardous constituents that have occurred at their properties. The Commonwealth of Virginia (VA) was authorized to implement the Corrective Action Program under Section 3006 of RCRA on September 29, 2000. EPA retained the lead for this Facility under a work share agreement with the VA Department of Environmental Quality (VDEQ).

EPA published a notice on April 15, 2014 in the Charlottesville Daily Progress newspaper requesting comments from the public on the proposed remedy described in the Statement of Basis (SB). During the 30-day public comment period, EPA received comments from a former and current owner of the Costco Parcel. EPA carefully reviewed the comments and responded to them in **Attachment 2** to this Final Decision. EPA has determined that it is not necessary to modify the remedy proposed in the SB. EPA however, has made minor modifications to the SB as noted in Attachment 2 (EPA Response to Comments) to this Final Decision. EPA modified certain aspects of the Final Decision for clarity. The Final Decision set out below, incorporates those minor modifications and clarifications.

The final remedy selected in the Final Decision addresses contaminated soil, soil vapor, and groundwater:

The soil remedy consists of (1) implementation of and compliance with the EPA-approved Soil Management Plan (SMP) submitted with the EPA approved Corrective Measures Study (CMS); (2) compliance with and maintenance of land use restrictions; and (3) notification to current and future construction/utility workers of risks so that appropriate health and safety measures during construction and excavation activities can be developed.

The soil vapor remedy consists of installing a vapor control system (VCS) to meet EPA's Corrective Action Objectives (CAOs), unless Costco demonstrates that indoor air in any occupied building will meet the CAOs without a VCS. An EPA approved VCS operation and maintenance plan is required.

The groundwater remedy consists of monitored natural attenuation of contaminants until drinking water standards are met, and compliance with a groundwater use restriction until CAOs

are met.

The institutional controls will be recorded in an environmental covenant that will restrict land use to non-residential purposes and groundwater use to non-potable use.

The Final Remedy is discussed in more detail in Sections **V. Final Remedy** and **VI. Evaluation of EPA's Final Remedy**.

II. Background

The Facility is located at 1070 Seminole Trail (Route 29) in Charlottesville, Virginia. It has been used to manufacture navigational instruments and systems since 1956. The manufacturing activities have included machining, degreasing, soldering and painting. Hazardous and non-hazardous chemicals and petroleum products have been and are currently used in the manufacturing process.

In 1999, the Facility subdivided its 82-acre property into three lots: Lots 1, 2 and 3. Lot 3 is currently owned by Northrup Grumman Systems Corporation and contains a manufacturing building, paved parking lots and concrete surfaces surrounding the building. Approximately 19 acres of Lot 3 is used for manufacturing purposes (Manufacturing Parcel).

The Costco Parcel is approximately 14.7 acres and is located on portions of Lots 2 and 3. The boundaries of the Parcel are shown in Exhibit 1. The Parcel was not used for manufacturing purposes. The Parcel is located along the north-northeastern border of the Manufacturing Parcel.

The Costco Parcel is comprised of graded soil, two large soil stock piles and part of a large earthen storm water management basin. Trees and vegetation were removed from the Parcel. As part of recent development activities, an unnamed tributary that flowed along the Parcel's southern boundary was diverted into an underground pipe. The tributary historically flowed off-site under Route 29 into Meadow Creek, to the southeast. The former tributary channel was filled in and the diverted water still discharges to Meadow Creek.

Facility environmental investigations began in 1987 and soil and groundwater (GW) samples collected from the Parcel indicated that soil and GW were impacted by Facility-related contaminants. GW samples from four monitoring wells on the Parcel contained chlorinated volatile organic compounds (cVOCs), also known as chlorinated solvents. Three cVOCs exceeded Federal maximum contaminant levels (MCLs) promulgated at 40 C.F.R. Part 141 pursuant to Section 1412 of the Safe Drinking Water Act, 42 U.S.C. Section 300g-1, for drinking water. The GW cVOCs were tetrachloroethylene (PCE), trichloroethylene (TCE), and 1,2-dichlorethylene (DCE). PCE and TCE are considered carcinogenic and are also associated with other health effects. While DCE is not considered carcinogenic, it has been found to cause adverse health effects.

Information provided by employees who worked at the Sperry Marine Facility in the 1970s suggests that spent solvents were used for weed control on the Parcel and on a portion of an adjoining parcel located downgradient from the Parcel. Later investigations also identified cVOCs in sediment and water collected from the tributary located on the Parcel (prior to diversion into an underground pipe). The solvent types, volumes and dates of application on the Parcel are unknown,

but the practice is reported to have ended in the 1970s. In addition, investigations found that an off-site source of cVOCs in GW migrated onto the Parcel along the Parcel's north-northeastern boundary.

III. Summary of Environmental Investigations

A. VA Voluntary Remediation Activities

From 1987 to the present, environmental investigations and remedial actions have been conducted at the Facility, including the Parcel. Starting in 1987, the Facility conducted due diligence environmental assessments in connection with potential property transactions. The Facility discovered cVOCs in GW and reported it to VA's Waste Management Program. In 1996, the Facility enrolled in VA's Voluntary Remediation Program (VRP) to complete environmental investigations and cleanup activities. During Site characterization activities, constituents of potential concern (COPCs) identified for soil were PCE, TCE and chromium, and for GW were PCE, TCE, chromium, and cis-1,2 DCE (cDCE). The risk assessments, approved by VDEQ, concluded that COPCs found in Facility soils did not pose unacceptable risk to human health and the environment, provided that that Facility activities and use are restricted to industrial use (i.e., no residential). The Facility has relied on public water for decades, and groundwater beneath the Facility is not used.

In 2000, VDEQ issued VRP Completion Certificates and Restrictive Covenants were notarized and recorded for Lots 2 and 3. The Covenants prohibit GW use (except for further environmental monitoring and testing), and prohibit residential uses for both Lots. A condition for Lot 3 (which includes the Parcel), required biennial GW monitoring. The Facility collected GW samples from seven wells in 2000, 2002 and 2004. The 2005 VDEQ approved GW Report concluded that GW contamination was decreasing, and no further monitoring was required on Lot 3 even though some COPCs exceeded MCLs. VDEQ issued a Completion Certificate for Lot 3 in February 2000.

B. EPA RCRA Corrective Actions Completed Under the Facility Lead Program

In January 2008, Unisys Corporation, a previous Facility owner, entered into the EPA Corrective Action Facility Lead Program to address any remaining contamination at the Facility. Unisys began addressing data gaps in previous investigations and exploring further cleanup options through a Facility Lead Agreement (FLA). In June 2008, EPA approved the *RCRA Facility Investigation (RFI) Workplan* (RFI WP) which identified three of the previously identified 13 solid waste management units (SWMUs) and one of the two previously identified Areas of Concern (AOCs), AOC-2, for further investigation (see Exhibits 1 and 2).

CVOCs found in AOC-2 were likely sprayed along a dirt road that ran between two test towers, one of which, Test Tower 1, was located on the Parcel. For AOC-2, the RFI WP recommended: (1) delineating the vertical and horizontal extent of VOCs in soil; (2) collecting paired sediment/surface water samples from the unnamed tributary which ran along AOC-2's border with the Facility, and; (3) determining if COPCs in GW were moving off-site downgradient from the Parcel.

In September 2010, Unisys sent its investigation results to EPA in the *RFI Report, Sperry Marine, Charlottesville, VA* (Sperry Marine RFI). The Sperry Marine RFI reported that PCE soil source area(s) remained on AOC-2. The Sperry Marine RFI recommendations for AOC-2 were: (1) complete an Interim Measure (IM) i.e., remove contaminated soil that exceeded health-based levels for cVOCs; and (2) following contaminated soil removal, monitor soil and soil vapor to determine the need for further IMs; and (3) evaluate the collected data to determine if additional engineering and/or land use restrictions would be required in order to protect and prepare the Parcel for potential future use. EPA approved the Sperry Marine RFI in March 2013.

Based on the EPA-approved Sperry Marine RFI, GW flow beneath the Parcel is primarily to the south across the Parcel to the former unnamed tributary. Two off-Parcel sources of cVOCs in GW were also identified. One source is from the Facility, and the other is from an up-gradient off-site source located on the Parcel's north-northeastern boundary. The cVOCs from this off-site source indicates a different cVOC pattern than Facility-related cVOCs. GW from the Sperry Marine Facility flows onto the Parcel towards the former unnamed tributary.

