
**VIRGINIA DEPARTMENT OF ENVIRONMENT QUALITY**

**WASTE DIVISION**

**OFFICE OF REMEDIATION PROGRAMS**

# STATEMENT OF BASIS

**VIRGINIA DEPARTMENT OF TRANSPORTATION**
**CULPEPER DISTRICT HEADQUARTERS**

**CULPEPER, VIRGINIA**

**EPA ID NO. VAD980715064**

**JUNE 2014**

**Figures and Tables**

# 1. INTRODUCTION

## 1.1 Facility Name

The Virginia Department of Environmental Quality (VDEQ) has prepared this Statement of Basis for Virginia Department of Transportation Culpeper District Headquarters Facility located at 1601 Orange Road, Culpeper, Virginia (hereinafter referred to as the Facility or VDOT).

The Facility is subject to the Corrective Action Program under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. Sections 6901 to 6992k. 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 waste constituents that have occurred at their property.

Information on the Corrective Action Program can be found by navigating http://www.epa.gov/reg3wcmd/correctiveaction.htm.

VDEQ has prepared this Statement of Basis in cooperation with the United States Environmental Protection Agency (EPA). VDEQ has reviewed all available Facility data and has determined that remediation is necessary for the Facility to satisfy its RCRA Corrective Action obligations.

VDEQ proposes its final remedy for the Facility in this Statement of Basis and is providing the opportunity for public comment and review on its proposal and the associated permit modification.

The Administrative Record (AR) for the Facility contains all documents, including data and quality assurance information, on which VDEQ's proposed decision is based. See Section 10.0, Public Participation, for information on how you may review the AR.

## 1.2 Proposed Decision

This Statement of Basis explains VDEQ's proposed decision that further actions to remediate soil and groundwater, also known as corrective measures, are necessary to protect human health and the environment given current and reasonably anticipated future land use. VDEQ's proposed decision requires the Facility to cap and excavate the impacted soil at two Solid Waste Management Units (SWMUs), SWMU 8 and SWMU 9, respectively. Maintenance of the cap, continued groundwater monitoring at two Hazardous Waste Management Units (HWMUs), and institutional controls are also proposed as the final remedy. The proposed corrective measures are discussed in Section 7.0.

This Statement of Basis summarizes information that can be found in greater detail in the workplans and reports reviewed by VDEQ, which can be found in the Administrative Record. The following figures and tables are included:

Figure 1: Facility Layout

Figure 2: Locations of HWMUs and SWMUs
Figure 3: Former Monitoring Well Locations
Figure 4: Proposed Cover Area for SWMU 8
Figure 5: Proposed Excavation Area for SWMU 9
Table 1A: SWMU 8 - Industrial Soil Cleanup goals
Table 1B: SWMU 8 – Protection of groundwater cleanup goals
Table B-1: SWMU 9 – Residential Soil Cleanup goals
Table B-2: SWMU 9 – Protection of groundwater cleanup goals

### 1.3 Importance of Public Input

The purpose of this document is to solicit public comment on VDEQ's proposed remedy prior to VDEQ completing its remedy selection for the Facility. The public may participate in the remedy selection process by reviewing this Statement of Basis and documents contained in the Administrative Record in support of VDEQ's proposed decision and submitting written comments to VDEQ during the public comment period. The information presented in this Statement of Basis can be found in greater detail in the work plans and reports submitted by the Facility to VDEQ and EPA. To gain a more comprehensive understanding of the RCRA activities that have been conducted at the Facility, VDEQ encourages the public to review these documents, which are found in the Administrative Record. A copy of the Administrative Record is available for public review, in electronic format, from the VDEQ contact person, whose address and telephone number is provided in Section 10.0.

VDEQ will make a final decision after considering all comments received during the comment period, consistent with applicable RCRA requirements and regulations. If the decision is substantially unchanged from the one proposed, VDEQ will issue a final decision and inform all persons who submitted written comments or requested notice of VDEQ' s final determination. If the final decision is significantly different from the one proposed, VDEQ will issue a public notice explaining the new decision and will reopen the comment period. Each person who has submitted written comments will receive a written response from VDEQ.

VDEQ will incorporate the remedy selection in its modification of the Facility's Hazardous Waste Management Post Closure Care Permit.

## 2. FACILITY BACKGROUND

The Culpeper District Headquarters is located in the Town of Culpeper, Culpeper County, Virginia. The Facility is owned and operated by the Virginia Department of Transportation (VDOT), and is comprised of several office buildings, garages, and various storage areas/buildings situated on a 52.8-acre parcel of land. Figure 1 depicts the general layout of the facility. The Culpeper District headquarters facility has been in operation since the late 1930's. Various activities conducted or historically conducted at the site include storage/maintenance of VDOT vehicles, storage of materials, sign production, and various administrative/dispatch services.

## 3. SUMMARY OF ENVIRONMENTAL INVESTIGATIONS

### 3.1 Hazardous Waste Management Units (HWMUs) Description and Closure

In July of 1996, VDEQ and VDOT entered into a Compliance Agreement for the facility pursuant to the Resource Conservation and Recovery Act (RCRA). The Compliance Agreement outlined VDOT's regulatory obligations associated with three hazardous waste management units (HWMUs) previously operated on the property. The three HWMUs identified in the Compliance Agreement have historically been referred to as the Paint Pit (PP), the Sign Shop Vat (SSV), and the Hot Vat Stripper Ditch (HVSD). The locations of these HWMUs are shown in Figure 2.

