INTERIM RECORD OF DECISION

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

OPERABLE UNIT 3

ANNISTON PCB SITE

ANNISTON, CALHOUN COUNTY, ALABAMA

PREPARED BY

U. S. ENVIRONMENTAL PROTECTION AGENCY

REGION 4

ATLANTA, GEORGIA

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PART 1: THE DECLARATION FOR THE INTERIM RECORD OF DECISION

1. SITE NAME AND LOCATION

The Anniston PCB Site (Site) is located in and around Anniston, Calhoun County, Alabama. The Site is being addressed as a Superfund Alternative Site (SAS). An SAS site is a site that requires long-term response, remedial action, and where site contaminants are significant enough that the site is eligible for, but not listed on, the National Priorities List (NPL). Superfund Alternative Sites must also have financially viable and capable potentially responsible parties that are willing to perform the cleanup work under a settlement agreement with the U.S. Environmental Protection Agency (EPA). The Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) identification number for the Site is ALD 000400123.

The Site is currently divided into three operable units (OUs). OU1/OU2 is a combination of what was originally two OUs representing residential properties (OU1) and non-residential properties (OU2) around the facility currently owned by Solutia Inc. (Solutia), and downstream along Snow Creek to Highway 78. OU3 is Solutia's Anniston Facility (Facility) and its adjacent closed landfills, the South Landfill and the West End Landfill. OU4 is Choccolocco Creek and its floodplains, from its confluence with Snow Creek up to Highway 78, to its discharge at the embayment of Lake Logan Martin on the Coosa River. All operable units are being investigated concurrently.

2. STATEMENT OF BASIS AND PURPOSE

This decision document, or Interim Record of Decision (IROD), presents the Interim Selected Remedy (or Selected Remedy) for OU3 of the Anniston PCB Site, in Anniston, Alabama, and was developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 U.S.C. § 9601 et seq., and, to the extent practicable, the National Contingency Plan (NCP), 40 CFR Part 300. This decision is based on the administrative record for the Site.

The State of Alabama, as represented by the Alabama Department of Environmental Management (ADEM), has received the reports which are included in the Administrative Record for the Site. In accordance with 40 C.F.R. § 300.430, the EPA sought input from ADEM during the remedial selection process. The EPA does not expect ADEM to provide any input about this Selected Remedy.

3. ASSESSMENT OF THE SITE

The response action selected in this IROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances from OU3 of the Anniston PCB Site into the environment.

4. DESCRIPTION OF THE SELECTED REMEDY

This interim action is the first remedial action selected for the Anniston PCB Site. OU3 is considered the original source of contamination for the Site and thus is being addressed first. The Selected Remedy includes Alternative S-D (Soil Capping), combined with Alternative GW-C (Expanded Groundwater Extraction and MNA). The Selected Remedy incorporates as CERCLA remedies all of the interim and final corrective measures implemented at OU3 by Solutia and its predecessors under ADEM's RCRA oversight, as well as any interim measures implemented by Solutia under the EPA's CERCLA oversight, prior to issuance of this IROD.

In addition, the following components are required (areas and wells listed below are depicted on Figure 8-1 in the Decision Summary) by this Selected Remedy:

- Install a new, RCRA Subtitle C-compliant cap over the Cells 1E, 2E, and 3E of the South Landfill;
- Install a cap over impacted soils in Areas A and E to eliminate dermal contact, minimize potential soil leaching to groundwater, prevent erosion, and direct storm water away from the impacted area;
- Install a cap over impacted soils in Areas C and D to eliminate dermal contact exposure, prevent erosion, and direct storm water away from the impacted area;
- Enhance institutional controls with a "no dig policy" restricting excavations within the Facility (particularly in Area F);
- Install perimeter fencing in the northeast portion of the Facility and along the southern portion of the employee parking lot.
- Verify with confirmation samples that the principal threat waste under cover in Area B has been removed;
- Verify with subsurface soil and/or groundwater confirmation samples that there are no groundwater impacts in Areas B, F, and G;
- Verify with confirmation samples that the PCB remedial goal is protective for dioxin toxic equivalency (TEQ) where dioxin TEQ includes dioxin-like PCBs, PCDDs and PCDFs;
- Execute and record (by Solutia) an environmental covenant with ADEM to restrict land and groundwater use in the OU3 area and the North Side and East Side Properties (in the vicinity of monitoring wells OW-21A and OW-10);
- Monitor select wells for natural attenuation parameters to demonstrate continued natural attenuation of PNP and parathion;
- Optimize and expand the existing groundwater corrective action system to provide further containment of groundwater near OW-21A and Area A (OW-10/OW-11);
- Pre-treat extracted groundwater using a carbon filtration system;
- After filtration, allow the water to flow to the on-Site equalization basin for discharge to the Anniston POTW for further treatment; and
- Provide operation, monitoring, and maintenance of soil ICMs, caps, groundwater corrective action system, carbon filtration system, and institutional controls to ensure continued long-term effectiveness of the remedy.

This combination of actions will protect human health and the environment in the short term, while moving towards restoration of groundwater to beneficial use (*i.e.*, attainment of drinking water standards), without interfering with operations at the Facility. A final remedy will be selected once confirmation sampling described above has been completed and groundwater data and modeling demonstrate that restoration is achievable.

5. STATUTORY DETERMINATIONS

This Selected Remedy is protective of human health and the environment in the short term and is intended to provide adequate protection until a final ROD is signed; complies with (or waives) federal and state requirements that are legally applicable or relevant and appropriate to the this limited-scope action; and is cost-effective. This action is an interim solution only, and is not intended to utilize permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable for OU3. Because this action does not constitute the final remedy for OU3, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed by the final response action. Subsequent actions are planned to address fully the threats posed by conditions at OU3.

Because this Selected Remedy will result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment. Because this is an IROD, review of this OU will be ongoing as the EPA continues to evaluate the performance of the Selected Remedy.

6. ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this IROD. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of concern and their respective concentrations (Section 7.2, page 59).
- Baseline risk represented by the chemicals of concern (Section 7.5, page 79).
- Cleanup levels established for chemicals of concern and the basis for these levels (Section 12.4, page 137).
- How source materials constituting principal threats are addressed (Section 11, page 129).
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and IROD (Section 6, page 58).
- Potential land and ground-water use that will be available at the Site as a result of the Selected Remedy (Section 12.4, page 135).
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 12.3, page 133).
- Key factors that led to selecting the remedy (Section 12.1, page 130).

7. AUTHORIZING SIGNATURE

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Superfund Division
U.S. Environmental Protection Agency, Region 4

9/29/2011
Date

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PART 2: DECISION SUMMARY

1.0 SITE NAME, LOCATION, AND DESCRIPTION

This Decision Summary provides a description of the site-specific factors and analyses that led to the selection of the interim action for OU3 of the Anniston PCB Site (Site). The Site consists of residential, commercial/industrial, and public properties located in and around Anniston, Calhoun County, Alabama, which contain hazardous substances, including but not limited to polychlorinated biphenyls (PCBs). The Site is located in the north-central part of Alabama (Figure 1-1). The Site is considered to be a Superfund Alternative Site (SAS). An SAS site is a site that requires long-term response, remedial action, and where site contaminants are significant enough that the site is eligible for, but not listed on, the National Priorities List (NPL). Superfund Alternative Sites must also have financially viable and capable potentially responsible parties (PRPs) that are willing to perform the cleanup work under a settlement agreement with the U.S. Environmental Protection Agency (EPA). At this Site, the EPA is the lead agency, and the Alabama Department of Environmental Management (ADEM) is the support agency. The EPA anticipates entering into a Consent Decree with the PRPs, Solutia Inc. (Solutia) and Pharmacia Corporation (Pharmacia), for performance of the selected remedy. The Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) identification number for the Site is ALD 000400123.

The Site has been divided into three operable units (OUs), which were selected based on geographic location and complexity (Figure 1-2). OU1/OU2 is a combination of what was originally two OUs representing residential properties (OU1) and non-residential properties (OU2) around the facility currently owned by Solutia, and downstream along Snow Creek to Highway 78. OU3 is Solutia's Anniston Facility (Facility) and its adjacent closed landfills, the South Landfill and the West End Landfill. OU4 includes Snow Creek and its floodplain downstream of Highway 78 to the confluence of Snow and Choccolocco Creeks and Choccolocco Creek from the backwater area upstream of Snow Creek to the embayment of Lake Logan Martin on the Coosa River. All operable units are being investigated concurrently. When the remedial investigation for OU4 is complete, the EPA will consider whether an additional downstream investigation of the Coosa River System is warranted.

OU3 covers approximately 138 acres (Figure 1-3) and is located about one mile west of downtown Anniston, Alabama. The Facility Area is approximately 68 acres in size and is bounded to the north by the Norfolk Southern and Erie railroads, to the east by Clydesdale Avenue, to the west by the West End Landfill and an Alabama Power Company substation and to the south by Highway 202. Solutia's predecessors produced PCBs at the Facility from 1929 until 1971. Solutia currently produces polyphenyl compounds and phosphate ester-based non-flammable hydraulic fluids at the plant. During its operational history, the Facility disposed of hazardous and non-hazardous waste at two adjacent areas, the closed West End Landfill and the closed South Landfill, which are located to the west and south of the Facility, respectively.

FIGURE 1-1: SITE LOCATION MAP

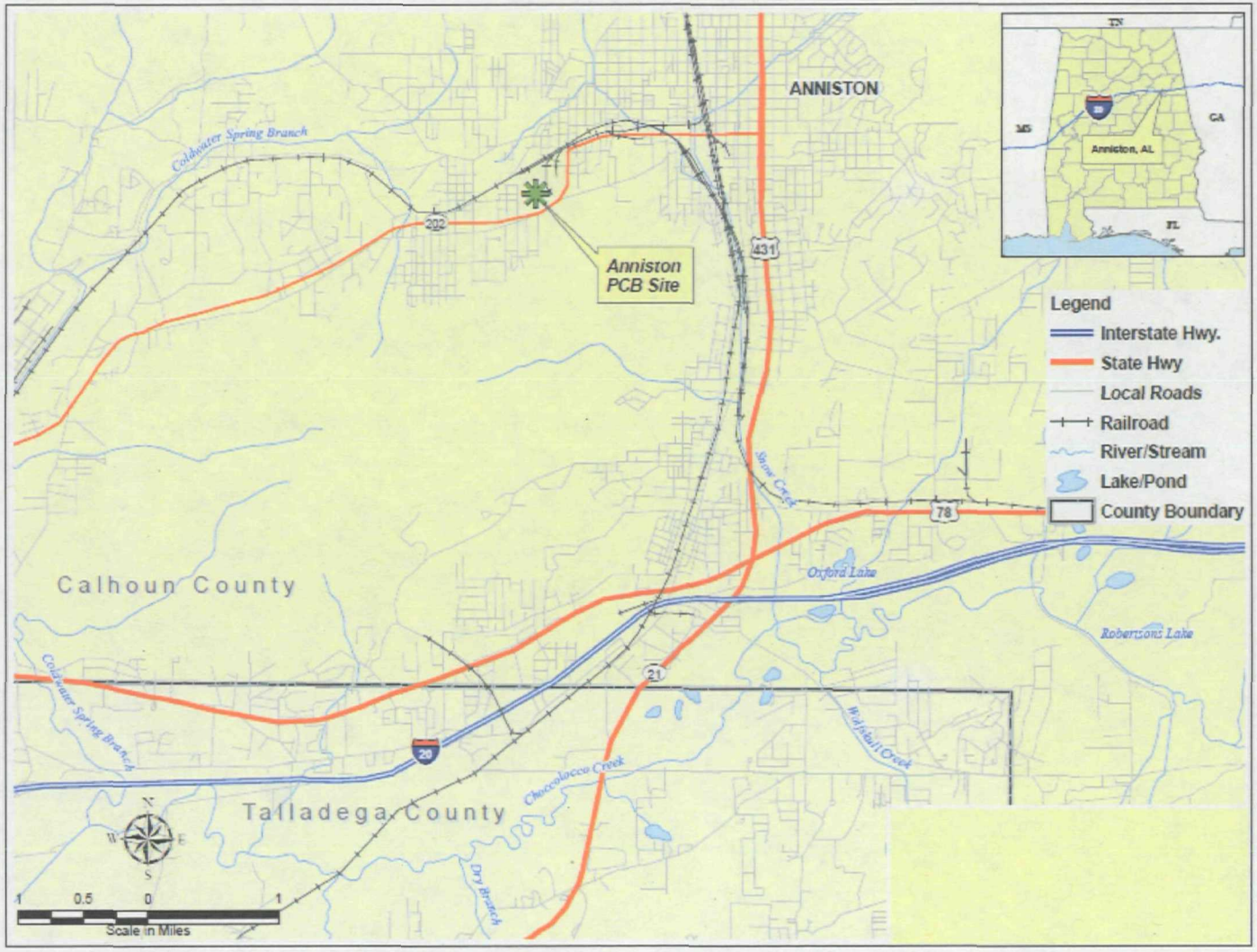


FIGURE 1-2: OPERABLE UNITS

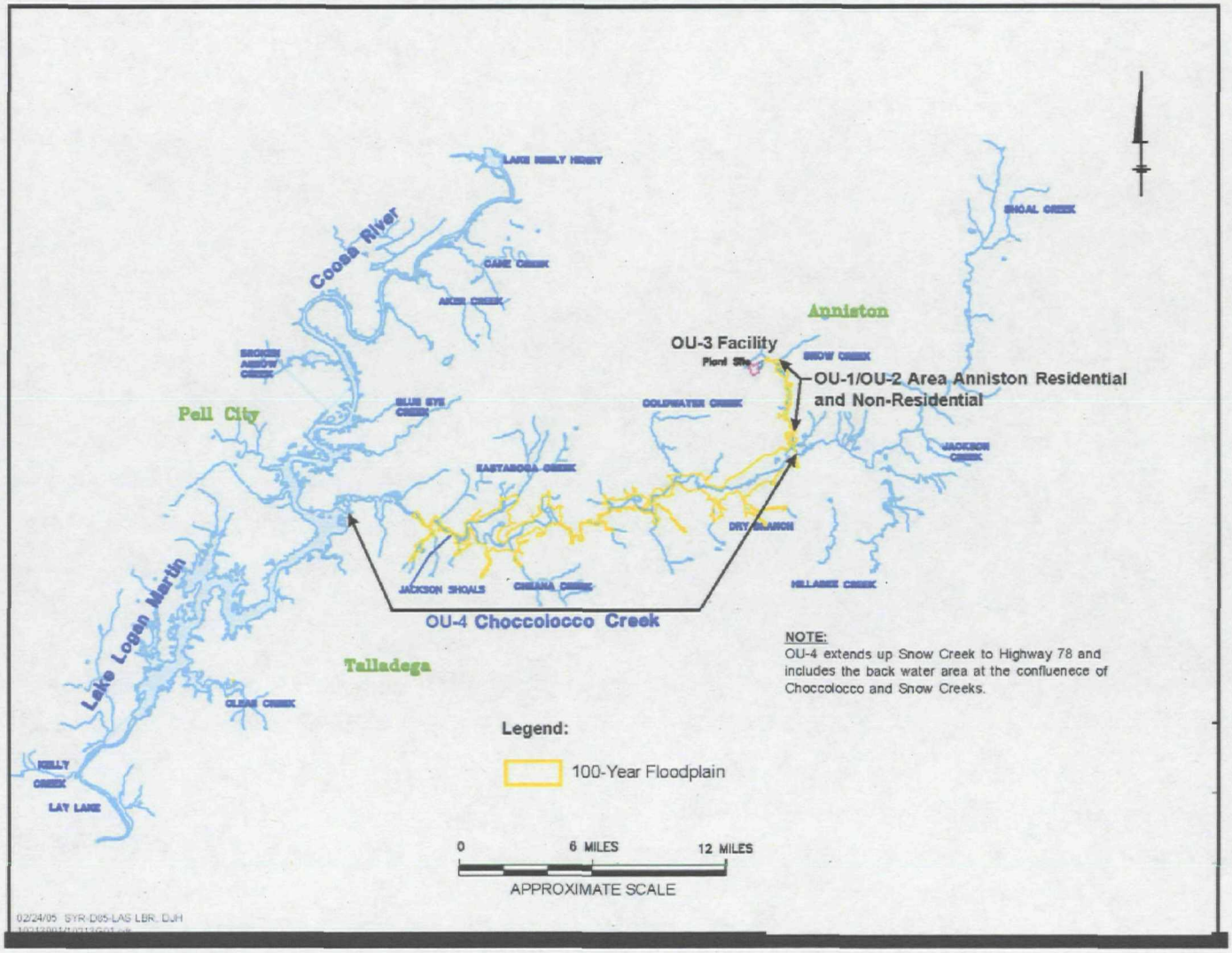
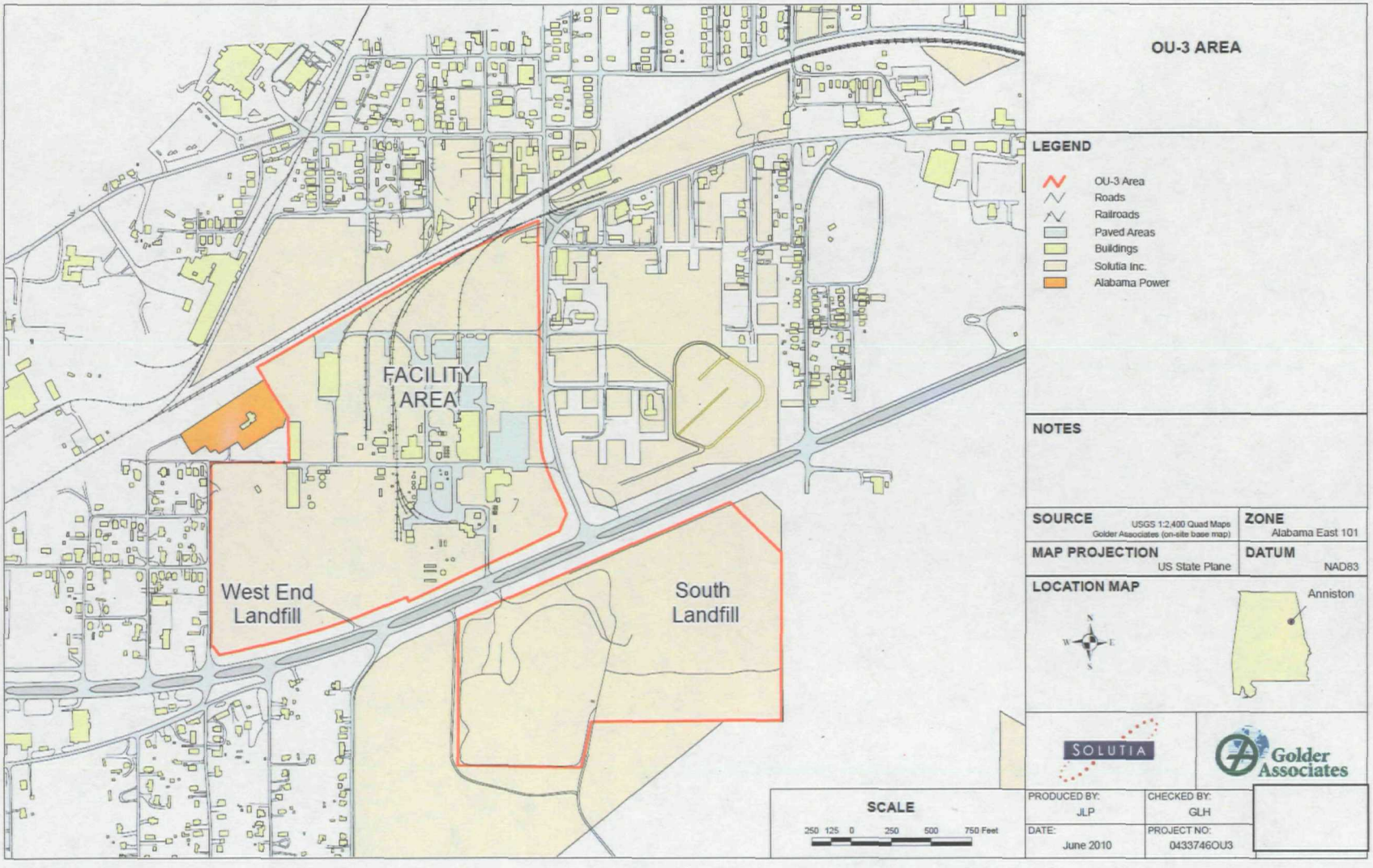


FIGURE 1-3: OPERABLE UNIT 3 SITE PLAN



Surface water containing PCBs discharged from the Facility and landfills to a ditch which flowed into local and downstream waterways. Sampling by the EPA, Solutia, ADEM, and other parties has demonstrated that sediments in waterways leading away from the area, as well as, soils in the floodplains of these waterways, contain varying levels of PCBs and other contaminants.

Distribution of PCBs may have also occurred through the air pathway and through the excavation of contaminated soil for use as fill. For that reason, PCBs may also be located outside of the floodplains. Although PCBs have been identified as the focus of this investigation, a small number of samples were collected and analyzed for a wide range of contaminants to ensure that all hazards associated with the Site are understood and addressed by this action.

This Decision Summary is only for OU3, which consists of the Facility and adjacent, closed South and West End Landfills. A final decision document will be prepared for OU3, and additional decision documents will be prepared for OU1/OU2 and OU4. The Decision Summary includes background information about OU3, the nature and extent of contamination found at OU3, the assessment of human health and environmental risks posed by contaminants in OU3, and the identification and evaluation of remedial action alternatives for OU3.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 Manufacturing History

The Facility is currently active and operates in accordance with a variety of environmental permits. Manufacturing operations began at the Facility in 1917 with the production of ferro-manganese, ferro-silicon, and ferro-phosphorus compounds, and later phosphoric acid by the Southern Manganese Corporation. In 1927, the production of organic chemicals began with the introduction of biphenyl, which remains a major product of the Facility. PCB production began in 1929. In 1930, Southern Manganese Corporation became Swann Chemical Company. Monsanto Chemical Company purchased Swan Chemical Company in 1935. Monsanto Chemical Company created Solutia as a separate company in 1997.

A variety of organic and inorganic chemicals have been produced at the Facility during its history, including PCBs, parathion, phosphorus pentasulfide, and 4-nitrophenol (also known as para-nitrophenol, or PNP). The Facility currently manufactures polyphenyl compounds (utilized in a variety of heat transfer fluid, plasticizer, and lubricant applications). These compounds have been produced for many years using the same raw materials and intermediates, even though there have been several expansions and process modifications. In addition, the manufacture of phosphate ester-based non-flammable hydraulic fluids commenced at the Facility in 2006. A summary description of the various manufacturing and associated support processes is provided below.

- Polyphenyl Production (1927 to Present) - Polyphenyls are manufactured from benzene and cumene (isopropyl benzene) in a continuous pyrolysis unit. The crude product is separated into various polyphenyl products including Santotar®.

- PNP Production (1965 to 2004) - PNP (4-nitrophenol) was manufactured by the hydrolysis of para-nitrochlorobenzene (PNCB). PNCB and sodium hydroxide were reacted and acidified with sulfuric acid before the product was filtered and dried.

- Therminol Production (1983 to Present) - Therminol is produced from polyethylbenzene. Distillation residues (Therminol® ends) are managed in a totally enclosed treatment facility. The ends are blended with Santotar® and burned as a non-hazardous back-up fuel in the plant boiler.

- Parathion and Methyl Parathion Production (1957 to 1986) - Parathion (or Niran®) and methyl parathion were produced on a seasonal basis. These materials were produced by reacting ethanol or methanol with phosphorus pentasulfide to form 'thio acid.' The thio acid was stripped, chlorinated and then distilled to produce an intermediate. The intermediate was either sold or reacted with acetone, PNP, and soda ash to produce crude parathion. Wet acetone from the operation was recovered in a solvent recovery system. The residue from the distillation of the chlorinated thio acid was recycled to a crystallizer. The filtrate was returned to the parathion process, and sulfur waste was returned to the production process or landfilled.

- Phosphorus Pentasulfide Production (1967 to 1988) - Phosphorus pentasulfide (P2S5) was produced by reacting elemental sulfur and phosphorus. The resulting phosphorus pentasulfide was drummed for sale or used in the parathion process.

- PCB Production (late 1929 to 1971) - The Facility manufactured Aroclor (PCBs) by reacting chlorine and biphenyl. Chlorine was produced at the Facility between 1952 and 1969 solely for this purpose. The manufacture of PCBs generated miscellaneous production-related wastes which were disposed in the West End Landfill prior to 1960 and in the South Landfill after 1960. The manufacture of PCBs ceased in 1971, and the associated production facilities were dismantled in 1972. Decommissioning included the removal of buildings and plant production equipment. Waste materials generated during these activities were placed into the South Landfill.

- Hydraulic Fluid Manufacturing (2006 to Present) – Various phosphate ester compounds (*e.g.,* butyl and phenyl phosphates) are processed to produce non-flammable hydraulic fluids, primarily for use in aviation hydraulic systems. Facility operations are limited to the processing of base raw materials and packaging, and no actual production of the base stock materials occurs.

2.2 Regulatory History

The Facility is currently operated in accordance with a variety of permits issued under provisions of the Clean Air Act (CAA), Clean Water Act (CWA), RCRA, and their state counterparts. There have been a number of investigations and corrective measures taken over the years to reduce environmental impacts from the Facility. The regulatory history of the Site is described below.

The Facility previously operated two hazardous waste management areas, or WMAs. These WMAs were closed in compliance with provisions contained in the Facility operating permit issued under the Alabama Hazardous Waste Management and Minimization Act (AHWMMA) and RCRA. In 1991, a RCRA Facility Assessment (RFA) was conducted by the EPA to identify additional solid waste management units (SWMUs) at the Facility that might be subject to potential corrective action. In December 1994, and as amended in July 1995 and May 1996, the Facility applied for the re-issuance, with modifications, of its AHWMMA Permit.

In October 1996, ADEM issued a Draft Hazardous Waste Post-Closure Permit (RCRA Permit) to regulate the Facility's post closure responsibilities for WMA I and WMA II and to address corrective action for SWMUs and potential areas of concern located both on and off the Facility. The RCRA Permit was finalized and issued on January 7, 1997 (No. ALD004019048) and subsequently modified on November 13, 1997, May 3, 2001, December 11, 2003, May 5, 2006, and October 31, 2008.

On April 5, 1995, the Facility entered into a Consent Order with ADEM to develop and implement a sampling plan for sediments in the storm water drainage system. Sediment samples

were collected throughout the reach of the drainage ditches and soil samples were collected extending outward on both sides of the ditches on the Facility's property and related areas. PCBs were reported at varying concentrations in the sediments of drainage ditches that flow from the area of the closed South Landfill and from the production area to an area east of the manufacturing area. PCBs were also reported at various concentrations in soil samples outside of the drainage ditches, but within areas flooded by the drainage ditches during heavy rains.

On March 8, 1996, the Facility entered into a second Consent Order with ADEM that expanded and defined the scope of the ongoing investigation and corrective measure activities close to the Facility. Under this Consent Order, four additional areas were sampled for the presence of PCBs, and other areas potentially affected by PCBs were identified and sampled. The Facility's obligations under the terms of both Consent Orders have been completed, and results of these activities have been reported to ADEM. These results confirm that PCBs released from the Facility are detected in areas adjacent to drainage ditches and in areas affected by storm water flooding from these ditches. The drainage ditches in which PCBs have been detected ultimately flow toward the 11th Street Ditch joining Snow Creek just south of West 11th Street.

Investigation and removal work were also conducted in the vicinity of the Facility under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The EPA notified Solutia and Pharmacia of their potential CERCLA liability in a General Notice letter dated August 31, 2000. Solutia and Pharmacia agreed to enter into negotiations for an Administrative Order on Consent (Removal Order) on September 12, 2000, for cleanup of certain residential properties. The Removal Order became effective October 27, 2000. In correspondence dated January 22, 2001, the EPA sought to add removal actions to address both PCB-contaminated soils distributed from the Quintard Mall and PCB-contaminated soil found at the Oxford Lake Softball Complex to the Removal Order. On October 5, 2001, the previous Removal Order was rescinded and replaced by a new order (2001 Removal Order). In additional to sampling and cleanup of residential properties, the 2001 Removal Order required a removal response for a portion of the 11th Street Ditch, sampling of a portion of the West 9th Street Creek, and a removal response at off-Facility areas related to activities previously completed at Quintard Mall and the Oxford Lake Softball Complex.

In January 2001, the EPA requested that its Environmental Response Team Center (ERT) utilize the Response Engineering and Analytical Contract (REAC) as a third party to conduct an independent evaluation of Solutia's Anniston Facility and adjacent landfills. The study objective was to assess the completeness of the investigative and remedial work performed to-date and to evaluate the potential for on-going releases of PCBs from the Facility and landfills through various environmental pathways. These pathways include soil, groundwater, surface water, sediment, and air. REAC performed a site reconnaissance, reviewed available technical reports and project files at the EPA and ADEM offices, and interviewed key project personnel to gather information for this evaluation. The evaluation resulted in a list of 18 specific recommendations documented in a May 2001 Report, commonly referred to as the ERT Report. The ERT Report was forwarded to ADEM and Solutia for implementation.

The EPA invited Solutia and Pharmacia to begin negotiations to conduct a CERCLA Remedial

Investigation/Feasibility Study (RI/FS) for the Site on January 2, 2001, and issued Special Notice Letters on November 19, 2001. After completing negotiations, the United States lodged the draft Partial Consent Decree (PCD) with the United States District Court for the Northern District of Alabama on March 25, 2002. The United States held a public comment period for the draft PCD from April 4, 2002 to June 3, 2002. During this time, the United States received over 370 public comments on the PCD, and after considering the comments, revised the PCD. On October 18, 2002, the United States lodged the Revised PCD with the court. After several hearings, the court entered the Revised PCD on August 4, 2003.

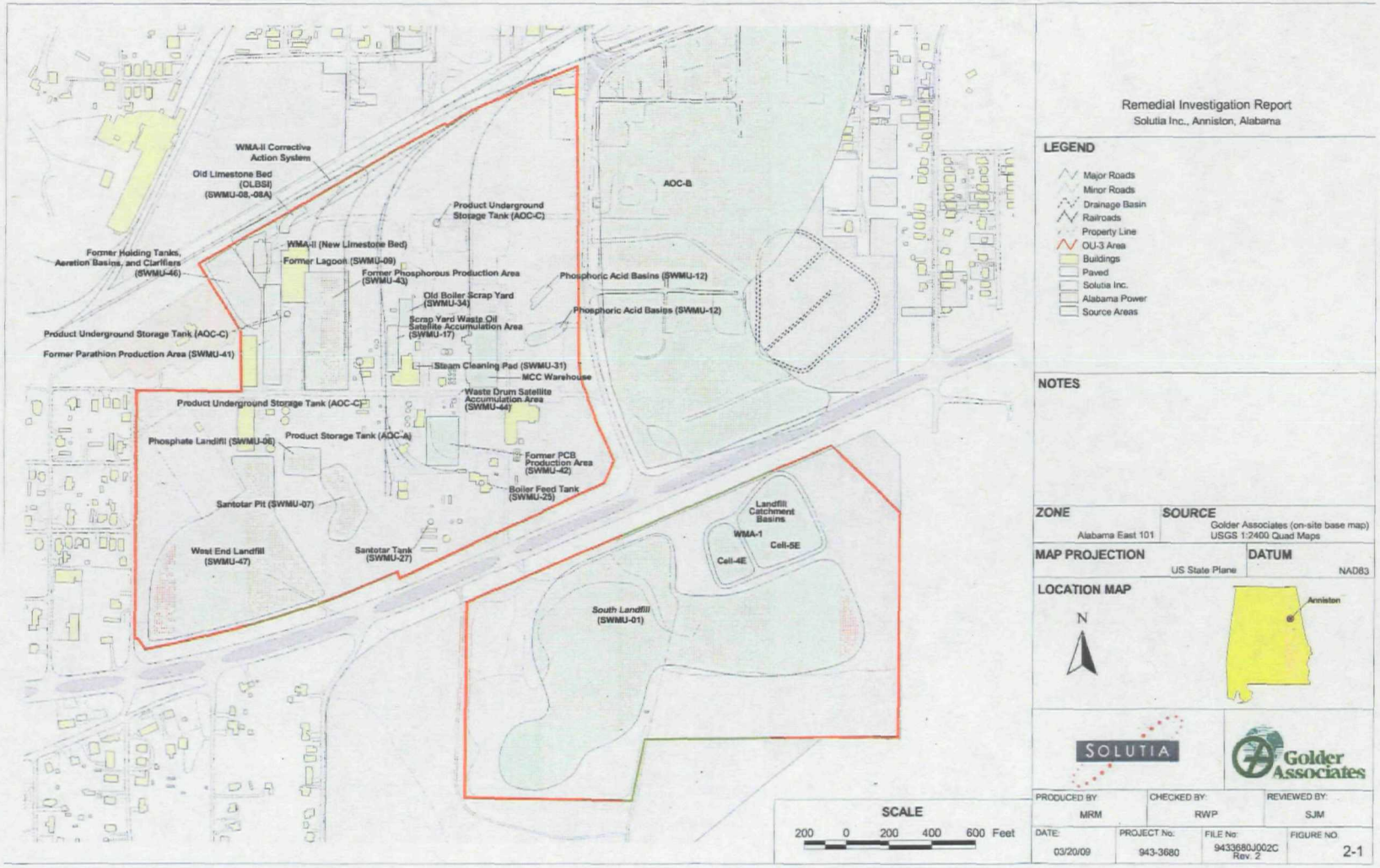
When the PCD was entered by the court, the Site, including the Facility, became subject to both RCRA and CERCLA authority. Although the 18 recommendations from the ERT report were not specifically mentioned in the RI/FS Agreement or the RI/FS SOW, the EPA expressed its intent to implement the recommendations in the ERT Report during its execution of the RI/FS to both the district court and in testimony before the U.S. Congress. A description of how the 18 ERT recommendations were considered and implemented is available in Appendix A to this Record of Decision.

In December 2005, Solutia and Pharmacia began slowing the pace of their cleanup under the PCD, in response to an Administrative Agreement and Order on Consent for Removal Action between the EPA and eleven industrial parties with respect to the Anniston Lead Site. As a result, the EPA assessed stipulated penalties, and in a letter dated December 29, 2005, the EPA demanded the payment of those stipulated penalties from Solutia and Pharmacia. Between January and July 2006, with the assistance of the court-appointed Special Masters, the United States and Solutia and Pharmacia negotiated an agreement resolving issues between the EPA and Solutia and Pharmacia. On July 6, 2006, the United States and Solutia and Pharmacia entered into a Stipulation and Agreement Clarifying the Partial Consent Decree (Stipulation), whereby Solutia and Pharmacia agreed to, among other things, waive their right to suspend work under the PCD.

2.3 RCRA Deferral to CERCLA

Under the most recent RCRA Post-Closure Permit (RCRA Permit), dated October 31, 2008, ADEM retained regulatory authority over the post-closure care for WMA-I (South Landfill Cells 4E and 5E) and WMA-II (Old Limestone Bed Surface Impoundment (OLBSI)); groundwater monitoring and detection monitoring program for WMA-I; and the corrective action monitoring program for WMA-II. In the RCRA Permit, ADEM deferred 19 SWMUs and two areas of contamination (AOCs) for investigation and assessment of long-term protection of human health and the environment to the EPA under CERCLA. ADEM also determined that no further action was required for 28 SWMUs, as documented in the RCRA Permit. Under CERCLA, the entire Facility, including the units remaining under RCRA regulatory authority, were evaluated to determine what additional measures are necessary to protect human health and the environment. The SWMUs, AOCs, and WMAs identified under RCRA at the Facility are described below, and the most significant are presented on Figure 2-1.

FIGURE 2-1: RCRA SWMUs, AOCs, AND WMAs



- **Closed South Landfill (SWMU-1 and WMA-I)** – This unit is a landfill that contains two RCRA-regulated cells (Cells 4E and 5E), collectively referred to as WMA-I, and eight unregulated cells. This unit was closed as a landfill. Groundwater from this unit is currently being managed by the SWMU-1 Corrective Action System. Post-closure monitoring is performed for WMA-I under the RCRA Permit. The two cells designated as WMA-I were closed with a RCRA-compliant cap in 1989. From the bottom up, the RCRA-compliant cap consists of a 24-inch thick compacted clay base, a 12-inch thick sand drainage layer, a geotextile fabric layer, and a 24-inch thick soil cover layer with vegetation.

  In 1997 and 1998, additional interim measures were implemented for the closed South Landfill to reduce infiltration into the landfill and prevent the transport of affected soils. The upgraded portions of the cap on the western cells of the closed South Landfill consists of a six-inch soil layer, a 40-mil thick textured high density polyethylene (HDPE) geomembrane, a geocomposite drainage layer, an 18-inch thick soil cover layer, and a six-inch thick topsoil layer with vegetative cover. Additionally, a 12-inch thick soil cover and vegetative layer were placed above a non-woven geotextile layer over areas adjacent to the closed South Landfill. A retention structure to collect stormwater run-off from the closed South Landfill was constructed. Diversion of stormwater run-on from unaffected areas upstream of the closed South Landfill, and installation of culverts to pass this stormwater through areas of affected soils prior to discharging off of the Facility. This allowed for the closure of ditches containing affected sediments.

  One of the areas where stormwater passed through from the South Landfill is now called the "Walking Trail Area." In May 1995, prior to the placement of a geotextile and soil cover, soil and sediment samples were collected from the Walking Trail Area located in what is now the southeast corner of the Facility. The samples were field screened for PCBs, and approximately 10% of the field samples were submitted for laboratory analysis of PCBs. Of the samples collected, nine soil and eight sediment samples exceeded the screening level of 10 milligrams per kilogram (mg/kg). Laboratory concentrations ranged from 6.1 mg/kg to 157 mg/kg.

  ADEM deferred the oversight of further action for SWMU-1 to the EPA under the CERCLA Program. RCRA retained authority over post-closure care for WMA-I and the groundwater detection system associated with WMA-I. RCRA also required continuing operation of the SWMU-1 Corrective Action System.

- **Landfill Catchment Basins (SWMU-2)** – These former units captured stormwater run-off from WMA-I and were closed as part of the WMA-I closure. They were located at the north end of the cells. The landfill catch basins were also covered with a clay cap and vegetated. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Western Landfill Corrective Action System (SWMU-3)** – This unit is a groundwater corrective action system for the closed South Landfill. Interceptor wells IW-1, IW-2,

IW-3, and IW-4 were installed in 1982 to intercept and recover shallow groundwater from the western side of the subsequently closed South Landfill. In 1998, interceptor wells IW-1, IW-3, and IW-4 were deactivated due to lack of contamination or lack of water. The wells are not in use, but the wells are still maintained. This unit is still operating as part of the SWMU-1 Corrective Action System.

- **Leachate Storage Tank (SWMU-4)** – This former aboveground storage tank was located on the western edge of the closed South Landfill. The 1,000-gallon steel tank was mounted within a steel frame located on a concrete pad. The tank was used to store leachate from a portion of WMA-I and extracted groundwater from the Western Landfill Corrective Action System. It was removed in 1996. The area where it was located is under cap and cover materials. No further action was required for this unit under RCRA.

- **North Landfill Corrective Action System (SWMU-5)** – This unit is a groundwater corrective action system for the closed South Landfill. Interceptor wells IW-5 and IW-6 were installed later in 1982, and IW-7, IW-8, IW-9, IW-10, IW-11, IW-12, and IW-13 were installed from late 1987 through early 1988. These wells were installed to intercept and recover groundwater along the northern side of the landfill. This unit is now part of the SWMU-1 Corrective Action System.

- **Phosphate Landfill (SWMU-6)** – This unit is more accurately described as a staging area for phosphate slag and tailings being transported to the landfills. This area was also used as a neutralization pit, which provided pre-treatment of acidic scrubber water from the parathion furnace area prior to discharging to the Phosphoric Acid Basin (SWMU-12). A two- to eight-inch thick gravel cover was installed in this area in the early 1980s. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Santotar® Pit (SWMU-7)** – This unit managed Santotar®. Santotar® (*i.e.*, the still bottoms generated during the production of Santowax) consists of high molecular weight polyphenyls and has the consistency of asphalt. Santotar® does not contain residual benzene and consists of mostly carbon and hydrogen. The unit was excavated 12 to 16 feet below existing ground surface, backfilled to grade with clay, and capped with a seven- to 12-inch gravel cover. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Old Limestone Bed Surface Impoundment (SWMU-8)** – This SWMU, managed wastes from the PNP and parathion processes. The Old Limestone Bed Surface Impoundment (OLBSI) was excavated and backfilled to grade with clay and a gravel and asphalt cover was installed. The unit was closed as a landfill with ADEM-approved closure and post-closure monitoring plans in 1984 and 1985. Portions of the cover have been replaced with concrete. Groundwater from this unit is currently being managed by the WMA-II Corrective Action System. Located on the northeast side of the impoundment was the Old Limestone Bed Storage Pad (SWMU-8A). The concrete pad measured 30 feet by 70 feet and was used to store potentially contaminated piping and

equipment from dismantled production areas and empty drums prior to disposal. SWMU-8A was closed with the OLBSI. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Lagoon (SWMU-9)** – This unit may have handled wastewater containing PNP, parathion, and methyl parathion. The earthen lagoon was removed and backfilled with soil and covered with gravel. Groundwater from this unit is currently being managed by the WMA-II Corrective Action System. SWMU-11 was later located in this area. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Limestone Bed Corrective Action System (SWMU-10)** – This unit is a groundwater corrective action system for the Old Limestone Bed. A groundwater corrective action system was installed in 1988, and recovery operations began in February 1989. The WMA-II system originally consisted of six interceptor wells (IW-16 through IW-21). Well DW-01 was subsequently incorporated into the interceptor well system in 1997. In 2003, four additional interceptor wells were installed as part of the Supplemental RFI/CS Program to improve the effectiveness of the collection system (IW-22, IW-23, IW-24, and IW-25). The total discharge for all the wells in the WMA-II Corrective Action System averaged 753,000 gallons per year (approximately 1.4 gallons per minute (gpm)) during the period from July 2001 to July 2005. The total discharge for the period from July 2005 through July 2007 averaged 639,000 gallons per year (approximately 1.2 gpm). Groundwater removed from the recovery wells is pumped to a collection tank, and then pumped to an equalization basin which discharges to the Anniston POTW. This unit has been retained by ADEM for regulatory oversight under RCRA.