In November 1989, surface and sediment samples from the tributary contained elevated levels of COPCs, with a maximum PCE level of 2.4 parts per million (ppm) in sediment and a surface water TCE maximum of 0.077 ppm. These maximum sediment and water concentrations were above EPA Region III's biological screening benchmarks (BTAGs). In July, 2011 tributary sediment and surface water were sampled again, as close to the 1989 locations as possible. PCE in sediment was 31 ppm (maximum), and in water, 0.029 ppm (maximum), with only the sediment sample exceeding the applicable BTAG benchmark. Other cVOCs previously detected in sediment and water were not detected. The tributary is now enclosed in a buried pipe that discharges off-site to Meadows Creek, southeast of the Parcel.

In December 6, 2011, EPA approved the *AOC-2 Soil IM Workplan* (Soil IM WP). The Soil IM WP objectives were to delineate and remove soil contaminated with COPCs from AOC-2. COPCs included: PCE, TCE, cDCE and vinyl chloride. The *Interim Measures Report AOC-2* (November 2012) was approved by EPA in January 2013 and depicts the three areas where soil was excavated as shown on Exhibit 1. The PCE soil cleanup level used was 0.39 ppm. This level was based on leachability of PCE from soil to GW using soil samples from AOC-2. Soil was excavated to depths ranging from 6 to 18 feet to meet the cleanup level. Bedrock and groundwater were encountered in small areas within two of the three excavations. The 2,581 tons of contaminated soil was disposed of off-site.

C. Investigations Conducted by Costco and EDENS

In 2013, Costco and EDENS, an affiliate of Albemarle, conducted two separate environmental investigations of the Parcel. Costco submitted a *Limited Site Investigation* (May 31, 2013) and EDENS submitted a *Soil and Soil Gas Confirmation Sampling* (July 16, 2013). As part of the Costco Investigation, 28 soil borings and six hand-augered borings were installed. Forty-five soil samples were collected from 2 to 21 feet below ground surface (bgs), and were analyzed for VOCs and chromium. GW was not encountered in the borings. Soil vapor screening points were installed at 14 locations, 12 within the proposed building footprint. Ambient air samples were also collected to identify background levels. After soil and soil vapor samples were collected, GW was sampled by advancing nine temporary wells from depths of 23 to 60 feet bgs. GW was

encountered in the wells from 15.6 to 38 feet bgs and GW samples were analyzed for VOCs and chromium. Four wells were within the building footprint. Exhibit 2 shows all sampling locations and analytical results. Exhibit 1 shows GW results in more detail.

Investigation results show that for soil, COPCs did not exceed VDEQ Tier III or EPA Regional Screening Levels (RSLs) for non-residential land use. VDEQ Tier III are equivalent to EPA's RSLs for non-residential land use. Chromium was found in all soil samples and was determined to be a naturally occurring element in the soil. Concentrations of PCE, TCE, 1,1-dichloroethane (DCA) and vinyl chloride (VC) exceeded VDEQ's Tier III Commercial Subslab Soil Gas Screening Levels. PCE was the predominate COPC, ranging from 1.4 to 25,000,000 micrograms per cubic meter (ug/ m^3). VDEQ's Tier III screening level for PCE is 584 ug/m^3. Groundwater samples from seven of the nine wells exceeded MCLs for five cVOCs. Exhibits 1 and 2 show sample locations and sampling results. EPA concluded that the Parcel has been sufficiently characterized.

EDENS's *Soil and Soil Gas Confirmation Sampling* (July 16, 2013) was conducted to determine whether there are temporal variations in soil and soil gas levels from those reported in the *Limited Site Investigation* (May 31, 2013). GW samples were not collected. EDENS's consultants installed six soil vapor probes at locations previously sampled by Costco, plus one in a new location, using Costco's methodology and sampling depths. Soil samples were collected from five of the seven soil vapor locations.

Two rounds of soil vapor samples were collected on July 1, 2013. Table 1 shows the results of the three soil vapor sampling events from April 18, 2013 and July 1, 2013. The vapor results confirmed that PCE, TCE, DCA and VC concentrations exceeded VDEQ's Tier III screening levels. VDEQ has published soil vapor screening levels for construction workers in trenches. These screening levels are used to protect workers from dermal and inhalation risks from cVOCs. Only PCE levels from the initial round of soil vapor sampling exceeded the construction worker levels at two sampling locations. PCE levels varied from the initial April 2013 sampling with some locations exhibiting lower and others higher levels then the July 2013 samples. Soil sample results show that no cVOCs exceeded EPA or VDEQ screening levels for non-residential uses.

A human health risk assessment was not conducted for the Parcel. An ecological risk assessment was not conducted because the Parcel, once wooded, is now not suitable for sustaining a viable foraging and breeding wildlife community.

D. Costco Corrective Measures Study

On January 30, 2014, EPA approved a *Corrective Measures Study, Proposed Costco Site* (December 6, 2013) (CMS). The CMS is based on previous investigations conducted at the Facility, including the Parcel. The CMS used EPA screening criteria to consider remedy alternatives. The CMS includes a Soil Management Plan (SMP) for identifying and separating contaminated soil from re-usable soil during Parcel development.

IV. Corrective Action Objectives

EPA has identified the following Corrective Action Objectives (CAOs) for soil, soil vapor

and groundwater at the Parcel:

A. Soil

The soil CAO is to attain EPA's Regional Screening Levels (RSLs) for non-residential exposure and construction/utility worker exposure scenario and to control exposure to any remaining contaminated soils.

B. Soil Vapor

The CAO for potential vapor intrusion for occupied buildings is to control human exposure and attain EPA's acceptable cancer risk range of 10^{-4} to 10^{-6} and the hazard quotient (HQ) of 1 or less for non-carcinogenic health effects.

C. Groundwater

The groundwater (GW) CAO is to restore the groundwater to drinking water standards and until such time as drinking water standards are restored, to control exposure to the hazardous constituents remaining in the GW by requiring the implementation of a GW monitoring program. The GW monitoring program at the Parcel will be part of the Site-wide monitoring program which will address Site-wide groundwater contamination associated with the Facility. This program will be implemented by Unysis under EPA and/or VDEQ oversight. EPA's groundwater use remedy also includes compliance with and maintenance of groundwater use restrictions at the Parcel to prevent migration of contaminants while levels remain above MCLs. If an MCL is not established for a cVOC, EPA's RSLs will be used as the CAO for that constituent.

V. Final Remedy

A. Soil

EPA's final soil remedy consists of (1) the implementation of and compliance with the EPA-approved Soil Management Plan (SMP) included with the EPA-approved CMS; (2) compliance with and maintenance of land use restrictions; and (3) notification to current and future construction/utility workers of risks to guide the development of appropriate health and safety measures during construction and excavation activities.

B. Soil Vapor

EPA's final remedy for any occupied building on this Parcel is the installation of a vapor control system (VCS), unless it is demonstrated that indoor air will meet EPA's CAOs. An Operation and Maintenance (O&M) Plan will be submitted to EPA and the VCS will be operated and maintained in accordance with an EPA-approved O&M Plan, thereafter.

C. Groundwater

The soil excavation conducted as part of the Interim Measures implemented at the Facility in 2012 removed sources of PCE contamination to the groundwater. EPA anticipates that as a result of the removal of soil sources, the remaining contamination in groundwater will naturally attenuate and will ultimately achieve EPA's groundwater cleanup levels (drinking water standards) without further treatment. Therefore, the final remedy for groundwater consists of monitored natural attenuation until drinking water standards are met, and compliance with and maintenance of groundwater use restrictions at the Facility to prevent exposure to contaminants while contaminant levels remain above drinking water standards.