1. Paint Pit: The PP was an excavation used to bury containerized wastes from painting operations conducted at the facility. According to available information, the PP was operated in the late 1970's. The facility, which at the time had used solvent-based paints in their pavement marking operations, generated waste from these operations including out-of-date paint, dried paint solids, and "skims" of semi-solid paint that would form on the top of useable paint and that were periodically removed. These materials were aggregated in 55-gallon drums for disposal. In what was apparently a one-time action prior to 1977, VDOT buried drums of these accumulated paint wastes in the open excavation. No information concerning the dimensions of the excavation created to bury the drums is available. According to VDOT personnel, use of the PP for disposal purposes was discontinued prior to 1977.

   Closure of the PP was completed in two phases. The initial phase of closure was completed in the early to mid-1990s, when VDOT initiated the voluntary removal of approximately 420 drums of waste paint and 500 tons of contaminated soil. This material was characterized and sent off-site to appropriate disposal facilities. The estimated dimensions of the excavation after removal were 80 to 90 feet long, 45 feet wide, and 16 to 18 feet deep. The second phase of the PP closure was completed pursuant to the July 16, 1997, document titled “Clean Closure, Contingent Closure, and Contingent Post-closure Plans-Paint Pit Area”. Details concerning the earlier drum and soil removal activities were summarized in this document. In December of 1998, the soil sampling specified in the clean closure plan was conducted. The results of the closure sampling and data evaluations were summarized in the closure certification report dated July 8, 1999 and titled “Closure Report, Paint Pit Area and Hot Vat Stripper Ditch Waste Management Units, Culpeper VDOT, Culpeper, Virginia”. VDEQ subsequently approved clean-closure of the unit for soils as per correspondence dated September 13, 2000.

2. Sign Shop Vat: The SSV (classified as a surface impoundment) included a subsurface feature similar to a septic tank. The tank was approximately 12 feet long by 5 feet wide by 5 feet deep, and was installed beneath the concrete floor of a small storage building previously located adjacent to the Sign Shop building. The sides of the tank were lined with concrete block. The floor of the tank was reportedly unlined and composed of natural earthen materials. The concrete floor of the storage building (approximately 10 inches thick) served as the roof of the tank with the exception of a 2-foot by 2-foot opening in the storage building floor. A drainpipe was installed beneath the floor of the tank, and connected to a subsurface drainfield, similar in nature to a septic system drainfield. The tank and associated drainfield

comprised the entire HWMU. The SSV was used as part of the fabrication process for new highway signs and markers and refurbishing of old highway signs and markers in the Culpeper District. The SSV was constructed in about 1976 and was operated for approximately four years. Old aluminum road signs in need of repair or upgrade were prepared by stripping and cleaning the signs of their existing reflective coating. The signs to be refurbished and new sign blanks were placed in a trough containing solvent and permitted to soak in the solvent to facilitate loosening and removal of the reflective coatings and protective films. On an annual basis throughout the operational lifetime (approximately four years) of the SSV, the contents of the trough were emptied into the tank. Since 1980, waste produced by the sign preparation process has been collected and disposed of off-site in accordance with all applicable regulations.

Closure of the SSV was conducted in two phases. The initial phase of closure was performed in late 1993 and 1994. This phase included removal of contaminated groundwater that had backed up into the tank, removal of the concrete covering the tank, high-pressure spray washing of the concrete block walls, collection of the wash water, and removal of the block walls and a portion of the drain line. In addition, approximately 2 feet of soil was removed from the sidewalls and bottom of the tank after the block walls had been removed. Approximately 12,000 gallons of contaminated groundwater including all decontamination rinseates, and 45 tons of contaminated debris and soil were disposed in accordance with applicable regulations. The second phase of closure of the SSV was performed in accordance with the June 4, 1998 plan titled "Clean Closure, Contingent Closure, and Contingent Post-closure Plan – Sign Shop Vat Area: Revision 3, VDOT-Culpeper District Headquarters Facility". Closure activities began on November 3, 1998 and concluded on December 3, 1998. In total, the excavation area encompassed 4,543 square feet with 846 cubic yards of soil and gravel removed. The results of this second phase of closure activities were summarized in a closure certification report dated January, 1999. VDEQ approved clean closure of the SSV soils in a letter dated August 30, 2000.

3. Hot Vat Stripper Ditch: The HVSD, which was classified as a surface impoundment, was a shallow, narrow surface drainage swale approximately 600 feet in length. The HVSD was designed to receive and convey surface runoff. A Hot Vat Stripper Tank was installed at the facility inside the Equipment Shop building for the purpose of stripping oil and grease from engine components. The tanks contained a heated, alkaline solution (pH of 14) that functioned as the stripping agent to clean the parts. Periodically, the solution was removed and replaced with fresh solution. The used solution was allegedly discharged into the HVSD. Soil and groundwater sampling activities at this unit occurred between 1998 and 1999; based on the data evaluation and associated risk assessment, the unit was recommended for clean closure for soils with unrestricted land use. VDEQ approved the risk-based clean closure of the unit in a letter dated August 30, 2000.

### 3.2 Post Closure Care Permit and Corrective Action for the Regulated Units

Immediately following the closure of the HWMUs, The Facility was requested to submit a Post Closure Care Permit Application. The Post-Closure Care Permit (PCCP) was completed by VDEQ on September 14, 2005 and received by VDOT on April 7, 2006. The PCCP outlines

VDOTs requirements for post-closure care, groundwater compliance monitoring and corrective action associated with the SSV and PP. The groundwater compliance monitoring continued until 2010; however, due to ongoing exceedances of the groundwater protection standards at both units, the Facility was requested to implement corrective action at SSV and PP. Accordingly, the Facility submitted a Class 3 Permit Modification Request for implementing Monitored Natural Attenuation as the Corrective Measure for groundwater at these Units. The Permit modification request was approved by VDEQ on September 21, 2010, and subsequent to this approval, VDOT has performed semiannual groundwater monitoring in accordance with the Permit's Module VII "Corrective Action Program Groundwater Monitoring – Regulated Units.