- **New Limestone Bed (SWMU-11)** – This RCRA regulated unit (WMA-II) consisted of a limestone bed, storage area, and sump and was used to partially neutralize acidic wastewaters generated by the parathion intermediates operation. The area was closed as a landfill in 1988 by removing the unit to a depth of 12 feet below ground surface, backfilling, and vegetating. Post-closure monitoring is performed for this unit by ADEM under RCRA.

- **Phosphoric Acid Basins (SWMU-12)** – This unit was used to neutralize acidic wastewaters from various production processes. The Phosphoric Acid Basins (North and South Basins) were located along the eastern border of the Facility. The two unlined impoundments consisted of limestone beds which were used to neutralize acidic wastewaters from the former parathion, PCB, and phosphorous production areas. Non-contact cooling and stormwater from the upslope catchment area were also discharged into these basins.

  The North Basin may have started operation in the 1920s and was approximately 50 feet wide and 140 feet long. This basin was most recently used for the retention of non-contact cooling water and storm water from the upslope catchment area. The basin was decommissioned in 1994 with an in-place closure without excavation. The limestone bed

materials, in the depth range of three to 10 feet below grade, were left in place.

The South Basin was installed around 1970 and was approximately 200 feet long and varied in width between 40 feet and 60 feet. In 1988 or 1989, the South Basin was excavated to a depth of approximately 10 to 12 feet below grade and the excavated material was placed in Cell 5E of WMA-I. The excavation was then backfilled with clay. The South Basin is mostly covered by an asphalt parking lot. The balance of this basin and the entire North Basin are grass covered. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Closed Container Storage Area (SWMU-13)** – This unit was located on the southwest corner of the South East Regional Distribution Center (*a.k.a.*, the ACL Warehouse). This unit was closed in accordance with an ADEM approved closure plan in 1989. No further action was required for this unit under RCRA.

- **Hazardous Materials Storage Area (SWMU-14)** – This unit was located east of the Benzene Satellite Accumulation Area in the southeast portion of the Facility. It consisted of a metal building on a concrete pad. This unit stored mixed laboratory solvents, waste benzene solutions, waste polyphenyls, and spill absorbent materials that were generated at the Facility. No further action was required for this unit under RCRA.

- **Spent Nickel Catalyst Storage Area (SWMU-15)** – This unit was located north of the Therminol® Production Area in the center of the Facility. It consisted of a 20-foot by 20-foot concrete pad surrounded by a three-foot concrete wall on two sides. Fifty-five-gallon drums were stored at this location on pallets. The nickel catalyst was composed of spent Raney nickel catalyst generated by the polyphenyl operations. Raney nickel catalyst is a special form of nickel which is comprised of finely divided spongy nickel particles prepared by leaching out aluminum under controlled conditions from a nickel – aluminum alloy. No further action was required for this unit under RCRA.

- **Laboratory Satellite Accumulation Area (SWMU-16)** – This unit formerly stored five-gallon plastic containers of hazardous waste. The waste consisted of waste laboratory solvents and off-specification PNP samples. Currently only 55-gallon drums of waste lab solvents are maintained in this area. These drums are stored on concrete in secondary containment with an overspill capacity. There is an overhang roof to protect against precipitation. No further action was required for this unit under RCRA.

- **Scrap Yard Waste Oil Satellite Accumulation Area (SWMU-17)** – This unit managed used compressor oils and consisted of two concrete pads with roofs. This oil was stored in 55-gallon drums on a non-curbed concrete pad then shipped off-site for incineration. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Benzene Satellite Accumulation Area (SWMU-18)** – This unit managed potentially contaminated soils from piezometer installation prior to offsite disposal. No further

action was required for this unit under RCRA.

- **Trash Incinerator (SWMU-19)** – This unit was previously located in the central area of the closed South Landfill. It consisted of an incinerator with a TeePee burner that received non-hazardous paper waste from the Facility. This unit was removed in 1973, and no further action was required for this unit under RCRA. This area is under the current landfill cap.

- **Sulfur Incinerator (SWMU-20)** – This unit was previously located south of the ACL Warehouse in the northern portion of the Facility. It consisted of an incinerator that burned waste sulfur generated by the parathion production process. This unit closed in 1973, and no further action was required for this unit under RCRA.

- **Former Boiler (SWMU-21)** – This unit was previously located north of the PNP production unit on a concrete pad within a steel building. The unit operated as a boiler until 1989. The unit and steel building have been removed, but the concrete pad remains. No further action was required for this unit under RCRA.

- **Present Boiler (SWMU-22)** – This unit is located in the southern portion of the Facility, northeast of the Santotar® Tank (SWMU-27). Natural gas, No. 2 fuel oil, or a blend of Therminol® ends and Santotar® provide fuel for the boiler. The boiler is located on a concrete pad with a one-foot high concrete secondary containment structure surrounding it. The unit operates under Alabama Air Pollution Control Commission Permit No. 301-0007-Z010. No further action was required for this unit under RCRA.

- **Satellite Accumulation Area of Compressed Oil (SWMU-23)** – This unit is located on the southern portion of the plant site, north of the Present Boiler (SWMU-22). The unit consisted of a 10-foot by 10-foot concrete pad, covered by a metal shed roof, used to store 55-gallon drums containing used oil from the hydrogen compressors. The unit has since been upgraded to three-foot by five-foot plastic bins capable of holding two 55-gallon drums. This unit is regulated under used oil regulations, and no further action was required for this unit under RCRA.

- **Boiler Satellite Accumulation Area (SWMU-24)** – This unit consists of one 55-gallon drum that receives line cleanings from the Boiler Feed Tank (SWMU-25). It is located on concrete, inside the secondary containment of the Present Boiler (SWMU-22). No further action was required for this unit under RCRA.

- **Boiler Feed Tank (SWMU-25)** – This unit managed Therminol® ends. Therminol® is currently produced from polyethylbenzene. The process produces Therminol® ends (the material managed at the Boiler Feed Tank), which are classified as a D018 hazardous waste because the material contains 1.0 part per million (ppm) of benzene. A leaking flange was observed during the RFA. The area around the flange was cleaned and the tank has since been dismantled. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Blending Tank (SWMU-26)** – This unit is located southeast of the Santotar® Tank (SWMU 27) in the southern portion of the Facility. It consists of an 11,800-gallon horizontal steel tank positioned on a concrete pad, surrounded by a four-foot concrete wall. It was previously in service as a benzene feed tank, then received Therminol® ends and Santotar® for blending into feed for the Present Boiler (SWMU-22). It currently receives blended fuel for feed into the Present Boiler. No further action was required for this unit under RCRA.

- **Santotar® Tank (SWMU-27)** – This unit managed Santotar®. The unit consists of a 22,000-gallon tank on a concrete pad. Black stains were observed on the concrete pad during the RFA. The investigation revealed the stains were associated with pipe insulation. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Therminol® Ends Tank (SWMU-28)** – This unit was located east of the Old Limestone Bed (SWMU-8). It consisted of a 150,000-gallon carbon steel tank on a sand base surrounded by a six-foot concrete wall. Therminol® ends were stored in this unit for 90 days or less, prior to being blended with Santotar® for use in the Present Boiler (SWMU-22). The tank was certified as clean closed by ADEM in October 1993 and removed six months later. No further action was required for this unit under RCRA.

- **Wastewater Treatment Plant (SWMU-29)** – The former wastewater treatment plan (WWTP) is located on the western border of the Facility. It previously consisted of two holding tanks (SWMU-29A), two aeration basins (SWMU-29B), one clarifier (SWMU-29C), and one wet well (SWMU-29D). The two aeration basins were converted to holding tanks by 1991. The unit is currently used as an equalization basin and water is discharged via DSN 002 to the Anniston POTW, permitted under a SID Permit. No further action was required for this unit under RCRA.

- **Plant Corrective Action System (SWMU-30)** – This unit is a groundwater corrective action system for contamination from the South Landfill (SWMU-1) that has migrated to the Facility. Interceptor wells IW-14 and IW-15 were installed in 1987, and pumping operations began in early 1988 to intercept and recover groundwater from the Facility area downgradient of the closed South Landfill. During the SRFI, a replacement well for IW-14 (IW-14A) was installed. New interceptor well IW-14A was installed approximately 200 feet north of the existing IW-14 (across the entrance driveway to the Facility). This unit is now part of the SWMU-1 Corrective Action System (which ADEM deferred to the EPA under the CERCLA Program).

- **Steam Cleaning Pad (SWMU-31)** – This unit manages oily condensate from steam cleaning. The unit consists of a 10-foot by 10-foot concrete pad with a three-inch concrete curb surrounded by a gravel covered areas. A concrete sump four-foot by three-foot and six-foot deep is located in the center of the unit. The sump discharges to the Facility's WWTP. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Drum Crusher (SWMU-32)** – This unit is located in the central portion of the Facility adjacent to the Hazardous Materials Storage Area (SWMU-14). It consists of an enclosed three-feet by four-foot by six-foot drum crusher that receives old or damaged drums that are triple rinsed in the production area. No further action was required for this unit under RCRA.

- **South Scrap Yard (SWMU-33)** – This unit is located in the southern portion of the Facility, north of the Santotar® Pit (SWMU-7). It consists of used, decontaminated equipment stored directly on gravel, in addition to scrap metal stored in a dumpster. No further action was required for this unit under RCRA.

- **Old Boiler Scrap Yard (SWMU-34)** – This unit manages used, decontaminated equipment and scrap metal. The unit is covered with a four-inch gravel cover. Some stained gravel was observed in the area during the RFA. Further investigation suggested that the staining was associated with rust deposits. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Acetone Recovery Column (SWMU-35)** – This unit is located west of the Old Boiler Scrap Yard (SWMU-34). It consists of an acetone distillation column approximately six stories high encircled by metal scaffolding. The unit operated until 1986 and currently remains unused. No further action was required for this unit under RCRA.

- **Carbon Towers (SWMU-36)** – This unit is located in the central portion of the Facility. It consists of four vertical towers encircled by metal scaffolding, packed with carbon. The unit received PNP production wastewater for filtering before being discharged to the former WWTP (SWMU-29). This unit regenerated the carbon used to filter PNP from the discharge to the Facility's WWTP. It regenerated the carbon by changing the pH to release organics and then backflushing the towers to return the organics to the process. Spent carbon was placed in drums and sent offsite for incineration. It operated until 2004, and no further action was required for this unit under RCRA.

- **Stormwater Drainage System – Production Area Portion (SWMU-37a)** – This system manages stormwater from within the production area of the Facility. The system had managed stormwater run-off from the polyphenyl, parathion, and PNP production areas until the units were shutdown. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Dumpsters (SWMU-38)** – This unit consisted of roll-off boxes used to receive various wastes from the Facility including waste from the Niran® and PNP production processes. No releases were identified in the RFA. No further action was required for this unit under RCRA.

- **Loading/Unloading Areas (SWMU-39)** – This unit consisted of five locations: SWMU-39A – Unlined Rail PCNB loading/unloading (L/U) Area; SWMU-39B – Benzene L/U Area and sump (paved rail unloading area with two-inch high 40-foot long

curbing, drained to a sump); SWMU-39C – Alimet L/U Area and sump (no longer used after 1991); SWMU-39D – PNP Warehouse L/U Area (truck ramp at PNP Warehouse); and SWMU-39E - ACL Warehouse L/U Area (two truck bays at ACL Warehouse – no longer used after 1995). No further action was required for this unit under RCRA.

- **Fire Training Area (SWMU-40)** – This unit is located near the Fire Training Building, east of the former WWTP (SWMU-29). Prior to the 1990s, this unit was used for fire brigade training purposes. Since the 1990s, it has been used for storage of a 55-gallon drum filled with water and diesel fuel for fire training exercises. When not in use, the drum is stored on a concrete pad under a metal shed roof. No further action was required for this unit under RCRA.

- **Former Parathion Production Area (SWMU-41)** – This unit was used to produce parathion. Production of parathion ceased in 1986. The unit was demolished. Soils beneath the unit were excavated, in some areas the excavation extended to a depth of 20 feet. The process sewers were also removed. The equipment, building, and soils were placed in SWMU-1. The area was backfilled and covered with gravel. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Former PCB Production Area (SWMU-42)** – This unit was located northeast of the Benzene L/U Area, in the south central portion of the Facility. PCBs were manufactured at the Facility from 1929 to 1971. The area was decommissioned in 1972 and covered with asphalt. The demolished unit was placed in SWMU-1. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Former Phosphorus Pentasulfide Production Area (SWMU-43)** – This unit was used to produce elemental phosphorus, phosphate salts, and phosphorous pentasulfide. Corrosive wastewaters from this unit were discharged to the Phosphoric Acid Basins. The production area buildings were demolished in 1988, and potentially affected soils were removed. The existing concrete slab was left in place, and other areas were covered with gravel. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Waste Drum Satellite Accumulation Area (SWMU-44)** – This unit managed drums of Therminol® and Santotar® and potentially hazardous wastes waiting toxicity characteristic leachate procedure (TCLP) analysis. In 2002, existing sumps and soil was excavated and removed from this area due to the detection of PCBs (PCB concentrations were greater than 500 mg/kg and were considered principal threat waste). Subsequently, a four-inch thick concrete cover was placed over the area. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Hydrogen Sulfide Flare (SWMU-45)** – This unit was previously located within the Former Parathion Production Area (SWMU-41). It consisted of a flare that was used to burn off hydrogen sulfide from the parathion process. It was dismantled in 1988, and no further action was required for this unit under RCRA.

- **Former Holding Tanks, Aeration Basins and Clarifiers (SWMU-46)** – These units treated wastewaters that contained parathion, PNP and acetone still bottoms. These units were cleaned, demolished and closed in place; and the area was covered with gravel. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **Closed West End Landfill (SWMU-47)** – This unit received production wastes and general trash from the Facility from 1930 through 1960. In 1960, the West End Landfill was sold to Alabama Power Company (Alabama Power). In the 1970s, Alabama Power constructed a switchyard on the property, disturbing waste within the West End Landfill and exposing PCB waste. When PCB releases were reported in the 1990's Solutia reacquired the West End Landfill. A detailed investigation of the closed West End Landfill was completed in August 1994 and reported to ADEM. Following the 1994 investigation, ADEM and the EPA approved a plan for stormwater improvements and an upgrade to the cap that had been placed on the area.

  A multi-media cap was constructed on the closed West End Landfill cell and a soil cover was placed on the area immediately around the West End Landfill. The cap included a six-inch thick compacted clay foundation layer, a 60-mil thick textured HDPE geomembrane liner, a geosynthetic drainage layer consisting of a continuous non-woven geotextile and one-foot wide and one-inch thick geosynthetic wick drains placed every 50 feet, an 18-inch thick soil cover layer, and a vegetative layer. Stormwater run-off from the closed West End Landfill is collected and transported through hard piping to a retention structure and ditch leading offsite. These measures were completed in 1996.

  The DSN 006 stormwater outfall currently conveys drainage from the closed West End Landfill. The monitoring requirement for this outfall was removed from the NPDES Permit after no detections of PCBs were measured from December 1997 through May 2001. As part of the investigation, monitoring wells (WEL-1 through WEL-4) were installed around the West End Landfill. The investigation concluded that the closed West End Landfill was not a source for groundwater impacts and that further monitoring was not required. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

- **The Monsanto Chemical Corporation Warehouse (MCC Warehouse)** – This unit housed PCB drumming and flaking operations until 1971. The building was identified as a potential source for low level PCBs detected in stormwater run-off from the Facility. This unit was added as a SWMU after the RFI/CS Program. Extensive investigations and interim measures have been completed at this unit. ADEM did not identify this unit in the RCRA Permit.

- **Product Storage Tank (AOC-A)** – This tank managed Santowax®. Santowax® is composed of tertiary and quaternary phenyls manufactured as part of the polyphenyl production process. Santowax® is hydrogenated with Raney nickel catalyst to produce

Therminol®. The base of the secondary containment was previously graveled, and evidence of spills was noted during the RFA. The spill containment was upgraded with a concrete floor, and level control circuitry has been updated on the tank. ADEM deferred the oversight of further action for AOC-A to the EPA under the CERCLA Program.

- **Underground Product Storage Tanks (AOC-C)** – Product Underground Storage Tanks (USTs) were removed in the mid-1980s. The specific contents for each tank are unknown; however, conversations with Facility personnel indicate that PNP, parathion, acetone, gasoline, sulfur, and soda ash solution may have been stored in these tanks. The most northern and most eastern of the four tanks was used to store gasoline for a fueling pump at the plant. The other three tanks were used in the manufacturing process and are more properly classified as in-ground process vessels than USTs. Specifically, the individual tanks contained the following chemicals used in the production process: a mixture of 4-nitrophenol and acetone; a mixture of acetone, water and parathion; and a mixture of acetone, water and soda ash (disodium carbonate). ADEM deferred the oversight of further action for this AOC-C to the EPA under the CERCLA Program.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Since 2000, the EPA and Solutia have been working to keep the community, governmental entities, the Community Advisory Group, the Technical Advisor, the United States District Court for the Northern District of Alabama, and all other interested parties informed about Site activities. Information has been disseminated through websites, fact sheets, open houses, availability meetings, and public meetings.

All basic requirements for public participation under CERCLA §§ 113(k)(2)(B)(i-v) and 117 and 40 C.F.R. § 300.430(f)(3) were met in the remedy selection process. Multiple fact sheets have been distributed for the Site since 2001. A community relations plan for the Site was developed in 2001 and was updated in 2004. An information repository was established in 2001 at the Main Branch of the Calhoun County Public Library on West 10th Street, in Anniston, Alabama. An additional repository was established at the Carver Branch of the Calhoun County Public Library on West 14th Street, in Anniston, Alabama, to allow for easier access by West Anniston residents.

The OU3 Remedial Investigation Report (RI), Feasibility Study Report (FS), Baseline Risk Assessment Report, and Proposed Plan for OU3 of the Anniston PCB Site were released to the public on August 3, 2010. These documents are incorporated in the Administrative Record for the Site. A copy of the Administrative Record, upon which the Selected Remedy is based, is located at the Information Repositories. In addition, the Administrative Record and the Site (project) files are available for review at the EPA Region 4 offices in Atlanta, Georgia. Notices about the availability of these documents were published in the *Anniston Star* on September 1, 2010, September 5, 2010, September 8, 2010, and September 12, 2010. A copy of the Administrative Record Index is provided in Appendix B.

On September 13, 2010, the EPA presented its preferred remedy for OU3 of the Anniston PCB Site during a public meeting at the Anniston Meeting Center, Noble Street, Anniston, Alabama. At this meeting, representatives of the EPA and Solutia answered questions about sampling at OU3 and the remedial alternatives under consideration. A transcript of the meeting was prepared and is available at the Information Repositories. A 30-day public comment period was held from September 1, 2010, through September 30, 2010. On September 8, 2010, the EPA received a request to extend the comment period for 30 days so that the community would have time to review the documents. The EPA agreed to extend the comment period and notifications about the extension were published in the *Anniston Star* on October 1, 2010, October 3, 2010, October 17, 2010, and October 20, 2010.

The EPA's responses to comments are contained in Part 3 of this IROD.

4.0 SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

As with many Superfund sites, the problems encountered at the Anniston PCB Site are complex. As a result, the work has been organized into three OUs, which were selected based on geographic location and complexity. OU1/OU2 generally consists of both residential and non-residential properties around the Facility and downstream, following Snow Creek to Highway 78. OU3 consists of the Facility, the closed South Landfill, and the closed West End Landfill. OU4 includes Snow Creek and its floodplain downstream of Highway 78 to the confluence of Snow and Choccolocco Creeks, and Choccolocco Creek from the backwater area upstream of Snow Creek to Lake Logan Martin. When the remedial investigation for OU4 is complete, the EPA will consider whether additional downstream investigations are warranted.

The EPA has already selected a Time-Critical Removal Action and a Non-Time Critical Removal Action to cleanup residential properties in OU1/OU2 and OU4. The removal decisions were documented in Enforcement Action Memoranda dated October 2001 and February 2004, respectively. Investigations to determine what additional actions are necessary for OU1/OU2 and OU4 are ongoing.

The subject of this IROD is OU3. The purpose of the interim action selected in this IROD is to reduce current and future risks from contaminants released from the Facility and adjacent closed landfills. Soil and groundwater are the media of concern in OU3. This is the first ROD signed for the Anniston PCB Site. Additional decision documents are expected to be issued that address risks at the other OUs. A final remedy for OU3 will be selected once confirmation sampling described in the Selected Remedy has been completed and groundwater data and modeling demonstrate that restoration is achievable. This interim action will neither be inconsistent with nor preclude implementation of a final remedy for OU3.

5.0 SUMMARY OF SITE CHARACTERISTICS

5.1 Conceptual Site Model

The conceptual site model for OU3 of the Anniston PCB Site (Figure 5-1) incorporates information on the potential chemical sources, affected media, release mechanisms, routes of migration, and known or potential human receptors. The purpose of the conceptual site model is to provide a framework with which to identify potential exposure pathways occurring at OU3. The conceptual site model is the model on which the sampling plan, risk assessment, and response action are based.

Potentially exposed populations consist of current and future operations area workers, operations and maintenance (O&M) workers, trespassers, and construction workers, all of which may be in contact with contaminated soils and PCBs in air as vapor and fugitive dust. The impact of PCBs in air from the Facility on adjacent residents was evaluated at the request of the community. Additionally, although no complete pathway was identified for current exposure to groundwater, groundwater resources are potential drinking water sources in the State of Alabama that must be restored for possible future use. Groundwater was evaluated for potential future exposure by operations workers and adjacent residents.

5.2 Physiography and Topography

The Site lies within the Weisner Ridges subsection of the Valley and Ridge physiographic province of the southern Appalachian Highlands, which consists of maturely dissected, faulted and folded ridges of high relief separated by flat to gently rolling valleys. Topography in the area is characterized by northeastward trending valleys that are paralleled by ridges and mountains. The highest point at OU3, at approximately 940 feet above mean sea level (msl), is near the Facility's southern property line. The ground surface declines rapidly across the closed South Landfill (moving south to north) and then slopes gently to the north across the rest of the Facility.

The Facility itself is largely occupied by buildings, parking lots, other areas actively used for industrial purposes. As shown in Figure 5-2, relatively impervious surfaces (buildings, roads, parking lots, impervious landfill covers and concrete or asphalt surfaces) make up approximately 27% of the total area of OU3. Other types of engineered covers, such as gravel or soil covers, occupy approximately 45% of the total area. The Facility, West End Landfill, and South Landfill encompass approximately 68, 17, and 53 acres, respectively.

5.3 Geology/Hydrogeology

Sandstones and mudstones of the Rome Formation and sandy dolostone and dolomitic limestone of the Shady Dolomite underlie the valley where the facility is located. The stratigraphy at the Site consists of residuum underlain by bedrock. The residuum consists of low permeability silts and clays that are products of bedrock weathering. Locally, the residuum extends to depths of over 100 feet below ground surface (bgs) and as a low permeability unit can reduce groundwater

FIGURE 5-1: CONCEPTUAL SITE MODEL

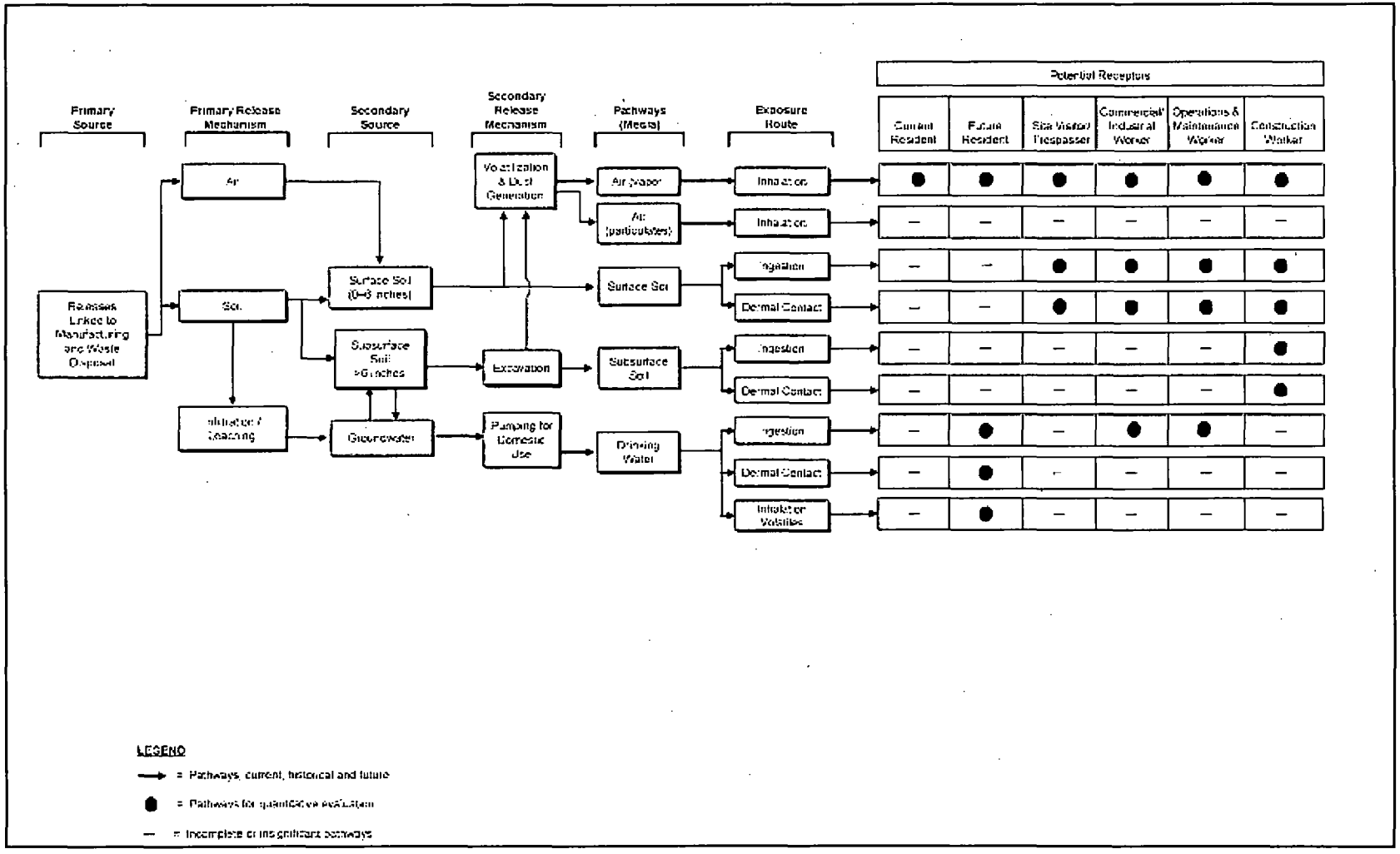
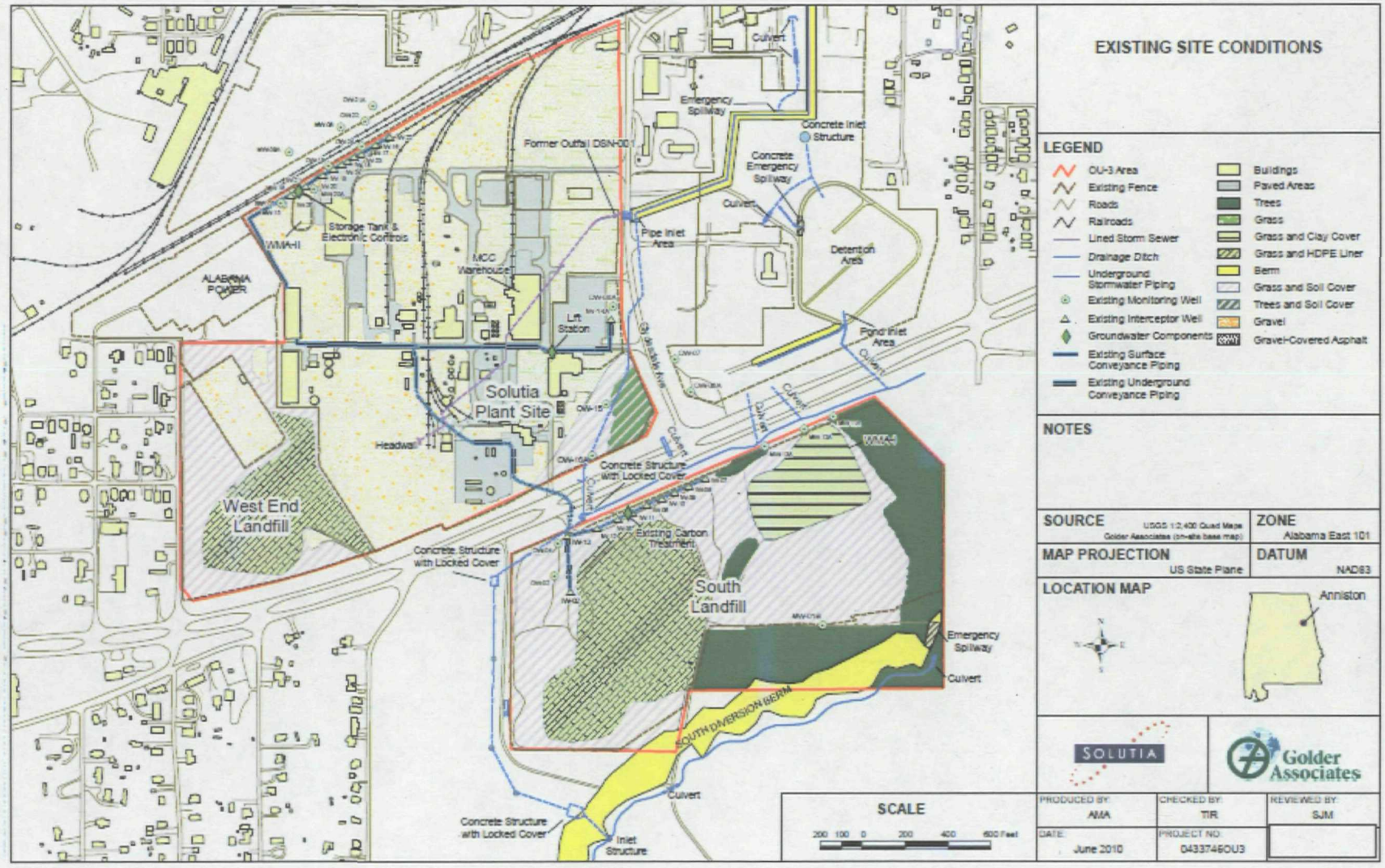


FIGURE 5-2: EXISTING SITE CONDITIONS



flow significantly in localized areas.

The Jacksonville Fault, a regional thrust fault, extends northeastward from the Town of Bynum, Alabama through Anniston, Piedmont, and Jacksonville. A regional map of the fault estimates that the fault occurs northwest of the northern boundary of the facility, as illustrated along with the bedrock geology of the area in Figure 5-3. The fault is mapped as a northeast-trending thrust fault that dips gently to the southeast. Although the magnitude of dip on the fault surface is not published, the fault is considered to be a low-angle thrust fault. This fault juxtaposes older Shady Dolomite, Rome Formation and Weisner Formation rocks to the southeast with younger Conasauga Formation and Knox Group rocks to the northwest. High-angle reverse and normal faults are also shown to occur in this geologic terrain.

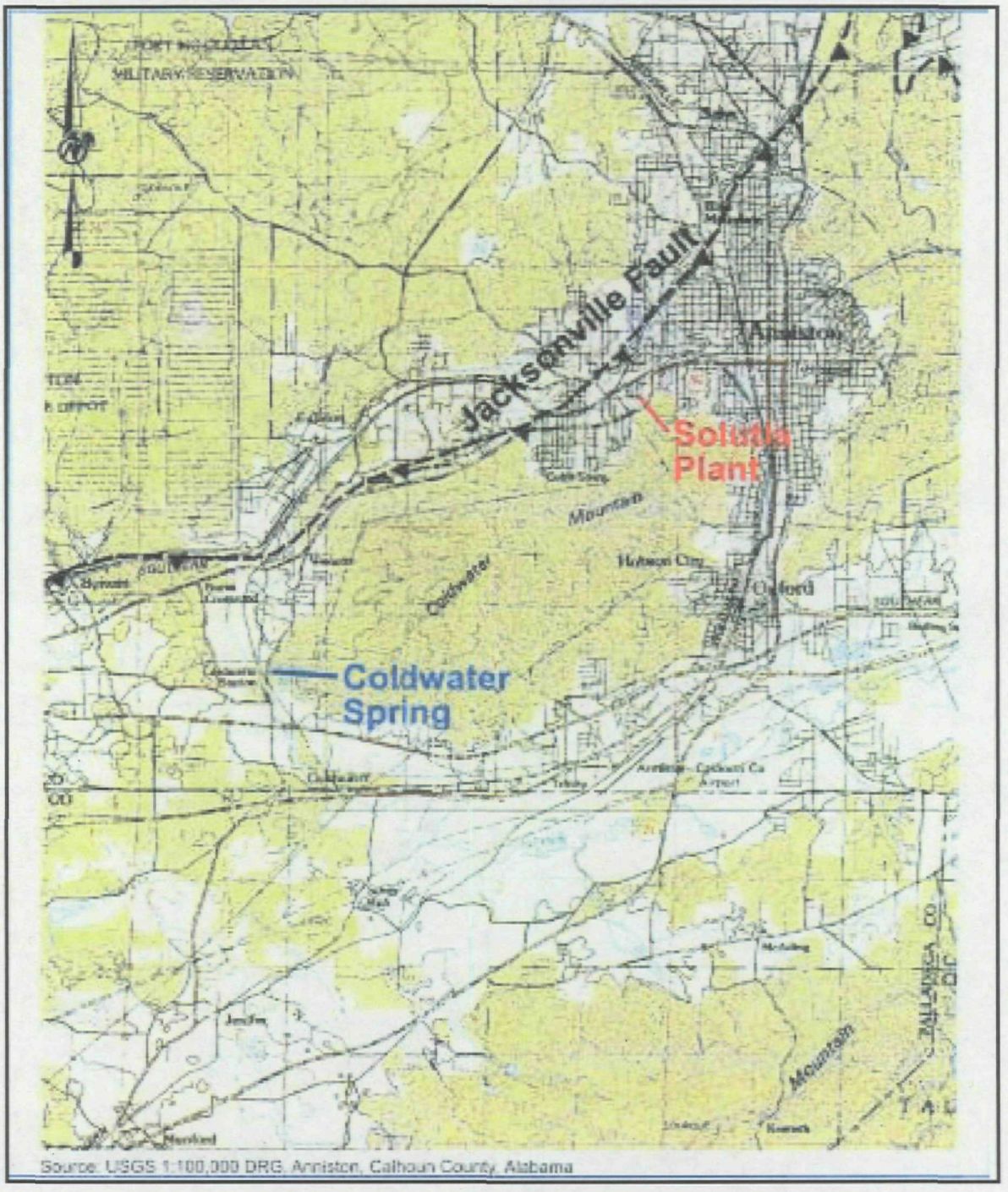
Although the residuum acts to reduce infiltration in localized areas, there is only one aquifer beneath the site which is composed of a saturated zone within the residuum (soil), weathered bedrock (soil bedrock mixture) and bedrock. The residuum has been loosely divided into two units, shallow residuum and deep residuum that are hydraulically connected. The residuum texture is silty-clay to clay that acts as a storage component for the aquifer since the porosity is around 45 percent and ranges in thickness between 75 to 175 feet. The effective porosity is, however, two to 20 percent, because the ability of the residuum to conduct water is limited. Low Flow/Low Stress pumping rates used during sample collection range from 0.1 to 0.5 gallons per minute.

Groundwater in the residuum ranges from approximately 15 feet bgs to 109 feet bgs in OU3. The shallow residuum is approximately 45 feet thick. The soil/rock zone from approximately 45 feet bgs to the top of weathered bedrock is referred to as the deep residuum and is up to 60 feet thick. The deep residuum is distinguished by the presence of chert and shale chips interspersed with the soil. The predominant lateral groundwater flow direction within the residuum is to the north/northeast. There is a northeast component of flow in the shallow residuum in the east portion of the plant and a northwest component of flow in the shallow residuum along the western plant boundary.

Based on variable head aquifer testing results, the geometric mean hydraulic conductivity values of the shallow residuum and deep residuum at the facility are 1.5×10^{-2} feet/day and 6.5×10^{-3} feet/day, respectively. The hydraulic gradient across the facility in the shallow residuum is approximately 1.9×10^{-2} feet/foot. The hydraulic gradient across the facility in the deep residuum is approximately 4.25×10^{-2} feet/foot. The effective porosity of the residuum has been assumed to vary between two percent to 20 percent. The horizontal rate of groundwater flow in the shallow residuum has been calculated to range from approximately 0.53 feet/year to 5.3 feet/year, and the horizontal rate of groundwater flow in the deep residuum has been calculated to range from approximately 0.51 feet/year to 5.1 feet/year.

The bedrock component of the aquifer is composed of a weathered saprolite (rock weathered in place and retaining the rock structure) and competent bedrock. The bedrock is composed of a dolomitic shale ranging to a gray, sandy, dolomite. Groundwater in the bedrock water-bearing zone ranges from approximately 85 to 100 feet bgs. In the area around the Former PCB

FIGURE 5-3: LOCATION OF JACKSONVILLE FAULT LINE



Production area and the Waste Drum Satellite Accumulation Area, the stratigraphic units appear to dip steeply and are intermittently wet and dry. Contaminant migration in this area would have been the result of DNAPL migration during the period when production was taking place. However, no DNAPL was present during the drilling of the wells in that area and concentrations do not indicate the current presence of DNAPL. Anecdotal information during the RCRA closure of the Former Production Area recalls the presence of free phase material contained within the surface soils that were removed in previous interim measures.

Based on hydraulic head data, the vertical flow direction appears to be downward, from the residuum to the bedrock. It is noted that gradients are both downward and generally to the north. As evidenced by the groundwater corrective action systems, interconnection of secondary porosity features is limited, meaning there is very little water movement regardless of direction. Vertical permeability values obtained from the laboratory analysis ranged from 2.3×10^{-5} ft/day to 0.23 ft/day, with a geometric mean of 6.4×10^{-4} ft/day.

Approximately 150 springs have been identified and located in Calhoun County during studies of the area. The discharge of these springs is variable, ranging from less than 1 gallon per minute (gpm) to over 17,000 gpm. Many of these springs are found along the trace of thrust faults and produce enough water for domestic uses and, in some instances, for municipal supply. It is estimated that 80 percent of these springs are used for domestic, farm, stock, municipal, industrial, or recreational water supplies.

Coldwater Spring, a major spring in the Anniston area, is located approximately five miles southwest of the Facility. The spring is the primary water source for the city of Anniston, Fort McClellan, Anniston Ordnance Depot, and other municipalities and communities within the County. Although the hydrogeology of the spring is considered to be highly complex, the recharge area for the spring is thought to generally include the area northwest of the crests of Coldwater and Choccolocco Mountain. Groundwater is interpreted to move south and west along the Jacksonville Fault, joining groundwater from distant sources moving parallel to the fault at depth, ultimately discharging at Coldwater Spring. Based on geochemical modeling, the quality of water flowing from Coldwater Spring is 1 to 25 percent rainwater and 75 to 99 percent groundwater, with a reported groundwater age of 15 years. The spring is reported to discharge from 24 to 33 million gallons per day. The municipal water plant routinely samples and analyzes the groundwater and no PCB's have ever been detected at the spring.

An evaluation was performed to identify active groundwater wells in the vicinity of the Facility, and only four active wells were identified. These wells are used as monitoring wells or for process water. No active potable groundwater wells were identified within a one-mile radius of the Facility.

5.4 Surface Water Hydrology

There are many natural and man-made features at the facility that govern surface water drainage (Figure 5-2). The most influential natural features are the steep side slopes of Coldwater Mountain near the closed South Landfill and the moderately-dipping slopes which trend

southwest to northeast across the production area of the Facility. During precipitation events, these moderate-to-steep slopes formerly contributed significant quantities of surface water flow across the closed South Landfill, along the eastern and western sides of the Facility, and into various man-made ditches. This flow generally discharged into the 11th Street Ditch north of the Facility. The 11th Street Ditch discharges in an easterly direction to Snow Creek. Snow Creek in turn flows to the south and eventually drains into Choccolocco Creek, which in turn flows to the west into Lake Logan Martin on the Coosa River.

When surface water comes into contact with affected soils or Facility areas, constituents can become entrained in the water and subsequently transported off of the Facility. In the past, extensive interim/corrective measures conducted under the RCRA Program, consisting of caps and covers over affected areas, upgraded storm sewers, diversion ditches, retention basins, and various drainage structures, have been constructed at the Facility with the goal of controlling storm water run-on and run-off and mitigate the transport of constituents. Surface water bodies (detention basin, 11th Street Ditch, Snow Creek, and Choccolocco Creek) are not part of this OU, but will be evaluated in other OUs. The quality of surface water leaving OU3 will be evaluated in this IROD.

5.5 Wildlife/Natural Resources

In general, the habitat at the Facility and West End and South Landfills is poor for sustaining wildlife and other natural resources. Due to maintenance activities (cutting and mowing) and Facility operating activities, there is low plant diversity and poor soil conditions for wildlife. The only exception is the open area (walking trail area), which supports nature trails through a forested area. Although the open area has fair habitat quality, a clean soil cap has been placed in the area which essentially eliminated the potential exposure pathway of contaminants in soil to wildlife.

5.6 Summary of Site Contaminants

5.6.1 Overview

Investigations of soil, groundwater, surface water, and air were conducted as part of the environmental programs at the Facility. These investigations included the RCRA Facility Investigation/ Confirmatory Sampling (RFI/CS) Program, the Supplemental RFI/CS Program, and the CERCLA RI. The results of these investigations are summarized in Section 5.6.2 through Section 5.6.6, and are considered the basis for taking action in this IROD. Early investigations identified PCBs as the primary COC in soils; for that reason, soil sampling primarily focused on PCBs.