D. Land and Groundwater Use Restrictions

Under EPA's final remedy, some contaminants will remain in GW and soil at the Parcel above levels appropriate for residential uses. Therefore, EPA's final remedy for the Parcel requires compliance with and maintenance of the following land and groundwater use restrictions and access and reporting requirements:

1. GW at the Parcel shall not be used for any purpose other than the operation, maintenance, and monitoring activities required by VDEQ and/or EPA, unless it is demonstrated to EPA, in consultation with VDEQ, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the final remedy and EPA, in consultation with VDEQ, provides prior written approval for such use;

2. The Parcel shall not be used for residential purposes unless it is demonstrated to EPA, in consultation with VDEQ, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy, and EPA, in consultation with VDEQ, provides prior written approval for such use;

3. The Parcel shall not be used in a way that will adversely affect or interfere with the integrity and protectiveness of the final remedy;

4. No new wells shall be installed on the Parcel unless it is demonstrated to EPA, in consultation with VDEQ, that such wells are necessary to implement the final remedy and EPA provides prior written approval to install such wells;

5. A vapor control system, the design of which shall be approved in advance by EPA, shall be installed in each new structure constructed in an area with residual contamination, unless it is demonstrated to EPA that vapor intrusion does not pose a threat to human health and EPA provides prior written approval that no vapor intrusion control system is needed;

6. Compliance with the EPA-approved GW monitoring program;

7. Compliance with the EPA-approved Soil Management Plan (SMP);

8. Compliance with the EPA-approved VCS Operating and Maintenance Plan; and

9. Submission of an annual report that includes: (a) an evaluation of the effectiveness of the remedy in reducing contaminant concentrations and in restoring groundwater to MCLs or RSLs,

if applicable, as part of the Site-wide remedy for GW, to be implemented once GW monitoring wells are installed on the Parcel; (b) an evaluation of the operation, maintenance and effectiveness of the vapor control system for every occupied building on this Parcel, demonstrating conformance with the CAO for soil vapor/vapor intrusion, and; (c) a statement confirming that land use remains non-residential and GW use remains restricted to non-drinking water use, as set out in the environmental covenant.

E. Implementation

The land and groundwater use restrictions selected as part of the final remedy for the Parcel will be implemented through an enforceable mechanism which shall consist of an Order and/or an Environmental Covenant executed pursuant to the Virginia Uniform Environmental Covenants Act, Title 10.1, Chapter 12.2, §§10.1-1238 - 10.1-1250 of the Code of Virginia (UECA) and UECA's implementing regulations, 9 VAC 15-90-10 through 60. If an Environmental Covenant is implemented as part of the final remedy, it will be recorded in the chain of title for the Parcel property and, once recorded, will be enforceable against future land owners. In addition, for purposes of implementing the groundwater use restrictions, EPA acknowledges that the Virginia Department of Health (VDH) has the authority to issue drinking water permits for wells, and VA regulations authorize the VDH to prohibit the use of contaminated GW as a drinking water source. See 12 VACS-630-10 through 480. If EPA determines that additional land or groundwater use restrictions or other corrective actions are necessary to protect human health or the environment, EPA has the authority to require and enforce such additional corrective actions through an enforceable mechanism which may include an Order and/or an Environmental Covenant. Additional enforceable land and groundwater use restrictions or other corrective actions may also be implemented through state laws or regulations (such as the aforementioned VDH groundwater permitting and enforcement authority) and/or local laws, regulations, ordinances or zoning restrictions.

VI. Evaluation of EPA's Final Remedy

This section provides a description of the criteria EPA used to evaluate the final remedy, according to EPA guidance. The criteria are applied in two phases. In the first phase, EPA evaluates remedy alternatives using three decision threshold criteria as general goals. In the second phase, EPA evaluates the remaining alternatives using seven balancing criteria.

A. Threshold Criteria

1. <u>Protect Human Health and the Environment</u>: The primary risks posed to human health and the environment at the Facility are related to direct contact with contaminated soil, soil vapor and/or GW by ingestion, inhalation of dust and vapor, and skin or contact with eyes. As part of Parcel development, soil will be excavated and sampled to determine whether it will be removed and disposed off-site or reused on-site. Once developed, the Parcel will consist of parking lots and buildings, thereby eliminating contact with soil and soil dust inhalation. GW will not be used for potable uses, and installation and maintenance of a VCS in the Costco building and any other occupied building will control potential vapor intrusion unless an evaluation and an EPA approved risk-assessment shows that a VCS is unnecessary to meet EPA's CAOs. In addition, land and

groundwater use restrictions will be implemented to minimize the potential for human exposure to contamination and protect the integrity of the remedy.

2. Achieve Media Cleanup Objectives: The final remedy will meet cleanup objectives appropriate for the expected commercial (non-residential) use of the Parcel.

3. Remediating the Source of Releases: In final remedies, EPA seeks to eliminate or reduce further releases of hazardous wastes or hazardous constituents that may harm human health and the environment. The last known contaminant releases on the Parcel occurred sometime in the 1970s and resulted in soil and GW contamination. Over the last three decades (approximate), records show that Facility-related GW contaminant levels have generally diminished. In mid-2012, the Facility removed 2,581 tons of soil contaminated with cVOCs from the Parcel, thereby removing a significant source of contaminants to the GW. After construction, the Parcel will be covered with a parking lot and buildings. The impervious surfaces will prevent contact with any residual contaminated soil, dust and vapor and create a barrier to infiltration of precipitation into soil, thereby further reducing any residual soil contaminants from leaching into GW. The final remedy will protect human health and the environment from the impacts of previous releases by removing contaminated soil encountered during construction and restricting land use to non-residential purposes and prohibiting GW use until contaminants are below RSLs or MCLs.

B. Balancing/Evaluation Criteria

1. Long-Term Effectiveness: EPA's final remedy will maintain protection of human health and the environment by excavation and off-site disposal of contaminated soil encountered during development and by controlling exposure to any hazardous contaminants that may remain in the groundwater until contaminants are below RSLs or MCLs. The Parcel parking lots and buildings will minimize further migration of contaminants from soil into GW and prevent contact with residual contamination in the soil. GW use restrictions will be implemented through an enforceable mechanism, such as an environmental covenant. GW will be monitored until clean up goals are attained. In addition, the VCS will effectively remove any cVOC vapors before entry into any buildings where people might be exposed, unless it is demonstrated that a VCS is unnecessary to meet EPA's CAOs.

2. Reduction of Toxicity, Mobility, or Volume of the Hazardous Constituents: The reduction of toxicity, mobility and volume of hazardous constituents at Parcel will be achieved by the excavation and off-site disposal of contaminated soil. CVOC levels in GW have generally diminished over time and will be monitored to document the reduction in cVOCs until cleanup goals are attained. Any residual contaminated soil will be covered by a parking lot and building, and will reduce leaching of residuals into GW.

3. Short-Term Effectiveness: EPA's final remedy includes excavation and off-site disposal of contaminated soil. Construction workers will be informed of potential exposure to residual contamination and be required to take appropriate protective measures to protect themselves from short-term risks. Also, the construction zone will be monitored for any releases of contamination as part of the EPA-approved SMP. Monitoring and dust control measures will be used to protect construction workers from dust and contact with contaminated soil. The public will not be exposed to contamination during excavation and construction activities because

construction practices including silt fencing and air monitoring will be used.

4. Implementability: EPA's final remedy is readily implementable. Soils will be excavated and sampled in accordance with the EPA-approved SMP. Any soil exceeding EPA RSLs discovered in the course of implementing the EPA-approved SMP during excavation will be removed prior to the Costco development and will be disposed off-site in accordance with applicable RCRA requirements. In addition, EPA does not anticipate any regulatory constraints in implementing GW and land use restrictions and the EPA-approved SMP for the Parcel.

5. Cost: EPA's final remedy is cost effective. Soil removal, paving and VCS installation are integrated and implemented as part of the redevelopment of the Parcel. The environmental covenant has a nominal cost associated to its development and implementation. Similarly, long term groundwater monitoring has at least no cost or at most a nominal cost associated with its implementation for Costco.

6. Community Acceptance: EPA opened the 30-day public comment period on April 5, 2014; it ended on May 15, 2014. EPA received comments from a former owner of the Parcel and the current owner of the Parcel. EPA's responses to the comments are set out in Attachment 2 of this document.

7. State/Support Agency Acceptance: VDEQ reviewed EPA's proposed remedy for the Parcel and concurred with EPA's remedy prior to the opening of the public comment period.