### 3.3 Solid Waste Management Units (SWMUs)

The PCCP specifies VDOT's requirements for conducting investigations of potential releases, and if necessary, undertaking corrective actions, associated with solid waste management units (SWMUs) identified at the site. The following areas were identifies as SWMUs at the Facility based on a review of facility operations. The locations of the SWMUs are provided in Figure 2.

SWMU 1 – Closed Heating Oil Underground Storage Tank (UST) (HO1) was a closed heating oil underground storage tank (UST) located near the northeast comer of the district office building. The 2,000-gallon steel tank held virgin heating oil. This unit was closed via removal in August/September of 2000.

SWMU 2 – Closed Heating Oil UST (HO2) was a closed heating oil UST located near the south end of the old VDOT Residency building. The 550-gallon steel tank held virgin heating oil. This unit was closed via removal in August/September of 2000.

SWMU 3 – Closed Heating Oil UST (HO3) was a closed heating oil UST was also located near the south end of the old VDOT Residency building. The 550-gallon steel tank held virgin heating oil. This unit was closed via removal in August/September of 2000.

SWMU 4 - Closed Heating Oil UST (HO4) was a closed heating oil UST located near the southwest comer of the sign shop. The 550-gallon steel tank held virgin heating oil. This unit was closed via removal in August/September of 2000.

SWMU 5 – Closed Gas/Diesel USTs at Equipment Shop/Garage included two closed gasoline USTs and two closed diesel USTs. The tanks were located north of the equipment shop / garage. Virgin gasoline was held in a 10,000-gallon and a 2,000-gallon steel tank. Virgin diesel was held in a 2,000-gallon and a 1,500-gallon steel tank. These units were closed via removal in May of 1992.

SWMU 6 – Closed Gas/Diesel USTs at Sign Shop Area included two closed gasoline USTs and two closed diesel USTs. The tanks were located northwest of the Sign Shop. Virgin gasoline was held in a 1,000-gallon and a 2,000-gallon steel tank. Virgin diesel was held in a 10,000-gallon steel tank. All were closed via removal in September 1997.

SWMU 7 – Closed Gas/Diesel Above ground Storage Tanks (ASTs) at Bulk Storage Area included six steel above-ground storage tanks (ASTs) including three 20,000-gallon and one

18,000-gallon ASTs used for storage of virgin diesel fuel, and two 20,000-gallon ASTs used for storage of virgin gasoline. The installation date was unknown, and the ASTs were close by removal in February of 1996.

SWMU 8 – Former Salvage Metal and Debris Storage Site was defined as an accumulation area for salvage metal and other debris and is approximately one half acre or less in size. The specific quantities and types of materials staged in this area are unknown and the precise dates of operation were not known; although accumulation activity was visible in aerial photographs dated from 1960 to 1963.

SWMU 9 – Former Equipment and Battery Storage Area was an equipment and battery storage area occupying about 0.14 acres. In addition to scrap batteries, other mechanical equipment may have been stored in the unit. The dates of operation were undetermined.

SWMU 10 – Suspect Waste Disposal Area (SWDA) was located at the southwest comer of the facility. The mapped location was based on an approximation of the area where paint residues were reported to have been observed on the ground surface. It was not known if activity associated with the observation was historically limited to the mapped area. Quantity or volume of waste disposed of there is unknown. Interviews with VDOT personnel indicated that this was an area previously used for equipment cleaning operations. The cleaning reportedly involved equipment used for application of paints, pesticides and herbicides.

### 3.4 Soil and Groundwater Assessment at SWMUs prior to RCRA Facility Investigation

- Heating Oil USTs (SWMU 1-SWMU 4)

As part of the closure of the Heating Oil USTs (HO1-HO4), the Facility conducted soil sampling activities to confirm releases from these units. Total petroleum hydrocarbon (TPH) diesel range organics (DRO) were detected beneath each tank. The results of the UST closure assessment were submitted to VDEQ on January 2001, and on March 2, 2001 the Department issued a no further action for these units.

- Gas/Diesel USTs at Equipment Shop Garage (SWMU 5)

A soil assessment was completed through collection of soil samples from soil borings and during monitoring well installation during borehole drilling. Soil samples submitted from depth intervals ranging from 3 to 9 feet below grade contained TPH gasoline range organics (GRO) at concentrations from <0.5 mg/kg to 220 mg/kg, and diesel TPH - DRO at concentrations from <2.0 mg/kg to 108 mg/kg. Six monitoring wells (MW-1 through MW-6, Figure 3) were installed to characterize petroleum hydrocarbon concentrations in groundwater near the removed USTs. Target compounds were not detected in MW-2, MW-3, and MW-6. Only benzene was detected in MW-4 and MW-5, at concentrations below the Groundwater Protection Standard (GPS). In MW-1, benzene (0.11 mg/L), toluene (0.019 mg/L) and total xylenes (0.088 mg/L) were reportedly detected, with benzene exceeding the respective GPS (0.005 mg/L). A baseline risk assessment was performed as part of the site characterization. The overall risk at the site was concluded to be low. However, it was later determined that a potentially higher level of risk was

present due to a storm drain that was identified to pass through the former tank pit area. Further evaluation concluded that any contaminant migration along the storm drain was limited to the section of the drain near the tank basin, as there was no indications of contamination along the trench near storm drains located approximately 80 feet downgradient of the excavation. Based on the findings of the site characterization, it was recommended to conduct quarterly sampling of monitoring wells and the flow through the storm sewer for a period of one year. On January 25, 1995, VDEQ issued a letter to VDOT stating that no further action was required for the unit based on VDEQ's determination that there was no indication of an unacceptable risk to human health and the environment.