5.6.2 Substances Detected in Soil

As part of the RFI/CS conducted by Solutia under ADEM oversight from 1998 to 2002, 17 surface or near-surface soil samples were collected from various locations across the Facility and landfills. In addition, five subsurface samples were collected (SSR-04, SSR-10, SSR-11, SSR-

14, and SSR-15). The samples were obtained to evaluate the potential for off-site migration from different SWMUs, confirm the effectiveness of existing corrective measures, and investigate areas that exhibited visual indications of residual staining. The samples were analyzed for a list of 29 COPCs, including PCBs, developed for the Facility by ADEM under the RCRA program.

In response to comments about the RFI/CS and the ERT Report, Solutia conducted the Supplemental RFI/CS under ADEM oversight from 2002 to 2003, which included additional soil sampling. Thirteen soil samples were collected from five SWMUs (SWMU-12, SWMU-17, SWMU-25, SWMU-31, and AOC-A) and analyzed for PCBs; two of the samples were also analyzed for mercury. Additionally, eight composite soil samples were collected from the surface of the closed South Landfill Cap and analyzed for PCBs. One soil sample was collected in the vicinity of the Former PCB Production Area and analyzed for polychlorinated dibenzofurans (PCDFs).

Additional surface and subsurface soil data were needed by the EPA to further characterize areas of the Facility and provide the data necessary for completing the HHRA and the RI. Beginning in 2005, 14 surface and subsurface soil samples were collected and analyzed for PCBs. The PCB results were reviewed, and three sample locations were selected to represent areas of high, medium, and low PCB concentrations. These locations were sampled and analyzed for a broad suite of parameters, including metals, volatile organics, semi-volatile organics, pesticides, and polychlorinated dibenzodioxins (PCDDs)/PCDFs (dioxins). Two surface samples were collected at the closed West End Landfill to determine the PCB concentrations in the cover soils above the landfill cap.

The samples collected during the RFI/CS Program, Supplemental RFI/CS Program, and RI Program were used to determine a list of contaminants of potential concern (COPCs) for the operations area, the West End Landfill cap, and the South Landfill cap. Subsurface COPC were evaluated in the operations area only; it was assumed that the caps over the South and West End Landfills are maintained and no exposure to subsurface contaminants in the landfills is allowed. In addition, five samples collected prior to the RFI/CS to determine PCB concentrations in the soil cap over the closed eastern cells in the South Landfill were considered.

All sample locations are shown on Figure 5-4. The occurrence and distribution of detected constituents in soil are presented in Table 5-1. Detected constituents include: four VOCs (acetone, carbon disulfide, chlorobenzene, and methylene chloride), 20 SVOCs (1,1-biphenyl, 2-methylnaphthalene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, carbazole, chrysene, dibenz(a,h)anthracene, dibenzofuran, di-n-butylphthalate, fluranthene, fluorine, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene), three pesticides (heptachlor epoxide, methyl parathion, and parathion), 22 metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, vanadium, and zinc), total PCBs, and dioxin TEQ. The more prevalent constituents detected in soils at the Facility consist of PCBs, benzo(a)pyrene, arsenic, cobalt, lead, manganese, mercury, and nickel.

FIGURE 5-4: SOIL SAMPLE LOCATIONS

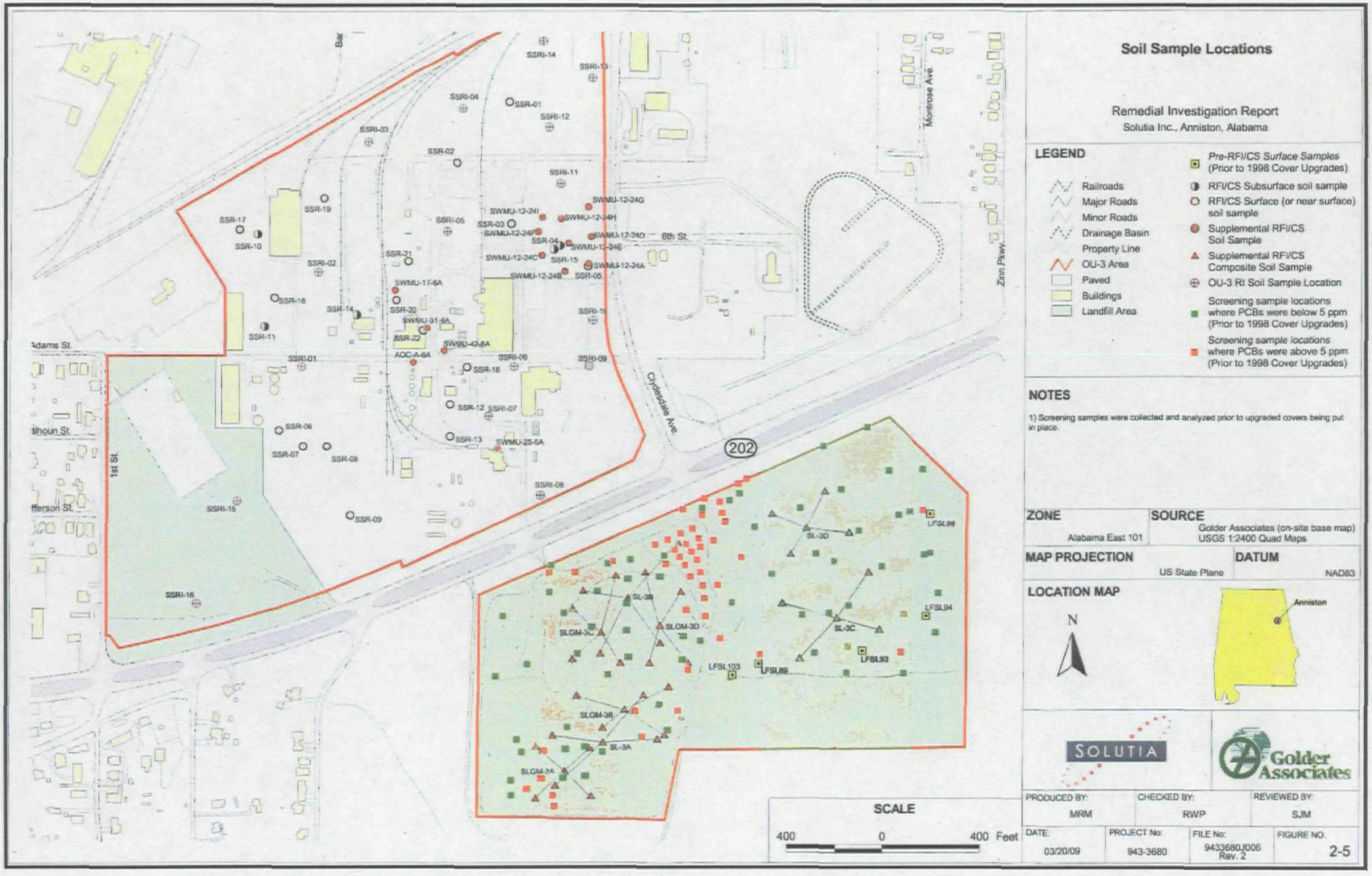


TABLE 5-1: OCCURRENCE AND DISTRIBUTION OF FACILITY CONSTITUENTS IN SOIL

Parameter Group	Constituent	CAS-ID	Unit	Minimum Concentration [2]	Maximum Concentration [6]	Mean Concentration	Location of Maximum Concentration	Most Recent Measurements	Detection Frequency	Percentage of Detections	Range of Reporting Limits
PCBs, Pesticides and Dioxin	PCBs, Total [1]	1336-36-3	µg/kg	23	16,620,000	266,473	SSR-18	ND - 930,000	63 / 76	83%	39 - 930,000
	Heptachlor epoxide	1024-57-3	µg/kg	380	380	126.6	SSRI-11	ND - 380	1 / 3	33%	31 - 380
	Methyl parathion	298-00-0	µg/kg	49 J	100 J	6.5	SSR-18	ND	2 / 23	9%	18 - 22
	Parathion	56-38-2	µg/kg	56 J	56 J	2.4	SSR-21	ND	1 / 23	4%	37 - 42
	Dioxin, TEQ[4]	NA	µg/kg	0.191	0.756	0.453	SSRI-07	.191-.756	3/3	100%	0.00197-0.0194
VOCs	Acetone	67-64-1	µg/kg	25 J	35 J	20	SSRI-11	ND - 35	2 / 3	67%	49 - 83
	Carbon disulfide	75-15-0	µg/kg	2.3 J	2.3 J	0.77	SSRI-04	ND - 2.3 J	1 / 3	33%	4.9 - 8.3
	Chlorobenzene	108-90-7	µg/kg	17	17	1.48	SSR-12, SSR-15	ND	2 / 23	9%	4.2 - 8.3
	Methylene chloride	75-09-2	µg/kg	33	33	1.43	SSR-11	ND	1 / 23	4%	4.2 - 8.3
SVOCs	1,1'-Biphenyl	92-52-4	µg/kg	45 J	140 J	82	SSRI-04	45 J - 140 J	3 / 3	100%	390 -420
	2-Methylnaphthalene	91-57-6	µg/kg	32 J	32 J	10.7	SSRI-11	ND - 32 J	1 / 3	33%	390 -420
	Anthracene	120-12-7	µg/kg	41 J	120 J	53.7	SSRI-11	ND - 120 J	2 / 3	67%	390 -420
	Benzo(a)anthracene	56-55-3	µg/kg	46 J	830	352	SSRI-11	46 J - 830	3 / 3	100%	390 -420
	Benzo(a)pyrene	50-32-8	µg/kg	24 J	1,900	701.3	SSRI-11	24 J - 1,900	3 / 3	100%	390 -420
	Benzo(b)fluoranthene	205-99-2	µg/kg	50 J	2,100	786.7	SSRI-11	50 J - 2,100	3 / 3	100%	390 -420
	Benzo(g,h,i)perylene	191-24-2	µg/kg	40 J	2,100	756.7	SSRI-11	40 J - 2,100	3 / 3	100%	390 -420
	Benzo(k)fluoranthene	207-08-9	µg/kg	88 J	1,500	529.3	SSRI-11	ND - 1,500 J	2 / 3	67%	390 -420
	bis(2-Ethylhexyl)phthalate	117-81-7	µg/kg	57 JN	200 J	122.3	SSRI-07	57 JN - 200 J	3 / 3	100%	390 -420
	Carbazole	86-74-8	µg/kg	62 J	62 J	20.7	SSRI-11	ND - 62 J	1 / 3	33%	390 -420
	Chrysene	218-01-9	µg/kg	290 J	1900 J	1,196.7	SSRI-04	290 J - 1,900 J	3 / 3	100%	390 -420
	Dibenz(a,h)anthracene	53-70-3	µg/kg	41 J	620	220.3	SSRI-11	ND - 620	2 / 3	67%	390 -420
	Dibenzofuran	132-64-9	µg/kg	31 J	31 J	10.3	SSRI-11	ND - 31 J	1 / 3	33%	390 -420
	Di-n-butylphthalate	84-74-2	µg/kg	49 J	49 J	16.3	SSRI-07	ND - 49 J	1 / 3	33%	390 -420
	Fluoranthene	206-44-0	µg/kg	42 J	940	464	SSRI-11	42 J - 940	3 / 3	100%	390 -420
	Fluorene	86-73-7	µg/kg	28 J	28 J	9.3	SSRI-07	ND - 28 J	1 / 3	33%	390 -420
	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	59 J	1,300	453	SSRI-11	ND - 1,300	2 / 3	67%	390 -420
	Naphthalene	91-20-3	µg/kg	37 J	37 J	12.3	SSRI-11	ND - 37 J	1 / 3	33%	390 -420
	Phenanthrene	85-01-8	µg/kg	74 J	470	258	SSRI-11	74 J - 470	3 / 3	100%	390 -420

Parameter Group	Constituent	CAS-ID	Unit	Minimum Concentration [2]	Maximum Concentration [6]	Mean Concentration	Location of Maximum Concentration	Most Recent Measurements	Detection Frequency	Percentage of Detections	Range of Reporting Limits
	Pyrene	129-00-0	µg/kg	340 J	1,200	786.7	SSRI-11	340 J - 1,200	3 / 3	100%	390 -420
Metals	Aluminum	7429-90-5	mg/kg	11,000	19,000	14,333	SSRI-11	11,000 - 19,000	3 / 3	100%	23 - 25
	Antimony	7440-36-0	mg/kg	8.7	8.7	2.9	SSRI-11	ND - 8.7	1 / 3	33%	2.3 - 2.5
	Arsenic	7440-38-2	mg/kg	3.1	390	25.44	SSRI-11	3.8 - 390	22 / 23	96%	1.1 - 12
	Barium	7440-39-3	mg/kg	18	780	110.48	SSR-09	41 - 230	23 /23	100%	1.1 - 13
	Beryllium	7440-41-7	mg/kg	0.47	1.9	0.42	SSR-10	0.47 - 0.8	11 / 23	48%	0.45 - 6
	Cadmium	7440-43-9	mg/kg	0.52	4.7	0.3265	SSRI-11	0.52 - 4.7	5 / 23	22%	0.49 - 6
	Calcium	7440-70-2	mg/kg	24,000	59,000	35,667	SSRI-04	24,000 - 59,000	3 / 3	100%	56 - 62
	Chromium	7440-47-3	mg/kg	7.4	110	24.06	SSR-13	13 - 23	22 / 23	96%	1.1 - 12
	Cobalt	7440-48-4	mg/kg	2	74	13.27	SSR-17	2.5 - 11	23 / 23	100%	1.1 - 13
	Copper	7440-50-8	mg/kg	13	280	104	SSRI-11	13 - 280	3 / 3	100%	2.3 - 2.5
	Iron	7439-89-6	mg/kg	19,000	26,000	22,000	SSRI-11	19,000 - 26,000	3 / 3	100%	5.6 - 6.2
	Lead	7439-92-1	mg/kg	8.7	4,700	264.07	SSRI-11	11 - 4,700	23/23	100%	0.56 - 29
	Magnesium	7439-95-4	mg/kg	850	34,000	15,616	SSRI-04	850- 34,000	3 / 3	100%	56 - 62
	Manganese	7439-96-5	mg/kg	68	12,000	1,241	SSR-09	160 - 830	23/23	100%	1.1 - 13
	Mercury	7439-97-6	mg/kg	0.032	3.3	0.592	SSR-15	0.17 - 2.6	24 / 25	96%	0.024 - 0.71
	Nickel	7440-02-0	mg/kg	5.7	2,400	130.17	SSR-07	15 - 33	22 / 23	96%	4.4 - 53
	Potassium	7440-09-7	mg/kg	1,000	1,800	1,433	SSRI-04	1,000 - 1,800	3 / 3	100%	110 - 120
	Selenium	7782-49-2	mg/kg	4.5	4.5	2	SSRI-11	ND - 4.5	1 / 3	33%	2.8 -3.1
	Silver	7440-22-4	mg/kg	12	12	4	SSRI-11	ND - 12	1 / 3	33%	1.1 -1.2
	Sodium	7440-23-5	mg/kg	150	400	303	SSRI-11	150 - 400	3 / 3	100%	110 - 120
	Vanadium	7440-62-2	mg/kg	10	93	39.69	SSR-19	23 - 31	23/23	100%	1.1 - 13
	Zinc	7440-66-6	mg/kg	25	610	232.3	SSRI-11	25 - 610	3 / 3	100%	2.3 - 2.5

Notes:
(1) Total PCBs were calculated based on using ND = 0 for individual Aroclors with no detections.
(2) Note that some analytes were detected below the laboratory reporting limits but above the method detection limits and have been qualified as estimated values.
(3) The table includes all parameters that had detections reported in the RI Report, dated July 2008.
(4) Dioxin TEQ: ITEF TEQ calculated with ND=0 and EMPC=EMPC.
(5) ND = Non-detect. J = Estimated Value.
(6) The maximum result from the original / duplicate pair was used in the analysis

The highest PCB concentration was reported in soil sample SSR-18 (16,620 mg/kg, estimated) collected immediately downgradient from the Former PCB Production Area and within SWMU-44. This sample was collected from the surface soil covered by approximately three inches of gravel. This area has been subsequently partially excavated and covered with concrete. Other areas exhibiting higher PCB detections in surface soils include SSR-7 (229 mg/kg) at the former location of the Phosphate Landfill (SWMU-6) and SSR-9 (282 mg/kg) in the Old Santotar® Pit (SWMU-7). These areas are currently covered by a gravel layer to prevent direct contact and minimize or reduce erosion from surface water.

Surface soil sample SSR-5, which is located downgradient from the Phosphoric Acid Basins (SWMU-12), had a PCB concentration of 106 mg/kg. Sample SWMU-12-24C and SWMU-12-24E also located at the Phosphoric Acid Basins had PCB concentrations of 84 and 169 mg/kg, respectively. PCBs were also detected in two subsurface soil samples collected from this SWMU, SSR-4 (104 mg/kg) and SSR-15 (65 mg/kg). A surface sample (SSRI-11-06) collected as part of the RI Program from a grassed area located to the north of the Phosphoric Acid Basins had a PCB concentration of 930 mg/kg, estimated.

Two samples collected in the open areas of the Facility as part of the RI Program showed elevated concentrations of PCBs. These samples were SSRI-07 (250 mg/kg, estimated, at the surface and 56 mg/kg, estimated, at depth) and SSRI-05 (38 mg/kg at the surface and 85 mg/kg at depth) located adjacent to the Former PCB Production Area and northeast of the Old Boiler Scrap Yard, respectively. The remaining soil samples had PCB detections ranging from less than 1 mg/kg to about 40 mg/kg.

Only one soil sample collected had a detection for parathion. Sample SSR-21, collected at the Old Boiler Scrap Yard, had a measured parathion concentration of 0.056 mg/kg, estimated. All samples collected and analyzed for 4-nitrophenol were non-detect. Of the three volatile organic compounds identified as prevalent constituents, only chlorobenzene was detected in soil samples collected at the Facility. Two samples, SSR-12 and SSR-15, had detections for chlorobenzene. The concentration measured was 17 µg/kg at each location. These samples were collected from the former PCB Production Area (SSR-12) and the Phosphoric Acid Basins (SSR-15). All samples collected and analyzed for 1,2-dichlorobenzene and 1,4-dichlorobenzene were non-detect.

Of the semi-volatile organic compounds identified as prevalent constituents, only benzo(a)pyrene was detected in soil samples collected at the Facility. Three samples, SSRI-04-06, SSRI-07-06, and SSRI-11-06, had detections for benzo(a)pyrene. The concentrations measured were 24 µg/kg (estimated), 180 µg/kg (estimated), and 1,900 µg/kg, respectively. The concentrations measured at SSRI-04-06 and SSRI-07-06 were estimated values since the detections were measured below the laboratory reporting limits. The sample with the highest measured concentration of benzo(a)pyrene, SSRI-11-06, was collected from a grassed area located north of the Phosphoric Acid Basins. All samples collected and analyzed for pentachlorophenol, and o,o,o-triethylphosphorothioate were non-detect.

In the following discussions, the metals results have been compared to background metals data compiled by the Army Corps of Engineers for the Fort McClellan Site located in Anniston, Alabama. This study was performed to provide a basis for environmental assessments conducted as part of the Fort McClellan closure. The overall objective for the study was to establish robust background concentrations for Target Analyte List metals in environmental media including soil. Fort McClellan is located very near the Solutia Facility in the same geologic province. In fact, data for the study were collected at both the Main Post and Pelham Range on Fort McClellan. The Main Post is located less than two miles to the east of the Facility, and the Pelham Range is located less than two miles northwest of the Facility. Due to the relevant purpose of the study and the study location, this information provides a reasonable estimate for background metals data for the Facility. For the RI, two times the mean value of both the surface and subsurface results was used as the estimated background concentration for the Facility.

Arsenic concentrations in the soil generally ranged between 1 mg/kg and 14 mg/kg, with the exception of sample SSR-18 (33 mg/kg, estimated) collected immediately downgradient from the Former PCB Production Area and within SWMU-44, and SSRI-11-06 (390 mg/kg) collected from a grassed area located to the north of the Phosphoric Acid Basins. SSR-18 was collected from the surface soil covered by approximately three inches of gravel. This area has been subsequently partially excavated and covered with concrete. Data developed for the Army Corps of Engineers and the soil arsenic distribution at the Facility indicate that a reasonable estimate of a background soil concentration (*i.e.*, 2 times the mean value of both surface and subsurface concentrations) of arsenic in the area near Fort McClellan, located in Anniston, is approximately 16 mg/kg. Therefore, the majority of the detected concentrations are below the estimated background concentration.

Cobalt was detected in soil samples at concentrations ranging from 2 mg/kg to 74 mg/kg. The highest cobalt concentrations were detected in samples SSR-10 (45 mg/kg, estimated), SSR-19 (47 mg/kg), and SSR-17 (74 mg/kg). These samples were collected from the northeast end of the Facility near WMA-II and the Old Limestone Bed. Based on the Army Corps of Engineers study at Fort McClellan and the soil cobalt distribution at the Facility, a reasonable estimate of a background soil concentration for cobalt in the area is approximately 16 mg/kg. The majority of detected concentrations are below the background soil concentration and typically below 10 mg/kg. However, some elevated detections were noted, the highest of which are described above.

Lead was detected in all soil samples at concentrations ranging from 8.7 mg/kg to 4,700 mg/kg. The highest lead concentrations were detected in samples SSR-7 (220 mg/kg), SSR-14 (250 mg/kg), and SSRI-11-06 (4,700 mg/kg). These samples were collected from the Phosphate Landfill (SWMU-6), the Underground Product Storage Tanks (AOC-C), and a grassed area located to the north of the Phosphoric Acid Basins, respectively. Based on the Army Corps of Engineers study at Fort McClellan and the soil lead distribution at the Facility, a reasonable estimate of a background soil concentration for lead in the area is approximately 39 mg/kg. The majority of detected concentrations are within the same range as the background soil concentration and typically below 60 mg/kg. However, some elevated detections were noted, the highest of which are described above.

Manganese was detected in soil samples at concentrations ranging from 68 mg/kg to 12,000 mg/kg. The highest manganese concentrations were detected in samples SSR-19 (2,600 mg/kg), SSR-17 (5,500 mg/kg), and SSR-09 (12,000 mg/kg). These samples were collected from the Former Phosphorus Pentasulfide Production Area, former holding tanks and aeration basin area, and the Old Santotar® Pit area (SWMU-7), respectively. Based on the Army Corps of Engineers study at Fort McClellan and the soil manganese distribution at the Facility, a reasonable estimate of a background soil concentration for manganese in the area is approximately 1,500 mg/kg. The majority of detected concentrations are below the background soil concentration and typically below 1,000 mg/kg. Elevated detections are described above.

The highest concentration of mercury was found in surface soil sample SSR-15 (3.3 mg/kg, estimated) collected from the Phosphoric Acid Basin. The next highest mercury concentration was detected in sample SSRI-07-06 (2.6 mg/kg) collected from the former PCB Production Area. Based on the Army Corps of Engineers study at Fort McClellan and the soil mercury distribution at the Facility, a reasonable estimate of a background soil concentration for mercury in the area is approximately 0.07 mg/kg. The majority of detected concentrations are above the background soil concentration of 0.07 mg/kg.

The highest concentration of nickel was found in soil sample SSR-7 (2,400 mg/kg) collected from the Phosphate Landfill (SWMU-6). The next highest nickel concentration was detected in sample SSR-9 (120 mg/kg) collected from the Old Santotar® Pit area (SWMU-7). These areas are covered by gravel. The remaining soil samples reported nickel at concentrations below 100 mg/kg. Based on the Army Corps of Engineers study at Fort McClellan and the soil nickel distribution at the Facility, a reasonable estimate of a background soil concentration for nickel in the area is approximately 12 mg/kg.

For the West End Landfill and the South Landfill, the only contaminant analyzed for in the surface soil of the capping material was PCBs. No PCBs were detected in the surface soils of the West Landfill, although historical records indicate that low levels of PCBs are likely present (up to 21 mg/kg at) in surface soils adjacent to the landfill cap. Total PCBs was detected in surface soil for the South Landfill (up to 10 mg/kg at LFSL 89).

5.6.3 Substances Detected in Groundwater

A significant number of groundwater wells (163) exist around the Facility and the Landfills. During the RFI/CS Program, twelve new monitoring wells (five shallow and seven deep) were installed and sampled along with eight existing monitoring wells. During the Supplemental RFI/CS, four additional observation wells were installed; one observation well was abandoned and re-installed; four additional interceptor wells were installed to upgrade the WMA-II Corrective Action System; and one interceptor well was abandoned and re-installed. In addition, an angled boring was drilled to determine the hydraulic properties of the interface (contact) of the discontinuity located north of the operations area. After the conclusion of the RFI/CS and Supplemental RFI/CS Programs, groundwater data gaps for areas of the Facility were identified and additional groundwater wells and samples to address these data gaps were installed/collected during the RI. A total of 386 samples taken from 43 locations over a period of nine years and

several investigations were used to evaluate groundwater in the RI. Groundwater well locations are shown on Figure 5-5. The occurrence and distribution of detected constituents in groundwater are presented in Table 5-2. The more prevalent constituents detected in groundwater at the Facility consist of PCBs, parathion, 4-nitrophenol, 1,2-dichorobenzene, 1,4-dichlorobenzene, chlorobenzene, pentachlorophenol, o,o,o-triethylphosphorothioate, cobalt, manganese, and mercury.

PCBs have been detected in the vicinity of the WMA-II Corrective Action System. Unfiltered samples from observation wells OW-21/21A, OW-22 and OW-24 have reported detections of PCBs. The detections at OW-22 and OW-24 have generally been sporadic and low over the last eight years with a maximum concentration of 4.3 µg/L. The concentrations from unfiltered samples reported at OW-21/21A have been more consistent and higher. A maximum concentration of 7,400 µg/L was detected for the OW-21A samples collected in April 2004 and April 2005. The April 2010 sample was 344 ug/L. Temporary well, T-04, was installed as part of the RI Program to investigate potential upgradient source areas for the detections at OW-21A. PCBs were detected in an unfiltered sample from T-04 consistent with concentrations measured at OW-21A in the April 2007 event. However, no source areas were identified. MW-07, a well located immediately downgradient of OW-21A, was sampled and PCBs were not detected. The results from well T-09 (1.04 µg/L, estimated PCBs by the homolog method and non-detect for the Aroclor method) and well T-10 (non-detect for both the homolog method and the Aroclor method) provide a limit for the extent of PCB impacts in this area of the Facility.

Another area of unfiltered PCB detections is along the east side of the Facility. During semi-annual groundwater monitoring, PCBs have been detected in samples from observation wells OW-08/08A, OW-15, and OW-16/16A. For OW-08/08A, detections have been fairly consistent at concentrations generally ranging from about 8 µg/L to 29 µg/L. Outlier concentrations were reported as 600 µg/L in 2003, and 130 µg/Lin 2005, but were down to 1.69 ug/L in 2010. The 2003 concentration represented an increase from 11.5 µg/L in the previous sample, reducing to 11 µg/L in the subsequent sample, suggesting that the 600 µg/L result was spurious. For OW-15, the concentrations have been low and sporadic with six detected concentrations (maximum of 14.5 µg/L in 1999) for the last 18 samples analyzed. For OW-16/16A, detections have been fairly consistent at concentrations generally ranging from about 100 to 300 µg/L. The sample from RFI well OWR-05D, located within the capture zone of the SWMU 1 Corrective Action System, also had reported PCBs (210 µg/Lin 2010) in the unfiltered sample, but not in the filtered sample.

In the interior portion of the Facility, PCBs were reported in observation wells OWR-11, OWR-12, and OWR-13. Observation well OWR-11 was installed to evaluate the groundwater quality in the vicinity of the Phosphoric Acid Basins (SWMU-12) where PCBs were detected in the soil. PCBs were detected in the unfiltered sample at a concentration of 170 µg/L and in the filtered sample at 20 µg/L. Downgradient well OW-09 did not show an elevated concentration of PCBs indicative of impacts from SWMU-12. OW-10, also downgradient of OWR-11, had a concentration of 6.2 µg/L (estimated) of PCBs reported in the unfiltered sample. OW-10 is located at the perimeter of the manufacturing area; however, Solutia has also monitored

FIGURE 5-5: GROUNDWATER MONITORING WELL LOCATIONS

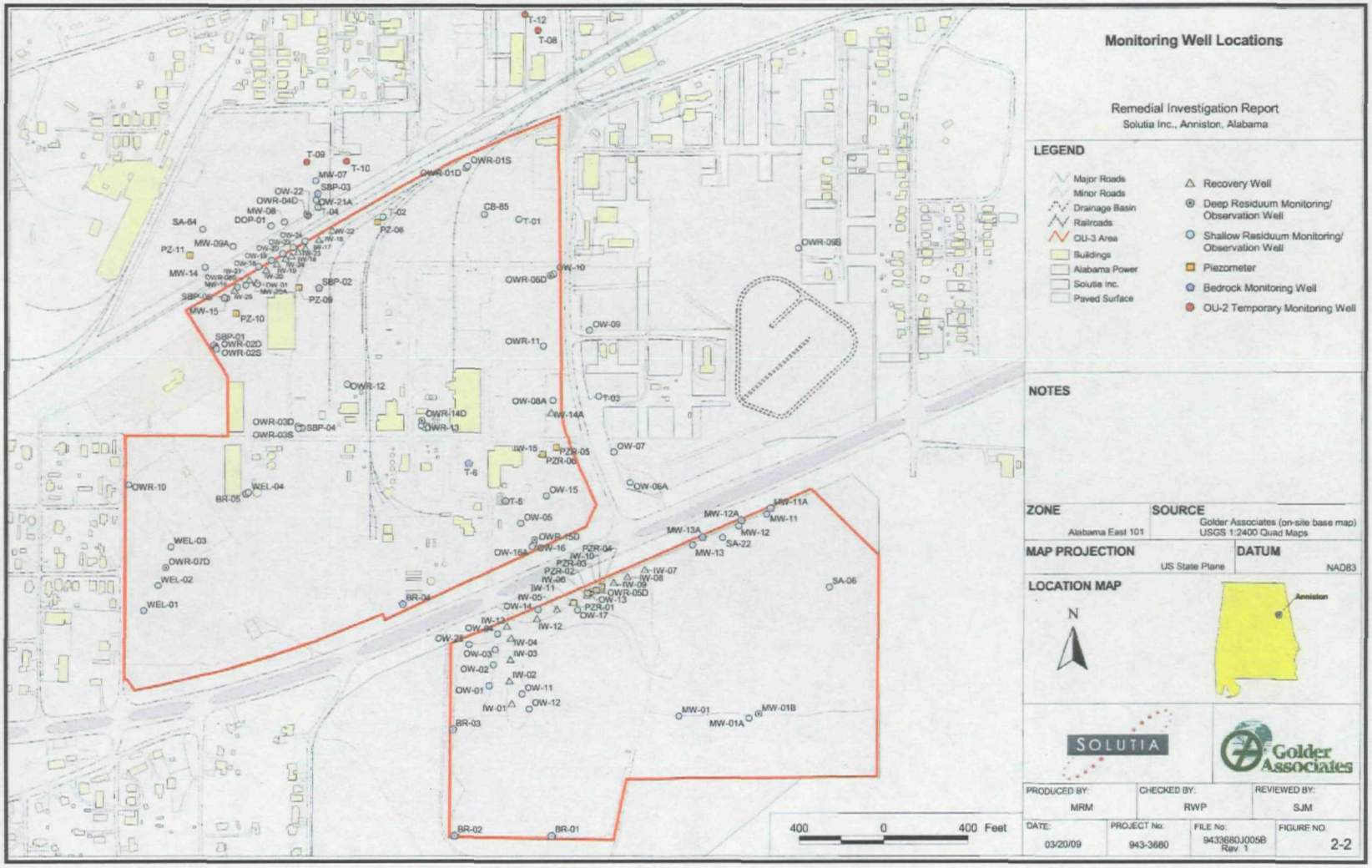


Table 5-2: OCCURRENCE AND DISTRIBUTION OF FACILITY CONSTITUENTS IN GROUNDWATER

Parameter Group	Constituent	CAS-ID	Unit	Minimum Concentration [7]	Maximum Concentration [5]	Mean Concentration	Location of Maximum Concentration	Most Recent Measurement from all Site Wells	Detection Frequency	Percentage of Detections	Range of Reporting Limits
PCBs, Pesticides and Dioxin	PCBs, Total [3]	1336-36-3	µg/L	0.32 J	15,500	97.7	OW-21A	ND - 190 J	90 / 368	24%	0.47 - 1,000
	4,4'-DDE	72-55-9	µg/L	0.14 JN	0.14 JN	0.014	OW-08A	ND - 0.14 JN	1 / 10	10%	0.094 - 9.5
	Dieldrin	60-57-1	µg/L	0.075 JN	0.075 JN	0.0075	OW-08A	ND - 0.075 JN	1 / 10	10%	0.094 - 95
	gamma-BHC	58-89-9	µg/L	0.1 J	0.56 JN	0.12	OW-08A	ND - 0.56 JN	3 / 10	30%	0.047 - 4.8
	Methyl parathion	298-00-0	µg/L	1.4 J	74 J	2.21	OW-21A	ND - 1.4 J	4 / 41	10%	0.5 - 500
	Parathion	56-38-2	µg/L	0.17 J	23,000	151.1	OW-21A	ND - 7,600	62 / 363	17%	0.94 - 1,100
	Tetraethyldithiopyrophosphate (Sulfotepp)	3689-24-5	µg/L	0.19 J	150	0.84	OW-21A	ND - 12	18 / 317	6%	0.47 - 500
	Dioxin TEQ [2]	NA	µg/L	5.6×10^{-8}	3.01×10^{-6} J	7.33×10^{-7}	OW-16A	5.6×10^{-8} - 3.01×10^{-6} J	4 / 10	40%	
VOCs	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	0.67 J	0.67 J	0.016	OW-08A	ND - 0.67 J	1 / 41	2%	1 - 50
	1,2,4-Trichlorobenzene	120-82-1	µg/L	0.8 J	1,200	121	OW-16A	ND - 1,200	3 / 10	30%	1 - 1
	1,4-Dichlorobenzene	106-46-7	µg/L	0.53 J	21	0.31	OWR-11	ND - 7.5 J	13 / 205	6%	1 - 2,000
	1,2-Dichlorobenzene	95-50-1	µg/L	1.2 J	39 J	1.70	OW-21A	ND - 39 J	30 / 205	15%	0 - 2,000
	Benzene	71-43-2	µg/L	0.77 J	0.77 J	0.08	OW-16A	ND - 0.77 J	1 / 10	10%	1 - 1
	Bromodichloromethane	75-27-4	µg/L	2	2	0.20	OW-10	ND - 2	1 / 10	10%	1 - 1
	Carbon tetrachloride	56-23-5	µg/L	2.5	2.5	0.25	OW-10	ND - 2.5	1 / 10	10%	1 - 1
	Chlorobenzene	108-90-7	µg/L	0.51 J	46	0.88	OWR-05D	ND - 3.4	42 / 306	14%	0 - 100
	Chloroform	67-66-3	µg/L	27	27	2.70	OW-10	ND - 27	1 / 10	10%	1 - 1
	cis-1,2-Dichloroethene	156-59-2	µg/L	10	10	1	T-4	ND - 10	1 / 10	10%	1 - 1
	Dibromochloromethane	124-48-1	µg/L	0.77 J	0.77 J	0.08	OW-10	ND - 0.77 J	1 / 10	10%	1 - 1
	Ethylbenzene	100-41-4	µg/L	2.1	2.1	0.21	OW-16A	ND - 2.1	1 / 10	10%	1 - 1
	Methylene chloride	75-09-2	µg/L	0.46 J	36	0.30	OWR-08S	ND	7 / 277	3%	5 - 500
	trans-1,2-Dichloroethene	156-60-5	µg/L	8.2	8.2	0.82	T-4	ND - 8.2	1 / 10	10%	1 - 1
	Tetrachloroethylene	127-18-4	µg/L	3.1	3.1	0.31	OW-10	ND - 3.1	1 / 10	10%	1 - 1
	Trichloroethylene	79-01-6	µg/L	3.4	10	1.3	OW-10	ND - 10	2 / 10	20%	1 - 1
	Xylenes (total)	1330-20-7	µg/L	6	6	0.6	OW-16A	ND - 6	1 / 10	10%	2 - 2
SVOCs	1,1'-Biphenyl	92-52-4	µg/L	170	170	17	OW-16A	ND - 17	1 / 10	10%	9.4 - 10
	2,4,5-Trichlorophenol	95-95-4	µg/L	1.5 J	18.2	0.378	MW-20A	ND - 4 J	11 / 288	4%	9.4 - 2,000
	2,4,6-Trichlorophenol	88-06-2	µg/L	3.4 J	25.1	1.04	MW-20A	6.7 J	19 / 290	7%	9.4 - 2,000
	2,4-Dichlorophenol	120-83-2	µg/L	.78 J	1.4 J	0.015	MW-20A	ND - 1.1 J	4 / 288	1%	9.4 - 2000
	4-Nitrophenol	100-02-7	µg/L	3.6 J	31,000	364	OW-21A	ND - 9,500	31 / 363	9%	24 - 19,000
	Acenaphthene	83-32-9	µg/L	0.73 J	0.73 J	0.073	T-4	ND - 0.73 J	1 / 10	10%	9.4 - 10
	Benzo(a)pyrene	50-32-8	µg/L	2.5 J	2.5 J	0.25	OW-08A	ND - 2.5 J	1 / 10	10%	9.4 - 10
	Benzo(b)fluoranthene	205-99-2	µg/L	2.1 J	2.1 J	0.21	OW-08A	ND - 2.1 J	1 / 10	10%	9.4 - 10
	Benzo(g,h,i)perylene	191-24-2	µg/L	2.1 J	2.1 J	0.21	OW-08A	ND - 2.1 J	1 / 10	10%	9.4 - 10
	Benzo(k)fluoranthene	207-08-9	µg/L	2.6 J	2.6 J	0.26	OW-08A	ND - 2.6 J	1 / 10	10%	9.4 - 10
	Butyl benzyl phthalate	85-68-7	µg/L	1.2 J	1.2 J	0.12	OW-16A	ND - 1.2 J	1 / 10	10%	9.4 - 10
	Caprolactam	105-60-2	µg/L	3.1 J	3.1 J	0.310	T-2	ND - 3.1 J	1 / 10	10%	9.4 - 10
	Dibenz(a,h)anthracene	53-70-3	µg/L	2.4 J	2.4 J	0.24	OW-08A	ND - 2.4 J	1 / 10	10%	9.4 - 10
	Dimethyl phthalate	131-11-3	µg/L	1.4 J	1.4 J	0.14	T-2	ND - 1.4 J	1 / 10	10%	9.4 - 10

Parameter Group	Constituent	CAS-ID	Unit	Minimum Concentration [7]	Maximum Concentration [5]	Mean Concentration	Location of Maximum Concentration	Most Recent Measurement from all Site Wells	Detection Frequency	Percentage of Detections	Range of Reporting Limits
	Indeno(1,2,3-cd)pyrene	193-39-5	µg/L	0.73 J	1.9 J	0.26	OW-08A	ND - 1.9 J	2 / 10	20%	9.4 - 10
	O,O,O-Triethylphosphorothioate	126-68-1	µg/L	1.3 J	530	7.780	OW-21A	ND - 530	81 / 363	22%	0- 2,000
	Pentachlorophenol	87-86-5	µg/L	1.2	95.4	1.9	MW-20A	8.8 J	20 / 290	7%	0.94 - 5,000
Metals	Aluminum	7429-90-5	mg/L	0.056 J	1.5	0.3446	OW-10	ND - 1.5	9 / 10	90%	0.20
	Antimony	7440-36-0	mg/L	0.0051 J	0.00051 J	0.0051 J	T-4	ND-0.0051 J	1 / 10	10%	0.02
	Arsenic	7440-38-2	mg/L	0.0044 J	0.0061 J	0.00026	T-4	ND - 0.0061 J	2 / 41	5%	0.01 - 0.1
	Barium	7440-39-3	mg/L	0.013 J	1.2	0.1578	OWR-05D	0.013 J - 0.092	36 / 41	88%	0.01 - 0.1
	Beryllium	7440-41-7	mg/L	0.00013 J	0.0068 J	0.00059	OWR-11/OW-10	ND - 0.005	15 / 41	37%	.004 - .04
	Cadmium	7440-43-9	mg/L	0.0016 J	0.0016 J	3.9E-05	OW-10	ND- 0.0016 J	1 / 41	2%	0.005 - 0.05
	Calcium	7440-70-2	mg/L	2.5	91	22.36	OW-10	2.5 - 91	10 / 10	100%	0.05
	Chromium	7440-47-3	mg/L	0.0012 J	0.057	0.00323	WEL-01	ND - 0.0089	9 / 41	22%	0.01 - 0.1
	Cobalt	7440-48-4	mg/L	0.00078 J	0.3	0.0191	OWR-11	ND - 0.24	119 / 313	38%	0.00071 - 0.01
	Copper	7440-50-8	mg/L	0.0021 J	0.014 J	0.0023	OW-10	ND - 0.014	4 / 10	40%	0.02
	Ferrous Iron	NA	mg/L	0.14	0.14	0.14	OWR-05D	ND - 0.14	1 / 9	11%	0.05 - 0.25
	Iron	7439-89-6	mg/L	0.03 J	1.7	0.2544	T-1	ND - 1.7	8 / 10	80%	0.05
	Lead	7439-92-1	mg/L	0.0022 J	0.033	0.00236	WEL-01	ND - 0.0092	8 / 41	20%	0.005 - 0.05
	Magnesium	7439-95-4	mg/L	1.3	34	7.03	OW-10	1.3 - 34	10 / 10	100%	0.5
	Manganese	7439-96-5	mg/L	0.02	12	1.053	OWR-12	0.02 - 1.5	38 / 41	93%	0.01 - 0.01
	Mercury	7439-97-6	mg/L	0.000081 J	0.05	0.00049	OW-10	ND - 0.0033	48 / 219	22%	0.0002 - 0.002
	Nickel	7440-02-0	mg/L	0.0023 J	0.082 J	0.0134	OWR-11	ND - 0.069	24 / 41	59%	0.004 - 0.4
	Phosphorus	7723-14-0	mg/L	0.039	6.8	0.76	OW-06A	ND - 6.8	2 / 9	22%	0.01 - 0.2
	Potassium	7440-09-7	mg/L	1.2	10	4.37	T-3	1.2 - 10	10 / 10	100%	1 - 1
	Sodium	7440-23-5	mg/L	6.5	58	19.39	OW-10	6.5 - 58	10 / 10	100%	1 - 1
	Vanadium	7440-62-2	mg/L	0.0019 J	0.081	0.0048	WEL-01	ND - 0.018	10/41	24%	0.01 - 0.1
	Zinc	7440-66-6	mg/L	0.0099 J	1.7	0.418	T-2	ND - 1.7	8 / 10	80%	0.02

Notes:

(1) Table defines ranges of detections for groundwater concentrations from 1998 to April 2007.
(2) Dioxin TEQ: ITEF TEQ calculated with ND=0 and EMPC=EMPC.
(3) Total PCBs were calculated based on using ND = 0 for individual Aroclors with no detections.
(4) Results from filtered samples were not used in the analysis.
(5) The maximum result from the original / duplicate pair was used in the analysis.
(6) ND = Non-detect. J = Estimated Value. JN = Tentatively Identified.
(7) Note that some analytes were detected below the laboratory reporting limits but above the method detection limits and have been qualified as estimated values.

groundwater downgradient from this location where total PCB concentration was non-detect for samples collected in August 2004. Observation well OWR-12 was installed to evaluate the groundwater quality in the vicinity of the Underground Product Storage Tanks where PCBs were detected in the soil. PCBs were detected at a concentration of 4.4 µg/L in the unfiltered sample, but were not detected in the filtered sample. PCB concentrations for samples collected from downgradient wells CB-85, T-02, and OWR-01S were non-detect. Observation well OWR-13 was installed to evaluate the groundwater quality in the vicinity of the former PCB Production Area (SWMU-42) and the Waste Drum Satellite Accumulation Area (SWMU-44) where PCBs were detected. PCBs were detected in the unfiltered sample at a concentration of 250 µg/L and in the filtered sample at 68 µg/L.