VII. Financial Assurance

EPA evaluated whether financial assurance for corrective action is necessary to implement EPA's final remedy at the Facility. The installation of the VCS is part of the building construction, and is budgeted to be completed within a year. Therefore, no financial assurance is required for the VCS. It is projected that other elements of the final remedy, the IC's and implementation of the GW monitoring and the projected maintenance and any sampling costs as part of the VCS and SMP, have minimal long term costs associated with their implementation (approximately $20,000 annually). Therefore, EPA concludes that no Financial Assurance is required.

VIII. Declaration

Based on information found in the Administrative Record for the Costco Parcel and EPA's analysis, I have determined that the Final Remedy as described in this Final Decision and Response to Comments is appropriate and protective of human health and the environment.

Signature: Date:

for JA 7/9/14

John A. Armstead, Director
Land and Chemicals Division
US EPA, Region III

Attachment 1: Administrative Record Index

Exhibit 1: Parcel boundaries, AOC-2 and GW cVOCs data

Exhibit 2: Parcel Map showing PCE/TCE levels in GW and Soil Vapor, and PCE levels in Soil

Table 1: VOCs in Soil Gas

Attachment 2: EPA's Response to Comments

Attachment 1

Index to the Administrative Record
For the Statement of Basis for the
Costco Parcel, Charlottesville, VA

2006, June 30 – *EPA Region III Final RCRA Site Visit Report* (June 30, 2006) by ICOR, Ltd.

2008, January 2 – Unisys Letter to EPA wherein Unisys agrees to conduct RCRA Corrective Actions through a Facility Lead Agreement with EPA, Region III.

2008, April -- *RCRA Facility Investigation Workplan, Sperry Marine, Charlottesville, VA*, April 2008 by Geosyntec Consultants, Inc. Includes the *Description of Current Conditions* and summary of previous investigation data, interim measures and VRP environmental covenants conducted at the Facility prior to EPA Facility Lead Corrective Action activities.

2008, June 27 -- EPA letter to Unisys approving the RFI Workplan.

2009, March 11 – *Addendum to RCRA Facility Investigation Work Plan*, March 11, 2009, by Geosyntec Consultants, Inc. WP proposes additional data collection and analysis for AOC-2.

2009, June 18 – EPA letter to Unisys "Final Comments on RFI WP Addendum."

2009, December 7 – *Preliminary Interim Measure Workplan, Area of Concern 2 (Former Weed Control Area), Sperry Marine Facility, Charlottesville, VA*, by Geosyntec Consultants, Inc.

2010, September – *RCRA Facility Investigation Report, Sperry Marine, Charlottesville, VA*, by Geosyntec Consultants, Inc.

2011, May – *AOC-2 Soil Interim Measures Work Plan, Sperry Marine, Charlottesville, VA*, by Geosyntec Consultants, Inc.

2011, November 1 – Unisys letter to EPA, 'Response to [EPA] Comments – AOC-2 Soil Interim Measures Workplan.' Letter contains EPA's comments and Unisys' responses.

2011, December 2 – Unisys letter to EPA, 'Response to [EPA] Comments – AOC-2 Interim Measures Workplan.' Letter contains further EPA comments and Unisys' responses.

2011, December 6 – EPA letter to Unisys, 'EPA Approval of AOC-2 Soil Interim Measures Workplan.'

2012, May 9 – EPA e-mail to Unisys approving Unisys' proposed modifications to AOC-2 WP outlined in the same e-mail.

2012, November – *Interim Measures Report for AOC-2, Sperry Marine, Charlottesville, VA* by Geosyntec Consultants, Inc.

2013, January 7 – EPA letter to Unisys, 'EPA Approval of Interim Measures Report for AOC-2.'

2013, March 18 – Unisys letter to EPA, 'Response to USEPA Comments on the RFI Report.' Letter consists of EPA's comments and Unisys' responses.

2013, March 21 – EPA letter to Unisys, 'EPA Acceptance of RFI Report.'

2013, April 9 – *Workplan Outline for Phase II ESA, Proposed Costco Wholesale Warehouse*, by Terracon Consultants, Inc.

2013, May 31 – *Limited Site Investigation, Proposed Costco Wholesale Warehouse*, by Terracon Consultants, Inc.

2013, July 16 -- *Environmental Services, Soil and Gas Confirmation Sampling, Proposed Costco – Charlottesville, VA* by ECS Min-Atlantic, LLC.

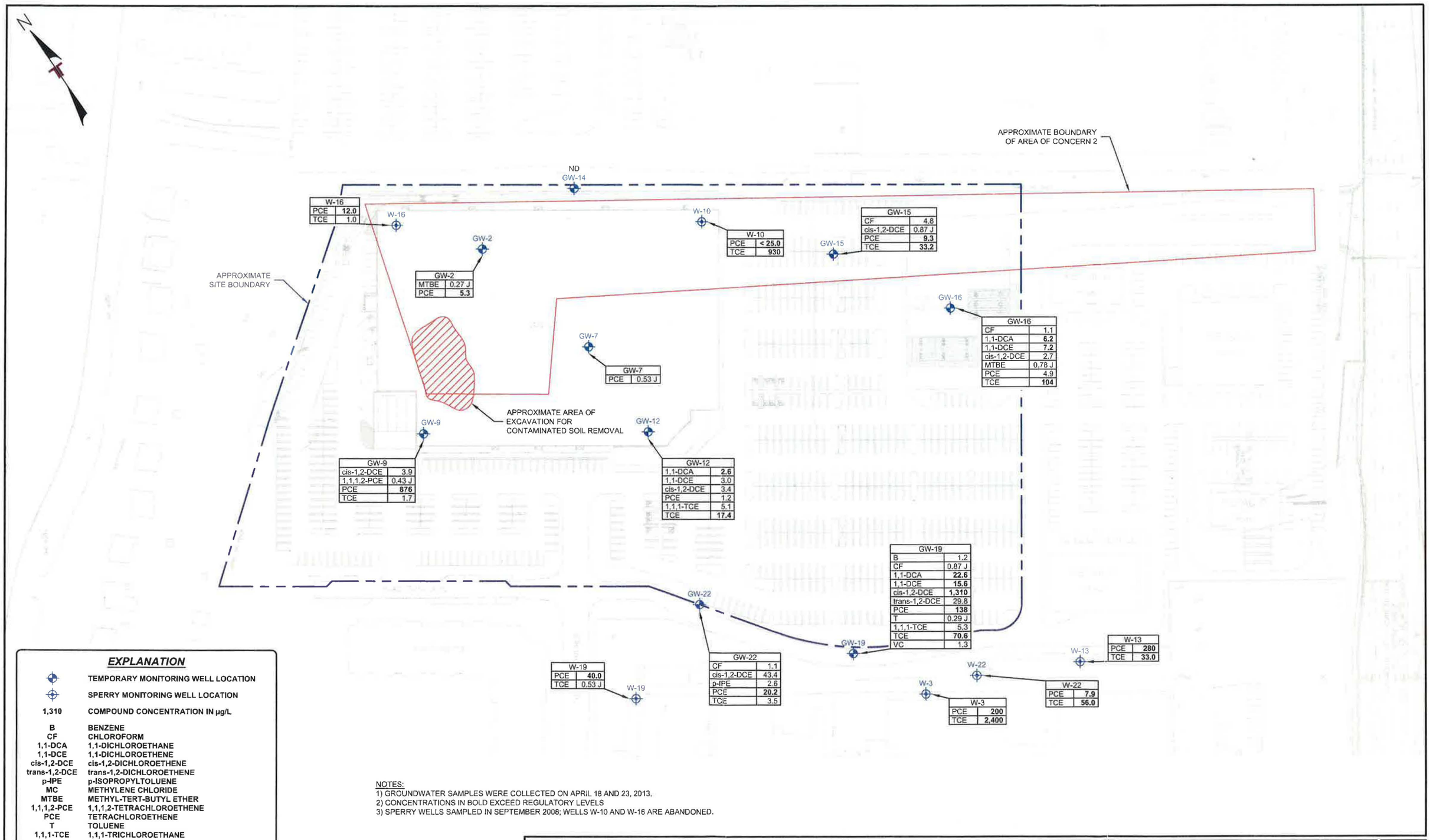
2013, December 5 – EPA letter to Costco, 'Status of Corrective Action.'

