VIRGINIA DEPARTMENT OF ENVIRONMENT QUALITY

WASTE DIVISION

OFFICE OF REMEDIATION PROGRAMS

STATEMENT OF BASIS

COOK COMPOSITES AND POLYMERS CO.

CHATHAM, VIRGINIA

EPA ID NO. VAD055046049

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1.0 INTRODUCTION

1.1 Facility Name

The Virginia Department of Environmental Quality (VDEQ) has prepared this Statement of Basis for the Cook Composites and Polymers Co. located at 920, Tight Squeeze Industrial Park, Chatham, Virginia 24531 (hereinafter referred to as the Facility or CCP).

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.

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 operate and maintain an *in situ* chemical oxidation system (ISCO), to continue operating the existing groundwater recovery and treatment system (installed in 1982), perform long term groundwater monitoring, and maintain certain property mechanisms known as Institutional Controls (ICs) and Engineering Controls (ECs). ICs are generally non-engineered mechanisms such as administrative and/or legal controls that minimize or eliminate the potential for human exposure to contamination and/or protect the integrity of a remedy. Engineering Controls are generally engineered mechanisms such as a landfill cap or construction requirements. The proposed corrective measures are discussed in Section 6.0 and the proposed controls are discussed in Section 6.3 below.

This Statement of Basis summarizes information that can be found in greater detail in the work plans and reports reviewed by VDEQ and EPA, which can be found in the Administrative Record. Figures are included following the text showing the Facility layout and the locations of each solid waste management unit (SWMU) and areas of concern (AOC) (Figure 1), Sample Area locations (Figure 2), the layout of Sample Area 5 (Figure 3), Sample Area 5 soil concentrations (Figure 4), site-wide groundwater concentrations that are above remedial cleanup goals (Figures 5 and 6), and groundwater monitoring and shallow groundwater pumping well locations (Figure 7).

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, for which the address and telephone number is provided in Section 9.0.

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 Permit for Site-Wide Corrective Action.

2.0 FACILITY BACKGROUND

The Cook Composite and Polymers Co. (CCP) facility in Chatham, Pittsylvania County, Virginia occupies approximately 101 acres of property in the Tight Squeeze Industrial Park. The CCP facility is located in Pittsylvania County which is in the Piedmont physiographic province of south-central Virginia. The Banister River is located approximately 1,200 ft south of the CCP facility. Unnamed tributaries to the Banister River run just south of the CCP facility. The environmental setting and updated site specific information is fully described in the Phase II RFI Report, dated November 2007.

The facility was originally constructed in 1969 by the former Freeman Chemical Corporation (Freeman Chemical) on a 68-acre parcel of property in the Tight Squeeze Industrial Park near Chatham, Virginia. CCP has owned and operated the facility since 1990. The facility produces unsaturated polyester resins for use in the manufacture of fiberglass boats, bathroom fixtures, sinks and related specialty composite products. Facility operations consist of batch process equipment housed in a roofed, semi-enclosed facility. The batch process equipment includes aboveground process tanks, reactor vessels (referred to as kettles), and blending and thinning tanks used to adjust the composition and consistency of the intermediate or finished product batches.

The VDEQ issued Cook Composites a Hazardous Waste Management Permit (Permit) on July 8, 1996 for the storage and treatment of hazardous waste. The Permit was modified on September 19, 2003 to incorporate RCRA Corrective Action requirements and encompasses thirty three (33) solid waste management units (SWMUs) and nine (9) areas of concern (AOCs) identified during a RCRA Facility Assessment (RFA) conducted in 1988. VDEQ's review of information provided by the Facility to date indicates there is enough data to support the determinations presented in Section 1.2. The Administrative Record may be reviewed in paper or electronic format at the location provided in Section 9.0.

3.0 SUMMARY OF ENVIRONMENTAL HISTORY AND INTERIM MEASURES

3.1 Environmental History and Milestones

To date, the following RCRA Corrective Action milestones have been completed at the Facility:

- In 1988, a RCRA Facility Assessment (RFA) was completed, during which 33 SWMUs and 9 AOCs were identified;
- On July 8, 1996, the VDEQ issued the Facility a Hazardous Waste Management Permit for the storage of hazardous wastes generated on-site and its treatment by incineration;
- In October 1996, the Facility performed a Screening Investigation (SI) and subsequently, completed a Verification Investigation (VI) report dated July 26, 2001;
- On September 19, 2003, the initial Hazardous Waste Management Permit was modified to incorporate RCRA Corrective Action requirements for the Facility site-wide;
- On September 25, 2003, the *Migration of Contaminated Groundwater Under Control* Environmental Indicator (CA750) was documented to have been met;
- On April 25, 2005, the *Current Human Exposures Under Control* Environmental Indicator (CA725) was documented to have been met;
- On May 10, 2005, the Facility submitted the RCRA Closure Plan Implementation Report documenting clean closure of the Incinerator and associated storage tanks. Subsequently the facility remains under permit for Corrective Action only.
- On October 30, 2006, the Hazardous Waste Management Permit for Corrective Action was renewed and remains in effect until October 30, 2016.
- In November 2007 the Facility completed the RCRA Facility Investigation (RFI) presenting data from 1996 through 2005.
- In May 2008, the Facility initiated a pilot test study utilizing ISCO; and
- On May 12, 2010, the Facility finalized a Corrective Measures Study (CMS) which selected ISCO together with institutional and engineering controls as the corrective measures.