In 2005, OWR-14D was installed in the deep residuum in close proximity to OWR-13 (a shallow residuum well). The total PCB concentration for the sample collected in 2005 was 5 µg/L, which indicates that concentrations of PCBs in the deeper residuum are substantially attenuated as compared to the shallow residuum well OWR-13 (250 µg/L) in this area of the Facility. OWR-15D was installed in close proximity to OW-16A (a shallow residuum well) and downgradient of OWR-05D. Impacts were present at this location; however, the initial concentration of 128 µg/L in 2005 substantially decreased in the subsequent sampling event in 2006 to 8.4 µg/L. Additionally, downgradient locations of OWR-06D, OWR-01D, and OWR-04D all reported non-detect for PCBs when they were last sampled.

The October 2006 results for the two shallow bedrock wells (T-05 and T-06) installed between OWR-14D and OWR-15D, indicated total PCB concentrations of 2.9 µg/l and 3.2 µg/l, respectively. Filtered concentrations were below detection limit for T-05 and 1.3 µg/l for T-06. These analytical results verify the conclusion that although some vertical migration of PCBs is occurring, the residuum, due to its low permeability and high sorption capacity, is acting to greatly retard contaminant movement.

At the closed West End Landfill, WEL-01 had detections of PCBs for two of the eight samples that have been collected (0.69 µg/L for October 2002 and 0.66 µg/L for June 2005), but had no detections in the last four sampling events. The results for OWR-07D (a deep residuum well near the closed West End Landfill) indicated generally low PCB concentrations with results generally below 0.5 µg/L, but increased to 0.72 µg/L in June 2005.

To address the potential for colloidal transport as a mechanism for PCB migration in the residuum, samples filtered with a 2 micron filter were collected as part of the RCRA groundwater monitoring in April 2006. Samples from observation wells with historic detections of unfiltered PCBs (OW-08A, OW-16A, OW-21A, and OWR-15D) were collected for total PCB and filtered PCB analysis. The results indicate that PCBs were detected in unfiltered samples but were below detection limits in filtered (2 micron) samples, though detection limits were elevated above the allowable Maximum Contaminant Level (MCL) of 0.5 µg/L.

During a later investigation of site bedrock, filtered (2 micron and 0.1 micron) groundwater samples were collected from wells T-05 and T-06. These results indicated that either colloidal particles were present with PCBs adsorbed to the particles, or that PCBs were present in a

dissolved phase. Colloidal-size particles were also examined during the OU-1/OU-2 groundwater investigations where three different samples were obtained: unfiltered samples, after filtration with a 2 micron filter, and after filtration with a 0.1 micron filter. In general, these results indicate that colloidal-size particles were present in the groundwater samples. Consequently, colloidal transport appears to be, or has been, functioning to facilitate PCB migration for short distances. Altered groundwater chemistry when associated with a highly contaminated waste stream such as the ones that contributed to the phosphoric acid basins and landfilled waste mixtures likely resulted in colloidal transport. Once the groundwater chemistry is buffered or diluted, the colloidal particles fall out and no longer act as a transport mechanism and the PCB concentrations decrease to non-detect. Current data supports small localized plumes rather than a large coalesced plume.

In general, groundwater contamination was found downgradient of five areas: the South Landfill, the West End Landfill, the Old and New Limestone Beds, the North and South Phosphoric Acid Basins, and PCB production facility.

Downgradient of the South Landfill
Monitoring downgradient of the South Landfill, both North and South of Highway 202, is performed under the RCRA Permit. Additional sampling was performed during the RFI/CS, Supplemental RFI/CS, and RI. Various constituents have been reported over these sampling events, including: aluminum, barium, beryllium, calcium, copper, cobalt, copper, iron, magnesium, manganese, nickel, vanadium, potassium, sodium, zinc, total PCBs, methyl parathion, parathion, 1,1-biphenyl, 4-nitrophenol, butyl benzyl phthalate, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene, benzene, ethylbenzene, xylene, chlorobenzene, and o,o,o-triethylphosphorothioate, 4-4'DDE, dieldrin, gamma-BHC, benzo(a)pyrene,. benzo(b)fluoranthene, benzo(g,h,i)perylene benzo(k)fluoranthene dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and 1,1,2,2-tetrachlorethane.

Downgradient of the West End Landfill
Monitoring in the vicinity of the closed West End Landfill is not a requirement of the RCRA Permit. However, as part of the RFI/CS Program, semi-annual groundwater monitoring was conducted for a two-year period. The two-year monitoring was completed in 2004; one additional round of sampling was conducted as part of the RI Program in 2005. Contaminants detected include: barium, beryllium, chromium, cobalt, lead, manganese, mercury, nickel, vanadium and total PCBs.

Downgradient of the New and Old Limestone Bed Surface Impoundments
Monitoring in the vicinity of the New and Old Limestone Bed Surface Impoundments is performed semi-annually under the RCRA Permit. Additional sampling was performed during the RFI/CS, Supplemental RFI/CS, and RI. Various constituents have been reported over these sampling events, including: aluminum, arsenic, barium, beryllium, calcium, cobalt, iron, lead, magnesium, manganese, mercury, potassium, sodium, vanadium, zinc, 1,2 dichlorobenzene, 1,4 dichlorobenzene, 2,4,6-triclorophenol, pentachlorophenol, 4-nitrophenol, parathion, sulfotepp, and total PCBs.

Downgradient of the Phosphoric Acid Basins

There are three monitoring wells in the vicinity of the former Phosphoric Acid Basins. One is monitored under the RCRA permit. All three were sampled during the Supplemental RFI/CS and RI. Constituents reported over these sampling events, include: aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, mercury, potassium, sodium, vanadium, zinc, 4,4'-DDE, dieldrin, gamma-BHC, parathion, 1,2 dichlorobenzene, 1,4 dichlorobenzene, chlorobenzene, 1,2,4-trichlorobenzene, bromodichloromethane, carbon tetrachloride, chloroform, dibromodichloromethane, tetrachloroethylene, 1,1,2,2-tetrachloroethane, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and total PCBs.

Downgradient of PCB Production Facility

One shallow residuum well, one deep residuum well, and one shallow bedrock well are located near the former PCB production area and satellite waste storage area. Constituents detected in these wells include: arsenic, barium, beryllium, chromium, cobalt, lead, manganese, mercury, nickel, vanadium, pentachlorophenol, 1,2-dichlorobenzene, and total PCBs. PCB concentrations generally decrease with depth.

It should be noted that the groundwater contamination downgradient of the Old and New Limestone Beds has the highest chemical concentrations. The groundwater exposure point concentrations used in the risk assessment is, conservatively, the arithmetic average of the concentrations in the wells downgradient of the Old and New Limestone Beds (*i.e.*, MW-07, MW-09A, MW-14, MW-15, MW-16, MW-20A, MW-21A, and T-4) and not the 95% upper confidence limit concentrations.

5.6.4 Substances Detected in Surface Water

There are no surface water features at the Facility or Landfills. However, there are storm water features that discharge to surface water off the Facility. Surface water/storm water samples have been collected on a quarterly and semi-annual basis in accordance with the Facility's NPDES Permit (No. AL0001201). The historical locations of the NPDES outfalls are shown on Figure 5-6. Only one storm water outfall (DSN 012) is currently regulated at the Facility under a NPDES Permit, and one non-storm water discharge point, DSN 002, is regulated under a State Indirect Discharge Permit from the Facility's former waste water treatment plant (WWTP). Outfall DSN 012 discharges storm water flow from the plant site area, closed South Landfill, and east side properties. Storm water outfall DSN 012 is sampled quarterly for flow, pH, biological oxygen demand (BOD), chemical oxygen demand (COD), oil and grease, total suspended solids (TSS), total dissolved solids (TDS), and total PCBs. Total PCB concentrations measured from DSN 012, in 40 sampling events from 1997 through 2007, range from non-detect to 22 µg/L.

In addition to the NPDES Program, surface water samples were collected during the RFI/CS Program in June and July 1998 to assess the possible migration of constituents by surface water routes from the plant production areas. Two NPDES outfall points (DSN 004 and DSN 005) were sampled after precipitation events that produced enough water flow to the outfall points.

Arsenic (max. 11 µg/L), barium (max. 36 µg/L), and PCBs (max. 1.1 µg/L) were the only constituents detected of the 29 constituents analyzed. Other storm water outfalls at the plant that are no longer included as part of the plant NPDES Permit include:

DSN 001 – This storm water outfall historically served as a Facility process water discharge point. The discharge point was removed from the NPDES Permit after all process related water was re-routed to outfall DSN 002 and flow from the outfall was conveyed by piping to outfall DSN 012.

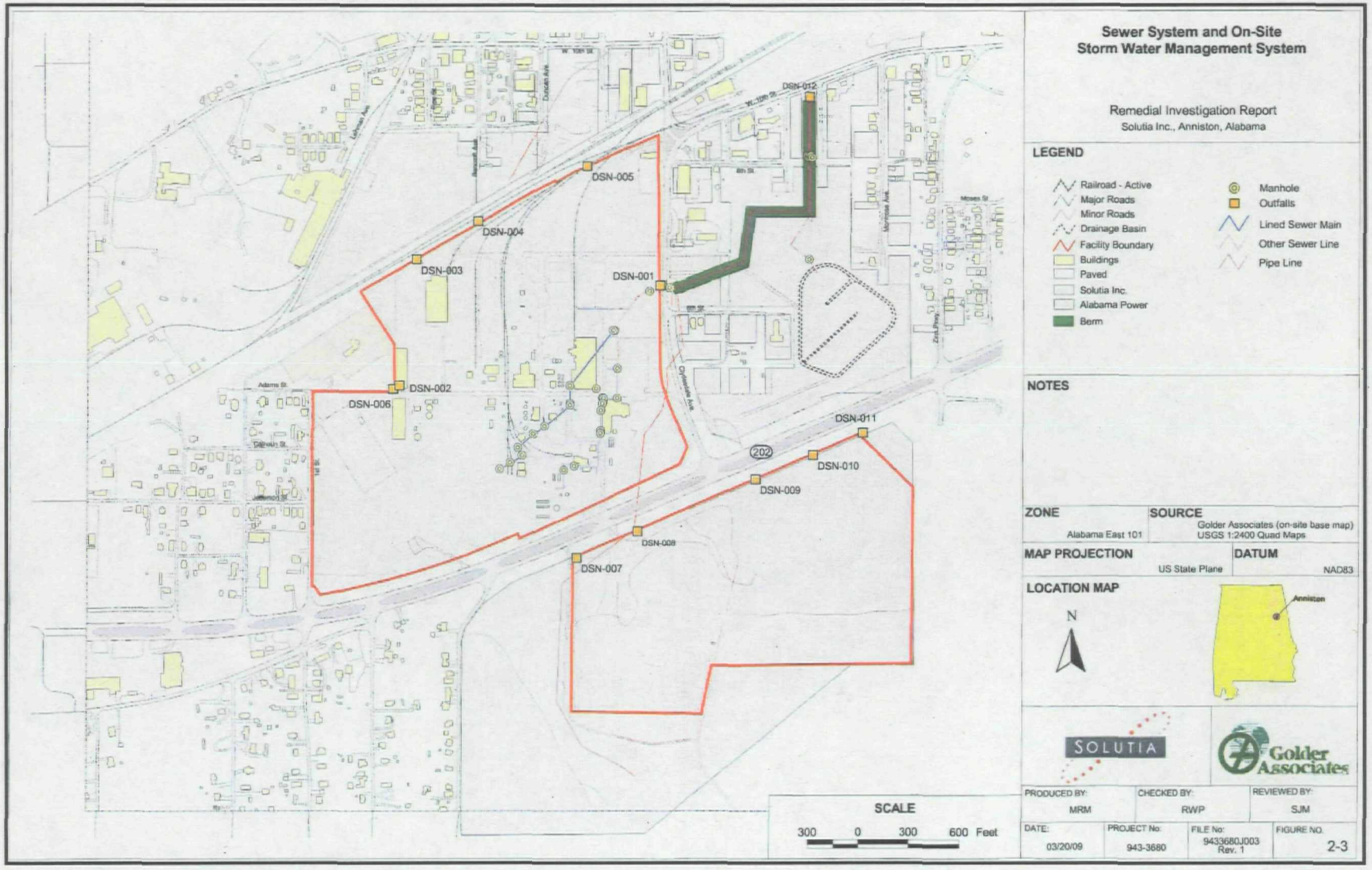
DSN 003 – No sampling has been conducted at DSN 003 since February 1994. At that time, no analytes were detected in the surface water sample collected at the outfall. More recent samples collected and analyzed from DSN 004 were representative of the outflow from this sample location. Based on these results, sampling of DSN 003 was discontinued under the NPDES Permit although the outfall continues to discharge stormwater.

DSN 004 – Since June 1998, PCB concentrations have been analyzed on four occasions at DSN 004; two events in 1998 for the RFI/CS Program and two events in 2001 under the NPDES Program. All results have been non-detect with the exception of one sample collected in June 1998 that had a total PCB detection of 1.1 µg/L. The June 1998 sample collected at DSN 004 was also analyzed for the full list of 29 contaminants identified under the RCRA Program. The only other constituents detected in this sample were arsenic at a concentration of 0.011 mg/l and barium at a concentration of 0.036 mg/l. BTEX (*i.e.*, the VOCs found in petroleum derivatives: benzene, toluene, ethylbenzene, and xylenes), 4-nitrophenol, and oil/grease were measured semi-annually at this outfall until October 2006 in accordance with the former NPDES Permit. None of these constituents were detected during these monitoring events. Although the outfall continues to discharge stormwater, sampling of this discharge point was discontinued following the shutdown of the 4-nitrophenol unit when the new NPDES Permit was issued in January 2007.

DSN 005 – A surface water sample was collected at DSN 005 in June 1998 during the RFI/CS Program and was analyzed for the full list of 29 contaminants identified under the RCRA Program. The only constituent detected in this sample was barium at a concentration of 0.013 mg/l. Based on these results, sampling of DSN 005 was discontinued under the NPDES Permit although the outfall continues to discharge stormwater.

DSN 006 – Prior to 2002, surface water samples were collected at DSN 006 on a quarterly basis in accordance with the Facility's NPDES Permit and analyzed for PCBs. Analytical results for samples collected from December 1997 to May 2001 (representative of 14 samples) showed no detections for PCBs. Based on these results and the completion of remedial work at the closed West End Landfill, sampling of DSN 006 was discontinued under the NPDES Permit although the outfall continues to discharge stormwater.

FIGURE 5-6: SEWER AND STORM WATER MANAGEMENT SYSTEM



DSN 007 thru 011 – These storm water outfalls were used to monitor surface water from the closed South Landfill. The outfalls were eliminated from the NPDES Permit when improvements were made to the storm water conveyance system on the closed South Landfill that converted these to internal outfalls, which all flow to outfall DSN 012.

DSN 012 – Surface water samples are collected at DSN 012 on a quarterly basis and analyzed for PCBs in accordance with the current NPDES Permit for the Facility. The PCB results for DSN 012 show that PCBs have only been detected three times over the past four years. A total of 11 sampling events were conducted during this period. The detections were 1.6 µg/L (estimated), 1.9 µg/L, and 16.0 µg/L. Oil and grease are also measured quarterly at this outfall in accordance with the NPDES Permit. There have been no detections for these constituents over the past four years. In conjunction with the NPDES Permit renewal process, in May 2006, an expanded list of parameters was analyzed for the sample collected from DSN 012. During this sampling event, benzene was the only contaminant detected in this sample at a concentration of 6.2 µg/L. An investigation and interim measures were completed under the Facility's NPDES Permit, and subsequent sampling confirmed the absence of benzene in this discharge. The internal Facility storm sewer system was investigated to locate the potential source of benzene-containing non-stormwater entering the drainage system. A previously-abandoned section of the storm sewer piping was identified as the source, and the discharge from the abandoned line was redirected to DSN 002 in accordance with provisions of the Facility's State Indirect Discharge Permit.

5.6.5 Substances Detected in Air

Air samples were collected at or near the Facility between 2000 and 2002 by both Solutia and the EPA. Sample locations are shown on Figure 5-7. The Facility samples were collected from Stations 1 through 5 during this time period; PCB concentrations generally declined except at Station 5, where one single high concentration of 89.7 nanograms per cubic meter (ng/m^3) caused the overall concentration to increase. The EPA samples were collected from Stations A through H, located from 0.25 to one mile from OU3; PCB concentrations were generally less than 10 ng/m^3. Since this is a decision document for OU3, only the Facility sampling is described below.

Air samples were collected as part of the RFI/CS from April 2003 to March 2004. The overall objectives of this air monitoring program were to: (1) evaluate the air pathway surrounding the Facility; and (2) assist in identifying PCB source areas not yet characterized near the Facility, if any, using an air pathway analysis approach. Two types of data, field data and laboratory analytical data, were collected. Field data included collecting the information necessary to calculate sampler air volumes, which are used to calculate ambient concentrations from the analytical results supplied from the laboratory. For each sample, the ambient PCB concentrations were calculated by dividing the weight of the desired compound per sample by the sample volume, giving the mass per unit volume in ambient air (ng/m^3). The calculations were made for each PCB congener class (mono through deca), and total PCBs were reported on a per sample basis by summing the values given for each of the ten congener classes. A value of zero was used to calculate the total PCBs for the congener classes reported as non-detect. Also,

total ambient PCB levels were assessed in conjunction with the meteorological monitoring data. Wind direction data facilitated evaluation of potential PCB source locations by comparing results from monitors mainly located upwind and downwind of the Facility during a given sampling session. In order to support the upwind/downwind evaluation, only data from sampling periods with consistent wind directions (16 of 24 sessions showed consistent wind directions) were used.

Ambient air PCB results from 2000 to 2004 for Stations 1 through 8 are provided in Table 5-3 (with the sampling locations shown on Figure 5-8). Average ambient PCB concentration levels at the eight sites monitored varied from 2.3 to 27.1 ng/m^3, with a maximum total PCB concentration for a single sampling date of 145.4 ng/m^3 measured at the Northwest sampler location.

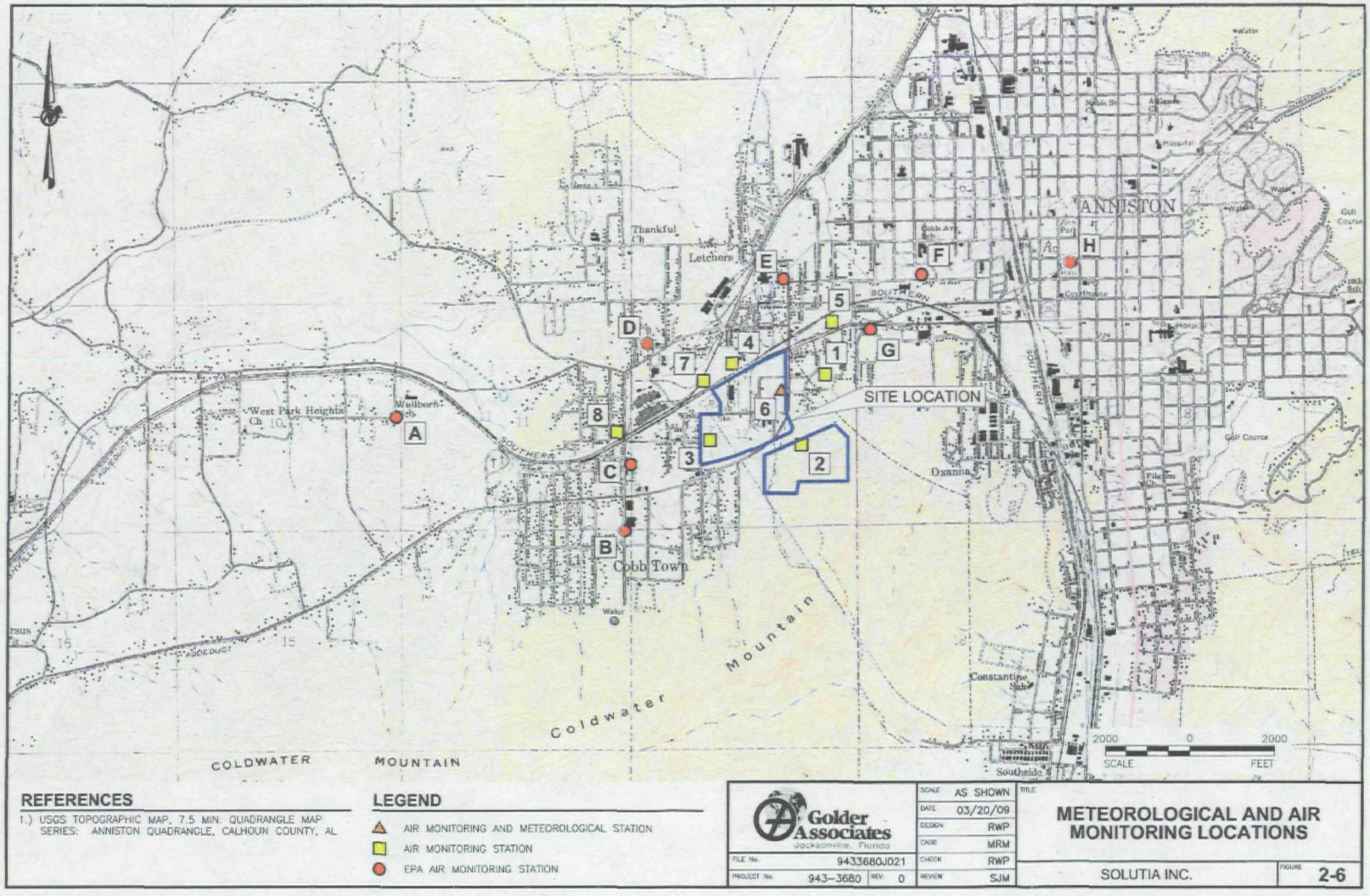
Volatilization and airborne suspension of PCB containing particles are mechanisms that transfer PCBs from existing source areas to the air pathway. These processes contribute to the vapor phase and particulate-associated partitions of total ambient PCB levels. In order to measure the vapor and particle partitioning of PCBs, 16 samples were collected at the Near East sampler location and subjected to separate analysis of the filter and polyurethane foam/sorbent media. PCBs were not detected on the filter (particulate) in any of the samples taken during different months and temperature ranges. The only PCBs found were measured in the polyurethane foam/sorbent (vapor phase) media. This indicates that the ambient PCBs appear almost exclusively in the vapor phase in the area surrounding the Facility. Therefore, the transport mechanism is volatilization and not the suspension of fugitive dust.

Congener analysis can provide information on potential sources of PCBs. PCBs are a combination of 209 congeners. The 209 congeners can be grouped based on the number of chlorines (1 through 10, or mono through deca) that are attached to the biphenyl molecule. The mono through deca PCB profile for this study showed that ambient PCB concentrations for the tri-substituted congener class and above (congeners with three or more chlorines attached) increased with temperature. The mono- and di-substituted PCBs (congeners with one or two chlorines attached) did not seem to vary with temperature.

Ambient air monitoring was conducted at both the closed South Landfill and closed West End Landfill. There were low overall PCB concentrations measured at the 2-South and 3-West monitoring locations. These monitoring locations were located predominantly downwind of the landfills, indicating that neither airborne particulate suspension nor evaporation are active mechanisms for transport of PCBs from source areas to the air pathway at the two landfills.

The data also indicated that potential PCB source areas exist both at the Facility and off the Facility. During many sampling sessions, monitors upwind from the Facility measured the maximum PCB concentration suggesting PCB source areas were off the Facility. However, during other sampling sessions, monitors downwind of the Facility showed higher PCB concentrations indicating PCB sources were on the Facility. The RFI/CS Air Monitoring Report concluded that the lack of correlation between temperature and levels of lighter, more volatile congeners indicated that the lighter PCBs are from outside the Facility.

FIGURE 5-7: METEOROLOGICAL AND AIR MONITORING LOCATIONS



REFERENCES

1.) USGS TOPOGRAPHIC MAP, 7.5 MIN. QUADRANGLE MAP SERIES: ANNISTON QUADRANGLE, CALHOUN COUNTY, AL.

LEGEND

- AIR MONITORING AND METEOROLOGICAL STATION
- AIR MONITORING STATION
- EPA AIR MONITORING STATION

Golder Associates
Jacksonville, Florida

SCALE	AS SHOWN
DATE	03/20/09
DESIGN	RWP
CADD	MRM
CHECK	RWP
REVIEW	SJM
FILE No.	9433680J021
PROJECT No.	943-3680 REV. 0

TITLE: METEOROLOGICAL AND AIR MONITORING LOCATIONS

SOLUTIA INC.

FIGURE 2-6

TABLE 5-3: AMBIENT AIR PCB MONITORING RESULTS

Sampling Date (c)	Session Number (d)	Units	1 East		2 South	3 West	4 North	5 Northeast	6 Near East (b)	7 Northwest			8 Far West
			Primary	Collocated						Night	Day	24-Hr (g)	
01/25-26/2000	NA	ng/m^3	0.0	0.0	17.4	0.8	2.1	0.0	NM	NM	NM	NM	NM
01/26-27/2000	NA	ng/m^3	0.6	0.6	NM	9.7	2.6	1.2	NM	NM	NM	NM	NM
02/24-25/2000	NA	ng/m^3	0.0	0.1	NM	0.4	16.1	11.4	NM	NM	NM	NM	NM
02/28-29/2000	NA	ng/m^3	1.0	NM	2.1	2.8	23.2	9.2	NM	NM	NM	NM	NM
03/27-28/2000	NA	ng/m^3	22.1	20.3	6.6	24.1	43.5	16.0	NM	NM	NM	NM	NM
03/28-29/2000	NA	ng/m^3	9.9	NM	6.4	7.2	37.4	10.3	NM	NM	NM	NM	NM
04/28-29/2000	NA	ng/m^3	9.9	NM	15.6	43.4	68.8	8.6	NM	NM	NM	NM	NM
04/29-30/2000	NA	ng/m^3	9.9	9.3	9.3	20.5	63.5	7.5	NM	NM	NM	NM	NM
05/20-21/2000	NA	ng/m^3	9.8	NM	14.5	22.4	NM	34.7	NM	NM	NM	NM	NM
05/21-22/2000	NA	ng/m^3	16.2	17.0	20.1	19.0	NM	27.4	NM	NM	NM	NM	NM
06/27-28/2000	NA	ng/m^3	4.6	3.9	3.7	2.6	96.9	14.1	NM	NM	NM	NM	NM
06/28-29/2000	NA	ng/m^3	8.8	NM	10.1	14.9	116.0	19.0	NM	NM	NM	NM	NM
07/25-26/2000	NA	ng/m^3	0.6	0.7	0.5	2.7	4.3	5.2	NM	NM	NM	NM	NM
07/26-27/2000	NA	ng/m^3	2.1	NM	3.0	12.6	77.4	16.4	NM	NM	NM	NM	NM
08/22-23/2000	NA	ng/m^3	NM	NM	0.2	0.2	6.8	NM	NM	NM	NM	NM	NM
08/23-24/2000	NA	ng/m^3	6.6	NM	5.7	10.3	36.9	8.0	NM	NM	NM	NM	NM
09/27-28/2000	NA	ng/m^3	2.8	NM	5.3	7.5	21.0	3.8	NM	NM	NM	NM	NM
09/28-29/2000	NA	ng/m^3	5.2	5.9	3.8	11.7	52.3	10.4	NM	NM	NM	NM	NM
10/25-26/2000	NA	ng/m^3	9.4	NM	5.5	4.3	4.8	9.9	NM	NM	NM	NM	NM
10/26-27/2000	NA	ng/m^3	9.0	8.8	10.1	13.2	30.7	17.6	NM	NM	NM	NM	NM
11/27-28/2000	NA	ng/m^3	4.0	NM	4.4	16.7	16.7	5.7	NM	NM	NM	NM	NM
11/28-29/2000	NA	ng/m^3	4.8	3.2	1.9	6.8	13.7	11.5	NM	NM	NM	NM	NM
12/19-20/2000	NA	ng/m^3	1.4	2.1	2.8	7.5	0.2	2.7	NM	NM	NM	NM	NM
12/20-21/2000	NA	ng/m^3	0.2	NM	0.1	1.8	2.8	2.1	NM	NM	NM	NM	NM
01/16-17/2001	NA	ng/m^3	0.5	0.4	0.7	8.0	1.4	3.1	NM	NM	NM	NM	NM
01/17-18/2001	NA	ng/m^3	0.0	NM	0.0	1.7	0.1	2.2	NM	NM	NM	NM	NM

Sampling Date (c)	Session Number (d)	Units	1 East		2 South	3 West	4 North	5 Northeast	6 Near East (b)	7 Northwest			8 Far West
			Primary	Collocated						Night	Day	24-Hr (g)	
05/15-16/2001	NA	ng/m^3	7.5	7.4	15.4	36.1	10.3	30.2	NM	NM	NM	NM	NM
05/16-17/2001	NA	ng/m^3	13.8	NM	15.1	24.1	52.6	18.7	NM	NM	NM	NM	NM
06/18-19/2001	NA	ng/m^3	0.5	0.4	0.7	0.7	2.0	25.9	NM	NM	NM	NM	NM
06/19-20/2001	NA	ng/m^3	1.0	NM	1.5	3.2	4.0	13.2	NM	NM	NM	NM	NM
07/18-19/2001	NA	ng/m^3	0.0	9.2	13.8	14.8	17.1	13.7	NM	NM	NM	NM	NM
07/19-20/2001	NA	ng/m^3	27.3	NM	39.2	18.2	18.3	17.3	NM	NM	NM	NM	NM
08/15-16/2001	NA	ng/m^3	4.2	3.8	6.9	11.1	7.7	10.7	NM	NM	NM	NM	NM
08/16-17/2001	NA	ng/m^3	7.9	NM	8.9	16.4	18.4	20.2	NM	NM	NM	NM	NM
09/18-19/2001	NA	ng/m^3	0.1	0.1	0.1	0.6	1.3	5.6	NM	NM	NM	NM	NM
09/19-20/2001	NA	ng/m^3	3.0	NM	1.8	2.2	11.3	7.0	NM	NM	NM	NM	NM
10/16-17/2001	NA	ng/m^3	10.1	0.2	4.7	7.9	17.1	3.3	NM	NM	NM	NM	NM
10/17-18/2001	NA	ng/m^3	5.5	NM	1.3	2.2	16.8	3.1	NM	NM	NM	NM	NM
11/14-15/2001	NA	ng/m^3	1.5	0.2	1.1	3.4	21.3	2.6	NM	NM	NM	NM	NM
11/15-16/2001	NA	ng/m^3	9.6	NM	4.5	9.8	16.9	2.6	NM	NM	NM	NM	NM
12/12-13/2001	NA	ng/m^3	0.2	0.0	0.3	0.2	0.8	12.7	NM	NM	NM	NM	NM
12/13-14/2001	NA	ng/m^3	1.0	NM	0.8	0.8	2.8	7.3	NM	NM	NM	NM	NM
01/15-16/2002	NA	ng/m^3	6.3	NM	NM	6.4	9.2	3.2	NM	NM	NM	NM	NM
01/16-17/2002	NA	ng/m^3	3.1	NM	2.2	4.1	11.2	3.6	NM	NM	NM	NM	NM
02/20-21/2002	NA	ng/m^3	7.1	7.0	4.0	4.9	19.8	7.8	NM	NM	NM	NM	NM
02/21-22/2002	NA	ng/m^3	7.4	NM	2.8	4.4	14.2	5.8	NM	NM	NM	NM	NM
03/13-14/2002	NA	ng/m^3	4.4	4.6	5.8	9.5	13.9	9.7	NM	NM	NM	NM	NM
03/14-15/2002	NA	ng/m^3	0.0	NM	0.0	0.3	1.6	9.3	NM	NM	NM	NM	NM
04/17-18/2002	NA	ng/m^3	7.9	7.7	9.5	11.2	22.4	11.4	NM	NM	NM	NM	NM
04/18-19/2002	NA	ng/m^3	6.6	NM	8.7	8.5	19.1	12.7	NM	NM	NM	NM	NM
05/20-21/2002	NA	ng/m^3	7.6	6.5	8.2	9.7	45.8	7.6	NM	NM	NM	NM	NM
05/21-22/2002	NA	ng/m^3	6.2	NM	6.3	10.0	55.3	10.1	NM	NM	NM	NM	NM
06/17-18/2002	NA	ng/m^3	4.2	4.0	8.3	7.7	17.7	8.4	NM	NM	NM	NM	NM
06/18-19/2002	NA	ng/m^3	1.1	NM	2.0	NM	2.8	12.5	NM	NM	NM	NM	NM

Sampling Date (c)	Session Number (d)	Units	1 East		2 South	3 West	4 North	5 Northeast	6 Near East (b)	7 Northwest			8 Far West
			Primary	Collocated						Night	Day	24-Hr (g)	
07/09-10/2002	NA	ng/m^3	4.5	4.6	8.6	7.6	7.6	9.4	NM	NM	NM	NM	NM
07/20-21/2002	NA	ng/m^3	7.4	NM	16.2	14.0	14.6	89.7	NM	NM	NM	NM	NM
08/12-13/2002	NA	ng/m^3	1.5	1.4	5.4	10.9	9.3	6.6	NM	NM	NM	NM	NM
08/13-14/2002	NA	ng/m^3	15.0	NM	12.1	18.1	15.1	13.6	NM	NM	NM	NM	NM
09/16-17/2002	NA	ng/m^3	9.7	9.9	10.3	16.1	14.4	13.3	NM	NM	NM	NM	NM
09/17-18/2002	NA	ng/m^3	2.9	NM	3.6	10.0	9.1	45.0	NM	NM	NM	NM	NM
10/14-15/2002	NA	ng/m^3	0.0	0.0	0.0	0.3	0.0	NM	NM	NM	NM	NM	NM
10/16-17/2002	NA	ng/m^3	0.6	NM	3.8	5.7	0.0	0.6	NM	NM	NM	NM	NM
11/18-19/2002	NA	ng/m^3	1.0	0.7	0.4	1.3	2.2	5.5	NM	NM	NM	NM	NM
11/19-20/2002	NA	ng/m^3	2.8	NM	2.5	6.8	7.9	8.1	NM	NM	NM	NM	NM
12/16-17/2002	NA	ng/m^3	2.3	2.4	2.4	9.2	25.1	11.6	NM	NM	NM	NM	NM
12/17-18/2002	NA	ng/m^3	0.0	NM	0.0	0.0	0.3	4.4	NM	NM	NM	NM	NM
4/15/2003	106	ng/m^3	ND	ND	0.3	0.6	12.9	8.5	14.3	3.4	7.2	5.5	10.9
4/16/2003	107 (e)	ng/m^3	ND	a	ND	ND	9.4	3.1	0.9	0.2	6.1	3.1	0.4
5/20/2003	108	ng/m^3	ND	ND	ND	ND	13.8	2.9	4.8	3.2	1.6	2.4	0.1
5/21/2003	109	ng/m^3	1.8	a	3.5	5	5	3.9	77.3	9.3	2.4	5.9	27.5
6/17/2003	110	ng/m^3	1.5	1.6	1.2	3.4	17.4	17.1	33.2	9.4	11.8	10.8	16.1
6/18/2003	111	ng/m^3	12.6	a	9.1	9.4	36.9	30.7	85.9	68.2	14.7	41.4	12.8
7/14/2003	112	ng/m^3	1.5	1.2	2.7	4.9	13.8	9.8	32.8	10.4	14.2	12.5	13.4
7/15/2003	113	ng/m^3	6.6	a	7.1	11.7	21.1	12.1	54.8	34.2	51.1	44.3	21.5
8/13/2003	114	ng/m^3	0.5	0.3	0.4	1.8	33	10.9	17.1	8.9	9.1	9.0	6.1
8/14/2003	115	ng/m^3	3.4	a	2.5	7.7	49.6	20	72.6	101.9	7.4	59.3	23.3
9/9/2003	116	ng/m^3	0.4	0.4	1.9	6.8	19.1	6.8	15.6	18.9	9.8	14.3	13.6
9/10/2003	117	ng/m^3	ND	a	0.2	2.7	12.9	6.5	10.7	2.8	15.5	8.2	26.6
10/21/2003	118	ng/m^3	22.5	22.8	10.2	3.2	79.2	22.5	44.9	a	a	145.4	12.1
10/22/2003	119	ng/m^3	9.9	a	5.6	17.5	40.7	9.9	34.4	a	a	54.5	9.9
11/18/2003	120	ng/m^3	ND	ND	0.1	0.6	9.9	3.8	4.9	a	a	9.8	1.3
11/19/2003	121	ng/m^3	1.8	a	0.2	0.5	21.5	16.9	11.9	a	a	32.1	1.1

Sampling Date (c)	Session Number (d)	Units	1 East		2 South	3 West	4 North	5 Northeast	6 Near East (b)	7 Northwest			8 Far West
			Primary	Collocated						Night	Day	24-Hr (g)	
12/9/2003	122	ng/m^3	ND	ND	ND	ND	3.9	4.4	3.3	a	a	3.0	0.2
12/10/2003	123	ng/m^3	1.1	a	2.6	1.9	3.3	0.5	8.5	a	a	13.1	ND
1/13/2004	124	ng/m^3	9.1	9	4.7	3.6	25.4	12.7	55.2	a	a	48.5	15.8
1/14/2004	125	ng/m^3	3.9	a	1.7	5.9	35.8	8.4	33.6	a	a	54.4	2.8
2/24/2004	126	ng/m^3	ND	ND	0.3	1.2	3.9	3.5	21.7	a	a	2.6	35.2
2/25/2004	127	ng/m^3	ND	a	ND	ND	1.7	f	8.4	a	a	0.4	0.2
3/23/2004	128	ng/m^3	ND	ND	ND	ND	2.5	1.8	2.0	a	a	1.8	1.7
3/24/2004	129	ng/m^3	ND	a	ND	ND	6.4	3.9	1.8	a	a	2.7	0.9
AVERAGE			5.3	4.7	5.5	8.3	20.2	11.3	27.1	22.6	12.6	24.4	11.0

Notes:

a - Not sampled; collocated sample collected once per month per RFI/CS Air Monitoring Plan.

b - Filter and PUF fractions were analyzed separately for samples collected April through September, February and March; results reported are combined for the two fractions.

(all filter analyses were reported as ND).

c - Start date; samplers operated nominally for 24 hour period.

d - Sampling session numbering scheme continued from regimen used for previous monitoring at the site.

e - 6-Near East location mistakenly operated as nocturnal sampler.

f - Power interruption led to sample invalidation; sample not analyzed.

g - Time weighted average of day/night results used to calculate "24-hour" value for samples collected April through September 2003 at the Northwest site.

ng/m^3 = nanograms per cubic meter.

ND = not detected.

NA= not applicable.

NM= not measured.

5.7 Contaminant Fate and Transport

The fate and transport characteristics for the prevalent constituents in groundwater were reviewed and the potential migration routes were considered. Releases from impacted areas to groundwater are possible with infiltration though permeable cover systems into impacted soil. Surface water is controlled on site via a system of sewers and ditches. All process related water is piped to the Facility's former WWTP and then discharged to the Anniston publically-owned treatment works (POTW). Precipitation falling at the Facility is collected in ditches and discharged primarily via an NPDES-regulated outfall. Consequently, constituent concentrations in surface water have been sporadic and low.

Groundwater migration is controlled by natural and man-made means. Migration is limited because the rate of groundwater flow is very low and there are natural attenuation processes for parathion and 4-nitrophenol and natural adsorption for PCBs and metals. These natural processes combined with the existing corrective action systems control the migration of constituents from SWMUs at the Facility.

The contaminant migration behavior for the constituents present was reviewed. Adsorption primarily controls the PCB distribution. With a low solubility and a high partitioning coefficient, PCBs are not very mobile in groundwater. As a result, areas with PCBs detected in groundwater are generally localized and represent a number of discrete releases, instead of wide-spread occurrences. 4-nitrophenol and parathion are more mobile in groundwater, however, both degrade biologically. Volatile organic compounds and semi-volatile organic compounds (with the exception of 4-nitrophenol as described above) are not prevalent across the Facility and only isolated detections have been reported.