2013, December 6 – *Corrective Measures Study, Proposed Costco Site*, by Terracon Consultants, Inc.

2014, January 17 – EPA letter to Costco, 'EPA comments on the Corrective Measures Study (CMS).'

2014, January 20 – *Revised CMS* by Terracon Consultants.

2014, January 30 – EPA letter to Costco approving the revised CMS.



EXPLANATION

	TEMPORARY MONITORING WELL LOCATION
	SPERRY MONITORING WELL LOCATION
1,310	COMPOUND CONCENTRATION IN µg/L
B	BENZENE
CF	CHLOROFORM
1,1-DCA	1,1-DICHLOROETHANE
1,1-DCE	1,1-DICHLOROETHENE
cis-1,2-DCE	cis-1,2-DICHLOROETHENE
trans-1,2-DCE	trans-1,2-DICHLOROETHENE
p-IPE	p-ISOPROPYLTOLUENE
MC	METHYLENE CHLORIDE
MTBE	METHYL-TERT-BUTYL ETHER
1,1,1,2-PCE	1,1,1,2-TETRACHLOROETHENE
PCE	TETRACHLOROETHENE
T	TOLUENE
1,1,1-TCE	1,1,1-TRICHLOROETHANE
TCE	TRICHLOROETHANE
VC	VINYL CHLORIDE
ND	NO COMPOUNDS DETECTED ABOVE THE LABORATORY REPORTING LIMIT

NOTES:
1) GROUNDWATER SAMPLES WERE COLLECTED ON APRIL 18 AND 23, 2013.
2) CONCENTRATIONS IN BOLD EXCEED REGULATORY LEVELS
3) SPERRY WELLS SAMPLED IN SEPTEMBER 2008; WELLS W-10 AND W-16 ARE ABANDONED.

120 0 20 40 60 120
SCALE IN FEET

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mngr:	SJK
Drawn By:	PTK
Checked By:	SJK
Approved By:	CRC
Project No.	73137325D
Scale:	AS SHOWN
File No.	73137325D
Date:	MAY 2013

Terracon
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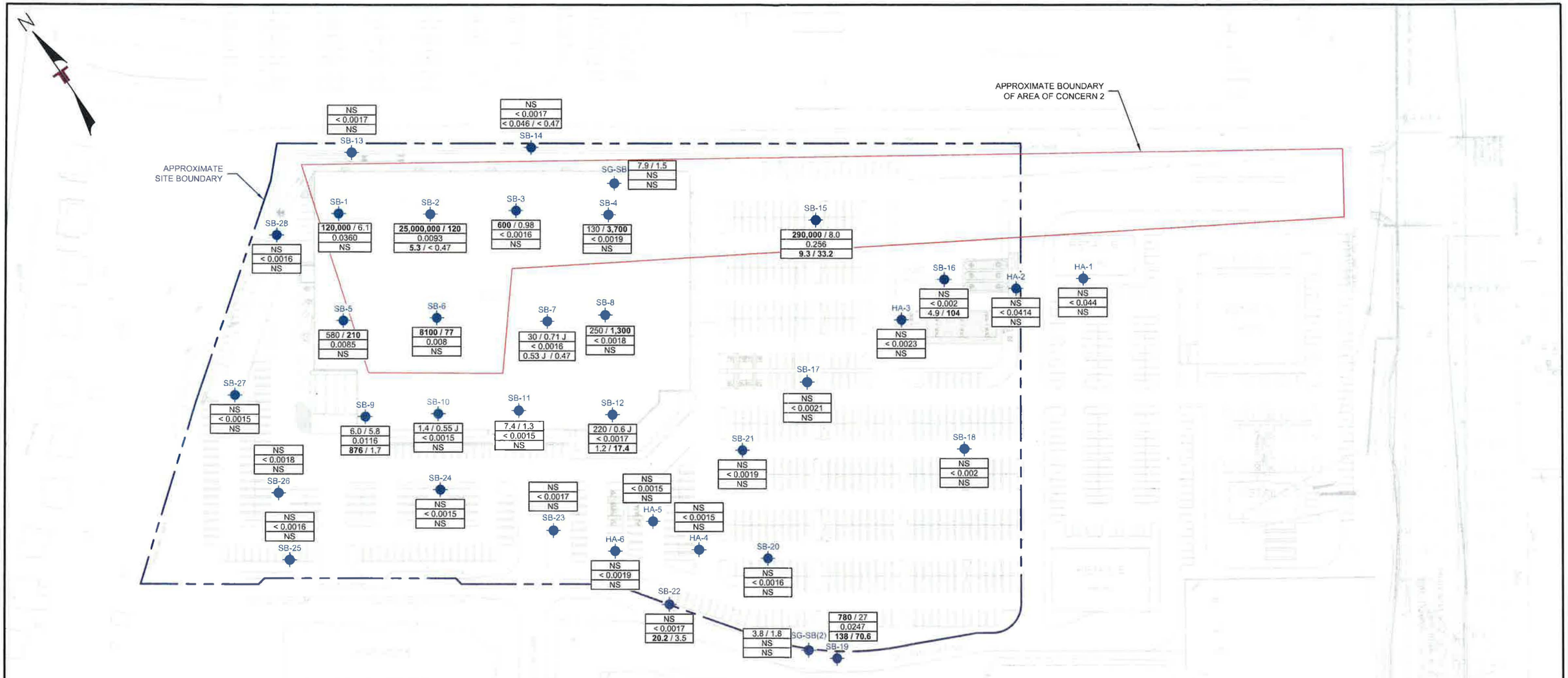
SITE MAP WITH DETECTED GROUNDWATER VOC CONCENTRATIONS

PROPOSED COSTCO - CHARLOTTESVILLE, VIRGINIA
3171 DISTRICT AVENUE / SEMINOLE TRAIL (US ROUTE 29)
CHARLOTTESVILLE, VIRGINIA

Exhibit 1



EXPLANATION

	SOIL BORING LOCATION
25,000,000 / 120	**PCE / TCE IN SOIL VAPOR (µg/m³)**
0.0093	**PCE IN SOIL (mg/kg)**
5.3 / < 0.47	**PCE / TCE IN GROUND WATER (µg/L)**
NS	**NOT SAMPLED**

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

NOTES:
1) SOIL DATA SHOWN IS THE HIGHEST RESULT FROM MULTIPLE DEPTH SAMPLING INTERVALS
2) PCE - TETRACHLOROETHYLENE
3) TCE - TRICHLOROETHENE
4) CONCENTRATIONS IN BOLD EXCEED REGULATORY LEVELS

120 0 20 40 60 120
SCALE IN FEET

Project Mngr:	SJK
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SITE MAP SHOWING PCE CONCENTRATIONS IN SOIL, SOIL VAPOR, AND GROUND WATER

PROPOSED COSTCO - CHARLOTTESVILLE, VIRGINIA
3171 DISTRICT AVENUE / SEMINOLE TRAIL (US ROUTE 29)
CHARLOTTESVILLE, VIRGINIA

Exhibit **2**

Table 1: TO-15 Volatile Organic Compounds (VOCs) in Soil Gas
Proposed Costco - Charlottesville, VA
ECS and Terracon Data Combined
ECS Project 28:1578-A