- Gas/Diesel USTs at Sign Shop Area (SWMU 6)

Following the removal of the three USTs, soil samples were collected beneath each tank at depths ranging from 7 to 11 feet below ground surface (bgs). Soils impacted by TPH – DRO at a concentration (142.9 mg/kg), slightly above the DEQ UST Program release reporting limit of 100 mg/kg was detected beneath one of the three USTs that were closed in this area. On March 30, 1998, VDEQ issued correspondence stating that the contamination levels remaining around the UST system did not warrant further assessment.

- Gas/Diesel ASTs at Bulk Storage Area (SWMU 7)

Following the removal of the six ASTs in 1996, several soil and groundwater assessment activities occurred. These activities included installation of 15 soil borings and relative sampling analysis, and installation and sampling of five monitoring wells. Soil contaminant concentrations were reported from the five monitoring well boreholes: BTEX concentrations ranged from 0.034 mg/kg to 145 mg/kg and TPH concentrations ranged from 2,700 to 79,000 mg/kg. Groundwater contaminant concentrations were reported: BTEX ranged from 0.017 to 1.05 mg/L and TPH ranged from 1.02 to 2,300 mg/L. In 1997 excavation of about 134 tons of petroleum impacted soil from the northern and southern "gas house" location. Soil samples were collected from the base and sidewalls of each excavation, reporting concentrations of TPH GRO from 515 to 2,408 mg/Kg. The five existing monitoring wells were gauged with an oil-water interface probe. Approximately 0.17' of free product was identified in one of the wells, while TPH DRO was identified in MW4 at 1.3 mg/L. No other target analytes were reported. On March 10, 1998, the VDEQ UST Program issued a letter to VDOT stating that the contamination levels associated with this Unit do not represent an identified risk to human health and the environment, issuing a no further action for this Unit.

- Former Equipment and Battery Storage Area (SWMU 9)

On September 15, 2003, VDOT initiated excavation of surface soil to a depth of 3 to 6 inches across the Unit. Soil borings were also advanced and samples were collected from the 0 to 0.5-foot depth interval. All surface soil samples (0-0.5 feet) from within the excavation limits were initially analyzed for total metals; in addition, select samples were analyzed for VOCs and SVOCs. After reviewing the total metals analytical results for the surface soil samples, additional surface and subsurface soil samples were analyzed for lead. For total metals, none of the reported concentrations were above established EPA Region III Risk-Based Concentrations (RBCs) for

residential or industrial soil at that time. EPA Region III had not established RBCs for lead and mercury. Accordingly, the detected concentrations were compared to EPA Region IX Preliminary Remediation Goals (PRGs). Concentrations of mercury were below Region IX PRGs for residential and industrial soil. For SVOCs, one sample contained benzo(a)pyrene at 1.5 mg/kg, which exceeded the RBC for residential and industrial soil. Benzo(b)fluoranthene (3.1 mg/kg), dibenzo[a,h]anthracene (0.37 mg/kg J-flagged) and indeno(1,2,3-c,d)pyrene (1.5 mg/kg) was also reported in this sample at concentrations above the RBC for residential soil, but below the RBC for industrial soil. VOCs were not detected at levels above the laboratory detection limits.

### 3.5 Phase I RCRA Facility Investigation

The Phase I RCRA Facility Investigation (RFI) focused on assessing groundwater quality conditions associated with the petroleum fuel USTs (SWMUs 1-5) and ASTs (SWMU 7) previously closed by the VDEQ UST Program, and assessing soil to identify if a release had occurred associated with operation of the Former Salvage Metal and Debris Storage Site (SWMU 8) and the Suspect Waste Disposal Area (SWMU 10). As indicated in Section 3.4, SWMU 6 did not require any further action, and the Facility elected to address soil impacts at SWMU 9 via Interim Measures (see section 3.6 below). Below is a summary of activities conducted as part of the Phase I RFI:

- SWMUs 1-5: two temporary groundwater monitoring wells (TW-7 and TW-8) were installed downgradient of the unit and sampled for the purpose of assessing the presence of impacted groundwater at the facility boundary. Concentrations of THP GRO and DRO, BTEX and methyl-tert butyl ether (MBTE) were detected above the laboratory detection limit, but none exceeded established EPA Region 3 Maximum Contaminant Levels (MCLs).

- SWMU 7: four temporary groundwater monitoring wells (TW-1 through TW-4) were installed in the approximate area where the AST system components were located. Concentrations of TPH GRO and DRO, and BTEX were detected. Only benzene in TW-3 had a concentration (5.8 ug/L) that slightly exceeded its MCL (5 ug/L).