The prevalent metals at the Facility have varying degrees of mobility. For instance, mercury has a high partitioning coefficient limiting its mobility, while manganese's mobility varies widely depending on the cation exchange capacity. However, as indicated in this section, the clay soils and the relatively low concentrations measured for many of the metals act to limit mobility at the Facility. Groundwater migration from the closed South Landfill and the SWMUs in the vicinity of WMA-II are currently being addressed by two groundwater corrective action systems.

Overall, contaminant migration to groundwater has developed as a function of several mechanisms: (1) free phase transport; (2) colloidal transport; and (3) dissolved phase transport. In the early days of production at the Facility, free phase material was likely present in the area of the former PCB production area. Soil sample contaminant concentrations reported during the RCRA investigation were high and indicative of free phase. Removal of non-aqueous phase liquid (NAPL)-saturated soil was performed during the RCRA activities, but during the 42 years of PCB production free phase transport was likely. Wells are installed in the area of the Former PCB Production area and the Waste Drum Satellite Accumulation Area that show concentrations ranging from 250 µg/L (at 36 feet depth) to 3.2 µg/L (at 125 feet depth). During the installation of wells, no NAPL-saturated soil was observed and concentration data from immunoassays performed during the boring activities confirmed this observation. Therefore, while free phase transport likely occurred in the past near the former PCB production area, only the residual

effects of that transport remain at the Facility.

The presence of colloidal material has been noted in a number of monitoring wells. Filtration using a series of filters, from a 2-micron filter down to a 0.1-micron filter, was used to demonstrate that colloidal material exists and is the probable explanation for high PCB concentrations in areas where no free phase transport is present. Inorganic colloids of manganese and iron found in groundwater can act as sorptive surfaces for PCBs to attach and become transported colloidally. Both manganese and iron are present in higher concentrations at the Facility, and concentration data indicates a relationship between PCB concentrations with manganese and iron concentrations. It also appears that while colloid mobilization, along with associated contaminants, probably does occur, there are several physicochemical mechanisms that might limit colloid migration significantly beyond the point of generation. Similar to the transport of colloids in landfill leachate, the data indicates that colloid concentrations in groundwater decrease rapidly with distance from the source. Field observations during groundwater well installation and sampling events point to the potential transience of colloid mobilization in the subsurface at the Facility. In the areas of the Limestone Beds, the Phosphoric Acid Basins and both Landfills, it appears that water infiltrated into an anoxic environment in the subsurface, thus creating a condition that leads to the development of colloidal material to which the PCBs are attached and transported to groundwater. Then, as the distance from the source increases, the physiochemical conditions change and the colloidal concentrations decrease.

Dissolved phase transport and migration has occurred at the Facility also. Filtered and unfiltered data demonstrate that PCBs are present in a dissolved phase at some locations. Conventionally, however, PCB sorption is high because of the hydrophobic nature of the PCBs as well as the higher soil/water distribution coefficient. The result is that large diffuse plumes are not present at the Facility. Soil textures at the Facility are silty clays and clays, so the sorption capacity of the subsurface soil is very high and migration is limited. For example, in the area of the West Landfill where concentrations are at the 0.36 to 0.66 µg/L, impacted groundwater would occupy an area of about 0.21 acres. Around the Old and New Limestone Bed area and OW-21A the area of impacted groundwater is about 0.31 acres. Both of these areas are shallow groundwater (29 feet to 35 feet in depth) contained in a very low yielding aquifer (0.1 to 0.5 gpm).

In summary, PCBs are found in groundwater at OU3. The former PCB production was likely a source of free phase transport in the past, but no current free phase transport was found during the investigation. The altered physicochemical conditions at the Landfills and neutralization basins (the Limestone Beds and the Phosphoric Acid Basins) have resulted in colloidal transport; however, migration of colloidal material appears to be very limited. Finally, although dissolved phase transport has been documented, the nature of the aquifer and the contaminants has resulted in small discrete plumes.

5.8 Natural Attenuation

Natural attenuation involves the combined effects of dispersion, dilution, adsorption, abiotic transformation (*e.g.*, hydrolysis), volatilization and biological degradation. These mechanisms can effectively reduce contaminant toxicity to levels that are protective of human health and the

environment. Abiotic transformation and biodegradation are important "destructive" attenuation mechanisms as they typically transform the constituent to less toxic compounds, and can ultimately result in the complete degradation of a compound to benign end products.

During the RFI/CS Program, Solutia investigated natural attenuation to determine its potential viability as a remediation process for parathion and 4-nitrophenol in the vicinity of the closed South Landfill. Since there is a significant amount of historical parathion data for the Facility, parathion was used as a surrogate to understand if natural attenuation may be occurring at the Facility. As 4-nitrophenol is a degradation product of parathion, the demonstration that parathion naturally attenuates can also be used to demonstrate that 4-nitrophenol would naturally degrade. A literature review was performed to determine the possible breakdown pathways of parathion. Parathion is the common term for organophosphate o,o-diethyl-o-4-nitrophenyl phosphorothioate. This compound contains carbon, oxygen, hydrogen, sulfur, and phosphorus. Review of chemical and microbiological processes suggests that microorganisms incorporate carbon and phosphorus from the parathion into their cell structure. The parathion is biodegraded to 4-nitrophenol which biodegrades to carboxylic acid by mineralization of nitrogen and breaking of the six-member carbon ring. The sulfur is released from the organic molecule as a reactive species, which is immediately scavenged by the cations in the soil.

The three tiers or "lines of evidence" that can be used to support the natural attenuation of parathion and 4-nitrophenol are:

- An observed reduction of chemical concentrations within specific wells downgradient from source areas;
- Hydrogeologic and geochemical data that indirectly demonstrates natural attenuation processes are active at the Facility; and
- Microbiological laboratory or field data that support the occurrence and rate of biodegradation.

From 1989 data, parathion concentrations in the hundreds of µg/L were measured in recovery wells at the closed South Landfill (IW-10 at 487 µg/L, IW-07 at 238 µg/L, IW- 09 at 168 µg/L, and IW-08 at 145 µg/L). In 1996, concentrations in these wells had decreased substantially (highest concentration at IW-07 at 37.3 µg/L). The only downgradient detection was at OW-16 at 7.6 µg/L. The RI 2005 data indicate further reduction at the closed South Landfill to below detection limits for monitoring wells in the area. Therefore, ample evidence is available showing an observed reduction of chemical concentrations within specific wells downgradient from source areas.

For parathion, the loss of mass can be calculated by examining the areal concentration reductions. In 1989, the area bounded by 0.1 mg/L, was approximately 24,400 square feet (sq ft). The area bounded by the 0.001 mg/L contour was approximately 253,100 sq ft. In 1996, the area bounded by the 0.001 mg/L contour had contracted to approximately 126,200 sq ft. Mass can be calculated by multiplying a representative concentration (mass per unit volume - µg/L) times the volume. The volume of water represented by the contours can be calculated as the area times depth times porosity. For this calculation, the depth was estimated at 35 feet and the

porosity at 30%. Consequently, from 1989 to 1996, the mass of parathion in the vicinity of the SWMU-1 Corrective Action System decreased by 85%. For more recent data, the number of wells where parathion has been detected has decreased providing further evidence of a decrease in parathion mass.

Predictions of the rate of natural attenuation and the length of time to achieve groundwater cleanup can be estimated from these data points. Based on a first order decay of mass reduction, the estimated decay rate is approximately 12% per year in terms of decreasing mass of parathion.

A similar analysis was conducted for 4-nitrophenol. The observed reduction of 4-nitrophenol concentrations can be seen within specific wells at the closed South Landfill. The loss of mass can be calculated by examining the concentration reductions. In 1989, the contour interval represented by 0.1 mg/L, was approximately 24,400 sq ft. The area bounded by the 0.001 mg/L contour was approximately 253,100 sq ft. In 1996, the area bounded by the 0.001 mg/L contour had contracted to approximately 126,200 sq ft. Mass can be calculated by multiplying a representative concentration (mass per unit volume - µg/L) times the volume. The volume of water represented by the contours can be calculated as the area times depth times porosity. For this calculation, the depth was estimated at 35 feet and the porosity at 30%. The relative parameters used in the calculation and the resulting mass reduction are provided in the table below. Consequently, from 1989 to 1996, the mass of 4-nitrophenol in the vicinity of the SWMU-1 Corrective Action System decreased by 95%.

Predictions of the rate of natural attenuation and the length of time to achieve groundwater cleanup can be estimated from these data points. Based on a first order decay of mass reduction, the estimated decay rate is approximately 35% per year in terms of the decreasing mass of 4-nitrophenol.

While the first line of evidence strongly supports monitored natural attenuation for parathion and 4-nitrophenol, the second line of evidence is the geochemical environment. Parathion and 4-nitrophenol degrade anaerobically. This is the same geochemical environment that promotes reductive dechlorination of chlorinated solvents and as such, much of the same analysis can be used to determine if strong reducing conditions exist that could be causing the natural attenuation of parathion by reduction.

In general, strong evidence of a reducing environment is indicated by: dissolved oxygen less than 0.9 mg/l; redox (eH) measurements less than 0 mv; nitrate less than 1 mg/l; iron II greater than 1 mg/l; sulfate less than 20 mg/l; sulfide greater than 1 mg/l; and alkalinity greater than two times background.

During the RFI, each of these indicator parameters were collected at nine wells across the Facility. The wells included: CB-85, MW-01B, OW-6A, OW-10, OWR-01D, OWR-01S, OWR-02D, OWR-02S, and OWR-05D. Additional indicator parameters were collected at various wells as part of measuring field parameters prior to sampling. The results of the analyses are presented in the table below by showing those wells that meet the criteria. Generally, the nine

wells spread out across the Facility sampled for the parameters listed above indicate an appropriate environment for the reduction of parathion and 4-nitrophenol.

To address the third line of evidence, biological plate counts were performed on water from the same well set, and the following wells reported bacterial culture populations greater than background: OW-06A, OWR-01D, OWR-01S, OWR-05D, OWR-02S, OWR-02D, and OW-10. The tracking of the breakdown of parathion by a review of daughter products is not possible with the data collected to date, since 4-nitrophenol, the main anticipated degradation product, was produced at the Facility. However, the environmental conditions at the site are conducive to natural attenuation and therefore these breakdown products are likely present.

TABLE 5-4: NATURAL ATTENUATION MONITORING RESULTS

Parameter	Strong Evidence of Reducing Conditions	
	Concentration	Wells
Dissolved Oxygen	<0.9 mg/L	OWR-01S, OWR-01D, OWR-02S, OWR-02D, OWR-03S, OWR-04D, OWR-05D, OWR-06D, CB-85,
Nitrate	<1 mg/L	MW-01B, OWR-01D, OWR-05D, OW-06A
Iron II	>0.1 mg/L	OWR-05D
Sulfate	<20 mg/L	CB-85, MW-01B, OW-06A, OW-10, OWR-01D, OWR-02D, OWR-02S, OWR-05D
Alkalinity	>2x background	OWR-01D, OWR-02D, OWR-02S, OW-10, OW-06A, OWR-05D, OWR-01S
Redox	<0 mv	OWR-02D, OW-09, OWR-06D, CB-85

6.0 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

OU3 includes an operating chemical manufacturing Facility and two closed landfills. The Facility itself is largely occupied by buildings, parking lots, other areas actively used for industrial purposes, and relatively impervious surfaces. These surfaces (buildings, roads, parking lots and concrete or asphalt surfaces) make up approximately 12% of the total area of the Facility. Other types of engineered covers, such as gravel or engineered landfill covers, occupy much of the remaining area (55% of the total area). As such, only 33% of the OU3 area can be considered undeveloped.

Groundwater, while not currently used as a drinking water source, is considered by the State of Alabama to be a potential drinking water source. However, the Facility and nearby residents obtain water from the local water utility. The water utility obtains its water from Coldwater Spring, which is located approximately five miles southwest (up gradient) of the Facility and can support an average discharge of 32 million gallons per day. Future use of groundwater at the Facility is unlikely because extraction rates are typically less than 0.1 gpm.

Other the storm water ditches, there is no surface water present in OU3, although there are significant surface waters downstream of the Facility.

The Facility and adjacent landfills have two waste management areas (WMA-I and WMA-II) regulated by ADEM under RCRA, which require notice and a survey plat indicating the location and dimensions of the disposal areas with respect to permanently established benchmarks. The required notices also include statements that:

- The property has been used to manage hazardous waste;
- The use of the land is restricted to activities that will not disturb the integrity of the final cover system, or monitoring system during the post-closure care period; and
- The survey plat and record of type, location, and quantity of the hazardous waste disposed of on the Facility are on file with the EPA Regional Administrator and ADEM.

The notices have been submitted to ADEM and the EPA. The Facility also includes a restriction on the property deed that will notify any potential purchaser of the property that:

- The property use has been restricted for industrial purposes only; and
- The use of groundwater underlying the Facility is restricted such that groundwater shall not be used for potable, industrial, agricultural, or any other supply purpose.

For the foreseeable future, the Facility is expected to keep operating and the land use is expected to remain the same.

7.0 SUMMARY OF SITE RISKS

7.1 Risk Assessment Overview

The baseline risk assessment estimates what risks OU3 poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the IROD summarizes the results of the baseline risk assessment for OU3.

The baseline risk assessment was developed with data gathered in the RFI/CS, Supplemental RFI/CS, and RI for OU3, and includes analyses of samples of soil, groundwater, and air. Estimates of current risks are based on the absence of any site-specific remediation; estimates of future risk are based on the assumption that current soil and ground water chemical concentrations will persist and the caps that currently exist in the operations area (buildings, pavement, etc.) have been compromised and groundwater will be utilized. Wells within the area of highest chemical concentrations, defined as MW-07, MW-09A, MW-14, MW-15, MW-16, MW-20A, MW-21A, and T-4, were used to assess risk to groundwater. Therefore, not all groundwater COCs are represented in the risk calculations; additional groundwater COCs and the bases for their inclusion will be described in Section 8.

7.2 Identification of Chemicals of Concern

Separate calculations were performed for areas of potential concern in OU3, including: the Facility Area, the South Landfill, and the West End Landfill. The chemicals detected in each area were screened against health-based screening levels and background data to determine if they should be evaluated further. Chemicals retained after the initial screening are called chemical of potential concern, and they were evaluated in the risk assessment to determine their impact to each exposure pathway. The chemicals that contributed an excess cancer risk greater than 1×10^{-6} or a non-cancer hazard quotient greater than 0.1 were determined to be chemicals of concern (COCs). Similarly, the impact of chemicals detected in groundwater and air to adjacent residential properties was evaluated.

Based on the data collected during the RFI/CS, Supplemental RFI/CS, and RI for OU3, 19 COCs were identified that drive the need for remedial action (Table 7-1). The volatile organic compounds that were detected in groundwater and contribute significantly to future risk include 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, pentachlorophenol, and trichloroethylene. The semi-volatile organic compounds that were detected in groundwater and contribute significantly to future risk include o,o,o-triethylphosphorothioate, 2,4,6-trichlorophenol, 4-nitrophenol and indeno(1,2,3-cd)pyrene. The semi-volatile organic compounds that were detected in soil and contribute significantly to the current and future risks include benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a, h)anthracene. PCBs and dioxins were detected in soil and groundwater at levels that contribute significantly to the current and future risks. Pesticides gamma-BHC, methyl parathion, and parathion were detected in groundwater at levels that contribute significantly to the future risks at OU3. The metal arsenic was detected in soil and groundwater and the metal mercury was detected in groundwater at levels that contribute

significantly to the current and future risks at OU3. PCBs were also detected in air at levels that contribute to the current and future risks at OU3.

Tables 7-2, 7-3, 7-4, and 7-5 present the concentrations of COCs that pose potential threats to human health in surface soil, subsurface soil, groundwater, and air respectively. The tables also identify the exposure point concentrations (EPCs), the concentration ranges, the detection frequency, and how the EPCs were derived. An EPC is an estimate of the true arithmetic mean concentration of a chemical in a medium at an exposure point. PCBs were the most frequently sampled for COC in all media. Previous investigations had shown that PCBs were the primary COC in soils, while a number of COCs are found in groundwater.

7.3 Exposure Assessment

Exposure refers to the potential contact of an individual (the receptor) with a contaminant. The exposure assessment evaluates the magnitude, frequency, duration, and route of potential exposure. This section describes which populations may be exposed, the exposure pathways, and the magnitude of exposure to the contaminants. As shown in the CSM (Figure 5-1), pathways for current and future receptors were considered.

For every exposure pathway of potential concern, there will be differences between different individuals in the level of exposure at a specific location due to differences in intake rates, body weights, exposure frequencies, and exposure durations. There is normally a wide range of average daily intakes between different members of an exposed population. Because of this, daily intake calculations ranging from "average," near the central portion of the range, to intakes that are near the upper end of the range (*e.g.*, the 95th percentile) were calculated. These two exposure estimates are referred to as Central Tendency Exposure (CTE) and Reasonable Maximum Exposure (RME), respectively. In addition, the EPA considered site-specific parameters used by Solutia in previous health assessments it performed under the RCRA program; those parameters were used in a modified evaluation. The RME, CTE, and modified daily intake assumptions for each receptor are provided in Tables 7-6, 7-7, and 7-8, respectively. Standard exposure algorithms were used in calculating chemical intakes through the exposure pathways and routes that are relevant for OU3. Assumptions used to evaluate each receptor are described below.

Operations Area Worker Exposure Assumptions

The Facility is currently an operating chemical plant. Under the current RME and CTE scenarios, the soil incidental ingestion rate of site workers was assumed to be 50 mg/day. Because Facility rules require workers to wear long-sleeve shirt, long pants and shoes, the exposed skin surface area for adult workers is 2,290 cm^2. A dermal adherence factor of 0.2 mg/cm^2 was assumed for the RME scenario and 0.02 mg/cm^2 under the CTE scenario. Chemical specific dermal absorption factors for COCs were used.

Under future RME and CTE scenarios, the soil incidental ingestion rate of site workers was assumed to be 100 mg/day. For dermal contact with soil, an adult worker was assumed to wear a short-sleeved shirt, long pants, and shoes; therefore, the exposed skin surface increased to 3,300

TABLE 7-1: SUMMARY OF CONTAMINANTS OF CONCERN

Contaminants	Surface Soil	Subsurface Soil	Groundwater	Ambient Air
Volatile Organic Compounds				
1,2,4-Trichlorobenzene			YES	
1,4-Dichlorobenzene			YES	
Pentachlorophenol			YES	
Trichloroethylene			YES	
Semi-volatile Organic Compounds				
o,o,o-Triethylphosphorothioate			YES	
2,4,6-Trichlorophenol			YES	
4- Nitrophenol			YES	
Benzo(a)pyrene	YES			
Benzo(b)fluoranthene	YES			
Dibenz(a, h)anthracene	YES			
Indeno(1,2,3-cd)pyrene			YES	
Pesticides and PCBs				
PCBs, Total	YES	YES	YES	YES
gamma-BHC			YES	
Heptachlor Epoxide	YES			
Methyl parathion			YES	
Parathion			YES	
Sulfotepp			YES	
Dioxins				
Dioxin TEQ	YES	YES	YES	
Inorganics				
Arsenic	YES	YES		
Mercury			YES	

Notes: See Appendix B, Tables B-2.1 through 2.4 of human health risk assessment for a full list of detected chemicals.
See Table 4-3 and Table 4-10 in RI for occurrence and distribution of all contaminants detected in soil and groundwater, respectively.
YES = Contaminant was detected in media and selected as a COC in the human health risk assessment.

TABLE 7-2: CONTAMINANTS OF CONCERN FOR SURFACE SOIL

Scenario Timeframe: Current and Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Concern	Concentration Detected Surface Soil (mg/kg)		Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
		Min	Max			
Surface Soil, (0-2 feet) Direct Contact	Benzo(a)pyrene	0.024	1.900	3/3	1.900	Max
	Benzo(b)fluoranthene	0.050	2.400	3/3	2.400	Max
	Dibenz(a, h)anthracene	0.041	0.620	2/3	0.620	Max
	PCBs, Total (current)	0.023	930	27/30	373.914	UCL-NP
	(future)	0.023	17,000	28/31	6,061.165	UCL-NP
	Heptachlor Epoxide	0.380	0.380	1/3	0.380	Max
	Dioxin TEQ	0.000191	0.000756	1/4	0.000756	Max
	Arsenic	3.8	390	6/6	390	Max

Key
mg/kg – milligrams per kilogram
Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

TABLE 7-3: CONTAMINANTS OF CONCERN FOR SURFACE/SUBSURFACE SOIL

Scenario Timeframe: Current and Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Concern	Concentration Detected Surface/Subsurface Soil (mg/kg)		Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
		Min	Max			
Subsurface Soil, Direct Contact	PCBs, Total	0.023	17,000	51/59	3272.601	UCL-NP
	Dioxin TEQ	0.000756	0.000756	1/4	0.000756	Max
	Arsenic	3.8	390	6/6	390	Max

Key
mg/kg – milligrams per kilogram
Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

TABLE 7-4: CONTAMINANTS OF CONCERN FOR GROUNDWATER

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Concern	Concentration Detected Groundwater (ug/L)		Frequency of Detection*	Exposure Point Concentration (ug/L)	Statistical Measure
		Min	Max			
	1,2,4-Trichlorobenzene	11	11	1/2	11	Max
	1,4-Dichlorobenzene	2.6	2.6	1/19	2.6	Max
	Pentachlorophenol	11	26	5/25	20	Perc
	Trichloroethylene	3.4	3.4	1/2	3.4	Max
	o,o,o-Triethylphosphorothioate	25	340	6/25	340	Max
	2,4,6-Trichlorophenol	9.4	17	5/25	14	UCL-NP
	4-Nitrophenol	140	30,000	5/25	17,440	UCL-NP
	Indeno(1,2,3-cd)pyrene	0.73	0.73	1/2	0.73	Max
	PCBs, Total	2.8	18,000	7/26	2,435	UCL-NP
	gamma-BHC	0.55	0.55	1/2	0.55	Max
	Methyl parathion	74	74	1/3	74	Max
	Parathion	51	23,000	4/26	9,375	Perc
	Sulfotepp	0.33	150	5/25	67	UCL-NP
	Dioxin TEQ	3.61E-06	3.61E-06	1/2	3.61E-06	Max
	Mercury	1	4.1	6/19	2	UCL-NP

Key
ug/L – micrograms per liter
Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).
* - Frequency is based sampling for those wells in the most contaminated part of the plume

TABLE 7-5: CONTAMINANTS OF CONCERN FOR AIR

Scenario Timeframe: Current and Future
Medium: Air
Exposure Medium: Air

Exposure Point	Chemical of Concern	Concentration Detected in Air (ng/m^3)		Frequency of Detection	Exposure Point Concentration (ng/m^3)	Statistical Measure
		Min	Max			
Air Facility	PCBs, Total	11	73	6/6	73	Max
Air West LF	PCBs, Total	0.1	39	76/82	7	UCL-G
Air South LF	PCBs, Total	0.2	43	81/84	10	UCL-G

Key ng/m^3 – nanograms per cubic meter
Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

TABLE 7-6 VALUES FOR REASONABLE MAXIMUM EXPOSURE DAILY INTAKE

Exposure Input Parameters	Units	RME					
		Operations Worker	O&M Worker	Trespasser 7-16	Construction Worker	Offsite Resident child-adult	Offsite Resident 0-6 yrs
General							
Averaging Time, Cancer	yrs	70	70	70	70	70	70
	days	25550	25550	25550	25550	25550	25550
Averaging Time, Noncancer	yrs	25	25	10	1	24	6
	days	9125	9125	3650	365	8760	2190
Body weight	kg	70	70	45	70	70	15
Exposure frequency	days/yr	250	24	50	100	350	350
Exposure duration	yrs	25	25	10	1	24	6
Ingestion of soil - current and future							
Ingestion rate-current	mg/day	50	100	100	330	NA	NA
-future	mg/day	100	100	100	330	NA	NA
Intestinal absorpt factor PCBs & As - current	unitless	0.3	1	1	1	NA	NA
- future	unitless	1	1	1	1	NA	NA
Dermal contact with soil - current and future							
Surface area – current	cm^2	2290	3300	2800	3300	NA	NA
- future	cm^2	3300	3300	2800	3300	NA	NA
Adherence factor	mg/cm^2	0.2	0.9	0.2	0.3	NA	NA
Absorption factor	unitless	value based on chemical – see risk assessment				NA	NA
Ingestion of groundwater – future							
Ingestion rate water	L/day	1	1	NA	NA	2	1
Dermal contact with groundwater – future							
Surface area	cm^2	NA	NA	NA	NA	18000	6600
Permeabilily coef.	cm/hr	NA	NA	NA	NA	value based on chemical – see risk assessment	
Exposure time	hr/day	NA	NA	NA	NA	0.25	0.45
Inhalation of groundwater – future							
Inhalation rate vapor	m^3/hr	NA	NA	NA	NA	1	1
Exposure time	hrs/day	NA	NA	NA	NA	0.58	1
Inhalation ambient air – current and future							
Inhalation rate air	m^3/hr	1.5	1.5	1.07	2.5	NA	NA
	m^3/day	NA	NA	NA	NA	13	7.5
Exposure time	hrs/day	8	8	4	8	NA	NA

NA – Not applicable
NE- Not evaluated

TABLE 7-7 VALUES FOR CENTRAL TENDENCY EXPOSURE DAILY INTAKE

Exposure Input Parameters	Units	CTE					
		Operations Worker	**O&M Worker**	Trespasser **7-16**	**Construction Worker**	**Offsite Resident child-adult**	**Offsite Resident 0-6 yrs**
General							
Averaging Time,	yrs	70	70	70	70	NE	NE
Cancer	days	25550	25550	25550	25550	NE	NE
Averaging Time,	yrs	**15**	**15**	10	1	NE	NE
Noncancer	days	**3285**	**3285**	3650	365	NE	NE
Body weight	kg	70	70	45	70	NE	NE
Exposure frequency	days/yr	**219**	**12**	**10**	**40**	NE	NE
Exposure duration	yrs	**9**	**9**	10	1	NE	NE
Ingestion of soil - current and future							
Ingestion rate-current	mg/day	50	100	100	330	NE	NE
-future	mg/day	100	100	100	330	NE	NE
Intestinal absorpt factor PCBs & As -current	unitless	0.3	1	1	1	NE	NE
-future	unitless	1	1	1	1	NE	NE
Dermal contact with soil - current and future							
Surface area – current	cm^2	2290	3300	2800	3300	NE	NE
- future	cm^2	3300	3300	2800	3300	NE	NE
Adherence factor	mg/cm^2	**0.02**	**0.2**	**0.04**	**0.1**	NE	NE
Absorption factor	unitless	value based on chemical – see risk assessment					
Ingestion of groundwater – future							
Ingestion rate water	L/day	1	1	NA	NA	NE	NE
Dermal contact with groundwater – future							
Surface area	cm^2	NA	NA	NA	NA	NE	NE
Permeabilily coef.	cm/hr	NA	NA	NA	NA	NE	NE
Exposure time	hr/day	NA	NA	NA	NA	NE	NE
Inhalation of groundwater – future							
Inhalation rate vapor	m^3/hr	NA	NA	NA	NA	NE	NE
Exposure time	hrs/day	NA	NA	NA	NA	NE	NE
Inhalation ambient air – current and future							
Inhalation rate air	m^3/hr	1.5	1.5	1.07	2.5	NE	NE
	m^3/day	NA	NA	NA	NA	NE	NE
Exposure time	hrs/day	8	8	**2**	8	NE	NE

NA – Not applicable
NE- Not evaluated

TABLE 7-8 VALUES FOR MODIFIED EXPOSURE DAILY INTAKE

Exposure Input Parameters	Units	Modified					
		Operations Worker	**O&M Worker**	Trespasser **7-16**	**Construction Worker**	**Offsite Resident child-adult**	**Offsite Resident 0-6 yrs**
General							
Averaging Time,	yrs	NE	70	70	70	NE	NE
Cancer	days	NE	25550	25550	25550	NE	NE
Averaging Time,	yrs	NE	25	10	1	NE	NE
Noncancer	days	NE	9125	3650	365	NE	NE
Body weight	kg	NE	70	45	70	NE	NE
Exposure frequency	days/yr	NE	**50**	**60**	**120**	NE	NE
Exposure duration	yrs	NE	25	10	1	NE	NE
Ingestion of soil - current and future							
Ingestion rate	mg/day	NE	**50**	100	330	NE	NE
Intestinal absorpt factor	unitless	NE	**0.3**	**0.3**	**0.3**	NE	NE
Dermal contact with soil - current and future							
Surface area – total	cm^2	NE		**5300**		NE	NE
- head	cm^2	NE	**1300**		**1300**	NE	NE
- hands	cm^2	NE	**990**		**990**	NE	NE
Adherence factor–total	mg/cm^2	NE		**0.04**		NE	NE
- head	mg/cm^2	NE	**0.004**		**0.029**	NE	NE
- hands	mg/cm^2	NE	**0.046**		**0.24**	NE	NE
Absorption factor	unitless	value based on chemical – see risk assessment					
Ingestion of groundwater - future							
Ingestion rate water	L/day	NE	NE	NE	NE	NE	NE
Dermal contact with groundwater – future							
Surface area	cm^2	NE	NE	NE	NE	NE	NE
Permeabilily coef.	cm/hr	NE	NE	NE	NE	NE	NE
Exposure time	hr/day	NE	NE	NE	NE	NE	NE
Inhalation of groundwater – future							
Inhalation rate vapor	m^3/hr	NE	NE	NE	NE	NE	NE
Exposure time	hrs/day	NE	NE	NE	NE	NE	NE
Inhalation ambient air – current and future							
Inhalation rate air	m^3/hr	NE	NE	1.07	2.5	NE	NE
	m^3/day	NE	NE	NA	NA	NE	NE
Exposure time	hrs/day	NE	NE	4	8	NE	NE

NA – Not applicable
NE- Not evaluated

cm^2. A dermal adherence factor of 0.2 mg/cm^2 was assumed for the RME scenario and 0.02 mg/cm^2 under the CTE scenario. Chemical specific dermal absorption factors for COPCs were used.

Inhalation of ambient air may also occur in current and future scenarios. An inhalation rate of 1.5 m^3/hour was assumed for both RME and CTE scenarios. Exposure time for inhalation of ambient air is assumed to be eight hours per day. A separate analysis to determine the impact on a future operations worker and O&M workers for a private well installation was considered. Ingestion of groundwater at an ingestion rate of one liter (L) of water per day was assumed.

Workers are assumed to be exposed for 250 days per year for the RME scenario and 219 days per year for the CTE scenario. Exposure duration for site workers is 25 years. A life expectancy of 70 years was used as the averaging time for exposure to carcinogenic contaminants. Averaging time for non-carcinogenic effects is equal to the exposure duration, or 25 years for site workers under the RME scenario and nine years under the CTE scenario. A body weight of 70 kg was used. A separate modified exposure scenario was not evaluated for the operations worker, because the RME included the modified intake adjustments.

Operation and Maintenance Worker Exposure Assumptions

In the current/future land use RME scenarios, O&M workers are assumed to be exposed to current/future soil at the South and West End Landfills, and current and future Facility Area surface soil while outdoors at work via incidental ingestion, dermal contact, and inhalation of ambient air. Under both RME and CTE scenarios, the soil incidental ingestion rate of site workers was assumed to be 100 mg/day. For dermal contact with soil, an adult worker was assumed to wear a short-sleeved shirt, long pants, and shoes; therefore, the exposed skin surface area for workers is 3,300 cm^2. A dermal adherence factor of 0.9 mg/cm^2 was assumed for the RME scenario and 0.2 mg/cm^2 for the CTE scenario. Chemical specific dermal absorption factors for COPCs were used.

Exposure frequency was assumed to be twice per month, or 24 days per year under the RME scenario. One half of that exposure frequency was assumed for the CTE scenario, or 12 days per year. A life expectancy of 70 years was used as the averaging time for exposure to carcinogenic contaminants. Averaging time for non-carcinogenic effects is equal to the exposure duration, or 25 years for the RME scenario and nine years for the CTE scenario. A body weight of 70 kg was used for O&M workers.

Inhalation of ambient air may also occur to an O&M worker. An inhalation rate of 1.5 m^3/hour was assumed for both RME and CTE scenarios. Exposure time for inhalation of ambient air is assumed to be eight hours per day.

A modified exposure scenario was evaluated assuming a lower ingestion rate, a higher exposure frequency, and a lower intestinal absorption factor. Separate adherence factors were evaluated for the head and hands.

Construction Worker Exposure Assumptions

In the current/future land use scenario, construction workers are assumed to be exposed to surface and subsurface soil at the facility over the duration of a single construction project (typically five months). If multiple non-concurrent construction projects are anticipated, it is assumed that different workers are employed for each project. Activities for this receptor typically involve substantial exposures to subsurface soils via incidental ingestion, dermal contact, and inhalation of ambient air.

The soil incidental ingestion rate of construction workers was assumed to be 330 mg/day under both RME and CTE scenarios. For dermal contact with soil, an adult construction worker was assumed to wear a short-sleeved shirt, long pants, and shoes; therefore, the exposed skin surface area for workers is 3,300 cm^2. A dermal adherence factor of 0.3 mg/cm^2 was assumed under the RME scenario and 0.1 mg/cm^2 under the CTE scenario. Chemical specific dermal absorption factors for COPCs were used.

Inhalation of ambient air may also occur. An inhalation rate of 2.5 m^3/hr was assumed for both RME and CTE scenarios. Exposure time for inhalation of ambient air is assumed to be eight hours per day. Construction workers are assumed to be exposed for five months (100 workdays) per year under the RME scenario and exposure frequency for the CTE scenario is assumed to be 40 days per year. Exposure duration for construction workers is one year.

A life expectancy of 70 years was used for all receptor groups as the averaging time for exposure to carcinogenic contaminants. Averaging time for non-carcinogenic effects is equal to the exposure duration, or one year for construction workers for both RME and CTE scenarios. A body weight of 70 kg was used for construction workers.

A modified exposure scenario was evaluated assuming a 120-day exposure frequency and an 0.3 intestinal absorption factor. Separate adherence factors were evaluated for the head and hands.

Trespasser Exposure Assumptions

The trespasser is assumed to be an adolescent seven to 16 years old (10-year exposure duration). While adults could also trespass at OU3, adolescent trespassers are expected to have a greater intake of site contaminants because of their lower body weight and because they have more time available to visit OU3 more frequently. In the current/future land use scenarios, adolescent trespassers (ages seven to 16 years old) are assumed to cross the fence and be exposed to current/future soil at the South and West End Landfills, and current and future Facility Area surface soil via ingestion, dermal contact, and inhalation of ambient air. Trespassers are assumed to be exposed for one day per week or about 50 days per year under the RME scenario and 10 days per year under the CTE scenario.

Soil incidental ingestion rate of trespassers was assumed to be 100 mg/day for both RME and CTE scenarios. For dermal contact with soil, the adolescent trespasser was assumed to wear a short-sleeved shirt, shorts, and shoes; therefore, the exposed skin surface area for adolescent trespassers was assumed to be 2,800 cm^2. A dermal adherence factor of 0.2 mg/cm^2 was assumed under the RME scenario and 0.04 mg/cm^2 under the CTE scenario. Chemical-specific

dermal absorption fractions for COPCs were used.

Inhalation of ambient air may also occur to a trespasser. An inhalation rate of 1.07 m^3/hour was assumed for both RME and CTE scenarios. Exposure time for inhalation of ambient air is assumed to be four hours per day for the RME scenario and two hours per day for the CTE scenario.

A life expectancy of 70 years was used for all receptor groups as the averaging time for exposure to carcinogenic contaminants. Averaging time for non-carcinogenic effects is equal to the exposure duration, or 365 days for trespassers under both RME and CTE scenarios. A body weight considered representative of the age range of seven to 16 years old, 45 kg, was used for adolescent trespassers.

A modified exposure scenario was evaluated assuming a higher exposure frequency, a higher exposure area, and a lower intestinal absorption factor.

Residential Exposure Assumptions

In the future land-use scenario, off-site residents are exposed to groundwater via ingestion, dermal contact, and inhalation during showering. In this future land-use scenario, the site groundwater is assumed to be the sole source of water supply for the exposed population. Residents are assumed to be exposed for 350 days per year. The total RME exposure duration for residents is assumed to be 30 years: 24 years as an adult and six years as a young child. A life expectancy of 70 years was used for all receptor groups as the averaging time for exposure to carcinogenic contaminants. Averaging time for non-carcinogenic effects is equal to the exposure duration, or six years for children. A body weight of 70 kg was used for all adult residents and 15 kg for children (zero to six years) under both scenarios.

As a measure of conservatism and to avoid redundancy, an effort was made to identify the most sensitive receptor to calculate non-cancer hazards and excess cancer risk levels. In the case of non-carcinogens, a child resident is the most sensitive receptor, owing to his lower body mass relative to the amount of chemical intake. The 95th percentile of the drinking water intake rate for children ages one to ten years is 1 L/day. Therefore, groundwater ingestion rate for child residents is assumed to be 1 L/day.

For carcinogens, a resident from child through adult (child/ adult) is the most sensitive receptor because the excess cancer risk for the child (exposure duration of six years) is assumed to be additive to that of an adult (exposure duration of 24 years). For this reason, no calculations of excess cancer risk are included for child residents and no calculations of non-cancer hazards are included for child/adult residents. An intake factor that accounts for changing body mass and consumption over 30 years was used to assess risk for a lifetime resident. The resulting groundwater ingestion factor is 1.09 L-yr/kg-d based on the adult groundwater ingestion rate of 2 L/day.

Inhalation and dermal exposure of residents to groundwater may occur through showering and other household activities. Shower duration for adults is assumed to be 15 minutes, with an

additional 20 minutes for drying off, brushing teeth, combing hair, etc., for a total of 0.58 hour. Children (zero to six years) are assumed to spend 27 minutes in the bath, with an additional 33 minutes spent in the bathroom afterwards, for a total of 1 hour. Showering inhalation rates for both adults and the child (zero to six years) are assumed to be 1 m^3/hour. Inhalation rates are based on the mean short-term rate for light activities (*e.g.*, walking at 1.5 to 3 miles per hour). For surface area exposed, estimates of total body surface areas for adults and children, respectively, are: 18,000 cm^2 and 6,600 cm^2. The chemical-specific dermal permeability coefficients for COCs were used.

Inhalation of ambient air may also occur for the current off-site resident. An inhalation rate of 13 m^3/day was assumed for adult residents. An inhalation rate of 7.5 m^3/day was assumed for child residents. Modified exposure was not evaluated for residents.

Uncertainties

The exposure assumptions directly influence the calculated doses (daily intakes), and ultimately the risk calculations. Site-specific data was available for the current operations worker risk assessment. Conservative default exposure assumptions were used in calculating future operations worker exposure and other receptor exposures. Conservative default exposure assumptions overestimate the most probable exposures and, therefore, overestimates risk, but provide a range of values for the risk managers to consider. OU3 is an operating chemical plant that is largely occupied by buildings, parking lots, and other areas, which are used for industrial purposes. Facility operations and engineered surfaces make potential for contact with soil relatively low under current conditions. Additionally, the Facility and nearby residents obtain water from the local water utility. The water utility obtains its water from Coldwater Spring which is located approximately five miles southwest (up gradient) of the Facility. Therefore, it is a highly conservative assumption that future residents and workers could be exposed to contaminated groundwater from OU3.

7.4 Toxicity Assessment

Tables 7-9 and 7-10 show the cancer toxicity factors and non-cancer reference doses, respectively, for the COCs that are the major risk contributors at OU3, based on data from the EPA's Integrated Risk Information System (IRIS) and other published data. The purpose of the toxicity assessment is to assign toxicity values (criteria) to each contaminant evaluated in the risk assessment. The toxicity values are used in conjunction with the estimated doses to which a human could be exposed to evaluate the potential human health risk associated with each contaminant. In evaluating potential health risks, both carcinogenic and non-carcinogenic health effects were considered.

Cancer slope factors (CSFs) are developed by the EPA under the assumption that the risk of cancer from a given chemical is linearly related to dose. CSFs are developed from laboratory animal studies or human epidemiology studies and classified according to route of administration. The CSF is expressed as $(mg/kg/day)^{-1}$ and when multiplied by the lifetime average daily dose expressed as mg/kg/day will provide an estimate of the probability that the dose will cause cancer during the lifetime of the exposed individual. Cancer toxicity data for the

COCs are summarized in Table 7-9.

The toxicity criteria used to evaluate potential non-carcinogenic health effects are reference doses (RfDs). The RfD is expressed as mg/kg/day and represents that dose that has been determined by experimental animal tests or by human observation to not cause adverse health effects, even if the dose is continued for a lifetime. The procedure used to estimate this dose incorporates safety or uncertainty factors that assume it will not over-estimate this safe dose. Non-cancer toxicity data for the COCs are summarized in Table 7-10.

As noted on Table 10, the construction worker exposure should be calculated using a subchronic reference doses for total PCBs. The human health risk assessment used a chronic reference dose to estimated risk for the construction worker exposure pathway. Since the study used to develop the chronic reference dose in IRIS is actually a subchronic study adjusted by a factor of three to estimate chronic toxicity, that factor was backed out to derive the subchronic toxicity reference dose. Although the subchronic reference dose was not identified in the human health risk assessment, it has been provided in Table 10 to make the final risk management decision more transparent in the IROD.

7.5 Risk Characterization

7.5.1 Overview

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$Risk = CDI \times SF$$

where: Risk = a unitless probability (*e.g.*, 2×10^{-5}) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$.

These risks are probabilities that usually are expressed in scientific notation (e.g., $1x10^{-6}$). An excess lifetime cancer risk of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an excess lifetime cancer risk because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual developing cancer from all other causes has been estimated to be as high as one in three. The EPA's generally acceptable risk range for site-related exposures is $1x10^{-4}$ to $1x10^{-6}$.