The documents listed above may be found in the Administrative Record developed for the Facility. The Administrative Record may be reviewed in electronic format at the location provided in Section 9.0. The environmental investigations performed at the Facility required detailed characterizations of each SWMU and AOC, including soil sampling to assess impacts from hazardous constituents. In addition, groundwater was sampled and characterized site-wide to assess impacts from hazardous constituents from each SWMU and AOC. Figure 1 is included showing the location of each SWMU and AOC.

Constituents of concern (COCs) identified during the investigations includes acetone, benzene, ethylbenzene, methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), methylene chloride, styrene, toluene, xylenes, naphthalene, acetophenone, and manganese.

3.2 Summary of Past Clean-Ups and Interim Measures

From 1981 to 2008, clean-up activities were completed at several SWMUs and AOCs by the Facility to eliminate impacts to human health and the environment as a result of hazardous materials management practices. Past clean-ups that occurred from 1981 to 1983 included shutdown and replacement of the original facility incinerator, installation of several spill control features, installation of a groundwater pump and treat system, and soil excavation, consolidation,

and containment beneath a concrete cap. The clean up activities performed from 1981 to 1983 were done in accordance with a Special Order (Order) issued by the State Water Control Board (SWCB) on October 2, 1981, which required the Facility to submit plans and specifications for the remediation of any contamination identified via environmental assessment. In 2003, the facility removed its flow-through process underground storage tanks and in 2008 remedial pilot testing utilizing ISCO was performed at AOC B, also known as Sample Area 5 (SA-5). For purposes of this discussion, these clean up activities are referenced in this Statement of Basis as interim measures. The following is a detailed summary of these interim measures.

3.2.1 Interim Measures Performed Under SWCB Special Order - 1981

Unit Shutdown and Removal

In 1981, the former incinerator (SWMU 3), the old esterification wastewater tank trailer (SWMU 4), and the former waste solvent tank (SWMU 12) were shutdown and taken out of operation permanently. The former incinerator was used to incinerate esterification wastewater, paper, and trash and was removed in 1982. The old esterification wastewater tank trailer was used to store esterification wastewater adjacent to the incinerator and the waste solvent tank was used to collect spent solvents prior to incineration. Additionally in 1981, drums storing waste methyl alcohol intended for incineration at drum storage areas A and B (SWMUs 10A and 10B) were removed permanently. Following the shutdown and removal activities at SWMUs 3, 4, 10A, 10B, and 12, soil from SWMU 10B was excavated and placed in the location of the former incinerator (SWMU 3). Currently the location of SWMU 3 is known as the capped soil landfill (SWMU 23) because this location was used to consolidate excavated soil generated from clean-up activies at other areas identified under the SWCB Order. Subsequently these areas were identified as SWMUs and AOCs during the 1988 RFA. The following sections summarize the activities performed at these areas.

Soil Excavation and Consolidation

In accordance with the SWCB Order issued in 1981, the facility was required to remediate any contamination identified via environmental assessment. An environmental assessment was performed including a hydrogeological study. During this time plans and specifications for the construction of a soil landfill were developed in preparation for soil excavation activities necessary to remediate several SWMUs and AOCs. Subsequently, a release agreement was executed allowing the construction and use of a soil landfill. The soil landfill was constructed on the location of the former incinerator (SWMU 3) and was used to consolidate soil excavated during clean up activities summarized below.

Soil excavation activities occurred to eliminate risk to human health and the environment through direct exposure and contaminants leaching to groundwater at the following SWMUs and AOCs. These areas described below were eliminated from further investigation following the VI and RFI investigations, with the exception of AOC B, Sample Area 5 (SA-5);

- SWMU 15 – Former Truck Maintenance Area Hose Rack – This area was used to store hoses used for unloading resin tank trucks while the trucks were being cleaned. Soil containing oil and resin drippage was excavated (see AOC H description below);
- SWMU 16 – Tank Truck Wash Area – A former concrete pad used as a truck wash staging area. Prior to constructing the former pad, soil was excavated. Since then truck washing operations were discontinued in 1990;
- SWMU 25 – Landfill No. 2 – This area was used to dispose of trash generated by the

facility and is now a paved road. Contents of SWMU 25 was excavated and placed in SWMU 23. This area did not manage hazardous wastes. However, this area was added to Sample Area 3 (SA-3) during the VI;