- SWMU 8: 15 randomly selected surface and subsurface soil samples were collected from a sampling grid superimposed over the unit. The soil samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCBs), and metals. Results were compared to the 2010 EPA Regional Screening Levels (RSLs) for Residential Soil, Industrial Soil and Protection of Groundwater (PGW) to determine constituents to carry forward for further evaluation. None of the VOCs detected in surface and subsurface samples exceeded established Residential or Industrial RSLs. Two VOCs were carried forward subsequent to screening against PGW RSLs including naphthalene and iodomethane, the latter due to having no established PGW RSL. SVOCs were detected in most of the surface samples. The SVOC results for subsurface samples showed little migration into the subsurface. Only one subsurface soil sample, collected at 1-2’ below grade, contained SVOCs at concentrations above the Residential and/or PGW RSLs, including benzo[a]anthracene,

benzo[a]pyrene and phenanthrene. Pesticide organics were detected in a limited number surface samples. Concentrations of detected pesticides in subsurface soil samples did not exceed any of these RSLs. A single PCB, arochlor 1254, was detected in one surface soil sample at levels above the Residential and Industrial RSL. Aroclors 1248, 1254 and 1260 were identified in two to five surface soil samples at levels above the PGW RSLs. PCBS were not present in subsurface soil samples at levels above the RSLs. Metals with concentrations above Residential Soil RSLs included antimony, arsenic, cadmium, chromium, cobalt, copper, lead, vanadium, and zinc. Arsenic, chromium, cobalt and lead exceeded Industrial Soil RSLs. Metals exceeding PGW RSLs included antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, vanadium, zinc and mercury. Several of the metals did not have established PGW RSLs, so background levels were used for screening.

Assessment of groundwater (through sampling of MW-31) at SWMU 8 was predicated on results of the Phase I RFI suggesting the likelihood of potential impact to groundwater from operation of the unit. However, the analytical results did not suggest this likelihood as the majority of mobile constituents did not appear to have migrated substantially into subsurface soil. Accordingly, sampling of MW-31 was not deemed warranted.

- SWMU 10: One surface and one subsurface soil sample was collected from fifteen randomly selected sampling locations from a sampling grid superimposed over the unit. Soil results were compared to the 2010 EPA RSLs for Residential Soil, Industrial Soil and PGW. None of the VOC concentrations in soil exceeded established Residential Soil and Industrial Soil RSLs. Two VOCs, benzene and naphthalene, were detected at levels above established PGW RSLs. Benzene and naphthalene are common petroleum constituents, and were attributed to the AST area (SWMU 7) located adjacent to the SWMU 10. Iodomethane was present in two samples, but Residential Soil, Industrial Soil and PGW RSLs were not established for this compound. Several pesticides were detected but none exceeded the Residential and Industrial Soil RSLs. Two pesticides, beta-BHC and delta-BHC, were present in a limited number of samples at concentrations above the PGW RSLs. All sample locations had detectable concentrations of metals. The detected metals included antimony, arsenic, barium, beryllium, chromium (total), cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, and mercury. Concentrations of antimony, arsenic, chromium, cobalt, lead, thallium, and vanadium were above the Residential RSL. Metals exceeding the Industrial RSLs included arsenic, chromium, cobalt, lead and thallium. Antimony, arsenic, chromium (total), cobalt, copper, lead, selenium, thallium, vanadium, and mercury concentrations were above the PGW RSL. Several of the metals did not have established PGW RSLs, so background levels were used for screening.

  Groundwater was sampled at two locations, TW-5 and TW-6. Groundwater analytical results were compared to EPA MCLs, or if no EPA MCL was established, the EPA RSL for tapwater (dated July 7, 2008). The groundwater sample results revealed low levels of the following VOCs in the sample from TW-5 and TW-6 locations: acetone, methylene chloride, naphthalene, toluene, and m/p-xylene. At TW-5, Barium, beryllium, lead, and vanadium concentrations were above the Tapwater RSL or EPA MCL. Barium and

beryllium were also present in the method blank. Cobalt was detected in both groundwater sample locations, but at that time no groundwater screening levels were available for cobalt. At the TW-6 location, only the reported concentration of beryllium exceeded the groundwater screening levels (EPA RSL for tapwater).

### 3.6 Post RFI Activities

- SWMU 9: in 2009 the Facility elected to address the impacted soil identified at the unit during past investigation through Interim Measures (IM). On December 9, 2009, VDOT submitted the "Interim Measures Remediation Work Plan - Former Equipment and Battery Storage Area" (IM WP). The IM WP would include excavation and off-site disposal to remediate the soil to levels that would support clean closure of the unit. In an e-mail dated June 27, 2013, the Department recommended this IM WP to be included as part of the final remedy for the facility.

- SWMU 10: in 2010 a permanent two-inch groundwater monitoring well (MW-SWD-1) was installed at the former location of TW-5 in order to further evaluate the concentrations of barium, beryllium, cobalt, lead, and vanadium detected in the sample from TW-5 during the Phase I RFI investigations. Barium and cobalt were the only targeted constituents that were detected in the sample at concentrations above the laboratory method detection limits (MDLs). The results for barium and cobalt were compared to the lower of the EPA MCL and EPA RSL for tapwater; concentrations of both barium and cobalt were below the RBSLs. In a letter dated April 8, 2011, VDEQ requested collection of a confirmatory groundwater sample from well MW-SWD-1 to further evaluate the presence of naphthalene at concentrations slightly above the RSL. The results of the sampling indicated that the concentration of naphthalene was below the ORNL RSL for Tapwater. On May 29, 2012, in consideration of pending approval for industrial land use assumptions at the facility, VADEQ approved no further action to address SWMU 10.

- SWMU 7: additional investigation was performed at this unit in October 2012 to assess benzene levels in groundwater. Four independent groundwater monitoring events were conducted, and the results for all four monitoring events were below the EPA MCL for benzene. Therefore, the Department recommended no further action for the facility in a letter dated July 2, 2013.

- SWMU 8: additional investigation was performed and to evaluate chromium speciation in soil at this unit in October 2012. The results indicated that hexavalent chromium was present in the surface soil. On December 5, 2012, VDEQ and VDOT agreed to forgo additional investigation at SWMU 8 and move towards performing soil removal as an IM at this unit along with implementation of the IM at SWMU 9.