TABLE 7-9. CANCER TOXICITY DATA SUMMARY

Pathway: Ingestion, Dermal

Chemicals of Potential Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,2,4-Trichlorobenzene	NA	NA	NA	D	IRIS	05/11/07
1,4-Dichlorobenzene	2.40E-02	2.40E-02	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	07/01/97
Pentachlorophenol	1.2E-01	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/07
Trichloroethylene	4.0E-01	4.0E-01	$(mg/kg\text{-}day)^{-1}$	B2-C	NCEA	01/23/03
o.o,o-Triethylphosphorothioate[1]	NA	NA	NA	D	ADEM Permit	10/08
2,4,6-Trichlorophenol	1.1E-02	1.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/09
4-Nitrophenol	NA	NA	NA	D	ADEM	04/08
Benzo(a)pyrene	7.30E+00	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/07
Benzo(b)fluoranthene	7.30E-01	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/07
Dibenz(a,h)anthracene	7.30E+00	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/07
Indeno(1,2,3-cd)pyrene	7.30E-01	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/07
PCBs, Total	2.0E+00	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/07
Gamma-BHC	1.30E+00	1.30E+00	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	07/01/97
Heptachor Epoxide	9.10E+00	9.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/07
Methyl Parathion	NA	NA	NA	NA	IRIS	05/11/07
Parathion	NA	NA	NA	C	IRIS	05/11/07
Sulfotepp	NA	NA	NA	D	NCEA	08/25/09
Dioxin TEQ	1.50E+05	1.50E+05	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	07/00/97
Arsenic	1.50E+00	1.58E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	05/11/07
Mercury	N/A	N/A	NA	C	IRIS	05/11/07

IRIS - Integrated Risk Information System
HEAST - Health Effects Assessment Summary Tables
NCEA - National Center for Environmental Assessment
ADEM - Alabama Risk-Based Corrective Action Guidance Manual, April 2008- Revision 1
Cancer Guidance Description: A - Human Carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of non-carcinogenicity

NA – Not Applicable

[1] The acute toxicity for ooo- Triethylphosphorothioate appears to be in the same range as dimethoate; chronic toxicity information for dimethoate was used for ooo- Triethylphosphorothioate, since no other data was available.

TABLE 7-9. CANCER TOXICITY DATA SUMMARY (continued)

Pathway: Inhalation

Chemicals of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guidance Description	Unit Risk Inhalation CSF	
	Value	Unit	Value	Unit		Source	Date
1,2,4-Trichlorobenzene	NA	NA	NA	NA	D	IRIS	05/11/07
1,4-Dichlorobenzene	NA	NA	2.2E-02	$(mg/kg\text{-}day)^{-1}$	NA	NCEA	10/04
Pentachlorophenol	NA	NA	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/07
Trichloroethylene	NA	NA	4.0E-01	$(mg/kg\text{-}day)^{-1}$	B2-C	EPA	01/17/07
o,o,o-Triethylphosphorothioate[1]	NA	NA	NA	NA	D	ADEM PERMIT	10/08
2,4,6-Trichlorophenol	3.1E-06	$(ug/m^3)^{-1}$	1.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/07
4-Nitrophenol	NA	NA	NA	NA	D	ADEM	04/08
Benzo(a)pyrene	8.9E-04	$(ug/m^3)^{-1}$	3.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	10/1/98
Benzo(b)fluoranthene	NA	NA	3.1E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	10/1/98
Dibenz(a,h)anthracene	NA	NA	3.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	10/1/98
Indeno(1,2,3-cd)pyrene	NA	NA	3.1E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	10/1/98
PCBs, Total	1.0E-04	$(ug/m^3)^{-1}$	3.5E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/07
Gamma-BHC	NA	NA	1.3E+00	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	10/04
Heptachor Epoxide	2.6E-03	$(ug/m^3)^{-1}$	9.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/07
Methyl Parathion	NA	NA	NA	NA	NA	IRIS	05/11/07
Parathion	NA	NA	NA	NA	C	IRIS	05/11/07
Sulfotepp	NA	NA	NA	NA	D	NCEA	08/25/09
Dioxin TEQ	NA	NA	1.5E+05	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	7/01/97
Arsenic	2.6E-03	$(ug/m^3)^{-1}$	1.5E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	05/11/07
Mercury	NA	NA	NA	NA	C	IRIS	05/11/07

IRIS - Integrated Risk Information System
HEAST - Health Effects Assessment Summary Tables
NCEA - National Center for Environmental Assessment
ADEM - Alabama Risk-Based Corrective Action Guidance Manual. April 2008- Revision 1
Cancer Guidance Description: A - Human Carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of non-carcinogenicity

NA – Not Applicable
[1] The acute toxicity for ooo- Triethylphosphorothioate appears to be in the same range as dimethoate; chronic toxicity information for dimethoate was used for ooo- Triethylphosphorothioate, since no other data was available.

TABLE 7-10. NON-CANCER TOXICITY DATA SUMMARY

Pathway: Ingestion, Dermal

Chemicals of Concern	Chronic/ Subchronic	Oral RfD Value (mg/kg-day)	Dermal RfD Value (mg/kg-day)	Primary Target Organ	Combined Uncertainty/ Modifying Factor	RfD Target Organ	
						Source	Date
1,2,4-Trichlorobenzene	Chronic	1.0E-02	1.0E-02	Adrenal	1000	IRIS	05/11/07
1.4-Dichlorobenzene	Chronic	3.0E-02	3.0E-02	NA	NA	NCEA	10/04
Pentachlorophenol	Chronic	3.0E-02	3.0E-02	Liver	NA	IRIS	05/11/07
Trichloroethylene	Chronic	3.0E-04	3.0E-04	Liver/Kid	NA	NCEA	10/25/04
o,o.o-Triethylphosphorothioate[1]	Chronic	2.0E-02	2.0E-02	NA	NA	ADEM PERMIT	10/08
2,4,6-Trichlorophenol	Chronic	1.0E-03	1.0E-03	Reproduct	3000	NCEA	08/25/09
4-Nitrophenol	Chronic	8.0E-03	8.0E-03	NA	NA	ADEM	04/08
Benzo(a)pyrene	NA	NA	NA	NA	NA	IRIS	05/11/07
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	IRIS	05/11/07
Dibenz(a.h)anthracene	NA	NA	NA	NA	NA	IRIS	05/11/07
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	N/A	05/11/07
PCBs. Total	Chronic	2.0E-05	2.0E-05	E/S/N/ Immune	300	IRIS	05/11/07
	Subchronic	6.0E-05	6.0E-05		100	Modified	05/11/07
Gamma-BHC	Chronic	3.0E-04	3.0E-04	Liver/Kid	1000	IRIS	05/11/07
Heptachlor Epoxide	Chronic	1.3E-05	1.3E-05	Liver	1000	IRIS	05/11/07
Methyl Parathion	Chronic	2.5E-04	2.5E-04	Blood	100	IRIS	05/11/07
Parathion	Chronic	6.0E-03	6.0E-03	NA	NA	HEAST	07/01/97
Sulfotepp	Chronic	5.0E-04	5.0E-04	Blood	NA	NCEA	08/25/09
Dioxin TEQ	NA	N/A	N/A	NA	N/A	N/A	N/A
Arsenic	Chronic	3.0E-04	3.0E-04	Skin	3	IRIS	05/11/07
Mercury	Chronic	3.0E-04	2.9E-04	Immune	1000	IRIS	05/11/07

NA - Not Applicable
NCEA = National Center for Environmental Assessment.
IRIS = Integrated Risk Information System.
HEAST = Health Effects Assessment Summary Tables. July 1997.
ADEM - Alabama Risk-Based Corrective Action Guidance Manual, April 2008- Revision 1
RfC = Reference concentration.
RfD = Reference dose.
ADEM = Alabama Risk-Based Corrective Action Guidance Manual, April 2008- Revision 1
Modified = Construction worker exposure is subchronic; because IRIS chronic values derived from subchronic study adjusted by a factor of three to estimate chronic toxicity, that factor was backed out to derive subchronic toxicity.
[1] The acute toxicity for ooo- Triethylphosphorothioate appears to be in the same range as dimethoate; chronic toxicity information for dimethoate was used for ooo- Triethylphosphorothioate, since no other data was available.

TABLE 7-10. NON-CANCER TOXICITY DATA SUMMARY (continued)

Pathway: Inhalation							
Chemicals of Concern	Chronic/ Subchronic	Inhalation RfC (mg/m^3)	Inhalation RfD Value (mg/kg-day)	Primary Target Organ	Combined Uncertainty /Modifying	Source of RfD Target Organ	Date of RfD Search
1.2.4-Trichlorobenzene	NA	N/A	1.0E-03	NA	NA	PPRTV	10/04
1.4-Dichlorobenzene	Chronic	8.0E-01	2.3E-01	Liver	100	IRIS	05/11/07
Pentachlorophenol	Chronic	NA	3.0E-02	NA	NA	IRIS	10/04
Trichloroethylene	Chronic	4.0E-02	1.1E-02	CNS	1000	NCEA	04/15/03
o.o.o-Triethylphosphorothioate[1]	Chronic	NA	NA	NA	NA	ADEM PERMIT	10/08
2.4.6-Trichlorophenol	Chronic	NA	1.1E-02	NA	NA	NCEA	08/25/09
4-Nitrophenol	Chronic	NA	NA	NA	NA	ADEM	04/08
Benzo(a)pyrene	NA	NA	NA	NA	NA	IRIS	05/11/07
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	IRIS	05/11/07
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	IRIS	05/11/07
Indeno(1.2.3-cd)pyrene	NA	NA	NA	NA	NA	IRIS	05/11/07
PCBs, Total	NA	NA	NA	NA	NA	IRIS	05/11/07
Gamma-BHC	Chronic	NA	3.0E-04	NA	NA	HEAST	10/04
Heptachlor Epoxide	Chronic	NA	1.3E-05	NA	NA	IRIS	10/04
Methyl Parathion	Chronic	NA	2.5E-04	NA	NA	IRIS	10/04
Parathion	Chronic	NA	6.0E-03	NA	NA	HEAST	10/04
Sulfotepp	Chronic	NA	NA	NA	NA	NCEA	08/25/09
Dioxin TEQ	NA	NA	NA	NA	NA	IRIS	05/11/07
Arsenic	NA	NA	NA	NA	NA	IRIS	05/11/07
Mercury	Chronic	3.0E-04	8.6E-05	CNS	30	IRIS	05/11/07

NA - Not Applicable
NCEA = National Center for Environmental Assessment.
IRIS = Integrated Risk Information System.
HEAST = Health Effects Assessment Summary Tables. July 1997.
ADEM - Alabama Risk-Based Corrective Action Guidance Manual. April 2008- Revision 1
RfC = Reference concentration.
RfD = Reference dose.
[1] The acute toxicity for ooo- Triethylphosphorothioate appears to be in the same range as dimethoate; chronic toxicity information for dimethoate was used for ooo- Triethylphosphorothioate, since no other data was available.

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (*e.g.*, life-time) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic non-carcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all chemical(s) of concern that affect the same target organ (*e.g.*, liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. An HI less than 1 indicates that, based on the sum of all HQ's from different contaminants and exposure routes, toxic non-carcinogenic effects from all contaminants are unlikely. An HI greater than 1 indicates that site-related exposures may present a risk to human health.

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

where: CDI = Chronic daily intake
RfD = reference dose.

CDI and RfD are expressed in the same units and represent the same exposure period (*i.e.*, chronic, sub-chronic, or short-term).

Carcinogenic risks and non-carcinogenic hazards were evaluated for potential exposures to contaminants of potential concern in soil, ground water, and air. The receptor populations were current/future operations area workers, operations and maintenance workers, trespassers, construction workers, and adjacent off-site residents. A summary of carcinogenic risks and non-carcinogenic health hazards under reasonable maximum exposure (RME) conditions, average exposure conditions (central tendency exposure or CTE), and modified exposure conditions are provided in Table 7-11.

Table 7-12A and 12B provides details about the chemicals driving the RME risk estimates for the most significant routes of exposure (current/future operations workers, current/future construction workers, and future adjacent off-site residents). These exposures are described below.

7.5.2 Current/Future Operations Workers

The current operations area worker could be exposed to constituents in soil, through incidental ingestion, dermal contact, and inhalation of ambient air. Site specific exposure assumptions were used to estimate current (and near future, assuming the plant continues to operate) exposure for operations area workers. Carcinogenic risk is estimated at $2x10^{-4}$ under RME exposure assumptions and $1x10^{-4}$ under CTE exposure assumptions. Non-carcinogenic hazard quotients are estimated at 8 under RME exposure assumptions and 3 under CTE exposure assumptions.

If OU3 is developed for a different industrial or commercial use, work rules and engineering controls such as surface caps at the Facility may not be in place. For that scenario, default exposure assumptions were used to estimate the future Operations Area Worker risk from contaminated soil through incidental ingestion, dermal contact, and inhalation of ambient air. Carcinogenic risk is estimated at $6x10^{-3}$ under RME exposure assumptions and $1x10^{-3}$ under CTE exposure assumptions. Non-carcinogenic HIs are estimated at 416 under RME exposure assumptions and 364 under CTE exposure assumptions.

A separate analysis looked at the impact of future operations workers drinking contaminated groundwater which resulted in even higher risk levels.

7.5.3 Current/Future Construction Workers

Current and future construction workers at the facility area can be potentially exposed to contaminants in subsurface soil via incidental ingestion and dermal contact as well as inhalation of ambient air. The total RME carcinogenic risk for construction workers in the facility area was $1x10^{-4}$, while the CTE carcinogenic risk was $3x10^{-5}$ and the modified carcinogenic risk using site-specific exposure assumptions was $8x10^{-5}$. The total HI for RME, CTE, and modified exposure assumptions was 83, 30, and 41, respectively, when the subchronic reference dose is considered. These values are 3 times lower than what was calculated in the human health risk assessment (250, 90, and 124) where a chronic reference dose was used.

7.5.4 Future Adjacent Off-Facility Residents

The future off-Facility resident was evaluated for the hypothetical exposure to groundwater through incidental ingestion, dermal contact, and inhalation of vapors in the bath/shower as well as through ambient air. An adult receptor and child receptor were evaluated under RME exposure assumptions using maximum groundwater concentrations and assuming full access to use the impacted groundwater at OU3. The results greatly exceed what the EPA considers acceptable risk. The RME carcinogenic risk an adult was $4x10^{-1}$ and HI was 30,445. The RME carcinogenic risk for a child was $2x10^{-1}$ and HI was 46,553.

7.6 Identification of Uncertainties

Uncertainty is inherent in the risk assessment process. Each of the three components of risk assessment (data evaluation, exposure assumptions, and toxicity criteria) contribute uncertainties. For example, the assumption that ground water concentrations will remain constant over time may overestimate the lifetime exposure. Contaminants are subject to a variety of attenuation processes. In addition, for a risk to exist, both significant exposure to the pollutants of concern and toxicity at these predicted exposure levels must exist. The toxicological uncertainties primarily relate to the methodology by which carcinogenic and non-carcinogenic criteria (*i.e.*, cancer slope factors and reference doses) are developed. In general, the methodology currently used to develop cancer slope factors and reference doses is very conservative and likely results in an overestimation of human toxicity and resultant risk.

TABLE 7-11. SUMMARY OF CANCER RISKS AND NON-CANCER HAZARDS

Area	Receptor	Cancer Risk			Noncancer Hazard Index (HI)		
		RME	CTE	Modified	RME	CTE	Modified
Current/Future Land Use							
South Landfill	O&M Worker	$3x10^{-6}$	$1x10^{-7}$	$4x10^{-7}$	0.2	0.04	0.02
	Trespasser –Adolescent (7-16 yrs)	$2x10^{-6}$	$1x10^{-7}$	$6x10^{-7}$	0.3	0.04	0.1
West End Landfill	O&M Worker	$1x10^{-8}$	$3x10^{-9}$	$3x10^{-8}$	NA	NA	NA
	Trespasser –Adolescent (7-16 yrs)	$7x10^{-9}$	$7x10^{-10}$	$8x10^{-9}$	NA	NA	NA
Facility	**Construction Worker** – Chronic Exposure	$1x10^{-4}$	$3x10^{-5}$	$8x10^{-5}$	250	90	124
	– Subchronic Exposure				83	30	41
Current Land Use							
Facility Area	**Operations Area Worker**	$2x10^{-4}$	$4x10^{-5}$	NA	8	9	NA
	O&M Worker	$1x10^{-4}$	$8x10^{-6}$	$2x10^{-5}$	5	1	0.7
	Trespasser –Adolescent (7-16 yrs)	$8x10^{-5}$	$1x10^{-5}$	$4x10^{-5}$	8	1	3
Site Wide (Air)	Off-site Resident - Child to Adult (Lifetime Resident)	$2x10^{-6}$	NA	NA	NA	NA	NA
	Off-site Resident – Child (0-6 yrs)	$1x10^{-6}$	NA	NA	NA	NA	NA
Future Land Use							
Facility Area	**Operations Area Worker**	$6x10^{-3}$	$1x10^{-3}$	NA	416	364	NA
	O&M Worker	$1x10^{-3}$	$6x10^{-5}$	$2x10^{-4}$	79	20	11
	Trespasser –Adolescent (7-16 yrs)	$7x10^{-4}$	$6x10^{-5}$	$3x10^{-4}$	124	20	48
Site Wide (Groundwater)	**Off-site Resident - Child to Adult (Lifetime Resident)**	$4x10^{-1}$	NA	NA	30445	NA	NA
	Off-site Resident – Child (0-6 yrs)	$2x10^{-1}$	NA	NA	46553	NA	NA
	Operations Area Worker	$2x10^{-2}$	$3x10^{-3}$	NA	1212	432	NA
	O&M Worker	$2x10^{-3}$	$2x10^{-4}$	NA	116	66	NA

NA –scenario was not applicable

Bold - The exposures are current and future operations worker exposure to surface soil, construction worker exposure to surface and subsurface soil, and residential exposure to groundwater,

TABLE 7-12A. RISK CHARACTERIZATION SUMMARY – CARCINOGENS

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Current (near Future) Operations Worker:							
Soil	Soil	Surface Soil Facility Area	Benzo(a)pyrene	2.4E-06	NA	1.3E-07	5.3E-06
			Dibenz(a,h)anthracene	7.9E-07	NA	9.4E-07	1.7E-06
			PCBs, Total	3.9E-05	NA	7.2E-05	1.1E-04
			Dioxin TEQ	2.0E-05	NA	5.4E-06	2.5E-05
			Arsenic	3.1E-05	NA	2.8E-05	5.9E-05
						Total Soil Risk	2.0E-04
Air	Air	Ambient Air Facility Area	PCBs, Total	NA	1.1E-06	NA	1.1E-06
						Total Air Risk	1.1E-06
						Total Risk	**2.0E-04**
Future Operations Worker:							
Soil	Soil	Surface Soil Facility Area	Benzo(a)pyrene	4.8E-06	NA	4.2E-06	9.0E-06
			Benzo(b)fluoranthene	5.4E-07	NA	4.6E-07	1.0E-06
			Dibenz(a,h)anthracene	1.6E-06	NA	1.4E-06	2.9E-06
			PCBs, Total	4.2E-03	NA	1.7E-03	5.9E-03
			Heptachlor Epoxide	1.2E-06	NA	NA	1.2E-06
			Dioxin TEQ	4.0E-05	NA	7.8E-06	4.7E-05
			Arsenic	2.0E-04	NA	4.0E-05	2.4E-04
						Total Soil Risk	6.2E-03
Air	Air	Ambient Air Facility Area	PCBs, Total	NA	1.1E-06	NA	1.1E-06
						Total Air Risk	1.1E-06
						Total Risk	**6.2E-03**
Current/Future Construction Worker:							
Soil	Soil	Surface and Subsurface Soil Facility	PCBs, Total	1.2E-04	NA	2.2E-05	1.4E-04
			Dioxin TEQ	2.1E-06	NA	1.9E-07	2.3E-06
			Arsenic	4.1E-06	NA	3.7E-07	4.5E-06
						Total Soil Risk	1.5E-04
Air	Air	Ambient Air Facility Area	PCBs, Total	NA	2.8E-08	NA	2.8E-08
						Total Air Risk	2.8E-08
						Total Risk	**1.5E-04**

TABLE 7-12A. RISK CHARACTERIZATION SUMMARY – CARCINOGENS (continued)

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Future Offsite-Resident (Child to Adult)							
Groundwater	Groundwater	Tap Water	1,2,4-Trichlorobenzene	NA	NA	NA	NA
			1,4-Dichlorobenzene	8.7E-07	7.9E-07	2.1E-07	1.9E-06
			Pentachlorophenol	3.5E-05	2.9E-05	7.8E-05	1.4E-04
			Trichloroethylene	2.0E-05	2.2E-05	1.4E-06	4.4E-05
			2,4,6-Trichlorophenol	2.5E-06	2.1E-06	4.9E-07	5.0E-06
			Indeno(1,2,3-cd) pyrene	8.0E-06	2.7E-06	4.5E-05	5.6E-05
			PCBs, Total	7.3E-02	NA	3.1E-01	3.8E-01
			Gamma-BHC	NA	NA	NA	NA
			Methyl Parathion	NA	NA	NA	NA
			Parathion	NA	NA	NA	NA
			Dioxin TEQ	8.1E-06	NA	NA	8.1E-06
			Arsenic	1.4E-04	NA	7.7E-07	1.4E-04
			Mercury	NA	NA	NA	NA
						Total Groundwater Risk	3.8E-01
Air	Air	Ambient Air	PCBs, Total	NA	1.6E-06	NA	1.6E-06
						Total Air Risk	1.6E-06
						Total Risk	**3.8E-01**

TABLE 7-12B. RISK CHARACTERIZATION SUMMARY – NON-CARCINOGENS

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Current Operations Worker (based on site specific assumptions):								
Soil	Soil	Surface Soil Facility Area	Benzo(a)pyrene	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA
			PCBs, Total	Eyes/Skin/Nails/ Immune System	2.7E+00		5.1E+00	7.8E+00
			Dioxin TEQ	NA	NA	NA	NA	NA
			Arsenic	Skin	1.9E-01	NA	1.7E-01	3.7E-01
							Total Soil HI	8.2E+00
Air	Air	Ambient Air Facility Area	PCBs, Total	NA	NA	NA	NA	NA
							Total HI	**8.2E+00**
Future Operations Worker (based on default assumptions):								
Soil	Soil	Surface Soil Facility Area	Benzo(a)pyrene	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA
			PCBs, Total	E/S/N/ImmSystem	3.0E+02	NA	1.2E+02	4.1E+02
			Heptachlor Epoxide	Liver	2.9E-02	NA	NA	2.9E-02
			Dioxin TEQ	NA	NA	NA	NA	NA
			Arsenic	Skin	1.3E+00	NA	2.5E-01	1.5E+00
							Total Soil HI	4.1E+02
Air	Air	Ambient Air Facility Area	PCBs, Total	NA	NA	NA	NA	NA
							Total HI	**4.1E+02**
Current/Future Construction Worker (based on subchronic exposure):								
			PCBs	E/S/N/ImmSystem	7.0E+01	NA	1.3E+01	8.3E+1
			Dioxin TEQ	NA	NA	NA	NA	NA
			Arsenic	Skin	6.4E-01	NA	5.7E-02	6.9E-01
							Total Soil HI	8.3E+1
Air	Air	Ambient Air Facility Area	PCBs, Total	NA	NA	NA	NA	NA
							Total HI	**8.3E+1**

TABLE 7-12B. RISK CHARACTERIZATION SUMMARY – NON-CARCINOGENS (continued)

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Future Offsite-Resident (Child 0-6 years)								
Groundwater	Groundwater	Tap Water	1,2,4-Trichlorobenzene	Adrenals	7.0E-02	7.0E+00	3.1E-02	7.1E+00
			1,4-Dichlorobenzene	NA	5.2E-03	6.6E-03	1.4E-03	1.3E-02
			Pentachlorophenol	Liver/Kidney	4.2E-02	3.4E-01	1.1E-01	4.9E-01
			Trichloroethylene	Liver/Kidney/Fetus	7.2E-01	2.0E-01	5.7E-02	9.8E-01
			2,4,6-Trichlorophenol	NA	9.6E+00	7.9E+01	2.2E+00	9.1E+01
			Indeno(1,2,3-cd) pyrene	NA	NA	NA	NA	NA
			PCBs, Total	E/S/N/ImmSystem	7.8E+03	NA	3.9+04	4.6E+04
			Gamma-BHC	Liver/Kidney	1.2E-01	1.1E+00	8.5-03	1.2E+00
			Methyl Parathion	Blood	1.9E+01	NA	NA	1.9E+01
			Parathion	NA	1.0E+02	NA	8.6+00	1.1E+02
			Dioxin TEQ	NA	NA	NA	NA	NA
			Arsenic	Skin	1.3E+00	NA	8.6E-03	1.3E+00
			Mercury	Immune System	3.8E-01	1.1+01	2.6E-03	1.1E+01
							Total Groundwater HI	4.7E+04
Air	Air	Ambient Air Facility Area	PCBs, Total	NA	NA	NA	NA	NA
							Total HI	**4.7E+04**

The use of conservative assumptions throughout the risk assessment process is believed to result in an over-estimate of human health risk. Therefore, actual risk may be lower than the estimates presented here but are unlikely to be greater.

7.7 Ecological Evaluation

A biological survey and habitat assessment were performed to evaluate habitat characteristics at OU3. The findings of this quantitative assessment were used to support a more detailed analysis of the relationship between ecological receptors and exposures at the Facility and Landfills. Habitats were assessed based on a general description of primary habitat, approximate percent cover of habitat types, dominant vegetation, vegetation density, vegetation height, bordering land use, and evidence of natural or anthropogenic disturbance. In general, the habitat of the areas evaluated was poor, reflecting maintenance activities (cutting and mowing), low plant diversity, and poor soil conditions. Since Solutia is expected to continue operating the Facility for the foreseeable future, a risk-management decision was made that no further assessment of ecological risk is necessary. Any actions taken to protect human health risk at the Facility and Landfills will reduce risk to ecological receptors. If all operations at the Facility cease, the CERCLA Five-Year Review process or the RCRA closeout process will identify if any re-evaluation of ecological risk is needed. Therefore, ecological risks are not a concern for OU3.

7.8 Basis for Action

The response action selected in this IROD is necessary to protect the public health or welfare or the environment in the short term from actual or threatened releases of hazardous substances into the environment.

8.0 REMEDIAL ACTION OBJECTIVES

8.1 Overview

Remedial action objectives (RAOs) consist of medium-specific or location-specific goals for protecting human health and the environment. This section presents the RAOs for soil and groundwater at OU3. It outlines the Remedial Goals (RGs), or cleanup levels, needed to meet the RAOs and address the risks identified in Section 7, and it provides the basis for evaluating the cleanup options presented in Section 9. Based on the RGs, areas where RGs are exceeded in soil and groundwater are described for use in Section 9. Finally, other areas considered for action in Section 9 are described.

8.2 Soil and Groundwater RAOs

RAOs for soils include the following:

- Reduce risks to operations area workers, O&M workers, and trespassers from direct contact with, inhalation of, or incidental ingestion of COCs in surface soil above levels that are protective;
- Reduce risks to the construction worker from direct contact with, inhalation of, or incidental ingestion of COCs in subsurface soil above levels that are protective;
- Prevent migration and leaching of COCs in surface and subsurface soils to groundwater above levels that are protective of beneficial use (*i.e.*, attain drinking water standards);
- Minimize migration of COCs in surface soil to surface water; and
- Control future releases of COCs to ensure protection of human health and the environment.

RAOs for groundwater include the following:

- Prevent exposure to groundwater from direct contact with, inhalation of, or ingestion of COCs in groundwater above acceptable levels that are protective of beneficial use (*i.e.*, attain drinking water standards);
- Prevent further migration of contaminated groundwater beyond the existing known limits of the contaminant plume;
- Control future releases of COCs in groundwater to ensure protection of human health and the environment; and
- Restore contaminated groundwater throughout each plume, or at and beyond the edge of designated waste management area(s) to levels that are protective of beneficial use (*i.e.*, attain drinking water standards).

8.3 Remedial Goals

Remedial Goals (RGs or "cleanup levels") are chemical- and media-specific concentrations that are intended to be generally protective of receptors and allow RAOs to be achieved. The RGs are developed from chemical specific applicable or relevant and appropriate requirements (ARARs) or, in the absence of chemical specific ARARs, the EPA develops risk-based goals.

RGs consist of target concentrations for the COCs in each media. The RGs described in this section were developed based on direct exposure pathways. In general, RGs are calculated separately for cancer and non-cancer effects to each exposure pathway, corresponding to incremental cancer risk levels of $1x10^{-4}$, $1x10^{-5}$, and $1x10^{-6}$ and hazard indices (HIs) of 0.1, 1, and 3. The RGs calculated for all COCs by media are provided in Table 8-1.

In the absence of chemical-specific ARARs, remedies should reduce the risks from carcinogenic contaminants such that the excess cumulative individual lifetime cancer risk for site-related exposures falls between $1x10^{-4}$ and $1x10^{-6}$. For non-carcinogens, contaminant concentrations should be reduced such that the exposed populations or sensitive sub-populations will not experience adverse effects during all or part of a lifetime, incorporating an adequate margin of safety (*i.e.*, a hazard index at or below one). Because OU3 is an operating industrial facility, RGs that achieve a target cancer risk near $1x10^{-5}$ and a hazard index near 1 are appropriate. The finals columns in Table 8-1 list the RGs selected and the bases for the final COCs.

In Table 8-1, PCBs and arsenic are the only two chemicals in soils that require RGs in order to achieve the desired risk range, because exposure point concentrations for benzo(a)pyrene and dibenzo(a,h) anthracene are below the RGs equivalent to a $1x10^{-5}$ cancer risk. Although the dioxin concentration includes polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzo-furans (PCDFs) but not dioxin-like PCBs, the concentrations are within the EPA's risk range in the Baseline Risk Assessment. The preliminary data suggests that the PCB surface soil RG of 25 ppm and subsurface goal of 40 ppm will be protective for dioxins even if dioxin-like PCBs are included in the dioxin total. During Remedial Design of this interim action, an analysis and sampling to verify that the PCB surface soil RG of 25 ppm and subsurface soil RG of 40 ppm are protective for dioxins when the dioxin toxic equivalency (TEQ) includes PCDDs, PCDFs, and dioxin-like PCBs.

Because the Facility is an operating industrial facility, the EPA selected a surface soil RG for PCBs of 25 ppm, which results in less than a $1x10^{-5}$ residual cancer risk for the current (near future) operations worker and is within the acceptable cancer risk range for the hypothetical future operations worker. This RG provides for an HI less than one for the current (near future) operations worker and an HI of 1.67 for the hypothetical future operations worker. Although the hypothetical future operations worker HI is greater than one, the HI is based on conservative exposure assumptions and toxicity factors that include a factor of safety of 300. As an operating facility with a RCRA Post Closure Care Permit, the Facility would undertake additional demolition and corrective measures before a hypothetical future operations worker could be exposed. Therefore, preference was given to the current operations worker scenario in selecting the RG for PCBs in soil.

Additionally, this goal is within the range recommended for industrial sites in the EPA's 1990 "Guidance on Remedial Actions for Superfund Sites with PCB Contamination." This guidance suggests that surface soil PCB concentrations ranging from 10 ppm to 25 ppm are generally considered to be within the EPA's acceptable risk range based on the direct contact exposure pathway.

As shown in Table 8-2, RGs for a larger number of chemicals are needed to attain ARARs or to reduce the risks associated with groundwater. Since the groundwater risk assessment only evaluated contaminants in the most highly contaminated area, Table 5-8 was reviewed to determine if there were other chemicals in groundwater that should have been included based on ARARs or concentrations higher than screening criteria. RGs for methylene chloride, benzo(a)pyrene, beryllium, and lead were added to Table 8-2 because of detections in Table 5-8 that exceeded chemical-specific ARARs. RGs for 1,1,2,2-tetrachloroethane, cobalt, and manganese were added to Table 8-2 because maximum detected concentrations onsite greatly exceed screening values. Finally, an RG for o,o,o-triethylphosphorothioate, an impurity produced during the manufacture of technical parathion, was added to Table 8-2. Since toxicity information was not available for o,o,o-triethylphosphorothioate, an RfD of 0.02 mg/kg based on dimethoate, previously approved under the RCRA Post Closure Care Permit, was used as a surrogate.

8.4 Areas of Soil Contamination Above Remedial Goals at OU3

Based on sampling results for the Facility, eight potential areas of impact (Areas A through H in Figure 8-1) have been identified where soil concentrations exceed the RG for PCBs in surface soil and/or subsurface soil. Soils in Area A also exceed the RG for arsenic in surface soil. The impacted areas are described below.

Area A
This soil impact area consists of the open, currently grassed, area to the north of the employee parking lot in the vicinity of the former Phosphoric Acid Basins (SWMU-12) and is approximately 3.3 acres in size. PCB concentrations measured in soil exceeded both the surface soil and subsurface soil RGs of 25 ppm and 40 ppm, respectively. Subsurface impacts extend to a depth of 10 feet bgs. Arsenic concentrations also exceeded the surface soil Remedial Goal. Prior to completing the FS, a removal action to address "principal threat waste" material at SSRI-11 (within Area A) was conducted. The material was delineated, excavated, and disposed of at a TSCA-approved landfill. Concentrations of PCBs below 500 mg/kg remain. Based on groundwater PCB concentrations in OW-10 and OWR-11, leaching to groundwater is considered probable from soils in this area.

Area B
This soil impact area is approximately 0.5 acres in size and is located in the center of the Facility at the location of the former Waste Drum Satellite Accumulation Area (SWMU-44). SWMU-44 was a pit, approximately 19 foot by 16 foot (304 square feet) in size, with four inch concrete curbs and two conical sumps six foot to eight ft deep.

Soil sample SSR-18 was collected near the Waste Drum Satellite Accumulation Area and yielded the highest PCB concentration reported in soil of 16,620 J mg/kg. SSR-18 was collected immediately north of the former PCB Production Area. This area and the sumps have subsequently been partially excavated and covered with a concrete cap. However, no samples

TABLE 8-1: REMEDIAL GOALS FOR SOIL

	EPC (mg/kg)	Cancer Calculated Risk	Noncancer Calculated Risk	Remedial Goals Based on Cancer Risk Level (mg/kg)			Remedial Goals Based on Hazard Quotient Level (mg/kg)			Final Remedial Goal	
				1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3	Value (mg/kg)	Basis
Surface Soil: Current Operations Worker											
Benzo(a)pyrene	1.9	5.3E-06	NA	0.4	4	36	NA	NA	NA	--	EPC< RG at risk of 1E-5
Dibenzo(a,h)anthracene	0.62	1.7E-06	NA	0.4	4	36	NA	NA	NA	--	EPC< RG at risk of 1E-5
PCBs, Total	370	1.1E-04	7.8E+00	3	34	336	5	47	142	25	RG < 1E-5 risk for current worker and within risk range for future worker
Dioxin TEQ	8E-04	2.5E-05	NA	3.E-05	3.E-04	3.E-03	NA	NA	NA	--	EPC within risk range
Arsenic	390	5.9E-05	3.7E-01	7	66	661	105	1054	3162	66	RG at 1E-5 risk for current worker within risk range for future worker
Surface Soil: Future Operations Worker											
Benzo(a)pyrene	1.9	9.0E-06	NA	0.2	2	21	NA	NA	NA	--	EPC< RG at risk of 1E-5
Dibenzo(a,h)anthracene	0.62	2.9E-06	NA	0.2	2	21	NA	NA	NA	--	EPC< RG at risk of 1E-5
PCBs, Total	6100	5.9E-03	4.1E+02	1	10	103	1	15	45	25	RG < 1E-5 risk for current worker and within risk range for future worker
Heptachlor Epoxide	0.380	1.2E-06	2.9E-02	0.3	3	32	1	13	39	--	EPC< RG at risk of 1E-5
Dioxin TEQ	8E-04	4.7E-05	NA	2.E-05	2.E-04	2.E-03	NA	NA	NA	--	EPC within risk range
Arsenic	390	2.4E-04	1.5E+00	2	16	163	26	260	780	66	RG at 1E-5 risk for current worker within risk range for future worker
Subsurface Soil: Construction Worker											
PCBs, Total – subchronic	3300	1.4E-04	8.3E+01	24	236	2357	4	40	120	40	RG for subsurface soil at HQ=1 under subchronic exposure conditions
Dioxin TEQ	8.E-04	2.3E-06	NA	3.E-04	3.E-03	3.E-02	NA	NA	NA	--	EPC within risk range
Arsenic	150	4.5E-06	6.9E-01	33	333	3333	22	217	652	217	RG at HQ=1

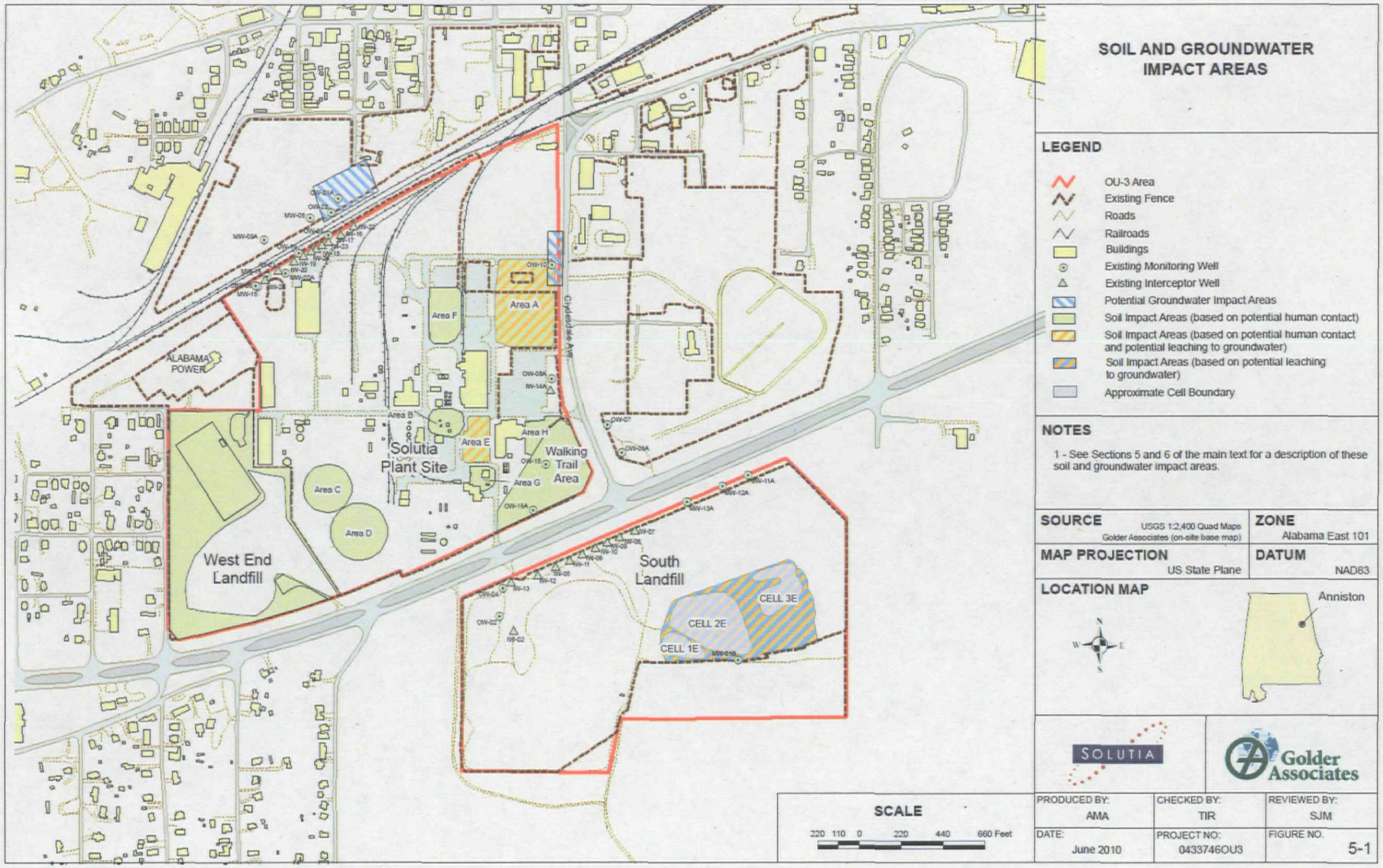
EPC = exposure point concentration, the lower of the maximum concentration and the 95% Upper Confidence Limit (UCL) or 95th Percentile.
RG = remedial goal

TABLE 8-2: REMEDIAL GOALS FOR GROUNDWATER

	EPC (µg/kg)	Cancer Calculated Risk	Noncancer Calculated Risk	Remedial Goals Based on Cancer Risk Level [1] (µg/kg)			Remedial Goals Based on Hazard Quotient Level [2] (µg/kg)			Final Remedial Goal	
				1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3	Value (µg/kg)	Basis
Groundwater: Future Offsite Resident											
Methylene Chloride	36	--	--	--	--	--	--	--	--	5	MCL
Benzo(a)pyrene	2.5	--	--	--	--	--	--	--	--	0.2	MCL
Beryllium	6.8	--	--	--	--	--	--	--	--	4	MCL
Lead	33	--	--	--	--	--	--	--	--	15	MCL
1,1,2,2-Tetrachloroethane	0.67	--	--	--	--	--	--	--	--	0.067	R9PRG
Cobalt	300	--	--	--	--	--	--	--	--	73	R9PRG
Manganese	12,000	--	--	--	--	--	--	--	--	880	R9PRG
o,o,o-Triethylphosphorothioate	530	--	--	--	--	--	--	--	--	310	ADEM Permit
1,2,4-Trichlorobenzene	11	NA	7.1E+00	NA	NA	NA	0.2	2	5	70	MCL
1,4-Dichlorobenzene[3]	2.4	3.3E-06	NA	0.7	7	73	NA	NA	NA	75	MCL
Pentachlorophenol	20	1.5E-04	4.9E-01	0.1	1	13	4	41	122	1	MCL
Trichloroethylene	3.4	8.7E-05	9.8E-01	0.04	0.4	4	0.3	3	10	5	MCL
2,4,6-Trichlorophenol	15	8.5E-06	9.1E+01	1.8	18	176	1.3	13	39	13	HHRA
4-Nitrophenol	17,440			NA	NA	NA	12	125	374	125	ADEM
Indeno(1,2,3-cd)pyrene	0.73	3.2E-05	NA	0.02	0.2	2	NA	NA	NA	0.2	HHRA
PCBs, Total	2400	1.6E-01	4.6E+04	0.02	0.2	2	0.01	0.05	0.2	0.5	MCL
gamma-BHC	0.55	4.0E-05	1.2E+00	0.01	0.1	1	0.05	0.5	1	0.2	MCL
Methyl parathion	74	NA	1.9E+01	NA	NA	NA	0.4	4	12	4	HHRA
Parathion	9400	NA	1.1E+02	NA	NA	NA	9	85	256	85	HHRA
Sulfotepp	67			NA	NA	NA	0.7	7	21	7	HHRA
Dioxin TEQ[3]	4.E-06	3.0E-06	NA	1.E-06	1.E-05	1.E-04	NA	NA	NA	3.E-05	MCL
Arsenic[3]	6.1	5.0E-05	1.3E+00	0.1	1	12	0.5	5	14	10	MCL
Mercury	1.8	NA	1.1E+01	NA	NA	NA	0.02	0.2	0.5	2	MCL

[1] Groundwater Remedial Goals Based on Cancer Risk Levels in table are for the receptor that required the most stringent number, either the adult or the child receptor.
[2] Groundwater Remedial Goals Based on Hazard Quotients in table are for the child (0-6 yrs) receptor.
[3] Remedial Goals are not needed for Dioxin 1,4-Dichlorobenzene, Dioxin TEQ, and Arsenic because EPCs and Maximum detects on Table 5-8 are below MCLs.
EPC = exposure point concentration, the lower of the maximum concentration and the 95% Upper Confidence Limit (UCL) or 95th Percentile.
MCL = Maximum Contaminant Level: HHRA = Human Health Risk Assessment; R9PRG = EPA Region 9 Preliminary Remediation Goal.