		Parameter											
Sample Location/Date	Depth (ft.)	1,1 Dichloroethane	1,1 Dichloroethene	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene	1,1,1- Trichloroethane	1,1,2- Trichloroethane	1,1,2,2-Tetrachloroethane	Trichloroethene	Vinyl chloride
SG-1 (4-18-13)	15.8	<0.62	1.5	0.62	5.3	<0.60	3.2	**120000**	35	<0.83	<1.0	6.1	<0.39
SG-1 (7-1-13)	15.8	<0.62	1.2	<0.62	16	1.7	<0.53	**1400**	39	<0.83	<1.0	16	<0.39
SG-1 (7-1-13) Terracon	15.8	<0.62	1.6	<0.62	23	2.1	<0.53	**15000**	37	<0.83	<1.0	16	<0.39
SG-2 (4-18-13)	18.2	<0.62	390	<0.62	3.5	<0.60	<0.53	**2.50E+07**	1,000	<0.83	<1.0	**120**	<0.39
SG-2 (7-1-13)	18.2	<0.62	170	<0.62	11	<0.60	0.49	**210000**	440	<0.83	<1.0	**400**	<0.39
SG-2 (7-1-13) Terracon	18.2	<0.62	170	<0.62	19	<0.60	0.6	**160000**	840	<0.83	<1.0	**410**	<0.39
SG-3 (4-18-13)	20.8	<0.62	0.89	<0.62	5.2	<0.60	0.56	**600**	5.4	<0.83	<1.0	0.98	<0.39
SG-3 (7-1-13)	20.8	<0.62	<0.60	<0.62	<0.60	<0.60	0.35	**630**	3.4	<0.83	<1.0	<0.82	<0.39
SG-3 (7-1-13) Terracon	20.8	<0.62	<0.60	<0.62	<0.60	<0.60	0.49	**45000**	4.8	<0.83	<1.0	1.4	<0.39
SG-4 (4-18-13)	5.0	**700**	880	<0.62	650	11	<0.53	130	6600	<0.83	<1.0	**3700**	<0.39
SG-5 (4-18-13)	8.9	<0.62	17	1.6	7,200	<0.60	3.1	580	<0.83	<0.83	<1.0	**210**	**340**
SG-5 (7-1-13)	8.9	<0.62	16	<0.62	880	160	2.4	**2000**	0.61	<0.83	<1.0	**190**	**260**
SG-5 (7-1-13) Terracon	8.9	<0.62	19	<0.62	1500	180	2.9	**3600**	1.2	<0.83	<1.0	**350**	**300**
SG-6 (4-18-13)	8.4	<0.62	<0.60	<0.62	6	<0.60	<0.53	**8100**	62	<0.83	<1.0	**77**	0.49
SG-6 (7-1-13)	8.4	<0.62	<0.60	<0.62	<0.60	<0.60	0.42	**6800**	48	<0.83	<1.0	1.9	<0.39
SG-6 (7-1-13) Terracon	8.4	<0.62	<0.60	<0.62	<0.60	<0.60	0.42	**44000**	71	<0.83	<1.0	2.6	<0.39
SG-7 (4-18-13)	5.0	<0.62	<0.60	0.41J	0.77	<0.60	0.35J	30	5.3	<0.83	<1.0	0.71J	<0.39
SG-8 (4-18-13)	5.0	210	540	2.8	170	3.6	<0.53	250	3800	<0.83	<1.0	**1300**	<0.39
SG-9 (4-18-13)	7.9	<0.62	<0.60	0.62	1.3	<0.60	1.7	6	8.8	<0.83	<1.0	5.8	<0.39
SG-10 (4-18-13)	6.4	<0.62	<0.60	<0.62	<0.60	<0.60	0.74	1.4	3.5	<0.83	<1.0	0.55J	<0.39
SG-11 (4-18-13)	5.0	<0.62	<0.60	0.82	0.4J	<0.60	0.81	7.4	4.2	<0.83	<1.0	1.3	<0.39
SG-12 (4-18-13)	5.0	<0.62	<0.60	3.7	0.44J	<0.60	<0.53	220	93	<0.83	<1.0	0.6J	<0.39
SG-15 (4-18-13)	5.0	<0.62	<0.60	<0.62	0.97	<0.60	<0.53	**290000**	5.8	<0.83	<1.0	8	<0.39
SG-15 (7-1-13)	5.0	<0.62	<0.60	<0.62	<0.60	<0.60	0.39	**33000**	5.9	<0.83	<1.0	18	<0.39
SG-15 (7-1-13) Terracon	5.0	<0.62	<0.60	<0.62	<0.60	<0.60	2.5	**95000**	6	<0.83	<1.0	12	<0.39
SG-29 (7-1-13)	5.0	<0.62	4.4	0.41	17	<0.60	3.4	**9000**	4	<0.83	<1.0	20	<0.39
SG-29 (7-1-13) Terracon	5.0	<0.62	8.1	0.58	38	<0.60	6.5	**6400**	7.2	<0.83	<1.0	**40**	3.5
SG-B (4-18-13)	NA	<0.62	<0.60	<0.62	<0.60	<0.60	1.1	7.9	1.3	<0.83	<1.0	1.5	<0.39
SG-B (2) (4-18-13)	NA	<0.62	<0.60	<0.62	0.6	<0.60	3.4	3.8	<0.83	<0.83	<1.0	1.8	<0.39
AB-1 (7-1-13)	NA	<0.62	<0.60	<0.62	<0.60	<0.60	0.6	14	<0.83	<0.83	<1.0	<0.82	<0.39
AB-1 (7-1-13) Terracon	NA	<0.62	<0.60	<0.62	<0.60	<0.60	<0.53	2.1	<0.83	<0.83	<1.0	<0.82	<0.39
Max. Detected Conc. (ug/L)		700	880	3.7	7200	180	6.5	2.5E+07	6600	<0.83	<1.0	3700	340
VRP Tier III Screening Level (ug/M3) Table 2.14 - Construction Worker		1.4E+06	6.18E+05	8.38E+04	NE	1.83E+05	8.01E+06	2.11E+05	2.06E+07	7.98E+03	6.38E+04	7.77E+03	2.49E+05
VRP Tier III Screening Level (ug/M3) **Table 2.12 - Commercial**		256	2920	15.7	NE	876	8760	584	73000	5	7.05	29.2	92.9

Notes:
Analyses via EPA Method TO-15
VOC reported in ug/M^3
NE - Not Established or No Proxy Value
NP - No Proxy Value
NA - Not Applicable
J - Estimated Concentration > MDL
Shaded Values Exceed Tier III Construction Worker Table 2.14
Bold Face values exceed Tier III Commercial; Table 2.12
Samples SG and AB are Background Ambient Air

Attachment 2

Costco Parcel, Sperry Marine Facility

EPA RESPONSE TO COMMENTS

During the public comment period, EPA received comments on the Statement of Basis (SB) from a previous owner of the Costco Parcel, Unisys Corporation (Unisys), and the current owner, Costco Wholesale Corporation (Costco). The Costco Parcel is located in Charlottesville, Virginia. Costco and Unisys' comments are listed below, followed by EPA's responses.

A. Costco's Comments and EPA's Responses

Costco submitted four comments in which they suggested changes to the test of the SB. The suggested changes are shown below in bold and underlined within the original SB text. EPA's responses are indented and in italics following the comment.

1. Section V.A: "EPA's proposed soil remedy consists of (1) the implementation of and compliance with the EPA-approved Soil Management Plan **SMP (included with the approved CMS)** . . . ."

2. Section V.D.7: "Compliance with the EPA-approved Soil Management Plan **SMP**;"

EPA Response to Costco Comments 1 and 2: The suggested wording is acceptable to EPA. Section V of the Final Decision and Response to Comments (FDRTC) has been modified to reflect the bolded and underlined wording in Comments 1 and 2.

EPA notes that the final remedy requires notification to current and future construction/utility workers of risks to guide the development of appropriate health and safety measures during construction and excavation activities. EPA has not received acknowledgement from Costco of how or when this notification will be given.

3. Section V.D.9: "**(a)** Submittal **by Unisys** of **an** annual documentation **report** that contains: (a) an evaluation of the effectiveness of the remedy in reducing contaminant concentrations and in restoring groundwater to MCLs or RSLs, if applicable, (b) **Submittal by Costco of a report documenting** an evaluation of whether indoor air in every building that is to be occupied on this Parcel meets EPA's risk range **the installation of a vapor intrusion barrier pursuant to an EPA approved design, (c) Submittal by Costco of a report documenting an inspection for any breaches of the barrier and satisfactory evidence of any necessary repairs thereto**, and; (c) a statement **included in Costco's annual report confirming that** whether land use restrictions prohibiting residential use are in place and effective."

EPA's Response to Costco Comment 3: EPA agrees with the intent of the proposed changes, however this section of the FDRTC lists items that EPA requires to be included in the annual documentation report, without specifying which entity will submit the items

included on the annual documentation list. In Section V.E., EPA states that the final remedy will be implemented using an enforceable document, such as an Order and/or an environmental covenant (pursuant to the format contained in the Virginia Uniform Environmental Covenants Act), which will identify and establish the responsible parties for the Final Remedy or portions thereof.