## 4.0 CURRENT REGULATORY STATUS OF HWMUs AND SWMUs

### 4.1 HWMUs

As discussed in Sections 3.1 and 3.2, the Hot Vat Stripper Ditch HWMU has previously been clean closed for soil and groundwater, and both the Paint Pit and Sign Shop Vat HWMUs were clean closed for soil. Impacted groundwater remains at the Paint Pit and Sign Shop Vat HWMUs. However, CMs are already in place for these two units to address impacted groundwater via Monitored Natural Attenuation, and these CMs were incorporated into the facility PCCP by virtue of the Class III Permit Modification effective September 21, 2010. VDOT will continue implementing the Corrective Action Monitoring Program as outlined in Module VII "Corrective Action Program, Groundwater Monitoring – Regulated Units, and as listed in Section 7.0 below.

### 4.2 SWMUs

Eight of the ten SWMUs identified at the facility were issued a "no further action" by VDEQ, and are therefore excluded from consideration during the subsequent remedy evaluation and selection. These closed SWMUs include SWMUs 1 through 7, and SWMU 10. SWMU 8 and SWMU 9 are the only remaining SWMUs that have not been closed; final remedies for these SWMUs are outlined in Section 7.0.

## 5.0 SUMMARY OF HUMAN HEALTH RISK

### 5.1 Soil Exposure Pathways

The immediate human health exposure risk to facility's soil is limited to workers that may conduct construction activities in the impacted areas. Exposure routes would include direct contact, ingestion, and inhalation of fugitive dust; however, construction of the cap over SWMU 8 will prevent direct exposure to the soil, eliminating fugitive dust emissions and exclude infiltration of precipitation through the impacted soil. Removal actions at SWMU 9 will permanently remove contaminated soil, thus enabling unrestricted land use. Specific measures to educate facility personnel regarding the applicable land use restrictions and required maintenance associated with SWMU 8 will be outlined in the Corrective Measures Implementation document to be generated at a later date.

### 5.2 Groundwater Exposure Pathways

Groundwater is not used as drinking water since the facility is connected to a public water supply, and the depth to groundwater precludes exposure during construction activities. Impacted groundwater exists at the Paint Pit and Sign Shop Vat HWMUs; however, historical groundwater trends have shown that concentrations of COCs at these units have declined, therefore indicating groundwater plume stability. Groundwater monitoring at these units is based on the Facility's Corrective Action Program, as outlined in the Facility's Permit Module VII.

Construction of the cap over SWMU 8 will prevent infiltration of precipitation through the impacted soil, thus protecting groundwater from potential future impacts. Removal of impacted soil at SWMU 9 will eliminate potential for COCs leaching to groundwater.

### 5.3 Potential Vapor Intrusion Pathways (Indoor Air)

A potential vapor intrusion into indoor risk air may develop for any fully enclosed structure constructed above the contaminated groundwater plume associated with the two HWMUs. In this eventuality, VDOT will be required to address potential vapor intrusion pathways as described in Section 7.3 “Institutional Controls”, item 5.

## 6. CORRECTIVE ACTION OBJECTIVES

As a result of the environmental investigations, the Facility intends on addressing all the documented releases from SWMU 8 and SWMU 9 through a Corrective Action process.

### 6.1 Soils

The Corrective Action Objective for Facility soils is to control human and environmental exposure to the hazardous wastes and hazardous constituents that remain in place at the Facility.

VDEQ has determined that EPA Regional Screening Levels for Industrial Soils for direct contact with soils and for protection of groundwater are protective of human health and the environment at SWMU 8. VDEQ has determined that EPA Regional Screening Levels for Residential Soils and for protection of groundwater are protective of human health and the environment at SWMU 9. Therefore, VDEQ’s Corrective Action Objectives for Facility soils are as follow: control exposure to the hazardous constituents remaining in soils by capping the soils and maintaining land use restrictions at SWMU 8; excavating the contaminated soils at SWMU 9 to eliminate the possibility of exposure to human and ecological receptors, as well as migration to groundwater. The Soil cleanup goals for SWMU 8 are shown in Tables 1A and 1B, and those for SWMU 9 are presented in Tables B1 and B2.

### 6.2 Groundwater

The Corrective Action objective for contaminated groundwater at the two HWMUs is to restore groundwater to drinking water standards. These standards are established by the Maximum Contaminant Levels (MCLs) promulgated at 40 CFR 141, pursuant to Section 1412 of the Safe Drinking Water Act (SDWA), 42 USC Section 300g-1. For a contaminant of concern without an applicable MCL, site specific backgrounds concentrations or VDEQ’s Alternate Concentration Limit are used. The groundwater remediation goals for the Facility are as outlined in Module VII “Corrective Action Program, Groundwater Monitoring – Regulated Units.

## 7.0 SUMMARY OF PROPOSED REMEDY

Based on the findings set forth in the RFI/CMS reports, VDEQ has determined that past operations at the Facility have resulted in soil contamination. The proposed remedy for the Facility emphasizes source control through excavation, as well as constructing a cap over soils with concentrations of contaminants above remedial goals. VDEQ will additionally require institutional and engineering controls be implemented as necessary to prevent current and potential future exposure to contamination. VDEQ's proposed remedy is:

### 7.1 Soils in SWMU 8

Based on considerations included in the CMS report, VDEQ proposes capping as the preferred remedy for contaminated soils at this unit. Capping involves covering the impacted soils with a natural (e.g. clay) or synthetic (e.g. concrete or asphalt) cover material. This material will provide an impervious surface to prevent infiltration of precipitation into and through the existing impacted soil zone, controls to prevent lateral migration of stormwater beneath the cover material, and control/management of stormwater runoff from the cover area. The proposed capped area is depicted in Figure 4. Long-term care and maintenance and inspection schedule to verify integrity of the cover material will also be developed and implemented. In support of the proposed remedy for this Unit, the Facility submitted the "Evaluation of Potential Future Land Use" report dated December 6, 2011, where an industrial land use was recommended as the reasonable future land use scenario.