FIGURE 8-1: SOIL AND GROUNDWATER IMPACT AREAS



were collected to confirm that concentrations have been reduced.

Area C

This soil impact area is located in the southwest portion of the Site in the vicinity of the Phosphate Landfill (SWMU-06) to the northwest of Area D and is approximately one acre in size. The landfill description is a misnomer; this area was reportedly used as a staging area for phosphorus slag and tailings received from the phosphorus furnaces. Landfilling was unlikely to have occurred at this location due to its proximity to active production areas. This area was also used at one time as a neutralization pit for the treatment of acidic wastewater as part of the parathion production process and likely contained limestone as a treatment media. The basin received acidic wastewater from the scrubber system of the sulfur incinerator which was used to burn residues from intermediates of the parathion production process. The effluent from the neutralization basin was discharged through the plant sewer system to the Phosphoric Acid Basins. Operations in this area ended in 1986. The suspect area was approximately 150 feet long by 170 feet wide. Currently, the whole area is covered with two to eight inches of gravel. Soil samples SSR-6 and SSR-7 were taken below the gravel cover between 0.67 feet and 2 feet bgs. Total PCBs at SSR-6 was 9.3 mg/kg. Total PCBs at SSR-7 was 229 mg/kg. Total PCB concentrations in two wells (OWR-03S and WEL-04) downgradient of SWMU 6 were non-detect. Based on groundwater quality, leaching to groundwater is not considered probable from soils in this area.

Area D

This soil impact area is located in the southwest portion of the facility in the vicinity of the former Santotar® Pit (SWMU-07). This area is approximately 1.5 acres in size. In 1989, the remaining solidified Santotar® was removed from the pit 12 to 16 feet below grade and the pit was backfilled with clay. The clay is covered with between 7 and 12 inches of clean coarse gravel. Two soil samples were collected from below the base of the gravel cap. SSR-8 was collected from 1 to 3 feet bgs and had total PCBs at 0.034 mg/kg. SSR-9 was collected from 0.6 to 2 feet bgs and had total PCBs at 282 mg/kg. Two wells are downgradient of SWMU-7. Total PCB concentrations in two wells (OWR-03S and WEL-04) downgradient of SWMU-6 were non-detect. Based on groundwater quality, leaching to groundwater is not considered probable from soils in this area.

Area E

This soil impact area consists of the open, currently grassed, area to the west of the main office building and to the east of the former PCB Production Area (SWMU-42) and is approximately 0.75 acres in size. Elevated PCB detections in soils include 250 mg/kg (SSRI-07) and 31 mg/kg (SSRI-06) at the surface, and 56 mg/kg (SSRI-07) and 0.865 mg/kg (SSRI-07) at depth. The PCB concentration in groundwater from T-6, a temporary bedrock monitoring well 125 feet below the surface in Area E, was 3.2 µg/L in an unfiltered sample and 1.3 µg/L after filtering. PCBs in this area may also contribute to elevated PCB concentrations in OWR-13. Based on groundwater PCB concentrations, leaching to groundwater is considered probable from soils in this area.

Area F
This soil impact area consists of the open currently grassed area to the northwest of the MCC Warehouse and is approximately 1.5 acres in size. Elevated PCB detections in soils include 37.6 mg/kg (SSRI-05) at the surface and 85 mg/kg (SSRI-05) at depth. Downgradient monitoring wells CB-85, T-01 and T-02 are non-detect for PCBs. Based on groundwater PCB concentrations, leaching to groundwater is not considered probable from soils in this area. However a closer well would more accurately answer this question.

Area G
This soil impact area is in the southeastern portion of the Facility, north of the Boiler Feed Tank (SWMU-25), and is approximately 0.3 acres in size. Elevated PCB detection in soil includes (SWMU-25-6A) 37.6 mg/kg at the surface, exceeding the PCB surface soil RG of 25 ppm. The former PCB Production Area (SWMU-42) is northwest of this area and impact Area E is directly north of this area. PCB concentrations in downgradient groundwater in T-6 are relatively low and more than likely the result of vertical migration from Area E than Area G. Leaching to groundwater is not considered probable from soils in this area. However, a closer well would more accurately answer this question.

Area H
This soil impact area is an open grassy area south of the walking trail area along the southern portion of the parking lot and is approximately 0.4 acres in size. Elevated PCB detections in soils include (SSRI-09) 38.4 J mg/kg at the surface and 13.1 J mg/kg at depth. The PCB concentrations and relative location of this area make impacts to groundwater unlikely; up to 10 ppm PCBs is being allowed to remain on residential properties and is considered protective of groundwater. Interceptor well IW-15 is located close to this area, and it has been shut-down due to dry conditions. If there is no shallow groundwater, there is not likely to be groundwater contamination.

Areas Requiring Cleanup
The soil COC concentrations used in the risk assessment are either averaged to determine the concentrations receptors are exposed to within an exposure unit or the maximum concentrations are used. The average or maximum concentrations used in the risk assessment are called the exposure point concentration (EPCs). EPCs are calculated for each exposure unit; an exposure unit is the geographic area within which a receptor comes in contact contamination. The Facility area was considered an exposure unit for the operations area workers; it was assumed that operations area workers have access to the entire Facility Area. Subsequently, RGs for soil were calculated using the EPCs for the Facility area.

The cleanup to meet RGs and RAOs can be implemented in two ways. The RGs can be treated as not-to exceed concentrations or as area averages. The EPA has determined that the cleanup of PCBs and arsenic at the Facility can be implemented as an area average because the risk calculations were based on chronic toxicity (not acute toxicity) and the risk calculations were made using area averages. The area average involves remediating the areas of the EU with the highest contaminant concentrations until the average concentration (post-remediation EPC) is at or below the RG. As included in the HHRA, the exposure point concentrations for PCBs and

arsenic in the Facility area prior to performing remedial actions are 374 mg/kg and 390 mg/kg, respectively. Based on the EPCs, remedial actions are required for soil impact areas A, C, D, and E in order to meet surface soil RGs. Once these areas are addressed and their relevant exposure pathways are eliminated, the resulting exposure point concentrations for surface soil at the Facility is reduced to 24 mg/kg for PCBs and 7.6 mg/kg for arsenic. Both of these values are below the RGs.

8.5 Areas of Groundwater Contamination Above Remedial Goals at the OU3

Based on sampling results, there are five main areas of impacted groundwater in OU3. The groundwater impacts in each area are described below. The constituents in groundwater that exceed RGs at these areas are shown in Table 8-2.

Downgradient of the South Landfill
The contaminants that exceed RGs in at least one of the groundwater wells downgradient of the South Landfill and its corrective action system (OW-03, OW-04, MW-13A, MW-12A, MW-11A, OW-16A, OW-15, OW-15D) are cobalt, total PCBs, and 1,2,4-trichlorobenzene. OW-5D is actually upgradient of the interceptor wells and it contains cobalt, total PCBs, methyl parathion, 4-nitrophenol, and pentachlorophenol in excess of RGs. The contamination present in OW-5D is the result of the interceptor extraction system pulling contamination towards the well, which is the expected outcome of the extraction system.

Downgradient of the West End Landfill
The only contaminant that currently exceeds RGs in at least one of the groundwater wells downgradient of the West End Landfill (WEL-01, WEL-02, WEL-03, OWR-7D and OWR-10) is total PCBs. The highest concentration of total PCBs detected was 0.72 µg/L. When filtered, that sample was below detection limits for PCBs. In a previous sampling event, lead was also detected above the RG at the West End Landfill, although recent sampling has not detected lead in groundwater.

Downgradient of the New and Old Limestone Bed Surface Impoundments
The contaminants that currently exceed RGs in at least one of the groundwater wells downgradient of the New and Old Limestone Bed Surface Impoundments (MW-07, MW-09A, MW-14, MW-15, MW-16, MW-20A, MW-21A, and T-4) are mercury, 2,4,6-triclorophenol, pentachlorophenol, o,o,o-Triethylphosphorothioate, 4-nitrophenol, indeno(1,2,3-cd)pyrene, parathion, sulfotepp, and Total PCBs. In a previous sampling event, methylene chloride was also detected above the RG in this area, although recent sampling has not detected methylene chloride in groundwater.

Downgradient of the Phosphoric Acid Basins
The contaminants that exceed RGs in at least one of the groundwater wells downgradient of the Phosphoric Acid Basins (OW10, OW-11, OW-09, OW-8A, OWR-6D, and T-03) are beryllium, cobalt, manganese, mercury, gamma-BHC, 1,1,2,2-tetrachloroethane, trichloroethylene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and Total PCBs.

Downgradient of PCB Production Facility
The only contaminants that exceed RGs in at least one of the groundwater wells downgradient of the former PCB production area and satellite waste storage area (OWR-13 and OWR14D) are mercury, pentachlorophenol, and Total PCBs. PCB concentrations decrease with depth.

Also, RGs have been exceeded on the Facility at OWR-12 and OWR-01D. OWR-12 is downgradient of former product underground storage tanks (AOC-C), and groundwater at this location exceeds RGs for manganese, cobalt, 4-Nitrophenol, and Total PCBs. OWR-01D is in the northeast corner of the site away from most of the production facilities, and groundwater at this location exceeds the RG for manganese.

8.6 Other Potential Areas of Concern

Additionally, the adequacy of caps and cover soils at the Walking Trail Area, the South Landfill, and the Adjacent Areas of the West End Landfill, including the Alabama Power Switchyard, were evaluated to determine if they need to be upgraded to protect human health and the environment.

Walking Trail Area
Prior to 1995, surface water drainage from the South Landfill flowed through a ditch in this area prior to discharging offsite. In May 1995, samples collected from soil and sediment were field screened for PCBs. Approximately 10% of the field samples were submitted for laboratory analysis of PCBs. Laboratory concentrations ranged from 6.1 mg/kg to 157 mg/kg. Drainage pathways were enclosed in pipe and a geotextile and soil cover was placed over this area to protect human health and reduce the downstream migration of PCBs in surface water. Surface water run-off from the Walking Trail Area was routed to surface water monitoring station (DSN-012). The results from DSN-012 indicate mostly no or low-level detections of PCBs in the years following construction of the soil cover system over this area. From March 2005 to December 2007, DSN-12 was sampled nine times, resulting in three PCB detections ranging from an estimated 1.6 µg/L to 16 µg/L. Well OW-15 is located directly within the Walking Trail Area. The concentrations measured at OW-15 have been low and sporadic with six detected concentrations (maximum of 14.5 µg/L in 1999) for the last 18 samples analyzed. More recent events show either low level detections or non-detect results for PCBs. The groundwater impacts measured beneath the Walking Trail Area have been tracked over many years and, based on monitoring data, likely originated from the South Landfill. Parathion, 4-nitrophenol , and, most recently, PCBs have been detected in deeper groundwater samples beneath this area, but concentrations decrease considerably with depth. All three of these constituents have been traced to the South Landfill. If these contaminants were releases from the Walking Trail Area, then parathion and 4-nitrophenol would be constituents of concern at DSN-012 also.

South Landfill
The South Landfill operated with ten individual cells from 1960 to 1988 and was used for the disposal of production wastes, demolition materials, and trash from the Facility. Available information indicates that PCB wastes were disposed in Cells 1E and 2E. Non-hazardous chemical wastes and PCB wastes were disposed in Cell 3E. Cell 4E is a RCRA-regulated unit

that received hazardous wastes, including ignitable wastes, methyl parathion, parathion, acetone, benzene, cumene, methylene chloride, methanol, 4-nitrophenol, and xylene. Cell 5E is a RCRA-regulated unit that managed ignitable wastes, methyl parathion, parathion, acetone, benzene, cumene, methylene chloride, methanol, 4-nitrophenol, xylene, spent limestone, limestone, clay, acid brick, and concrete rubble. Cell 5E received spent limestone from the cleaning of the Old Limestone Bed and limestone, clay, acid brick and concrete rubble when the Old Limestone Bed was closed. Cells 1W, 2W, 2WA, and 3W received waste materials that contained parathion, methyl parathion, asbestos, 4-nitrophenol, biological solids from the WWTP, and Facility trash. Cell 4W received waste materials that contained organophosphate contaminated sulfur, parathion, methyl parathion, asbestos, 4-nitrophenol, and biological solids from the WWTP, and Facility trash. In the late 1970s (approximately 1978), waste material from the north end of Cell 1W was excavated and relocated to the RCRA-regulated cell (Cell 4E). This work was performed as part of the realignment of Highway 202.

Two cells (Cells 4E and 5E), were operated as hazardous waste disposal cells under RCRA and are designated as WMA-I in the RCRA Permit. The cells of WMA-I were closed with a RCRA-compliant cap in 1989, while the remaining cells in the closed South Landfill, closed prior to the effective date of RCRA, were covered with compacted soil and a vegetative layer. Following the hydrogeologic assessments and groundwater sampling program, the stormwater catchment basins located north of WMA-I were closed with a clay cap and vegetative cover, and interceptor wells were installed to capture affected groundwater from the western landfill cells (SWMU-1 Corrective Action System). The total discharge for all the wells in the SWMU-1 Corrective Action System averaged 243,000 gallons per year (approximately 0.5 gpm) during the period of July 2001 to July 2005. The total discharge for the period of July 2005 to July 2007 averaged 127,000 gallons per year (approximately 0.24 gpm). Groundwater from each of the recovery wells except IW-10 is pumped to the site equalization basin and then discharged to the Anniston POTW. Upon decommissioning of the on-site WWTP, Solutia sampled and analyzed the effluent from the piping network of the two groundwater extraction systems. The effluent was analyzed for total PCBs. Based on this analysis, Solutia determined that the presence of PCBs was limited to groundwater extracted from IW-10. As a result, groundwater from IW-10 is passed through a carbon filtration system prior to discharging to the Anniston POTW.

In 1997 and 1998, the cap on the closed South Landfill over Cells 2W, 2WA, 3W, 4W, and the remnants of 1W was improved to reduce infiltration of 4-nitrophenol and parathion concentrations in groundwater. Stormwater run-on from unaffected areas upstream of the closed South Landfill was diverted, and culverts were installed to pass this stormwater through areas of affected soils prior to discharging off of the Facility. This allowed for the closure of ditches containing affected sediments. The South Landfill is subject to long-term monitoring and maintenance under provisions of the Facility's current RCRA Permit. This includes quarterly inspection (monthly for WMA-I), access controls, and repairs as needed. ADEM retained authority over the groundwater monitoring and detection monitoring program for WMA-I.

Available information indicates that PCB waste placement in the former South Landfill was limited to Cells 1E, 2E and/or 3E only. ADEM deferred the oversight of further action for this SWMU to the EPA under the CERCLA Program.

West End Landfill

The closed West End Landfill is located along the western boundary of the Facility and operated as a single landfill cell from approximately 1930 to approximately 1960, receiving production wastes and general trash from the Facility. In 1994, it was determined that PCBs were being released from the landfill and the cap needed to be upgraded. The PCB concentrations were measured in soil prior to constructing the cover system over the closed West End Landfill. Soils with high PCB concentrations outside of the waste disposal area were either moved into the landfill cell prior to capping or removed and shipped offsite for disposal. A multi-layer cap was installed over the waste disposal area in 1996, and adjacent areas, except for the Alabama Power Switchyard, were covered with a geotextile and a minimum of 18 inches of clean soil. ADEM deferred the oversight of further action for this landfill to the EPA under the CERCLA Program.

During the RI, the EPA raised concerns about the concentrations of PCBs in the adjacent areas outside the landfill cell, beneath the geotextile and soil cover. Pre-closure surface soil composite samples indicated PCB concentrations of 382 mg/kg, 1,940 mg/kg, 138 mg/kg and 258 mg/kg in soils adjacent to the landfill cell (referred to as Adjacent Areas 1, 2, 3, and 4, respectively). After the adjacent soils were removed, no confirmation samples were taken to demonstrate what residual contamination was present outside the cell. Of particular concern was the PCB concentration of 1,940 mg/kg at Adjacent Area 2, which was above the principal threat level of 500 ppm. Confirmation sampling was conducted for Adjacent Area 2 during the RI/FS; the original and duplicate sampling results ranged from an estimated 14.86 mg/kg to an estimated 89.8 mg/kg, demonstrating that no principal threat wastes remain outside of the multi-layer cap.

Additionally, soil was excavated from outside the fence line of the West End Landfill along 1st Avenue to address PCBs found in soil/sediment and to improve drainage in the area. The area addressed includes a strip of grass between the road and the fence line approximately eight to ten feet wide. Surface soil samples were collected from the closed West End Landfill following completion of the cover systems and analyzed for PCBs. The PCB concentrations were non-detect in cover soils; however, historical records indicated that up to 21 mg/kg PCBs remain in soils along the fence-line adjacent to the Alabama Power Company switch yard.

NPDES samples collected from December 1997 to May 2001 at DSN 006, which is down-gradient from the adjacent areas, were non-detect for PCBs. Groundwater data from OWR-10 was non-detect for PCBs. The soil cap installed in Adjacent Areas 1, 2, and 4, appears to be protective of human health and the environment, as long as no construction is allowed in the area.

Alabama Power Switchyard

Historical records indicate that PCB concentrations were detected in the soil underlying the Alabama Power Company switchyard located within the limits of the West End Landfill property (also referred to as Adjacent Area 3, mentioned above). A composite sample collected from beneath the gravel present in the switchyard indicated a PCB concentration of 138 mg/kg in this area. The samples were collected from beneath the gravel present in the switch yard. Although no additional capping of this area was completed as part of the interim measures, Alabama

Power maintains a gravel cover over the area and restricts access to the switch yard to employees only. The area is enclosed with a chain link fence, which remains locked to prevent unauthorized entry or trespass. NPDES samples collected from December 1997 to May 2001 at DSN 006, which is down-gradient from the switchyard, were non-detect for PCBs. Groundwater data from OWR-10, which is downgradient from large portion of Adjacent Area 3 was non-detect for PCBs.

8.7 Designated Waste Management Areas

It is the EPA's long-standing policy to attain groundwater RGs throughout contaminated groundwater plumes, or at and beyond the edge of designated waste management areas. A waste management area is generally considered to consists of a unit, or several units in close proximity to one another, where waste was disposed of in-place. In addition to the two RCRA-regulated waste management areas at OU3, WMA-I and WMA-II, the EPA considers the South Landfill and West End Landfill to be waste management areas.

9.0 DESCRIPTION OF ALTERNATIVES

9.1 Overview

General response actions and remedial technologies for soil and groundwater at OU3 were developed and screened in the FS. The potential technologies were first screened based on technical implementability only. Surviving technologies were then screened based on effectiveness, implementability, and cost. The technologies that were not feasible or had limitations that might prevent achievement of RAOs were eliminated in the screening process, with the remaining technologies considered to be better suited for further consideration in developing remedial alternatives. The retained technologies are included in six alternatives for cleanup of contaminated soil and four alternatives for cleanup of contamination in ground water. These alternatives represent the range of remedial actions considered appropriate for OU3. As required by CERCLA, no further action alternatives were evaluated for soil and groundwater, to serve as a basis for comparison with the other active cleanup methods.

Remedial Alternatives for soil include the following:

- Alternative S-A: No Action;
- Alternative S-B: Excavation and Off-Site Disposal (previously identified in the Proposed Plan as Alternative S-B: Additional Institutional and Engineering Controls and Excavation and Off-Site Disposal);
- Alternatives S-C: Soil Capping Option 1 (previously identified in the Proposed Plan as Alternative S-C Option 1: Additional Institutional and Engineering Controls and Soil Containment);
- Alternative S-D: Soil Capping Option 2 (previously identified in the Proposed Plan as Alternative S-C Option 2: Additional Institutional and Engineering Controls and Soil Containment);
- Alternative S-E: Chemical Dehalogenation (previously identified in the Proposed Plan as Alterntive S-D: Additional Institutional and Engineering Controls and Soil Excavation and Treatment Using Chemical Dehalogenation); and
- Alternative S-F: Thermal Desorption (previously identified in the Proposed Plan as Alterntive S-E: Additional Institutional and Engineering Controls and Soil Excavation and Treatment Using Thermal Desorption).

Remedial Alternatives for groundwater include the following:

- Alternative GW-A: No Action;
- Alternative GW-B: Expanded Groundwater Extraction (previously identified in the Proposed Plan as Alternative GW-B: Additional Institutional Controls and Expanded Groundwater Extraction);
- Alternative GW-C: Expanded Groundwater Extraction with MNA (of parathion and 4-nitrophenol) (previously identified in the Proposed Plan as Alternative GW-C: Additional Institutional Controls and Expanded Groundwater Extraction and MNA); and

- Alternative GW-D: Zero Valent Iron Groundwater Treatment (previously indentified in the Proposed Plan as Alternative GW-D: Additional Institutional Controls and Groundwater Treatment Using Funnel and Gate Zero Valent Iron Walls).

9.2 Common Elements to All Alternatives

There are a number of soil and groundwater interim corrective measures and final closures that serve as the initial condition for evaluation of OU3 risks to human health and the environment and for use in the screening and evaluation of remedial actions. The implementation, operation, and maintenance of many of the interim corrective measures and final closures are the foundation of the alternatives and must be continued to make the alternatives effective. Unless modified by the alternatives presented, all of the interim and final corrective measures implemented at OU3 prior to the IROD are being proposed as acceptable interim remedial actions under CERCLA, and the evaluation of alternatives includes the evaluation of those actions.

The following actions are common to all soil remedies evaluated:

- Accept all the interim and final corrective measures implemented at OU3 for soil prior to the IROD under CERCLA, except where modified by specifics of the Alternative;
- Verify with confirmation samples that the principal threat waste under cover in Area B has been removed;
- Verify with subsurface soil and/or groundwater confirmation samples that there are no groundwater impacts in Areas B, F, and G;
- Verify with confirmation samples during remedial design that the PCB surface and subsurface remedial goals are protective of dioxin TEQ where dioxin TEQ includes dioxin like PCBs, PCDDs and PCDFs;
- Execute and record (by Solutia) an environmental covenant with ADEM to restrict land use in OU3 and the North Side and East Side Properties (in the vicinity of monitoring wells OW-21A and OW-10);
- Enhance institutional controls with a "no-dig policy" restricting excavations within the Facility (particularly in Area F);
- Install perimeter fencing in the northeast portion of the Facility and along the southern portion of the employee parking lot; and
- Provide operation, monitoring, and maintenance of soil ICMs, caps, and institutional controls to ensure continued long-term effectiveness of the remedy.

The following actions are common to all groundwater remedies evaluated:

- Accept all the interim and final corrective measures implemented at OU3 for groundwater prior to the IROD under CERCLA, except where modified by specifics of the Alternative.
- Solutia to execute and record an environmental covenant with ADEM to restrict groundwater use in OU3 and the North Side and East Side Properties (in the vicinity of monitoring wells OW-21A and OW-10).
- Provide operation, monitoring, and maintenance of groundwater corrective action

systems, carbon filtration system, and institutional controls to ensure continued long-term effectiveness of the remedy.

Treatment/Containment Components
Prior to the mid-1990s, numerous ICMs were completed that consisted mostly of contaminated soil excavation, in-plant surface improvements (*e.g.*, pavements), decommissioning of units, and tank removals. These ICMs have been described in the RI Report. Additionally, beginning in the mid-1990s under the RCRA Corrective Action Program, extensive ICMs were completed to cap existing landfills, manage surface water through the Facility, and remediate potential contaminant exposure areas. These corrective measures were completed as interim measures in order to expedite approval and construction under RCRA. A complete list of ICMs completed at the facility is provided on Table 9-1 and the ICMs are common elements to all of the alternatives described below.

Institutional/Engineering Controls
Currently, the Facility is subject to a restrictive covenant recorded for the Facility that prohibits current or future residential development or groundwater use. All remedies, except the no action remedies, call for Solutia to also execute and record an environmental covenant with ADEM to restrict land use and groundwater use at OU3 and extension of the covenant prohibiting groundwater use to include the North Side and East Side Properties (in the vicinity of monitoring wells OW-21A and OW-10/OW-11).

At the Facility, a "no dig policy" restricting excavation within the Facility area is required for all alternatives, as well as, additional perimeter fencing in the northeast portion of the Facility and along the southern portion of the employee parking lot. This policy is an internal Solutia policy.

All alternatives require soil samples in Area B to confirm that the principal threat waste under concrete in Area B has been removed. Additionally, subsurface soil samples and/or groundwater samples in Areas B, F, and G are required to demonstrate that protection of groundwater has been achieved. During the implementation of the interim remedial design, confirmatory soil sampling will be conducted to ensure and demonstrate that the remaining PCB in surface and subsurface soils provide adequate protection of dioxin TEQ, where dioxin TEQ includes dioxin like PCBs, PCDDs, and PCDFs.

Groundwater Monitoring Components
Part III of the Solutia's AHWMMA Post-Closure Permit, dated October 31, 2008, includes a description of groundwater monitoring and corrective action requirements at the Facility. Current monitoring requirements are defined in the RCRA Permit. These requirements will, at a minimum, be part of all alternatives considered, and may be supplemented with additional requirements during remedial design.

O&M Components
Certain O&M activities are currently carried out as required by the Facility's RCRA Permit. The costs to maintain the existing soil measures, including maintaining both caps installed over RCRA-regulated units WMA-I and WMA-II and covers installed as part of ICMs ($40,000 in

O&M costs over 30 years using a 7% discount rate, amounting to a present worth cost of $496,000), are included in all of the evaluated soil remedial alternatives, except the No Action Alternative. Likewise, the costs to maintain the groundwater measures, including the existing groundwater monitoring wells and groundwater corrective action system installed and regulated under the Facility's RCRA Permit ($110,000 in operations and maintenance costs over 30 years using a 7% discount rate, amounting to a present worth cost of $1,365,000), are included in all of the evaluated groundwater remedial alternatives, except the No Action Alternative. These requirements will, at a minimum, be part of all alternatives considered, and may be supplemented with additional requirements during remedial design.

Expected Outcome
The common elements to all alternatives are not protective of human health and the environment when taken alone. They are considered an integral part of each of the soil or groundwater alternatives evaluated. The costs to maintain the ICMs are separated into soil and groundwater components, and appear as line items in the cost estimate for each alternative.

Although the property already is subject to a restrictive covenant, all of the soil alternatives call for Solutia to also execute and record an environmental covenant with ADEM to restrict land use at OU3. This will provide stronger protection than a deed restriction, as the environmental covenant is enforceable by ADEM. The "no-dig policy" over the Facility area will prevent any maintenance or construction work below grade without prior sampling and removal of soils as necessary to make the work environment safe; this policy is an internal Solutia policy. If the EPA determines during Five-Year reviews of the remedy that the policy is not providing adequate protection, additional remedial actions may be required.

Confirming that principal threat waste is not present in Area B and that soils in Areas B, F, and G are not impacting groundwater will reduce the uncertainty about the long-term risk from those areas. Also, testing to confirm that PCB surface and subsurface soil RGs provide adequate protection of dioxin TEQ will reduce uncertainty related to remedial goals for PCBs.

9.3 Soil Alternatives

The six soil alternatives are as follows:

9.3.1 Alternative S-A: No Action

Alternative S-A is the No Action Alternative for soil, which means that no additional remedial action will be conducted for soil. This alternative is presented and analyzed as required by the NCP, 40 C.F.R. Section 300.430(e)(6). The No Action Alternative does not provide adequate protection of human health and the environment. The No Action Alternative will not address the unacceptable risks to current and future operations area workers and construction workers. No ARARs apply to the No Action Alternative.

TABLE 9-1: LIST OF INTERIM CORRECTIVE MEASURES

RCRA Area Type	RCRA Area ID	Area Description / Site Designation	Description of Interim Corrective Measures (ICMs)	Dimensions (if Applicable)
SWMU	1	South Landfill (unregulated cells) Note - Regulated Cells are designated WMA-I	• Portions covered with multi-layer cap and drainage controls over waste; clay and vegetated cap around disposal area, soil stabilization measures to control erosion (1997-1998) • Cap portions over waste, from top: vegetative cover; 6 inches of topsoil; minimum of 18 inches of cover soil; geocomposite drainage layer anchored along the entire perimeter three-sides (west, north, and east) of which contain a toe drain consisting of a 4-inch corrugated, slotted HDPE pipe surrounded by a filter sock and sand bedding; with 4-inch solid pipe toe drain outlets installed every 200 feet that daylight outside the limits of the cover system; 40-mil High Density Polyethylene (HDPE) textured geomembrane, 6-inches of foundation soil, waste • Cap portions around disposal area, from top: vegetative cover, either a geotextile with 12 inches of compacted soil or varying thicknesses of clay, former soil surface • Drainage controls - construction of South Diversion Berm, and associated channels and hard piping to transfer water around South Landfill to DSN-012 • In the late 1970s (approximately 1978), waste material from the northern portion of Cell 1W was excavated and relocated to the RCRA-regulated cell, 4E.	21.6 Acres
SWMU	2	Landfill Catchment Basins (south landfill)	• Part of WMA-I Closure: clay cover and seeding when landfill cells closed	
WMA	I	WMA-I - South Landfill (regulated cells 4E/5E)	• Multi-Layer Cap (and drainage controls) • Cap, from top to bottom: vegetative cover, 24-inches of topsoil, geotextile fabric, 12-inch sand drainage layer, 24-inch compacted clay base, waste • Drainage control includes diversion of storm water run-off from unaffected upgradient areas, allowing closure of ditches in areas of potentially affected soils • Collection of runoff from South Landfill (SWMU-1 and WMA-1), hard piped to ~6.2 Acre detention pond in East Side Area then discharged to DSN-012 • Soil stabilization measures to control erosion	4.41 Acres
SWMU	4	Leachate Storage Tank	• Unit previously located on western edge of South landfill • 1000 gallon steel tank mounted in steel frame above concrete pad, previously pumped leachate from Cell 5E, and then received water from the Western Landfill Groundwater Extraction System • Removed in 1996	1000 gallon steel tank in steel frame over concrete pad
SWMU	6	Phosphate Landfill	• Gravel cover (2 to 8 inches thick) installed in early 1980s	~150' x 170'
SWMU	7	Santotar® Pit	• Removal - remaining solidified Santotar® removed from the pits (12 to 16 feet below grade), and pits backfilled with clay in 1989, currently under gravel cover (7 to 12 inches thick)	1.1 Acres

RCRA Area Type	RCRA Area ID	Area Description / Site Designation	Description of Interim Corrective Measures (ICMs)	Dimensions (if Applicable)
SWMU	8	Old Limestone Bed Surface Impoundment (OLBSI)	• Removal (min 3 feet below old liner) / clay backfill to surface / asphalt cover (end of 1984) • Closed as landfill with ADEM approved closure + post closure monitoring plan (in 1984 - 1985) • Portion of surface concrete • Groundwater corrective action system in place, see details at end of table.	0.14 Acres
SWMU	9	Former Lagoon	• Removal (several feet below grade) / clay / gravel cover (< 2") (1965) • Corrective action system in place, see details at end of table.	0.53 Acres
WMA	II	WMA-II - New Limestone Bed	• Removal (12 feet below grade) / soil backfill / seed • Fenced in area with warning signage • Groundwater corrective action system in place, see details at end of table.	0.2 Acres
SWMU	12	Phosphoric Acid Basin (South Basin)	• Removal / clay / seed then asphalt cover - under extension of employee parking lot (1994) • Removal - clean fill clay placed 10 to 12 ft-bgs, then seeded • Cover - asphalt cover (employee parking lot - 2")	0.24 Acres
SWMU	12	Phosphoric Acid Basin (North Basin)	• Decommission / backfill / seed (1980s) • Horizontal and vertical delineation and removal of impacted soil at SSRI-11 (2010)	0.11 Acres
SWMU	13	Closed Container Storage Area	• Unit was located on southwest corner of ACL warehouse • Closed with ADEM approved closure plan in 1989 (steam clean, decon, wipe test, submit data)	4" epoxy coated concrete pad
SWMU	14	Hazardous Materials Storage Area	• Unit located east of Benzene Satellite Accumulation Area in SE portion of facility, consisting of a 10'x10'x8' metal building on a concrete pad (capacity of 660 gallons, secondary containment of 190 gallons).	10'x10'x8' steel building on concrete pad
SWMU	15	Spent Nickel Catalyst Storage Area	• Unit located north of the Therminol Production Area in center of facility. • 20'x20' concrete pad surrounded by 3' concrete wall on two sides, stores 55-gallon drums on pallets.	20'x20' concrete 3' wall on two sides
SWMU	16	Laboratory Satellite Accumulation Area	• Previously 5-gallon red plastic jugs labeled hazardous waste in each lab room. • Now, waste lab solvents are stored in 55-gallon drum maintained outside the laboratory building in special secondary containment bins designed to hold 2 55-gallon drums with an overspill capacity of 55 gallons.	Special secondary containment for 2 55-gallon drums with 55-gallons of secondary containment
SWMU	17	Scrap Yard Waste Oil Satellite Accumulation Area	• Gravel cover • Contains 28'x12' concrete pad with roof and 15'x25' concrete pad with partial roof	~50'x220'

RCRA Area Type	RCRA Area ID	Area Description / Site Designation	Description of Interim Corrective Measures (ICMs)	Dimensions (if Applicable)
SWMU	21	Former Boiler	• Previously located north of 4-nitrophenol production unit on concrete pad within a steel building • Operated until 1989, consisted of a 181.7 Million British Thermal Unit (MBTU) / hr boiler • Unit and steel building removed, concrete pad remains, replaced by current boiler (SWMU 22) • Unit operated under Alabama Air Pollution Control Commission Permit No. 301-0007-Z0003 from June 1978 through Jan 1989	
SWMU	29	Wastewater Treatment Plant	• Located on the western border of the facility • Consists of: two hold tanks (SWMU 29A), two aeration basins (SWMU 29B), one clarifier (SWMU 29C), one wet well (SWMU 29D), and associated process sewer piping • Demolition in place of the hold tanks, four aeration basins, and three clarifiers; conversion of two aeration basins to hold tanks (1987-1991) • Only used as equilibration and neutralization area since 2004 after end of 4-nitrophenol production, and water is currently discharged through DSN-002 to the Anniston Publicly Owned Treatment Works (POTW) • Discharge to Anniston POTW is permitted under a State Indirect Discharge Permit	
SWMU	37A	Stormwater Drainage System - Production Area Portion	• Separation of process and stormwater systems 1996 • Sealing of unused collection sewers, installation of sediment control measures at stormwater inlets, and lining of the main stormwater trunk line (~ 1400 LF) with a polyurethane Cure-Line liner system in 1997 to reduce sediment transport, infiltration, and leakage • Additional stormwater sewer repairs and upgrades in 2006/2007	
SWMU	41	Former Parathion Production Area	• End of production in 1986 • Removal - potentially affected soil up to 20 feet bgs and associated process sewer piping • Backfill with soil / gravel cover (1 - 2" thick)	460'x85'
SWMU	42	Former PCB Production Area	• Decommission / concrete / asphalt cap (1972) • Supplemental asphalt cover - (additional 1 -2" thickness in 1993/1994)	Asphalt cap 180'x100'
SWMU	43	Former Phosphorous Pentasulphide Production Area	• Decommission (1988) • Removal of potentially affected soils (most along drainage ditch - 6' - 8' on N to < 1' on S) • Maintenance of concrete-gravel cover (existing slab left in place, gravel down to 1 - 2" thick)	551'x205'
SWMU	44	Waste Drum Satellite Accumulation Area	• Partial removal / concrete backfill in former pit and area (near soil sample location SSR-18) of 2 conical sumps to 6' - 8' deep / 4-inch thick Concrete Cover over surrounding area (2002)	Previously 19'x16' concrete pit with 4" curbing containment

RCRA Area Type	RCRA Area ID	Area Description / Site Designation	Description of Interim Corrective Measures (ICMs)	Dimensions (if Applicable)
SWMU	46	Former Hold Tanks, Aeration Basins and Clarifiers	• Units cleaned, demolished (basin walls pushed down) and landfilled in place (1987-1988) • Soil backfill to grade / gravel cover (1-2 " thick)	330'x160'
SWMU	47	West End Landfill	• Multi-layer cap and drainage controls (1996) • Cap, from top to bottom: vegetative layer, 18-inch soil cover, geosynthetic drainage layer of continuous nonwoven geotextile with 1'x1" geosynthetic wick drains placed every 50 feet daylighting into a ditch near the toe of the western and northern slopes of the covered area, 60-mil textured HDPE geomembrane, 6-inch compacted clay foundation layer, waste • Surrounding area cap, from bottom up, consists of: former soil surface, cover soil, vegetation • Drainage control included collection of storm water run-off and installation of hard piping to replace ditches for run-off through areas of affected soils	8.93 Acres
SWMU	MCC Ware-house	MCC Warehouse	• Replacement of lower 12 feet of siding panels along entire south and portions of east and west sidewall, plus additional 20 feet from the east wall north of the loading dock • Decontamination and paint encapsulation of a 5-foot strip of the concrete floor surface along the entire inside perimeter • Decontamination and paint encapsulation of the exterior concrete foundation walls adjacent to replaced siding and two concrete drainage ditches along the exterior of the south and east walls. • Replacement of southern 1/4 of roof panels • Concrete ditches (40-LF on E sidewall, 100-LF on south sidewall, 12" wide by 8" deep, cleaned and coated with epoxy • Asphalt capping of a rail spur adjacent to the west wall (6 to 12 inches of dense graded aggregate topped by 2 inches of asphalt)	~120'x300'
AOC	A	AOC-A - Product Storage Tank	• Located in central portion of facility to the east of SWMU 15 • Consists of 11,000-gallon Santowax product tank located within a 4-foot high concrete secondary containment wall • Removal of stained gravel, upgrade of spill containment to concrete floor, backup secondary level control circuits (1991/1992)	10' diameter 15,600 gallon tank with 30'x27'x2.5' concrete secondary containment
AOC	C	AOC-C - Product Underground Storage Tanks	• Removal of 4 tanks (mid to late 1980s)	

RCRA Area Type	RCRA Area ID	Area Description / Site Designation	Description of Interim Corrective Measures (ICMs)	Dimensions (if Applicable)
SUMMARY OF CORRECTIVE ACTION SYSTEMS				
SWMU WMA	1 I	South Landfill Corrective Action System	Western Landfill Groundwater Extraction System • Installation and operation of 4 interceptor wells (IW-1, IW-2, IW-3, and IW-4) in 1983 • Monitoring and observation wells (OW-02 and OW-04) • IW-1, IW-3, and IW-4 turned off in 1998 per RCRA Permit	
SWMU WMA	1 I	South Landfill Corrective Action System	Northern Landfill Groundwater Extraction System 1982-1983 (IW-5 & IW-6) 1987-1988 (other IWs) • Installation and operation of 9 interceptor wells (IW-5, IW-6, IW-7, IW-8, IW-9, IW-10, IW-11, IW-12, and IW-13) • Monitoring and observation wells (MW-1B, OW-6A, OW-7, OW-15, and OW-16A) • IW-10 has been pre-treated by pumping through a carbon filter drum	
SWMU WMA	1 I	South Landfill Corrective Action System	Plant Site Groundwater Extraction System • Installation and operation of 2 interceptor wells (IW-14 and IW-15) (1987-1988) • Monitoring and observation well (OW-08A) • Currently only IW-14 in operation (IW-15 turned off as per RCRA Permit) • IW-14 replaced with IW-14A 200 feet to north (downgradient of OW-8 & OW-8A on Feb 2003)	
SWMU WMA	8 II	WMA II Corrective Action System	Old Limestone Bed Surface Impoundment Groundwater Extraction System • Installation and operation of 6 interceptor wells (IW-16, IW-17, IW-18, IW-19, IW-20, and IW-21 in 1988; addition of DW-1 in 1997; addition of IW-22, IW-23, IW-34, IW-25 in Jan-Feb 2003) • Monitoring and observation wells (MW-1B, MW-8, MW-9R, MW-15, MW-16, MW-20A, OW-19, OW-21, OW-22, OW-24, and SBP-5)	

9.3.2 Alternative S-B: Excavation and Off-Site Disposal

Estimated Capital Cost: $ 28,785,000
Estimated O&M Cost: $ 713,000
Total Present Worth: $ 29,498,000
Estimated Design and Construction Timeframe: 2 years
Estimated Time to Achieve RAOs: 2 years

Key ARARs
Alternative S-B includes the following key ARARs:

- Regulations at 40 C.F.R. Part 261 for the management and disposal of remediation wastes;
- Regulations at 40 C.F.R. Part 761 for the management and disposal of PCB remediation wastes and
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes.