Section V.D.9 is modified as follows:

9. Submission of an annual report that includes: (a) an evaluation of the effectiveness of the remedy in reducing contaminant concentrations and in restoring groundwater to MCLs or RSLs, if applicable, as part of the Site-wide remedy for GW, to be implemented once GW monitoring wells are installed on the Parcel; (b) an evaluation of the operation, maintenance and effectiveness of the vapor control system for every occupied building on this Parcel, demonstrating conformance with the CAO for soil vapor/vapor intrusion, and; (c) a statement confirming that land use remains non-residential and GW use remains restricted to non-drinking water use, as set out in the environmental covenant.

4. Section VI.B.4: "Implementability: EPA's proposed remedy is readily implementable. **Soils will be excavated and sampled in accordance with the EPA approved SMP.** Any soil exceeding EPA RSLs discovered **in the course of implementing the EPA-approved SMP that exceed the levels as designated therein** during excavation will be removed prior to the Costco development and will be disposed off-site in accordance with applicable RCRA requirements…."

EPA's Response to Costco Comment 4: Section VI.B.4 is modified as follows:

4. Implementability: EPA's proposed remedy is readily implementable. Soils will be excavated and sampled in accordance with the EPA-approved SMP. Any soil exceeding EPA RSLs discovered in the course of implementing the EPA-approved SMP during excavation will be removed prior to the Costco development and will be disposed off-site in accordance with applicable RCRA requirements. EPA does not anticipate any regulatory constraints in implementing GW and land use restrictions and the EPA-approved SMP for the Parcel.

B. Unisys' Comments and EPA's Responses

Unisys submitted six comments as listed below. EPA's responses are indented and in italics following the comment.

1. Section II. Background (Page 2):
Facility environmental investigations, which began in 1987, at what is now referenced as the Costco Parcel, have consistently measured groundwater flow as emanating from the former Comdial Corporation facility (Comdial) property onto the subject Costco Parcel. Based on data collected over time, the Comdial facility should be identified by EPA as a potential source of chlorinated volatile organic compounds (cVOCs) migrating onto the Costco Parcel. That off-site source of cVOCs is noted by EPA in Section III (B) of the SB.

EPA's Response to Unisys Comment 1: In Section II. Background, EPA inserted the following sentence in the last paragraph of Section II, last sentence:

In addition, investigations found that an off-site source of cVOCs in GW migrated onto the Parcel along the Parcel's north-northeastern boundary.

2. Section III B (Page 4):
The reference to EPA's approval of the Interim Measures Report should be January 2013 not January 3013.

EPA's Response to Unisys Comment 2: EPA corrected the typo to January 2013.

EPA corrected another typo in Section IV.B., changing the incorrect acceptable cancer risk range of 10^{-5} to 10^{-6} to the correct risk range of 10^{-4} to 10^{-6}.

3. Section III C (Page 4):
Soil vapor measurements collected in April 2013 by Costco were substantially higher at several locations than what was observed later in July 2013 sampling events conducted by Costco and Edens, prior owner of the Costco Parcel. Soil vapor measurement results collected during the Costco environmental investigation evidencing a tetrachloroethene (PCE) concentration of 25,000,000 micrograms per cubic meter (µg/m3) in soil vapor at SG-2 are believed by Unisys to be an outlier or anomalous. PCE concentrations in two (2) samples collected in July 2013 at the same location were approximately two (2) orders of magnitude lower than Costco's earlier sampling results. As a result, the April 2013 measurement should not be considered in any risk assessment because it could not be confirmed by the re-sampling analytical efforts. For subsequent analytical sampling to confirm a previous result, generally the analytical results must be within one (1) order of magnitude as was the case for other locations (e.g., SG-6 and SG-15).

EPA's Response to Unisys Comment 3:
EPA agrees with the first sentence of Comment 3 regarding Parcel-wide soil gas results, however, soil gas samples collected from beneath the proposed building footprint (which is the primary area of interest for evaluating a potential vapor intrusion pathway) contained higher levels of PCE in three of the five soil gas probes that were reinstalled in July 2013 than the initial corresponding five probes installed during April 2013. The five soil gas probes that were reinstalled within the proposed building footprint during August 2013 were placed at: SG-1,-2,-3,-5,-6. EPA considers the results from the five resampled footprint locations more reliable because samples were collected from probes with depths of 8 to 21 feet bgs, rather than from probes at shallower depths (5 feet bgs).

There were two soil gas probes located outside the building footprint that were reinstalled and sampled (SG-15 and -29). Those two probes did show lower levels of PCE in soil gas than those that were taken in the initial April 2013 round, however, these July samples were collected from the less desirable shallow zone (5 feet bgs) in areas away from the building footprint.

EPA recognizes the inherent variability in collecting and analyzing samples containing volatile gases, particularly soil gas samples, which can show more variability than results from other media (e.g., groundwater and soil). EPA considers soil gas samples collected from deeper probes to be more reliable than samples collected from shallow probes (5 feet bgs). For example, the sample from SG-2 that was found to contain 25 million ug/m^3 PCE was gathered from a probe with a depth of 18 feet. Also, in the ECS Report dated July 16, 2013, a 'sweet odor, similar to degraded solvent compounds' was noted coming from SG-1 and SG-2 from a depth of 2 feet bgs when ECS was installing the new probes. Lastly, the laboratory reported the Costco SG-2 data as useable.

Therefore, EPA does not agree with Unisys that the 25 M ug/m^3 from SG-2 should be eliminated when evaluating vapor intrusion potential into the Costco building.

Since the 25,000,000 ug/m^3 PCE soil gas result warrants evaluation, the following toxicological information is provided. Cancer slope factors and reference doses are generally reserved for use in the low dose region of the dose-response relationship, for example, for exposures corresponding to excess lifetime cancer risks less than 1 in 100. If calculated for a commercial exposure using EPA's Vapor Intrusion Screening Level (VISL) calculator, that PCE concentration attenuated into indoor air results in an excess lifetime cancer risk greater than 1 in 100, as well as an unreasonably high hazard quotient (14,000). These results indicate that not only would cancer outcomes and neurotoxicity be expected but also acute effects would be anticipated. Assuming the EPA default soil gas to indoor air attenuation factor of 0.1, the 2,500,000 ug/m3 PCE concentration is associated with the following (ATSDR Toxicological Profile for Tetrachloroethylene, 1997): For short-term (hours to days) effects, humans exposed to this concentration exhibit the symptoms (dizziness and incoordination) of central nervous system depression, accompanied by ocular and respiratory irritation. Intermediate (multiple weeks) exposures to this concentration in rodents and occupationally exposed humans produces measurable toxicity to multiple organ systems, particularly the liver and kidney.

4. Section V.B (page 6):
EPA's proposed remedy for installation of a vapor mitigation system (VMS) as part of building construction presumes an unacceptable risk to human health based on exceedance of Virginia Department of Environmental Quality (VADEQ) Tier III Commercial Subslab Soil Gas Screening Levels. Unisys considers this to be an unnecessary, presumptive remedy to meet the corrective action objective (CAO) for soil vapor presented in the SB. Unisys position in that regard arises from the fact that a human health risk assessment was not conducted as is specifically prescribed by the VADEQ guidance if screening levels are exceeded. In the absence of a human health risk assessment, the proposed selection of a VMS is premature. Section III.C (page 5) of the SB confirms that a human health risk assessment was not conducted for the Costco Parcel.