- AOC B – Clean Up Area No. 2 – Currently known as Sample Area 5 (SA-5) – An area located approximately 40 feet west of the boiler room and consisted of surface tank wagon oil drips and a styrene spill. Soil in this location was excavated to depths of 1.5 to 3 feet below ground surface (ft bgs) and placed in SWMU 23. This area is currently the focus of active soil and groundwater remediation;
- AOC C – Clean Up Area No. 3 – An area located west of the kettle furnace room. This area consisted of surface engine oil drips and floor run-off from the facility. Soil in this location was excavated to depths of 1.5 to 3 ft bgs;
- AOC D – Clean Up Area No. 4 – An area located southeast of the drumming/filtering area and consisted of polyester resin spills. Soil in this location was excavated to depths of 1 to 1.5 ft bgs. This area is currently covered by a concrete pad;
- AOC E – Clean Up Area No. 5 – An area located between the drumming/filtering area and the drum storage pad. This area also contained SWMU 10B and in addition to the contents of SWMU 10B consisted of locations at which polyester resin and waste methyl alcohol/water mixture spills were reported. Soil at this location was excavated to depths of 1.5 to 3 ft bgs;
- AOC F – Clean Up Area No. 6 – An area located approximately 120 feet north of the Scrap Drum Storage Pad. This area consisted of a solvent loading area and evidence of polyester resin and oil drips. Soil in this area was excavated to depths of 6 to 8 inches bgs;
- AOC G – Clean Up Area No. 7 – An area located approximately 60 west of the truck maintenance building at which oil stains were observed. Soil in this area was excavated to depths of 8 to 12 inches bgs.
- AOC H – Clean Up Area No. 8 – An area located northwest of the truck maintenance building at the same location of the former truck maintenance area hose rack (SWMU 15). Soil at this location in addition to the SWMU 15 was excavated to depths of 1.5 to 3 ft bgs; and
- AOC I – Clean Up Area No. 9 – An area located just north of the raw material unloading pad at which raw material and oil drips were reported. Soil at this location was excavated to depths of 1.5 to 3 ft bgs.

As described above, the soil excavated from these SWMUs and AOCs were consolidated in the location of former incinerator (SWMU 3) and is now SWMU 23, the capped soil landfill. During consolidation activities, the soil was amended with fertilizer to stimulate biological degradation of constituents within the soil placed in the landfill. The soil was compacted and graded in preparation of a concrete cap and drainage system. In accordance with approved plans and specifications under the SWCB Order, a concrete cap with a storm water drainage system was constructed on top of SWMU 23, including the locations of SWMU 3, 4, 10A, and 12. The concrete cap is 140 feet wide by 190 feet long by 4 inches thick and captures and diverts storm water to a discharge outfall (Outfall 004), which is managed under a Virginia Pollution Discharge Elimination Systems (VPDES) Permit. The Facility maintains the integrity of this cap and continues to operate the pump and treat system as described in the next section. The maintenance of the concrete cap and the continued operation of the pump and treat system are

part of the facility's remedy for RCRA Corrective Action.

Groundwater Pump and Treat System

During the construction of the capped soil landfill, a shallow groundwater pump and treat system was implemented at the capped soil landfill SWMU 23 and SWMUs 3, 4, 10A, and 12. The pump and treat system was implemented to hydraulically contain shallow groundwater potentially impacted by soil to groundwater transfer of constituents from the capped soil landfill and mitigate downgradient constituent migration off site. The pump and treat system began operation in 1982 and currently includes four active groundwater recovery wells (SW-1, SW-2, SW-3, and SW-6) and an effluent treatment system (SWMU 28) having two granular activated carbon filters and a non-contact cooling system.

The pump and treat system and its recovery wells have been monitored via groundwater sample analysis since implementation. Hazardous constituents have occasionally been detected at concentrations below applicable drinking water standards and current remedial goals. Drinking water standards are established by the maximum contaminant levels (MCLs) promulgated under 40 CFR 141, pursuant to Section 1412 of the Safe Drinking Water Act (SDWA), 42 USC Section 300 ug-1. The 2007 RFI documented that groundwater recovered by the shallow pumping system met applicable discharge to surface water standards prior to treatment. Groundwater monitoring downgradient of the soil capped landfill SWMU 23s, 3, 4, 10A, and 12 indicate continued compliance with current MCLs and Regional Screening Levels (RSLs). Groundwater monitoring downgradient of the capped soil landfill will continue as part of the remedy until 2013. Additional detail on groundwater monitoring is provided in Section 6.0.

Presently, recovery wells SW-1, SW-3, and SW-6 operate continuously. SW-2 may run continuously, but is periodically shutdown at the discretion of the operator to manage the volume of water entering the groundwater treatment system. Other than during groundwater sampling events, SW-4 is not currently in use and SW-5 was abandoned in 2008. SW-1 and SW-3 are downgradient of SA-5. SW-6 is located at the capped soil landfill and SW-2 is located adjacent to the capped soil landfill. The pump and treat system remains in operation as a source of non-contact cooling water and is part of the facility's remedy for RCRA Corrective Action. Operation of the groundwater pump and treat containment system will continue until remedial clean up targets for groundwater are met.