### 7.2 Soils in SWMU 9

The proposed remedy for this unit is excavation as outlined in the IM Work Plan dated December 9, 2009. The remedy consists of excavation of soil at the two grid node locations where targeted analytes were detected above residential RBSLs in the soil samples collected after surface soil removal activities conducted in September 2003 as discussed above in Section 3.4. The grid nodes are indicated as C2 and D1 and shown in Figure 5.

### 7.3 Institutional Controls

Institutional controls will be implemented in order to protect human health and the environment, and to maintain the current and future integrity of the remedy in SWMU 8. Given the nature and extent of impacted media left in place, more than one institutional control is necessary to prevent activities which could interfere with the integrity or protectiveness of the remedy. Therefore, VDEQ has determined that institutional controls are necessary to ensure the short and long term reliability of the remedy. Institutional controls to be utilized at the site will:

1. notify prospective buyers of the property of the environmental conditions at the Facility and of VDEQ's selected corrective measures as part of the remedy for the Facility under RCRA Corrective Action;

2. prohibit the use of groundwater beneath the property except for non-contact cooling water and purposes to support selected corrective measures;

3. require inspection and maintenance of the cap over SWMU 8;

4. all earth moving activities, including excavation, drilling and construction activities in SWMU 8 shall be conducted in such a manner that such activities will not pose a threat to human health and the environment or adversely affect or interfere with the Final Remedy, and provided VDEQ's prior written approval; and

5. a vapor intrusion control system, the design of which shall be approved in advance by VDEQ, shall be installed in each new structure constructed above the contaminated groundwater plume or within 100-foot around the outermost wells exhibiting concentrations above the GPS, unless it is demonstrated to VDEQ that vapor intrusion does not pose a threat to human health and DEQ provides prior written approval that no vapor intrusion control system is needed.

Institutional controls described above will be implemented at the site through the following mechanisms;

- The existing Hazardous Waste Management Permit for Site-Wide Corrective Action will be modified to include the RCRA Corrective Action remedy decision after it is approved, and will be used as the controlling authority for implementation of the remedy through the VDEQ.

- While groundwater beneath the site is not currently used as a drinking water source and there are no plans for such future use, to provide additional protection, the proposed remedy includes institutional controls to prohibit the development of wells for drinking water or other domestic uses at the Facility. A notification to prohibit well drilling under Virginia's Private Well Regulations, 12VAC 5-630-380 will be provided to the local health district (Town of Culpeper) in writing describing the nature and extent, including a map, of the contaminated groundwater located on the Facility property. The notice will be updated every three (3) years to reflect the latest contaminated groundwater plume boundary. A copy of the notification will be provided to VDEQ.

## 8. REPORTING

VDOT will be required to submit annual reports containing, but not be limited to, groundwater monitoring data, compliance with institutional and engineering controls, and evaluation of remedial effectiveness. VDOT will also be required to submit a remedy status evaluation report every three (3) years that evaluates the effectiveness of the remedies in meeting the human health and environmental protection objectives. This review may include, but not be limited to, review of VDOT's compliance with any institutional and engineering controls, groundwater and land uses on the property, and zoning maps or planning documents that may affect future land use in the impacted area. The report will include progress of the remedial measures and of meeting the cleanup targets or remedial goals. VDEQ will review the progress of the remedy activities to confirm that clean up targets and remedial goals have been met. If VDEQ determines that VDOT is not achieving clean up targets remedial goals, VDEQ may require VDOT to perform additional studies and/or to modify the existing corrective measures. If new contamination is

discovered or if the proposed remedial options cannot adequately mitigate risk to human health or the environment, additional corrective measures will be implemented. In the event that VDEQ requires VDOT to perform additional studies and/or to modify the existing and additional corrective measures, an opportunity for public comment will be provided prior to the initiation of changes to the existing corrective measures, as necessary or appropriate.

## 9. EVALUATION OF PROPOSED REMEDY

This section provides an evaluation of the proposed remedy using EPA's RCRA Corrective Action Program criteria. These criteria consist of three threshold criteria and seven balancing criteria. The criteria are applied in two phases. In the first phase, VDEQ evaluates three Threshold Criteria as general goals. In the second phase, if there is more than one remedy which meets the Threshold Criteria, VDEQ evaluates seven Balancing Criteria to determine which proposed remedy alternative provides the best relative combination of attributes.

### 9.1 Threshold Criteria

#### 9.1.1 Overall Protection of Human Health and the Environment

VDEQ's proposed remedies for soils are protective of human health and the environment. Excavation removes COCs from the site eliminating the possibility of exposure to human and ecological receptors, as well as migration to groundwater. Although the COCs remain in the excavated soil, disposal of the soil will occur at a permitted land disposal facility. Capping prevents exposure to the COCs in the soil beneath the cover area. The cover also prevents migration of the COCs from the soil to groundwater by eliminating precipitation infiltration and leaching that may occur.

The annual groundwater monitoring reports over the last several years have shown that COCs concentrations below the HWMUs are stable; groundwater monitoring will continue to assess for impacts to groundwater that can be mitigated in the eventuality of off-site migration.

Institutional controls that will be implemented will prevent use of the property in a manner that could potentially cause unacceptable exposure to the residual concentrations of COCs in soil and groundwater.