Separately, Unisys has completed a human health risk assessment for a default commercial/industrial scenario (Attachment 1) using soil vapor results measured by Costco and EDENS for the Parcel. Soil vapor data are widely considered to be a more direct line of evidence for exposure from a vapor intrusion pathway than groundwater data. The results from Unisys risk assessment are presented in Tables 1a, 1b and 2 of Attachment 1. The results indicate that one (1) discrete area of the Parcel is above the proposed soil vapor CAO in Section IV. B of the SB ("attain

EPA's acceptable cancer risk range of 10-5 to 10-6", applicable to indoor air when a building actually exists, but no building yet exists at the Costco Parcel). This discrete area is centered around soil gas location SG-2, within the footprint of the proposed Costco building, as shown on Figure 1. Please note that this Unisys risk assessment result is based on the aforementioned PCE soil vapor concentration of 25,000,000 µg/m3 measured in April 2013. As stated above, that April 2013 data point should not be considered in a risk assessment because it was not reproduced during re-sampling in July 2013, with the July 2013 measurements being approximately two (2) orders of magnitude lower than those observed in April 2013. Consideration of more recent soil vapor data results (July 2013 data only) results in an estimated potential cancer risk at SG-2 that is below the lower range of the soil vapor CAO (10-6), as shown on Figure 2. Based on the human health risk assessment using those data, the potential risk to indoor air quality from subsurface soil vapor for a commercial/industrial worker is less than the lower bound of the CAO acceptable risk range of 10-6. Additionally, it should be noted that to the extent that a Site-specific risk assessment was conducted using building dimensions similar to a typical Costco store, estimated risks would be even lower than for the default commercial/industrial scenario presented here.

EPA's Response to Unisys Comment 4: EPA agrees with the comment regarding acceptable use of VADEQ's Tier III Screening Levels. However, VADEQ guidance for using the Tier III screening levels recommends further evaluation if soil gas levels are above screening levels, and does not specify a human health risk assessment.

Based on the soil gas results collected from varying depths within the proposed Costco building footprint, the building will be within and on an area with residual cVOC vapor sources. Without a vapor control system, Costco would be required to sample indoor air periodically, demonstrating compliance with the CAO for soil vapor. Many builders and businesses elect to install vapor control systems without further investigation or analysis, based on the possibility of vapor intrusion using existing data alone. This is often the case for sites when construction schedule commitments are tight and background cVOCs in the building may interfere with indoor air assessments.

EPA reviewed Unisys' human health risk assessment submitted in Attachment 1 to Unisys' comments. EPA's comments are as follows: Unisys states that a vapor mitigation system is unnecessary because Unisys' human health risk assessment showed no unacceptable risk, assuming the 25,000,000 ug/m^3 PCE soil gas level is not considered. The Johnson and Ettinger modeling (J&E Model) used by Unisys and referred to as a 'human health risk assessment,' cannot be used as the sole basis for ruling out unacceptable risk from vapor intrusion into the proposed Costco building. The J&E Model has proven to be inadequate as a predictor for vapor intrusion when compared to actual subslab/indoor air results from buildings where the J&E Model was used. Also, the J&E Model does not use current toxicity criteria.

Therefore, EPA does not agree with or endorse Unisys' human health risk assessment.

EPA uses the Vapor Intrusion Screening Level (VISL) Calculator (Version 3.3, May 2014) as one of many lines of evidence for evaluating potential indoor air contaminant levels. EPA screened the soil gas data using the VISL calculator for the soil gas to indoor air pathway using the July 2013 PCE soil gas level from SG-2 of 210,000 ug/m^3. The result

shows that, using EPA's current attenuation factor of 0.1 for subslab soil to indoor air, the indoor carcinogenic risk was calculated as 4.5E-04 and HQ of 120. For the second VISL calculation, EPA also used the highest soil gas result from SG-1, which is 120,000 ug/m^3. This results in an indoor carcinogenic risk of 2.5E+04 and a HQ of 68. Both results show carcinogenic risks exceeding EPA's acceptable risk range of 10^{-4} to 10^{-6} and HQ of 1. Finally, for TCE, EPA used the highest result from SG-2 of 410 ug/m^3 in the VISL. The result shows that the HQ for TCE is 4.7 for indoor air, which is higher than EPA's acceptable HQ of 1.

EPA has enough information to conclude that, for the final remedy, installation of a vapor control system (VCS) is necessary to protect Costco workers and customers from potential unacceptable risks from vapor intrusion, unless Costco can show that indoor air will meet EPA's Corrective Action Objectives for indoor air without a VCS.

5. Section V.D (5) (Page 7):
Land and groundwater use restrictions stipulate installation of a vapor intrusion control system above a contaminated groundwater plume or within one hundred (100) feet around the perimeter of a contaminated groundwater plume. However, the boundary of the groundwater plume, if any, has not been defined at the Costco Parcel nor have criteria to define a plume boundary been established. However, given that the source area (Area of Concern 2) was remediated and the soil gas concentrations measure by Costco and Edens are not expected to adversely affect indoor air quality, measured concentrations of VOCs dissolved in groundwater beneath the Costco parcel would also not be expected to adversely affect indoor air quality. Consequently, the installation of a vapor intrusion control system is an unnecessary, presumptive engineering control when there has been no finding of risk to human health. In Section V.D (5) EPA states that the vapor intrusion control system is needed unless it can be demonstrated that vapor intrusion does not pose a threat to human health. Unisys finds that most recent soil vapor data indicate that there is indeed no such demonstration of a threat to human health. As discussed in the previous comment, the results of the human health risk assessment for a default commercial/industrial scenario utilizing reliable data found that any risks are below the lower bound of the soil vapor CAO acceptable risk range of 10-5 and 10-6. Therefore, Unisys requests that EPA consider these risk assessment results and reconsider the need for a vapor intrusion control system for the proposed Costco building.

EPA's Response to Unisys Comment 5: Even though Unisys removed soil contaminated with PCE from Area of Concern-2 (AOC-2), there is ample evidence of PCE residual remaining in soil gas, as shown by the data collected in and around the building footprint.

Regarding cVOCs in groundwater, there were four temporary groundwater monitoring wells installed within the building footprint at locations SG-2,-7,-9,and -12, and also a well located up-gradient of the proposed building. Only SG-9, within the building footprint, showed an elevated cVOC level in groundwater, which was PCE at 876 ppb, two orders of magnitude higher than the drinking water MCL of 5 ppb.

Currently there is not enough data to determine the boundaries of a groundwater plume in and around the area of the proposed building, however, existing data suggests that cVOCs may be 'hit or miss' in groundwater rather than in a contiguous plume. This conceptual model is supported by the history of how groundwater became contaminated at AOC-2:

cVOCs (primarily spent PCE) were sprayed on ground vegetation for weed control, and then cVOCs moved down through the soil column and into groundwater in a non-uniform way. Rather than spending more time and money in investigating groundwater in detail, Costco has elected to install a vapor control system.

Therefore, EPA has modified the final remedy from the remedy proposed in the Statement of Basis to state: "EPA's final remedy for any occupied building on this Parcel is the installation of a vapor control system (VCS), unless it is demonstrated that indoor air will meet EPA's CAOs."

EPA considered Unisys' risk assessment and EPA's evaluation and comments are provided in the response to Unisys Comment 4. EPA revised Section V.D(5) as follows:

> *"A vapor control system, the design of which shall be approved in advance by EPA, shall be installed in each new structure constructed in an area with residual contamination, unless it is demonstrated to EPA that vapor intrusion does not pose a threat to human health and EPA provides prior written approval that no vapor intrusion control system is needed."*

6. Section V.D (9)(b) (Page 7):
The SB is unclear in describing whether multiple parties will be responsible for submittal of annual documentation. The owner (i.e., Costco) will be presumably controlling multiple aspects of building heating, ventilation and air conditioning (HVAC) that will directly impact operation of a VMS and will be in a position to determine whether such VMS is operational and meeting EPA's range of risk.

EPA's Response to Unisys Comment 6:

In Section V.E., EPA states that the final remedy will be implemented using an enforceable document, such as an Order and/or an environmental covenant (pursuant to the format contained in the Virginia Uniform Environmental Covenants Act), which will identify and establish the responsible parties for the Final Remedy or portions thereof.

EPA modified V.D (9) as follows:

Submission of an annual report that includes: (a) an evaluation of the effectiveness of the remedy in reducing contaminant concentrations and in restoring groundwater to MCLs or RSLs, if applicable, as part of the Site-wide remedy for GW, to be implemented once GW monitoring wells are installed on the Parcel; (b) an evaluation of the operation, maintenance and effectiveness of the vapor control system for every occupied building on this Parcel, demonstrating conformance with the CAO for soil vapor/vapor intrusion, and; (c) a statement confirming that land use remains non-residential and GW use remains restricted to non-drinking water use, as according to the environmental covenant.

End of Comments