3.2.2 Flow-Through Process Tanks Removal - 2003

In 2003, CCP completed a removal of their flow-through process tanks. The removal activities were implemented in two phases. The first phase consisted of removing three 30,000 gallon tanks in the western portion of the area. The second phase consisted of removing the five 15,000 gallon tanks remaining. During these phases, approximately 465 tons of soil were excavated, characterized, and transported off site for disposal. Backfill was placed in the excavations and compacted. Following these activities, soil borings were advanced through the fill to collect samples representative of soil beneath the former tank farm. Soil sample analytical results did not exceed industrial screening criteria for direct contact.

3.2.3 *In Situ* Chemical Oxidation at Sample Area 5 – 2008 to Present

During the RFI investigation, Sample Area 5 (SA-5, AOC B) was indentified for active remedial measures to treat acetone, benzene, ethylbenzene, and xylenes in soil and groundwater including manganese in groundwater. It was determined that xylenes in soil at SA-5 pose an unacceptable risk to human health for a construction worker under current conditions. Additionally, concentrations of acetone, benzene, and ethlybenzene do not support the future beneficial use of

groundwater as a drinking water source. Therefore, these constituents plus manganese in groundwater at SA-5 require treatment by the active remediation. Because these constituents at SA-5 are the source of groundwater contamination, the concentrations of these constituents downgradient of SA-5 are expected to diminish by treating these constituents at the source.

Based on the results of the investigations, CCP screened several remedial technologies in 2006 and proposed *in-situ* chemical oxidation (ISCO) utilizing ozone and peroxide injection. Ozone (O3) is a commonly recognized oxidant used in the waste water industry and more recently in soil and groundwater remediation. Ozone has a very short half-life (approximately 20 minutes in an aqueous phase) therefore it must be generated on-site. During its relatively short life span ozone is highly reactive, allowing it to react and degrade other compounds. And since it is applied as a gas, ozone is more readily distributed in the subsurface, particularly the vadose zone. Ozone reverts to common oxygen once the oxidation reaction is complete, subsequently benefiting aerobic biodegradation of the constituents present in the soil and groundwater. Ozone is particularly efficient in breaking the double-bonded carbon bond found in many aromatic hydrocarbon compounds such as benzene, ethylbenzenes, and xylenes.

The oxidation potential of ozone alone is 2.07 volts (V) and is generally sufficient to breakdown aromatic rings. The addition of peroxide is understood to boost the effectiveness of the technology by the creation of hydroxyl radicals. The hydroxyl radical reaction which has a greater oxidation potential of 2.80 V, is understood to be the controlling factor in the elimination of acetone. Therefore, this method of treatment is improved by using hydrogen peroxide (peroxide) in combination with ozone.

In 2008, a pilot test study was conducted from June to September 2008 at SA-5 in support of a CMS. For pilot test purposes, an ISCO remediation system was constructed. The system utilizes three injection well nests to inject the oxidant mixture into the subsurface. Figure 3 shows the layout of SA-5 and location of the injection well nests. Each injection well nest includes a shallow and deep piezometer. The shallow piezometer targets the vadose zone while the deep piezometer targets groundwater. The ozone and peroxide production system consists of an ozone generator, oxygen concentrator, compressed air system, ozone distribution manifold, hydrogen peroxide metering pump and a hydrogen peroxide distribution manifold. All of the equipment was supplied and packaged into a trailer mounted system by the manufacturer. The ozone concentrator feeds the in-situ oxidation sparger (IOS) units via subsurface tubing, which create micro-sized bubbles of air-encapsulated ozone. Peroxide is metered into a separate IOS unit through tubing from the peroxide metering pump and distribution manifold. The system trailer operates on a 220 volt, 100 amp AC power panel and is equipped with a powered ventilation and air conditioned fan to protect equipment from the weather, and maintain the temperature between 40°-90° F and relative humidity below 80%. Further details regarding system components can be found in the CMS Work Plan dated August 2008 which is included in the Administrative Record.

CCP previously constructed the ISCO injection system in limited size on-site for pilot test study purposes. The system was originally designed to be scaled up in size to treat the entire area of SA-5 and site-wide groundwater following the pilot test, but system expansion was determined to be unnecessary based on the results of the pilot test study. Therefore, there are no plans to modify the system or upscale the system from the pilot test scale. At the approval of VDEQ, the system currently remains operational. The results of the pilot test study are included in the Pilot Test Study Report which may be found in the Administrative Record.