#### 9.1.2 Achieve Media Cleanup Objectives

The proposed soil remedy for SWMU 8 and SWMU 9 will target the source areas which will eliminate or reduce contamination in soil, and minimize the migration of the contamination in groundwater. The cleanup objective for SWMU 8 and SWMU 9 is to reduce or eliminate, to the extent practicable, the source of contamination in soil and the migration to groundwater. Excavation accomplishes this by physical removal of the impacted soil, whereas capping achieves it by stabilizing the area and preventing migration of the impacted material from disturbance and/or leaching from precipitation infiltration. VDEQ's proposed remedy also requires the implementation and maintenance of institutional controls to ensure industrial use of SWMU 8, and to restrict groundwater use as a drinking water supply.

### 9.1.3 Source Control

VDEQ seeks to eliminate or reduce further releases of hazardous wastes and hazardous constituents that may pose a threat to human health and the environment. The proposed remedy will physically remove the impacted soil in SWMU 9, and will stabilize SWMU 8 by capping it and preventing migration of the impacted material from disturbance and/or leaching from precipitation infiltration. VDEQ's proposed remedy also requires the implementation and maintenance of institutional controls to ensure industrial use of SWMU 8 and to restrict groundwater use as a drinking water supply.

## 9.2 Balancing/Evaluation Criteria

### 9.2.1 Long-Term Effectiveness

Both proposed remedies provide for long-term effectiveness and permanence. Excavation permanently removes the COCs from the site, whereas capping the residual COCs in soil offers a long-term solution to prevent exposure and migration. The capping remedy will include a long-term maintenance plan that will assure that the design integrity of the cover is maintained over time. Institutional controls will provide for protection against usage that could compromise the cover causing unwanted exposure and migration of the COCs, as well long-term groundwater monitoring at the HWMUs.

### 9.2.2 Reduction of Toxicity, Mobility, or Volume of the Hazardous Constituents

The proposed remedies for SWMU 8 and SWMU 9 will reduce the toxicity, mobility and volume of hazardous constituents at the Facility in soil and groundwater by stabilizing and eliminating, respectively, the soil contamination at the Facility, and reducing the potential of contamination migration to groundwater.

### 9.2.3 Short-Term Effectiveness

Implementation of excavation or capping can be fully completed in a short time frame from commencement of construction activities. Potential for human exposure during implementation is greater for excavation of SWMU 9 since the soil will be disturbed throughout the thickness of the impacted horizon, and the soil will be moved from its point of origin to the temporary staging area and later transported to the disposal facility. Excavated soil will also be sampled for waste characterization and samples will be collected from the limits of the excavation for removal efficiency confirmation. A Health and Safety Plan will be adopted to provide for procedures and personal protective equipment to prevent exposure during construction activities on-site. Capping of SWMU 8 will involve significantly less disturbance and handling of the impacted media than excavation, thus inherently offers less risk for human exposure to the impacted soil during implementation. Groundwater monitoring at the HWMUs is currently being implemented, and will continue in accordance with the Permit’s Corrective Action Monitoring Program.

### 9.2.4 Implementability

Both capping and excavation are feasible to implement. Excavation is logistically more difficult due to space needed for the temporary staging area. Although vehicular traffic on the facility during waste transportation will increase, it is not anticipated to cause extensive disruption to facility operations. Groundwater monitoring at the HWMUs is currently being implemented and will continue in accordance with the Permit's Corrective Action Monitoring Program.

### 9.2.5 Cost

As indicated in the estimates provided in Appendix C of the CMS, capping costs for SWMU 8 are projected to range from $130,000 to $175,000. Costs to implement the excavation project for SWMU 9 are estimated to range from $25,000 to $35,000.

### 9.2.6 Community Acceptance

Community acceptance of the proposed remedy will be determined based on comments from the public. The modification of VDOT's Hazardous Waste Management Post Closure Permit, incorporating the remedy decision, will undergo public comment and a public meeting will be conducted. Additional details about public participation are provided in Section 10.0 below.

## 10. FINANCIAL ASSURANCE

Assurances of financial responsibility for corrective action will be provided in accordance with the Facility's current Permit as follows. Within ninety (90) calendar days of final acceptance of the proposed determination and corrective measures remedy by the VDEQ via the Facility's Permit modification, the Permittee shall submit an updated cost estimate for completing the approved remedies. The estimate may be based on the Corrective Measure Study, the approved remedies, or any other available information. The cost estimate for completing the approved remedies shall be updated pursuant to the development of more detailed information (e.g., Corrective Measure Design or Implementation) and any modifications to the approved remedies.

By March 31st following approval of the cost estimate for financial assurance, and each succeeding year, the Permittee shall demonstrate compliance with financial assurance to the Department for completing the approved remedies in accordance with 40 CFR § 264.101(b).

By March 31st following approval of any revised cost estimate, the Permittee shall demonstrate to the Department financial assurance for the updated cost estimates. Financial assurance will be required by the Permit for ongoing operation and maintenance costs associated with the proposed determination including corrective/remedial measures and institutional controls during the Corrective Measures Implementation (CMI) period.

## 11. PUBLIC PARTICIPATION

Interested persons are invited to comment on VDEQ's proposed decision. The public comment period will last sixty (60) calendar days from the date the notice is published in a local

newspaper. Comments may be submitted by mail, fax, e-mail, or phone to Mr. Brett Fisher at the address listed below.

A public meeting will be held upon request fifteen (15) calendar days from the date the notice is published in a local newspaper. The Administrative Record contains all the information considered by VDEQ for its proposed remedy for the Facility. To receive a copy of the Administrative Record, contact Ms. Laura Galli at the address below:

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