4.0 SUMMARY OF HUMAN HEALTH RISK ASSESSMENT

4.1 Human Health Risk Assessment (HHRA) – Procedures Performed

The RFI report for the CCP facility includes an HHRA for each sample area evaluated during the investigation. The facility's future land use evaluation and feasible use of the property in the foreseeable future supported an industrial land use scenario as the reasonable scenario for the quantitative risk assessment. For each of these sample areas, two realistic receptors were identified: Current commercial/industrial workers and future construction worker. In addition, the following hypothetical receptors were identified and evaluated;

- Future Adult Resident;
- Future Child Resident; and
- Child and Adult Banister River Recreators (Sample Area 12 only).

Hypothetical residential receptors were added for the purpose of determining which SWMUs and AOCs could be closed without a land use restriction. Soil sample area analytical results were screened by comparing the maximum detected concentration of each detected constituent to three screening criteria:

- EPA Region 3 Residential risk based concentrations (RBCs) including 400 milligrams per kilogram (mg/kg) for lead; and
- EPA Region 3 Soil-to-Groundwater SSLs with dilution attenuation factor (DAF) of 20.

Constituents detected in soil having a maximum detected concentration greater than either its EPA Region 3 RBC for residential contact including lead or Region 3 SSL were retained for quantitative assessment as a contaminant of potential concern (COPC). Similarly, groundwater samples were screened by comparing the maximum detected concentration of each detected constituent to two screening criteria:

- EPA Region 3 tap water RBCs; and
- EPA Maximum Contaminant Levels (MCLs).

Constituents detected in groundwater having a maximum detected concentration greater than either its Region 3 RBC or MCL were retained for quantitative assessment.

Once the constituents were established for each area, each constituent was assigned an Exposure Point Concentration (EPC) based upon a 95% Upper Confidence Limit (UCL). Procedures for calculating the EPC varied depending on the number of data points and statistical distribution of the results as identified in the RFI. The data were then evaluated based upon constituent specific toxicity criteria and assigned both a hazard quotient for non-carcinogenic effects and risk value for carcinogenic effects. The hazard quotient for the various contaminants was summed within each exposure pathway to form a Hazard Index (HI) representing non-carcinogenic effects. Similarly, the carcinogenic risks were summed within each exposure pathway to calculate a cumulative risk. An HI with a value greater than 1 indicated potential adverse health affects. Lifetime cancer risks were compared to EPA's target risk range of 1E-04 to 1E-06.

A summary of results is provided below. The detailed Human Health Risk Assessment for soil and groundwater is included in the RFI report, which may be found in the Administrative Record.

4.2 HHRA Soil Results Summary

Soil data was evaluated by the Sample Areas established during the VI as follows:

- Sample Area 1 (SA-1) - SWMUs 3, 4, 10A, 12, and 23;
- Sample Area 3 (SA-3) - SWMUs 25, 26, and 27;
- Sample Area 5 (SA-5) - Area of Concern B;
- Sample Area 12 (SA-12) - SWMU-22;
- Sample Area 13 (SA-13) - Area of Concern A; and
- Surface Soil Samples for air deposition.

For the industrial land use scenario carcinogenic risks were within the target risk range for all areas, and the HI was 1 or less for all realistic situations except for a potential construction worker in SA-5, where an HI of 9 was calculated. The primary risk driver for the elevated HI for a construction worker at SA-5 were xylenes, indicating a necessity for active remedial measures. A discussion of remediation standards and clean up targets for soil is included in Section 5.2.

4.3 HHRA Groundwater Results Summary

The original screening results for groundwater data collected from 2003 through 2005 indicated that the following constituents exceeded their MCLs and RBCs and required remediation to meet the most beneficial future use of groundwater as a drinking water resource: Acetone, benzene, ethylbenzene, methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), methylene chloride, styrene, toluene, xylenes, naphthalene, acetophenone, and manganese. Groundwater analytical data collected in 2008 and 2009 indicate that acetone, benzene, ethylbenzene, xylenes, dicyclopentadiene, naphthalene, and manganese exceed their MCLs and RSLs (Figure 5).

5.0 SUMMARY OF SAMPLE AREAS AND REMEDIAL CLEAN UP TARGETS

5.1 Sample Areas That Will Be Addressed By Proposed Remedy

As a result of the environmental investigations, interim measures, and HHRA, No Further Action/Evaluation was required for twenty four (24) of the 33 SWMUs and eight (8) of the 9 AOCs. Based on these conclusions, the following areas of the property will be addressed by the proposed remedy. As previously mentioned, the above SWMUs and AOCs were grouped into Sample Areas during the investigation phases to logistically simplify the investigation activities;

- Sample Area 1 (SA-1) – SWMUs 3, 4, 10A, 12, and 23;
- Sample Area 3 (SA-3) – SWMUs 25, 26, and 27;
- Sample Area 5 (SA-5) – AOC B;
- Sample Area 12 (SA-12) – SWMU 22; and
- Site-Wide Groundwater (downgradient of SA-1 and SA-5).

Based on future land use evaluation, the expected use of this property for the foreseeable future is industrial or commercial. Therefore, of the areas listed above, active remediation of soil and groundwater will occur only at SA-5 and the remaining areas will be addressed by the proposed ICs/ECs including long term groundwater monitoring, land use restrictions, and concrete cap maintenance. Figure 2 shows the areas that will be addressed by the proposed remedy including SA-5. Figure 3 shows the layout of SA-5 and Figure 7 shows the long term groundwater monitoring locations. The proposed remedy for the CCP facility is described in detail below in Section 6.0.

5.2 Remedial Clean Up Targets for SA-5

Based on the HHRA results for soil, xylenes will be remediated at SA-5. In addition to xylenes, acetone, benzene, and ethylbenzene are present, but pose no unacceptable risk to human health for the current and reasonably foreseeable future land use scenarios. However, they are considered for remediation due to their potential for leaching to groundwater. As stated in the CMS, the clean up targets are expressed in short term and long term goals. For xylenes in soil, the short term goal is 2,700 mg/kg which is equal to the industrial EPA Regional Screening Level (RSL)[i] for direct contact. The long term goals are based on calculated, site-specific, soil screening levels (SSLs) for the protection of groundwater utilizing a dilution attenuation factor of 20. The site specific SSL calculations may be found in the Administrative Record. The following is a list of short term and long term clean up targets for constituents in soil.

Constituent	Short Term (HHRA)	Long Term (SSLs)
Acetone	NA	140 mg/kg
Benzene	NA	0.13 mg/kg
Ethylbenzene	NA	48 mg/kg
Xylenes	2,700 mg/kg	604 mg/kg

Notes: NA = Not Applicable

Soil sampling will occur periodically to evaluate remedial effectiveness and to determine if clean up targets for soil have been met. The first remedial effectiveness soil sampling will occur sometime in 2013.

Additionally, based on the HHRA results for groundwater and EPA Region 3 MCLs and RSLs for tap water, acetone, benzene, ethylbenzene, xylenes, and manganese require remediation at SA-5 and areas downgradient. Again, the clean up targets for groundwater are expressed in short term and long term goals. The following is a list of short term and long term clean up targets for constituents in groundwater.

Constituent	Short Term (HHRA)	Long Term (MCL/RSL)
Acetone	NA	22,000 ug/l
Benzene	NA	5 ug/l
Ethylbenzene	NA	700 ug/l
Xylenes	NA	10,000 ug/l
Naphthalene	NA	0.14 ug/l
Dicyclopentadiene	NA	14 ug/l
Manganese	7,210 ug/l*	880 ug/l

Notes: NA = Not Applicable; * = Short term goal for manganese is a calculated EPC

Although concentrations of acetone, benzene, ethylbenzene, xylenes, naphthalene, and dicyclopentadiene in groundwater exceed MCLs and/or tap water RSLs, these constituents have no short term goal derived by the groundwater risk assessment because groundwater at the site is not currently used as drinking water and therefore poses no unacceptable risk. Therefore, long term goals were developed for these constituents including manganese based on the most

[i] In 2008 the EPA replaced the Region 3 RBC table, and similar tables produced by other EPA Regions, with the Regional Screening Level (RSL) Table, which is similarly updated twice per year. So while the HHRA utilized the RBC table for screening levels, future comparisons must be made to the RSLs.

beneficial use of the groundwater, which are drinking water standards (MCLs). For constituents without an applicable MCL, the RSLs for tap water listed in the most current table are used.

6.0 SUMMARY OF PROPOSED REMEDY

Based on the findings set forth in the RFI and CMS reports, VDEQ has determined that past operations at the Facility have resulted in soil and groundwater contamination. The proposed remedy for the Facility emphasizes source control through in-situ chemical oxidation of soil and groundwater as well as maintaining capping of soils with concentrations of contaminants above remedial goals. VDEQ additionally proposes that long term groundwater monitoring be conducted to ensure clean up goals are met and for remedial effectiveness. Finally, VDEQ will require institutional controls be implemented as necessary to prevent current and potential future exposure to contamination. This section details the active remedial measures proposed for SA-5, the proposed long term groundwater monitoring, and the proposed ICs and ECs.

6.1 Active Remedial Measures - SA-5 and Site-Wide Groundwater

The continued operation of the ISCO system in combination with the existing groundwater pump and treat containment system is proposed as the active remedial measure for SA-5 and site-wide groundwater (CMS, Appendix A). A System Operations and Maintenance (O&M) Plan will be developed that specifies system operation and maintenance and describes how remedial effectiveness will be evaluated in support of attaining media clean up targets. A complete description of the ISCO system is provided in Section 3.2.3.

As previously stated, CCP constructed the ISCO injection system on-site in support of a pilot test study and CMS. The system was originally designed to be scaled up in size to treat the entire area of SA-5 and site-wide groundwater, but system expansion was determined to be unnecessary based on the results of the pilot test study. Therefore, there are no plans to modify the system or upscale the system from the pilot test scale. The existing groundwater pump and treat system operated continuously during the pilot test study and its on-going operation is proposed as part of the remedy.

The ISCO system will remain in operation until long term cleanup goals in soil are met or data indicate asymptotic treatment effectiveness. Upon a determination of either, the operation of the ISCO system maybe discontinued. The pump and treat system will remain in operation until the short term cleanup goal for manganese and long term cleanup goals for acetone, benzene, ethylbenzene, and xylenes in groundwater are met, upon which operation of the groundwater pump and treat containment system may be discontinued. Groundwater will continue to be evaluated via long term groundwater monitoring until it is demonstrated that the long term cleanup goals for acetone, benzene, ethylbenzene, xylenes, naphthalene, dicyclopentadiene, and manganese have been met and are being maintained.

6.2 Long Term Groundwater Monitoring

Long term groundwater monitoring is proposed at the Facility in combination with the active remedial measures and ICs/ECs to evaluate remedial effectiveness at and down-gradient of SA-5 and to ensure long term cleanup goals, namely drinking water standards, are met and maintained. A Groundwater Monitoring Plan will be developed in conjunction with the System O&M Plan that specifies the locations, frequency, and types of samples necessary to evaluate remedial effectiveness and whether it is capable of attaining clean up targets. Additionally, this plan will specify reporting periods and endpoints for which groundwater monitoring may be discontinued.

Groundwater monitoring will be conducted down-gradient of SA-1, which includes the capped

soil landfill SWMU 23 and SWMUs 3, 4, 10A, and 12 to ensure continued compliance with MCLs and RSLs until the year 2013. Groundwater from the shallow pumping wells will also be analyzed to monitor hydraulic containment of groundwater within the areas discussed above. Additionally, perched groundwater captured by the tank farm drain system (SWMU 26) at the former process flow-through tank location within SA-3 will be monitored via the tank farm sump (SWMU 27).

Long term groundwater monitoring will continue to be conducted at the Facility until it is demonstrated that long term cleanup goals/drinking water standards are met and maintained. Changes to the long-term groundwater monitoring program may be proposed by the facility based on results from groundwater sampling and will be implemented via the Groundwater Monitoring Plan. Figure 7 is included showing groundwater monitoring locations including the tank farm sump and shallow pumping wells.

6.3 Institutional and Engineering Controls

Institutional and engineering controls will be implemented in order to protect human health and the environment and to maintain the current and future integrity of the remedy. 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 and engineering 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 use of the property for residential purposes (including single family homes, multiple family dwellings, schools, day care facilities, child care centers, apartment buildings, dormitories, other residential style facilities, hospitals, and in-patient health care facilities) within the surveyed footprint of SA-1, SA-3, SA-5, and SA-12;
3) prohibit the use of groundwater beneath the property except for non-contact cooling water and purposes to support selected corrective measures;
4) require inspection and maintenance of the concrete cap over SWMUs 3, 4, 10A, 12, and 23;
5) require vapor barriers be utilized in or beneath new, totally enclosed structures designed for occupation within the foot print of SA-3 and SA-5, unless it's demonstrated to VDEQ that it's not necessary to protect human health.
6) restrict subsurface soil excavation below four feet except in conformance with an appropriate soil management plan; and
7) restrict activities that would interfere with or adversely impact the integrity of the remedy.

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

- A declaration of restrictive covenant or similar instrument consistent with applicable requirements under the laws of the Commonwealth of Virginia will be recorded with the real property records for the Site such that prospective purchasers of the Site will have

constructive notice of land use restrictions. The declaration of restrictive covenants will contain the land use controls described above and will be recorded with the land records in the office of the clerk of the circuit court for the jurisdiction in which the Site is located within ninety (90) days of executing the declaration. The current owner and future owners of the Site will be obligated to comply with the recorded restrictive covenant since the covenant will run with the land;

- 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. The Permit will also be modified, as appropriate, to include land use restrictions as described above; and
- 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 (Pittsylvania County) 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.

6.4 Reporting

CCP will be required to submit annual reports containing, but not be limited to, semi-annual groundwater monitoring data, system O&M data, and evaluation of remedial effectiveness. CCP will also be required to submit a remedy status evaluation report every three (3) years that evaluates the effectiveness of the institutional controls in meeting the human health and environmental protection objectives. This review may include, but not be limited to, review of CCP's compliance with the covenant requirements, 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 CCP is not achieving clean up targets remedial goals, VDEQ may require CCP 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 developed and implemented. In the event that VDEQ requires CCP to perform additional studies and/or to modify the existing 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.

7.0 EVALUATION OF PROPOSED REMEDY

This section provides an evaluation of the proposed remedy using the EPA's RCRA Corrective Action Program criteria. These criteria consist of three threshold criteria and seven balancing criteria.

7.1 Threshold Criteria

7.1.1 Overall Protection of Human Health and the Environment

The completed interim measures and the pilot test of the proposed remedy have already resulted in protection of human health and the environment by significantly reducing constituent concentrations, and will continue to do so under the existing and proposed institutional and engineering controls. As previously mentioned, no adverse ecological impact was identified. Active remediation, groundwater monitoring, and institutional controls will ensure that no adverse impacts from SA-5 will occur and that overall protection of human health and the environment are maintained.

7.1.2 Attainment of Media Cleanup Standards

The active remediation implemented at SA-5 and semi-annual groundwater monitoring indicates that media clean up standards have not yet been attained. The active remedial measures at SA-5 will remain in place until long term cleanup goals for soil are attained. The groundwater pump and treat system will remain in place and operational until long term goals for acetone, benzene, ethylbenzene, and xylenes in groundwater are attained and the short term goal for manganese in groundwater is attained. Long term groundwater monitoring will be conducted until long term cleanup goals, namely drinking water standards, are attained. The completion of soil sampling for remedial effectiveness at SA-5 is expected to occur no later than the year 2013. The attainment of short term and long term cleanup goals for soil and groundwater will be based on the results of the soil sampling and long term semi-annual groundwater monitoring. These results will be reported to VDEQ annually and a remedy status evaluation will be conducted every three years.

7.1.3 Source Removal

With the exception of SA-5, all known sources of contamination have been removed from the site by excavation and consolidated in the concrete capped soil landfill. Active remediation of soil and groundwater at SA-5 is being conducted via ISCO utilizing ozone and peroxide injection to reduce or eliminate contaminant mass. Groundwater is actively being recovered and treated mainly for hydraulic containment of the groundwater on-site, but also as a remedial measure. Contaminant mass in soil at SA-5 was not estimated during the design phase of the remedial measure. The ISCO system was originally constructed on a pilot scale, but designed for expansion based on the results of the pilot test scale operation. Based on those results of the post pilot test soil and site wide groundwater sampling, expansion is determined unnecessary. Therefore, attainment of media cleanup goals will be based on future sample results.

7.2 Balancing Criteria

7.2.1 Long-Term Reliability and Effectiveness

Active remediation of soil and groundwater at SA-5, groundwater pump and treat operations, long term groundwater monitoring, and institutional controls are required. The long-term reliability and effectiveness will be ensured through the use of the facility's current Hazardous Waste Management Permit for Site-Wide Corrective Action and layering of institutional controls that will be implemented by deed notice and environmental covenants.

7.2.2 Reduction of Waste Toxicity, Mobility or Volume

All known wastes have been removed and disposed of off-site or consolidated in the concrete capped soil landfill, and measures have been put in place to be protective of human health and

the environment, leaving the majority of the site suitable for industrial use. Active remediation is currently underway at SA-5 and upon attaining short term clean up goals for soil the entire facility will be suitable for industrial use. However, future removal actions must be considered to return the entire site to unrestricted use.

7.2.3 Short-Term Effectiveness

Active remediation at SA-5, groundwater pump and treat operations, engineering controls, and groundwater monitoring are already in place.

7.2.4 Implementability

The proposed remedy is anticipated to be fully implementable with readily available methods. No regulatory hurdles are anticipated for continued implementation.

7.2.5 Cost

The proposed remedy represents a good balance between cost and risk reduction. CCP has already expended costs for source removal, engineering controls, and monitoring. Additionally, CCP has expended approximately $228,000 in capital costs related to active remediation. The anticipated annual cost of the remedy including operation and maintenance (O&M) of the ISCO system and groundwater pump and treat system, ongoing monitoring, and maintenance of the institutional/engineering controls are estimated at approximately $71,800 per year based on the cost estimate provided in Tables 3, 4, and 5 in the CMS.

7.2.6 Community Acceptance

Community acceptance of the proposed remedy will be determined based on comments from the public. CCP presently and has in the past updated the community via semi-annual town hall style community advisory meetings. The modification of CCP's Hazardous Waste Management Permit for Site-Wide Corrective Action, incorporating the remedy decision, will undergo public comment and a public meeting will be conduct. Additional details about public participation are provided in Section 9.0 below.

8.0 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 a cost estimate for completing the approved remedy(ies). The estimate may be based on the Corrective Measure Study, the approved remedy(ies), or any other available information. The cost estimate for completing the approved remedy(ies) shall be updated pursuant to the development of more detailed information (e.g., Corrective Measure Design or Implementation) and any modifications to the approved remedy(ies).

Within thirty (30) calendar days of approval of the cost estimate for financial assurance, the Permittee shall demonstrate compliance with financial assurance to the Department for completing the approved remedies in accordance with 40 CFR § 264.101(b). Within thirty (30) calendar days of 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, groundwater

monitoring, and institutional/engineering controls during the Corrective Measures Implementation (CMI) period.

9.0 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 Mr. Brett Fisher at the address below:

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629 East Main Street
P.O. Box 1105
Richmond, VA 23218
Contact: Mr. Brett Fisher
Phone: (804) 698 - 4219
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