Treatment/Containment Components
Alternative S-B includes the common elements described above for soil and the following:

- Excavate impacted soils in Areas A, C, D, and E;
- Dispose of impacted soils off-site; and
- Backfill excavated areas with clean soils.

Alternative S-B includes excavation and off-site disposal of an estimated 68,900 cubic yards of impacted soil. Appropriate temporary erosion and sedimentation control measures and surface water management structures will be put in place to prevent off-site migration of contaminants during excavation. Continuous air monitoring will be conducted at the location of the excavation and the perimeter of the Facility to monitor air for soil particulates containing contaminants in excess of RGs.

Institutional Controls
No change from common elements listed in Section 9.2.

Groundwater Monitoring Components
The EPA will review all groundwater monitoring requirements and may make revisions to all plans as deemed necessary to ensure monitoring is adequate.

O&M Components
The EPA will review all existing O&M requirements and may make revisions to all plans as deemed necessary to ensure that the remedies are protective of human health and the environment.

Expected Outcomes
Excavation and off-site disposal of contaminated soil would prevent direct exposure and reduce the onsite risk from soil to levels that are protective of human health. Excavation of

contaminated soils in Area A, C, D, and E to depths of at least 10 feet, 2 feet, 2 feet, and 4 feet, respectively, will prevent future contaminate migration to groundwater. Off-site disposal facility for soil with PCBs greater than 50 µg/kg has been operational since 1978, so there should not be concerns from the receiving community. Air monitoring to address community concerns would be important and integral to the success of this alternative. The clean soil backfill would not require special operation or maintenance activities and would reduce the risks to construction workers from direct contact with, inhalation of, or incidental ingestion of COCs.

9.3.3 Alternative S-C: Soil Capping Option 1

Capital Cost: $ 2,063,000
Estimated O&M: $ 796,000
Total Present Worth: $ 2,859,000
Estimated Design and Construction Timeframe: 2 years
Estimated Time to Achieve RAOs: 2 years

Key ARARs
Alternative S-C includes the following key ARAR:

- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes.

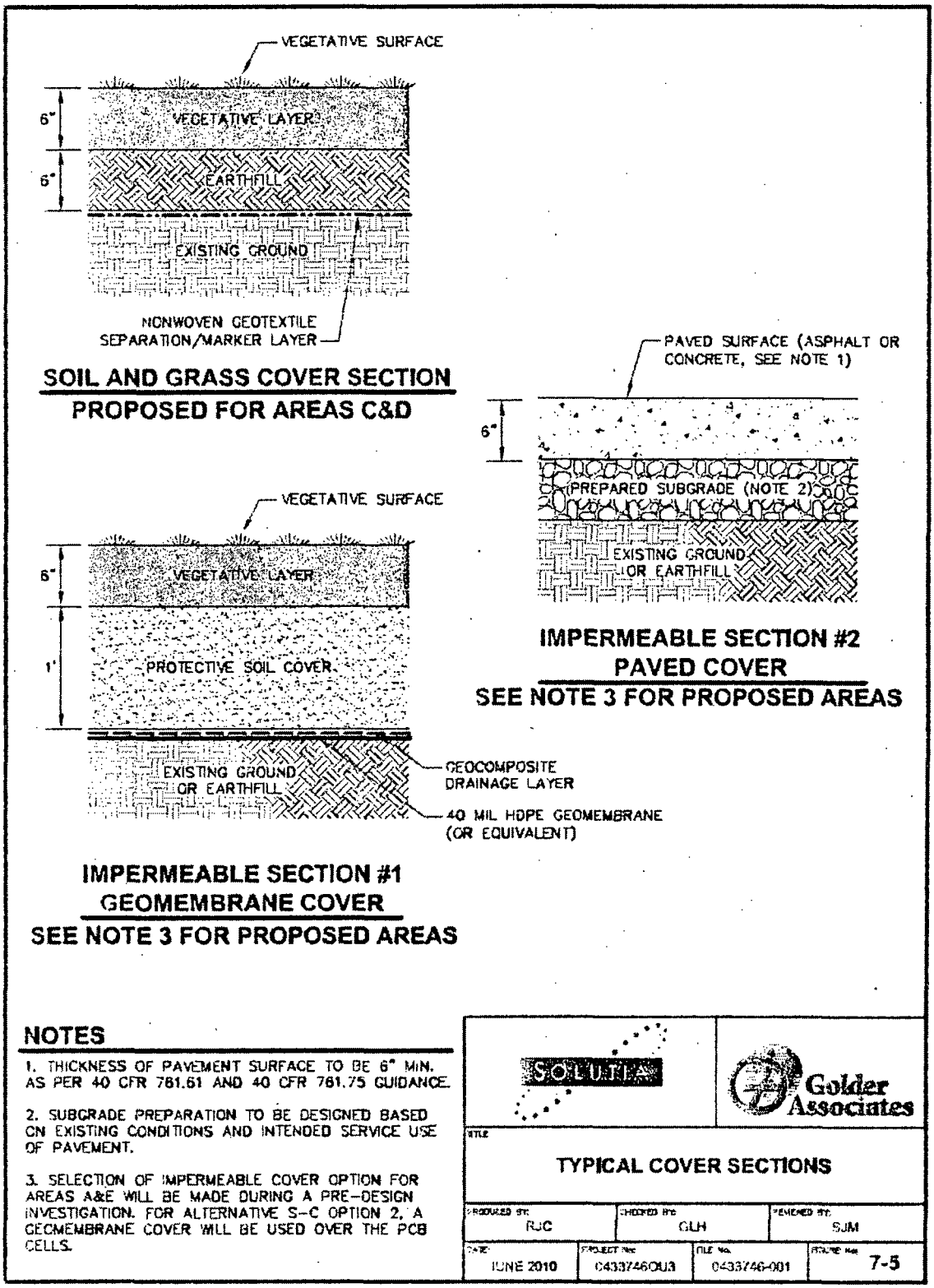
Treatment/Containment Components
Alternative S-C includes the common elements described above for soil and the following:

- Install a cap over impacted soils in Areas A and E to eliminate dermal contact, minimize potential soil leaching to groundwater, prevent erosion, and direct storm water away from the impacted area; and
- Install a cap over impacted soils in Areas C and D to eliminate dermal contact exposure, prevent erosion, and direct storm water away from the impacted area.

Typical cover sections for the caps required by this alternative are provided in Figure 9-1. The actual cover sections will be determined during remedial design. Areas A and E will be capped with either a 6-inch-thick asphalt or concrete cap, or a geomembrane cap based on the intended end use determined during remedial design. Areas C and D will be capped with a minimum 1-foot-thick vegetated soil cover (soil and grass cover). Cover materials will be imported to OU3. Any existing materials that are cut or excavated for grading purposes will be contained under the proposed caps. The final surface will be graded to promote drainage away from the capped area. Wherever possible, existing surface water management structures will be used to convey storm water away from the capped areas. New surface water management structures will be installed as needed.

The final surfaces of the capped areas will be gently graded into the surrounding terrain, with no significant or noticeable changes from the existing topography. Appropriate temporary erosion and sedimentation control measures and surface water management structures will be put in place to prevent off-site migration of contaminants during excavation. Continuous air monitoring will be conducted at the location of the excavation and the perimeter of the Facility to monitor air for soil particulates containing contaminants in excess of RGs.

FIGURE 9-1: TYPICAL COVER SECTIONS



NOTES

1. THICKNESS OF PAVEMENT SURFACE TO BE 6" MIN. AS PER 40 CFR 761.61 AND 40 CFR 761.75 GUIDANCE.

2. SUBGRADE PREPARATION TO BE DESIGNED BASED ON EXISTING CONDITIONS AND INTENDED SERVICE USE OF PAVEMENT.

3. SELECTION OF IMPERMEABLE COVER OPTION FOR AREAS A&E WILL BE MADE DURING A PRE-DESIGN INVESTIGATION. FOR ALTERNATIVE S-C OPTION 2, A GEOMEMBRANE COVER WILL BE USED OVER THE PCB CELLS.

SOLUTIA

Golder Associates

TITLE: TYPICAL COVER SECTIONS

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Institutional Controls
No change from common elements listed in Section 9.2.

Groundwater Monitoring Components
Groundwater monitoring for these soil containment remedies will be required as necessary. The specific requirements will be developed during remedial design.

O&M Components
The EPA will review all existing O&M requirements and may make revisions to all plans as deemed necessary to ensure that the remedies are protective of human health and the environment. New O&M requirements will be developed for caps installed as part of this alternative.

Expected Outcomes
Capping of contaminated soil would prevent direct exposure and reduce the onsite risk from soil to levels that are protective of human health. Capping of impacted soils in Areas A and E will prevent potential soil leaching to groundwater, and capping of Areas A, E, C, and D will minimize migration of contaminants in surface soil to surface water. Air monitoring would not be necessary, only dust management, because contaminated soils would not be moved to any large degree. However, monitoring to address community concerns may be required. Contamination would be managed onsite rather than being taken to another community. Operation and maintenance would be required in perpetuity.

9.3.4 Alternative S-D: Soil Capping Option 2

Capital Cost: $ 4,172,000
Estimated O&M: $ 946,000
Total Present Worth: $ 5,118,000
Estimated Design and Construction Timeframe: 2 years
Estimated Time to Achieve RAOs: 2 years

Key ARARs
Alternative S-D includes the following key ARARs:

- Regulations at 40 C.F.R. Part 264 for the capping of waste in-place at South Landfill Cells 1E, 2E, and 3E; and
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes.

Treatment/Containment Components
Alternative S-D includes the common elements described above for soil and the following:

- Install a new, RCRA Subtitle C-compliant cap over the Cells 1E, 2E, and 3E of the South Landfill;
- Install a cap over impacted soils in Areas A and E to eliminate dermal contact, minimize potential soil leaching to groundwater, prevent erosion, and direct storm water away from the impacted area; and
- Install a cap over impacted soils in Areas C and D to eliminate dermal contact exposure,

prevent erosion, and direct storm water away from the impacted area.

Typical cover sections for the caps required by this alternative are provided in Figure 9-1. The actual cover sections will be determined during remedial design. Cells 1E, 2E, and 3E of the South Landfill will be capped with a RCRA Subtitle C-compliant cap. Areas A and E will be capped with either a 6-inch-thick asphalt or concrete cap, or a geomembrane cap based on the intended end use determined during remedial design. Areas C and D will be capped with a minimum 1-foot-thick vegetated soil cover (soil and grass cover). Cover materials will be imported to OU3. Any existing materials that are cut or excavated for grading purposes will be contained under the proposed caps. The final surface will be graded to promote drainage away from the capped area. Wherever possible, existing surface water management structures will be used to convey storm water away from the capped areas. New surface water management structures will be installed as needed. The final surfaces of the capped areas will be gently graded into the surrounding terrain, with no significant or noticeable changes from the existing topography.

Appropriate temporary erosion and sedimentation control measures and surface water management structures will be put in place to prevent off-site migration of contaminants during excavation. Continuous air monitoring will be conducted at the location of the excavation and the perimeter of the Facility to monitor air for soil particulates containing contaminants in excess of RGs.

Institutional Controls
No change from common elements listed in Section 9.2.

Groundwater Monitoring Components
Groundwater monitoring for these soil containment remedies will be required as necessary. The specific requirements will be developed during remedial design.

O&M Components
The EPA will review all existing O&M requirements and may make revisions to all plans as deemed necessary to ensure that the remedies are protective of human health and the environment. New O&M requirements will be developed for caps installed as part of this alternative.

Expected Outcomes
Capping of contaminated soil would prevent direct exposure and reduce the risk from soil to levels that are protective of human health. Improving the cap on Cells 1E, 2E, and 3E of the South Landfill will provide for a more competent cap that will provide a more stringent barrier to infiltrations, leading to reduced groundwater contamination from the landfill. Capping of impacted soils in Areas A and E will prevent potential soil leaching to groundwater, and capping of Areas A, E, C, and D will minimize migration of contaminants in surface soil to surface water. Air monitoring would not be necessary, only dust management, because contaminated soils would not be moved to any large degree. However, monitoring to address community concerns

may be required. Contamination would be managed onsite rather being taken to another community. Operation and maintenance would be required in perpetuity.

9.3.5 Alternative S-E: Chemical Dehalogenation

Capital Cost: $ 39,305,000
Estimated O&M: $ 713,000
Total Present Worth: $ 40,018,000
Estimated Design and Construction Timeframe: 2 years
Estimated Time to Achieve RAOs: 4 years

Key ARARs
Alternative S-E includes the following key ARARs:

- Regulations at 40 C.F.R. Part 264 for the management and disposal of remediation wastes;
- Regulations at 40 C.F.R. § 761.61 for off-site disposal of PCB remediation wastes;
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes; and
- Regulations at 40 C.F.R. § 761.79 for PCB treatment and disposal.

Treatment/Containment Components
Alternative S-E includes the common elements described above for soil and the following:

- Excavate impacted soils in Areas A, C, D, and E;
- Dispose of soils that qualify for Subtitle D landfill off-site;
- Treat remaining excavated soils using on-site chemical dehalogenation; and
- Backfill excavated areas with treated soils that meet RGs or clean soils.

Alternative S-E includes soil excavation and on-site treatment using chemical dehalogenation. Soils qualifying for Subtitle D landfill disposal will be disposed of accordingly in lieu of treatment in order to reduce the cost to implement this option. Remaining soils will be treated using on-site chemical dehalogenation. There is an estimated 68,900 cubic yards of impacted soil.

There are a number of chemical dehalogenation technologies including base-catalyzed decomposition (BCD), alkaline metal hydroxide polyethylene glycol (APEC), and potassium metal hydroxide polyethylene glycol (KPEGTM). BCD appears to be the most proven, efficient, and cost effective of these processes; therefore, BCD is the only one considered in this alternative. However, prior to implementation, a treatability study will need to be conducted at OU3 to determine what technology is most appropriate for OU3 conditions. The presence of multiple COCs could affect the effectiveness of this technology and therefore will need to be evaluated further during the treatability study.

Treated soils will be sampled and analyzed; soil meeting the RGs will be backfilled within the areas of excavation. Soil not meeting the RGs will be retreated or disposed off-site. A six-inch

thick vegetative soil cover or gravel cover will be used above the treated soil backfill.

Appropriate temporary erosion and sedimentation control measures and surface water management structures will be put in place to prevent off-Site migration of contaminants during excavation. Continuous air monitoring will be conducted at the location of the excavation and the perimeter of the Plant to monitor air for soil particulates containing contaminants in excess of RGs.

Institutional Controls
No change from common elements listed in Section 9.2.

Groundwater Monitoring Components
Groundwater monitoring for these soil containment remedies will be required as necessary. The specific requirements will be developed during remedial design.

O&M Components
The EPA will review all existing O&M requirements and may make revisions to all plans as deemed necessary to ensure that the remedies are protective of human health and the environment.

Expected Outcomes
Excavation of contaminated soil and onsite treatment using chemical dehalogenation would leave clean (treated) soil onsite, reducing the risk from soil to levels that are protective of human health. For the most part, contamination would be destroyed and the residuals managed onsite, rather being taken to another community. The clean soil backfill would not require special operation or maintenance activities and would reduce the risks to construction workers from direct contact with, inhalation of, or incidental ingestion of COCs.

There might be additional community concerns about contamination releases to the community with an additional process located in the community. Air monitoring to address community concerns would be important and integral to the success of this alternative.

9.3.6 Alternative S-F: Thermal Desorption

Capital Cost: $ 27,069,000
Estimated O&M: $ 713,000
Total Present Worth: $ 27,782,000
Estimated Design and Construction Timeframe: 2 years
Estimated Time to Achieve RAOs: 4 years

Key ARARs
Alternative S-F includes the following key ARARs:

- Regulations at 40 C.F.R. Part 264 for the management and disposal of remediation wastes;

- Regulations at 40 C.F.R. § 761.61 for off-site disposal of PCB remediation wastes;
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes; and
- Regulations at 40 C.F.R. § 761.79 for PCB treatment and disposal.

Treatment/Containment Components
Alternative S-F includes the common elements described above for soil and the following:

- Excavate impacted soils in Areas A, C, D, and E;
- Dispose of soils that qualify for Subtitle D landfill off-site;
- Treat remaining excavated soils using on-site thermal desorption; and
- Backfill excavated areas with treated soils that meet RGs or clean soils.

Alternative S-F includes soil excavation and on-site treatment using thermal desorption. Soils qualifying for Subtitle D landfill disposal will be disposed of accordingly in lieu of treatment in order to reduce the cost to implement this option. Remaining soils will be treated using on-site thermal desorption. There is an estimated 68,900 cubic yards of impacted soil.

Appropriate temporary erosion and sedimentation control measures and surface water management structures will be put in place to prevent off-site migration of contaminants during excavation. Continuous air monitoring will be conducted at the location of the excavation and the perimeter of the Plant to monitor air for soil particulates containing contaminants in excess of RGs.

Institutional Controls
No change from common elements listed in Section 9.2.

Groundwater Monitoring Components
Groundwater monitoring for these soil containment remedies will be required as necessary. The specific requirements will be developed during remedial design.

O&M Components
The EPA will review all existing O&M requirements and may make revisions to all plans as deemed necessary to ensure that the remedies are protective of human health and the environment.

Expected Outcomes

Excavation of contaminated soil and onsite treatment using thermal desorption would leave clean (treated) soil onsite, reducing the risk from soil to levels that are protective of human health. For the most part, contamination would be destroyed and the residuals managed onsite, rather being taken to another community. The clean soil backfill would not require special operation or maintenance activities and would reduce the risks to construction workers from direct contact with, inhalation of or incidental ingestion of COCs.

There might be additional community concern about contamination releases to the community with an additional process located in the community. Air monitoring to address community concerns would be important and integral to the success of this alternative.

9.4 Groundwater Alternatives

The four groundwater alternatives are as follows:

9.4.1 Alternative GW-A: No Action

Alternative GW-A is the No Action Alternative, which means that no additional remedial actions will be conducted. This alternative is presented and analyzed as required by the NCP, 40 C.F.R. Section 300.430(e)(6). The No Action Alternative does not provide adequate protection of human health and the environment. The No Action Alternative will not address the unacceptable risks to future operations area workers and off-site residents who might ingest contaminated groundwater. No ARARs apply to the No Action Alternative.

9.4.2 Alternative GW-B: Expanded Groundwater Extraction

Capital Cost: $ 305,000
Estimated O&M: $ 2,002,000
Total Present Worth: $ 2,307,000
Estimated Design and Construction Timeframe: < 1 year
Estimated Time to Achieve RAOs: 30 years

Key ARARs
Alternative GW-B includes the following key ARARs:

- State and federal Safe Drinking Water Act maximum contaminant levels (MCLs);
- Regulations at ADEM Admin. Code r. 335-6-5-.03 for discharge to a POTW; and
- Regulations at ADEM Admin. Code r. 335-9-1-.05 and ADEM Admin. Code r. 335-9-1-.06 for construction of new extraction wells.

Treatment/Containment Components
Alternative GW-B includes the common elements described above and the following:

- Optimize and expand the existing groundwater corrective action system to provide further containment of groundwater near OW-21A and Area A (OW-10/OW-11);
- Pre-treat extracted groundwater using a carbon filtration system; and
- After filtration, the water will flow to the on-Site equalization basin for discharge to the Anniston Publically-Owned Treatment Works (POTW) for further treatment.
- Provide operation, monitoring, and maintenance to ensure continued long-term effectiveness of the remedy.

Alternative GW-B includes the optimization and expansion of the existing groundwater corrective action system. The existing system will continue to be operated, and will be optimized

and expanded through the incorporation of additional interceptor wells, which may be deeper wells in some areas, to provide for complete control of groundwater impacts. Figure 9-2 shows the locations of the proposed expansion in the locations noted as "Potential Groundwater Impact Areas." Two new interceptor wells have been assumed to be required at the two proposed expansion locations. Three observation wells, two existing and one proposed, will be used to monitor the effectiveness of the new interceptor wells. The exact location and number of interceptor well and monitoring well locations will be determined in design. Extracted water will be pre-treated using a carbon filtration system, and then sent to the on-site equalization basin. From the equalization basin, extracted groundwater is discharged to the Anniston POTW for further treatment. Extraction and treatment will continue until a final remedy is selected and RGs for groundwater, based on MCLs or risk, are met.

Water levels will be collected for all wells. A report verifying capture will be provided so that system modifications are possible to prevent the escape of any contamination. The remedial components included in this alternative are intended to contain and remove contaminated groundwater. If necessary, the groundwater recovery network will be modified periodically until groundwater satisfies RAOs.

Institutional Controls
No change from common elements listed in Section 9.2.

Groundwater Monitoring Components
Groundwater monitoring will be performed to ensure that contaminated groundwater is contained, and the plume is decreasing in size and mass over time, in support of a final remedy restoring groundwater to beneficial use and attaining RGs. The specific requirements will be developed during remedial design.

O&M Components
The EPA will review all existing O&M requirements and may make revisions to all plans as deemed necessary to ensure that the remedies are protective of human health and the environment. New O&M requirements will be developed as part of this alternative.

Expected Outcomes
The existing groundwater pump-and-treat system is working to restore groundwater quality from sources previously addressed through interim measures. This alternative provides for expansion of the existing pump-and-treat system to address contamination in areas of impact. If necessary, the groundwater recovery network will be modified periodically. A Final ROD will be prepared when a demonstration can be made that, in conjunction with the soil remedy selected, groundwater outside of the limits of approved waste management areas can be restored to satisfy RAOs.

9.4.3 Alternative GW-C: Expanded Groundwater Extraction and MNA

Capital Cost: $ 414,000
Estimated O&M: $ 2,955,000
Total Present Worth: $ 3,369,000
Estimated Design and Construction Timeframe: <1 year
Estimated Time to Achieve RAOs: 30 years

Key ARARs
Alternative GW-C includes the following key ARARs:

- State and federal Safe Drinking Water Act maximum contaminant levels (MCLs);
- Regulations at ADEM Admin. Code r. 335-6-5-.03 for discharge to a POTW; and
- Regulations at ADEM Admin. Code r. 335-9-1-.05 and ADEM Admin. Code r. 335-9-1-.06 for construction of new extraction wells.

Treatment/Containment Components
Alternative GW-C includes the common elements described above for groundwater and the following:

- Monitor select wells for natural attenuation parameters, to demonstrate natural attenuation of 4-nitrophenol and parathion;
- Optimize and expand the existing groundwater corrective action system to provide further containment of groundwater near OW-21A and Area A (OW-10/OW-11);
- Pre-treat extracted groundwater using a carbon filtration system;
- After filtration, the water will flow to the on-Site equalization basin for discharge to the Anniston POTW for further treatment; and
- Provide operation, monitoring, and maintenance to ensure continued long-term effectiveness of the remedy.

Alternative GW-C includes the optimization and expansion of the existing groundwater corrective action system, as described in GW-B, in addition to providing for the use of natural attenuation parameters to optimize 4-nitrophenol and parathion recovery. Select, existing wells will be sampled for dissolved oxygen, oxidation-reduction potential, turbidity, pH, specific conductance, methane, ethane, ethene, total organic carbon, alkalinity, TSS, nitrate, sulfate, sulfide, ferrous iron, and chloride. Water levels will be measured during each sampling event, and equipotential maps will be constructed to monitor groundwater flow and direction. A report verifying capture will be provided so that system modifications are possible to prevent the escape of any contamination. Extraction and treatment will continue until a final remedy is selected and RGs for groundwater, based on MCLs or risk, are met.

Water levels will be collected for all wells. A report verifying capture will be provided so that system modifications are possible to prevent the escape of any contamination. The remedial components included in this alternative are intended to contain and remove contaminated groundwater. If necessary, the groundwater recovery network will be modified periodically.

Institutional Controls
No change from common elements listed in Section 9.2.

Groundwater Monitoring Components
Groundwater monitoring will be performed to ensure that contaminated groundwater is contained and the plume is decreasing in size and mass over time, in support of a final remedy restoring groundwater to beneficial use and attaining RGs. The specific requirements will be developed during remedial design.

O&M Components
The EPA will review all existing O&M requirements and may make revisions to all plans as deemed necessary to ensure that the remedies are protective of human health and the environment. New O&M requirements will be developed as part of this alternative.

Expected Outcomes
The existing groundwater pump-and-treat system is working to restore groundwater quality from sources previously addressed through interim measures. This alternative provides for expansion of the existing pump-and-treat system to address contamination in areas of impact. This also provides for collection of MNA parameters to assist in optimizing the existing pump-and-treat system at the South Landfill to account for natural attenuation of parathion and 4-nitrophenol in groundwater. If necessary, the groundwater recovery network will be modified periodically until groundwater attains RGs. A Final ROD will be prepared when a demonstration can be made that, in conjunction with the soil remedy selected, groundwater outside of the limits of approved waste management areas can be restored to satisfy RAOs.

9.4.4 Alternative GW-D: Zero Valent Iron (ZVI) Groundwater Treatment

Capital Cost: $ 8,826,000
Estimated O&M: $ 4,624,000
Total Present Worth: $ 13,450,000
Estimated Design and Construction Timeframe: <1 year
Estimated Time to Achieve RAOs: 30 years

Key ARARs
Alternative GW-D includes the following key ARARs:

- State and federal Safe Drinking Water Act maximum contaminant levels (MCLs);
- Regulations at ADEM Admin. Code r. 335-6-5-.03 for discharge to a POTW; and
- Regulations at ADEM Admin. Code r. 335-9-1-.05 and ADEM Admin. Code r. 335-9-1-.06 for construction of new extraction wells.

Treatment/Containment Components
Alternative GW-D includes the common elements described above for groundwater and the following:

- Install Funnel and Gate ZVI Walls to treat groundwater in-situ; and
- Provide operation, monitoring, and maintenance to ensure continued long-term effectiveness of the remedy.

Alternative GW-D includes groundwater treatment using funnel and gate ZVI Walls. Two in-situ treatment units will be installed: one near OW-21A, and the other near OW-10. The funnel will consist of slurry walls constructed of a bentonite/soil mix and extended to approximately 45 feet below ground surface to act as local impermeable barriers to groundwater flow. The slurry walls will be constructed using standard construction techniques (*i.e.*, extending a trench to the necessary depth and length with simultaneous injection of bentonite slurry). ZVI is an effective reductant that can treat many contaminants, and is particularly effective for chlorinated solvents, PCBs, pesticides, and dioxins. These compounds are completely reduced to non-toxic compounds such as ethane and carbon dioxide. In addition, ZVI is potentially effective in the treatment of certain metals, including cadmium, cobalt, nickel, lead, copper, mercury, and chromium. As groundwater passes through the permeable treatment area, COCs are treated resulting in reduced groundwater concentrations downgradient from the treatment area.

A series of bench scale studies will be performed during a design to establish the efficacy of ZVI on all groundwater COCs. It would be difficult to modify the location of this remedy if needed to support a final remedy of restoring groundwater to beneficial use and attaining RGs.

Institutional Controls
No change from common elements listed in Section 9.2.

Groundwater Monitoring Components
Groundwater monitoring to will be performed to ensure that contaminated groundwater is contained and the plume is decreasing in size and mass over time, in support of a final remedy restoring groundwater to beneficial use and attaining RGs. The specific requirements will be developed during remedial design.

O&M Components
The EPA will review all existing O&M requirements and may make revisions to all plans as deemed necessary to ensure that the remedies are protective of human health and the environment. New O&M requirements will be developed as part of this alternative.

Expected Outcomes

This alternative provides for construction of passive Funnel and Gate ZVI Walls where the existing groundwater corrective action system is not intercepting contaminated groundwater near OW-21A and OW-10. This remedy will take longer to support a final remedy of attaining RGs because the walls are passive and groundwater travels slowly in this aquifer. It would be difficult to modify the interim remedy in support a final remedy of restoring groundwater to beneficial use and attaining RGs. A Final ROD will be prepared when a demonstration can be made that, in conjunction with the soil remedy selected, groundwater outside of the limits of approved waste management areas can be restored to satisfy RAOs.

10.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

Each alternative was evaluated using the nine evaluation criteria in the NCP, 40 C.F.R. Section 300.430(e)(9)(iii). Two of the nine criteria, overall protection of human health and the environment, and compliance with ARARs, are threshold criteria. If an alternative does not meet these two criteria, it cannot be considered as a remedy for the Facility.

Five of the criteria are balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, or volume of contaminants through treatment; short-term effectiveness, implementability, and cost. The EPA can make tradeoffs between the alternatives with respect to the balancing criteria.

Two of the criteria are modifying criteria, state/support agency acceptance and community acceptance. These modifying criteria are formally taken into account after public comment is received on the Proposed Plan and RI/FS, and may be used by the EPA to modify the proposed remedy.

10.1 Threshold Criteria

10.1.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls. Provided a combination of a soil alternative and a groundwater alternative are proposed, all of the alternatives, except the no-action alternatives (Alternative S-A and Alternative GW-A), are protective of human health and the environment by eliminating, reducing, or controlling exposure through treatment, engineering controls, and/or institutional controls.

10.1.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA, as amended, specifies, in part, that remedial actions for cleanup of hazardous substances must comply with requirements and standards under federal or more stringent state environmental laws and regulations that are applicable or relevant and appropriate (*i.e.*, ARARs) to the hazardous substances or particular circumstances at a site or obtain a waiver. *See also* 40 C.F.R. § 300.430(f)(1)(ii)(B). ARARs include only federal and state environmental or facility siting laws/regulations and do not include occupational safety or worker protection requirements. Compliance with OSHA standards is required by 40 C.F.R. § 300.150 and, therefore, the CERCLA requirement for compliance with or wavier of ARARs does not apply to OSHA standards.

Under CERCLA Section 121(e)(1), federal, state or local permits are not required for the portion of any removal or remedial action conducted entirely on-site as defined in 40 C.F.R. § 300.5.

See also 40 C.F.R. §§ 300.400(e)(1) & (2). Also, CERCLA actions must only comply with the "substantive requirements," not the administrative requirements of a regulation. Administrative requirements include permit applications, reporting, record keeping and consultation with administrative bodies. Although consultation with state and federal agencies responsible for issuing permits is not required, it is recommended for determining compliance with certain requirements such as those typically identified as Location-Specific ARARs.

Applicable requirements, as defined in 40 C.F.R. § 300.5, means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a CERCLA site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be applicable.

Relevant and appropriate requirements, as defined in 40 C.F.R. § 300.5, means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site.

Per 40 C.F.R. § 300.400(g)(5), only those state standards that are promulgated, are identified in a timely manner, and that are more stringent than federal requirements may be applicable or relevant and appropriate. For purposes of identification and notification of promulgated state standards, the term promulgated means that the standards are of general applicability and are legally enforceable. State ARARs are considered more stringent where there is no corresponding federal ARAR, where the State ARAR provides a more stringent concentration of a contaminant, or the where a State ARAR is broader in scope than a federal requirement.

In addition to ARARs, the lead and support agencies may, as appropriate, identify other advisories, criteria, or guidance to be considered for a particular release. The "to-be-considered" (TBC) category consists of advisories, criteria or guidance that were developed by the EPA, other federal agencies, or states that may be useful in developing CERCLA remedies. *See* 40 C.F.R. § 300.400(g)(3). TBCs are not considered legally enforceable and, therefore, are not considered to be applicable for a site but are evaluated along with ARARs as part of the risk assessment to set protective cleanup goals. TBCs can be used in the absence of ARARs, when ARARs are insufficient to develop cleanup goals, or when multiple contaminants may be posing a cumulative risk. *See* the EPA, OSWER Directive No. 9234.0-05, *Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements* (July 9, 1987).

ARAR Categories

For purposes of ease of identification, the EPA has created three categories of ARARs: Chemical-, Location- and Action-Specific. Under 40 C.F.R. § 300.400(g)(5), the lead and support agencies shall identify their specific ARARs for a particular site and notify each other in

a timely manner as described in 40 C.F.R. § 300.515(d). Chemical- and Location-Specific ARARs should be identified as early as the scoping phase of the RI, while Action-Specific ARARs are identified as part of the FS for each remedial alternative. *See* 40 C.F.R. §§ 300.430(b)(9) & 300.430(d)(3).

In accordance with 40 C.F.R. § 300.400(g), the EPA and the State of Alabama have identified the potential ARARs and TBCs for the evaluated alternatives. Tables C-1 and C-2, provided in Appendix C, list respectively the Chemical- and Action-Specific ARARs/TBCs for the Selected Remedy. No Location-Specific ARARs/TBCs have been identified for the Selected Remedy.

Chemical-Specific ARARs/TBC Guidance
Chemical-Specific ARARs are usually health or risk based numerical values limiting the amount or concentration of a chemical that may be found in, or discharged to, the environment. The Safe Drinking Water Act (SDWA) MCLs at 40 C.F.R. Part 141 and the state or federal ambient water quality criteria established under Section 303 or 304 of the Clean Water Act are examples of Chemical-Specific ARARs that used to establish remediation levels for restoration of groundwater and surface water that are current or potential sources of drinking water. *See* 40 C.F.R. §§ 300.430(e)(2)(i)(B), (C), & (E).

Chemical-Specific ARARs for the Facility include SDWA MCLs for some of the groundwater COCs at the Plant. In the absence of an MCL or other Chemical-Specific ARARs, site-specific risk-based remedial goals were developed for the groundwater COCs 2,4,6-trichlorophenol, indeno(1,2,3-cd)pyrene, methyl parathion, parathion, and PNP, and for soil COCs PCB and arsenic.

However, the Selected Remedy will invoke the interim action waiver under CERCLA § 121(d)(4)(A) for chemical-specific ARARs – namely, the State and federal MCLs for groundwater at OU3. The interim action to be selected is an interim measure, which is only part of a total remedial action for the contaminated groundwater. The total remedial action will attain such MCLs or standards of control when the final action is completed.

Action-Specific ARARs/TBC Guidance
Action-specific ARARs are usually technology-based or activity-based requirements or limitations that control actions taken at hazardous waste sites. Action-Specific requirements often include performance, design and controls, or restrictions on particular kinds of activities related to management of hazardous substances. Action-specific ARARs are triggered by the types of remedial activities and types of wastes that are generated, stored, treated, disposed, emitted, discharged, or otherwise managed.

Any remediation wastes that are generated and subsequently transferred off-site or transported in commerce along public right-of-ways must meet any applicable requirements such as those for packaging, labeling, marking, manifesting, and placarding requirements for hazardous materials. In addition, CERCLA Section 121(d)(3) provides that the off-site transfer of any hazardous substance, pollutant, or contaminant generated during CERCLA response actions be sent to a treatment, storage, or disposal facility that is in compliance with applicable federal and state laws

and has been approved by the EPA for acceptance of CERCLA waste. *See also* 40 C.F.R. § 300.440 (so called "Off-Site Rule").

Comparison of Alternatives

All retained alternatives, except the No Action Alternatives (Alternative S-A and Alternative GW-A) are expected to achieve compliance with those Chemical- and Action-Specific ARARs that pertain to each alternative. Alternatives S-E and S-F, which include treatment of soil via chemical dehalogenation and thermal desorption, respectively, will require extensive design, pilot studies, and air monitoring in order to attain the Chemical- and Action-Specific ARARs associated with air emissions. Alternative GW-D will also require extensive design, pilot studies, and air monitoring in order to attain the Chemical- and Action-Specific ARARs associated with air emissions.

Because they do not meet the requirements of the threshold criteria, Alternatives S-A and GW-A were eliminated from consideration under the remaining seven criteria.

10.2 Primary Balancing Criteria

10.2.1 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

The long-term effectiveness and permanence of Alternatives S-B, S-E, and S-F, are equally effective and permanent to OU3. However, Alternatives S-E and S-F provide greater long-term effectiveness because contaminants are destroyed or reduced in volume. Alternatives S-B, S-E, and S-F are ranked higher than S-C and S-D due to the residuals remaining on-site under caps. Within Alternative S-D provides an improved cap on the PCB cells of the South Landfill, which will afford more effective long-term protection.

The long-term effectiveness and permanence of Alternatives GW-B and GW-C are expected to be higher than Alternative GW-D, which relies on passive groundwater flow to an in-situ treatment gate. Alternatives GW-B and GW-C include a highly effective and proven remedial component (groundwater extraction). Alternative GW-C provides an additional degree of effectiveness, compared to Alternative GW-B, through the use of monitoring to continuously evaluate the long-term effectiveness of the remediation and associated natural attenuation processes, allowing for an optimized extraction system. Alternative GW-B and GW-C will likely be more effective and permanent than Alternative GW-D due to the potential difficulties associated with the installation and long-term performance of the ZVI.

10.2.2 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of the remedy. This criterion evaluates an alternative's use of treatment to reduce harmful effects of contaminants, their ability to move in the environment, and the amount of contamination present.

The reduction of toxicity, mobility, and volume through treatment is highest for alternatives that treat impacted soil. Alternatives S-E and S-F treat impacted soil via chemical dehalogenation and thermal desorption, respectively. Pilot studies for both of these technologies have shown reductions in the concentration of PCBs in treated soil. Both of these processes, however, produce a significant amount of residual products that require either treatment or off-site disposal. In addition, reuse of the treated soil on-site is not always appropriate due to the change in physical characteristics of the materials. Alternatives S-E and S-F are ranked higher for reducing the toxicity, mobility, and volume of impacted soil through treatment than those alternatives which have either a containment or excavation with off-site disposal component for impacted soils.

Alternatives GW-B and GW-C will reduce the toxicity, mobility, and volume of groundwater impacts through extraction and on-Site treatment, followed by additional off-Site treatment at the POTW. Alternative GW-C provides an additional monitoring component, which will continuously evaluate the natural degradation of groundwater constituents. Alternative GW-D provides for in-situ treatment of groundwater, which is intended to reduce the toxicity of groundwater. However, due to the potential effectiveness concerns with this technology, this alternative is ranked lower than the others in regards to groundwater treatment. Considering each alternative individually, Alternatives GW-B and GW-C are considered to offer the highest reductions in toxicity, mobility, and volume, followed by Alternative GW-D.

10.2.3 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

In general, alternatives with the fewest construction or intrusive activities pose the lowest risk to site workers and the community. Alternative S-C and S-D will have minimal short-term impacts because contaminated soil is not being excavated and/or treated on-site. Alternative S-B will have some additional short-term impacts due to hauling activities associated with off-site disposal of soil. Alternatives S-E and S-F are both anticipated to have a high potential for short-term impacts compared to the other alternatives due to the soil treatment components of these alternatives. Both of these alternatives will require on-site treatment of impacted soil using systems that will be in operation 24 hours per day throughout treatment. As a result, there will be the continued potential for air emissions, and noise and light impacts to the Plant workers and surrounding communities. In addition, fuel and power demands, staging areas, and health and

safety requirements will have the potential to cause disturbances to the existing Plant operations. Particular attention would be required for air monitoring during treatment activities to provide protection for the construction worker, facility worker, and local community members.

Alternatives GW-B and GW-C are anticipated to result in minimal, if any, short-term impacts. Alternative GW-D is anticipated to have a higher potential for short-term impacts compared to the other alternatives due to the installation of the ZVI system.

10.2.4 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility and coordination with other governmental entities are also considered.

For soil, Alternative S-C and S-D are easiest to implement, followed by Alternative S-B. Alternatives S-E and S-F are the most difficult to implement because equipment and expertise are in short supply.

For groundwater, Alternatives GW-B and GW-C are equally easy to implement because the base pump and treat system and permits are already in place. Alternative GW-D is the most difficult to implement because it requires more expertise.

10.2.5 Cost

This criterion evaluates the estimated capital and O&M costs as well as present worth costs of each alternative based on a 7% discount rate. Present worth costs are the total cost of an alternative over time in terms of today's dollars (*i.e.*, present worth costs correct for expected inflation). The cost estimates are order-of-magnitude estimates, which are expected to be accurate within the range of +50 to -30 percent. The cost of alternatives, from most expensive to least expensive is provided in Table 10-1. The most expensive remedies require excavation and treatment or offsite disposal of contaminated soils and in-situ treatment of groundwater. Containment remedies for soil and extraction and monitoring of groundwater are the least expensive alternative. Since all of these alternatives provide overall protection and meet ARARs, soil containment and groundwater extraction and monitoring are the most cost effective.

10.3 Modifying Criteria

10.3.1 State Acceptance

This criterion considers whether the state agrees with the EPA's analyses and recommendations. ADEM has received all documents related to development of the RI/ FS and Proposed Plan for OU3 of the Anniston PCB Site. The EPA anticipates working with ADEM to obtain support for the Selected Remedy and any changes that are required to the Post-Closure Care Permit for the facility as a result of this IROD.

TABLE 10-1. COMPARISON OF COSTS FOR ALTERNATIVES

Alternative	Capital Cost	Estimated O&M	Total Present Worth
Soil:			
S-D	$ 39,305,000	$ 713,000	$ 40,018,000
S-B	$ 28,785,000	$ 713,000	$ 29,498,000
S-E	$ 27,069,000	$ 713,000	$ 27,782,000
S-C (Option 2)	$ 4,172,000	$ 946,000	$ 5,118,000
S-C (Option 1)	$ 2,063,000	$ 796,000	$ 2,859,000
Groundwater:			
GW-D	$ 8,826,000	$ 4,624,000	$ 13,450,000
GW-C	$ 414,000	$ 2,955,000	$ 3,369,000
GW-B	$ 305,000	$ 2,002,000	$ 2,307,000

10.3.2 Community Acceptance

There were a number of comments received recommending that a more expensive alternative be selected and recommending that local workers be hired to conduct the work. There was no reasoning provided for why another alternative would be better, other than the implication of bring more money into the affected community. Other comments were related to providing more information than was available in the Proposed Plan. For a complete summary of comments to the Proposed Plan and the EPA's responses, see Part 3 of this IROD.

10.4 Comparison of Alternatives

Table 10-2 provides a summary of the relative rankings of the soil remedial alternatives for each of the nine NCP criteria. Five soil alternatives met the threshold criteria. All can be designed and constructed to be protective of human health and the environment and attain ARARs. However, the capping alternatives (S-C and S-D) have fewer ARARs with which to comply than the excavation alternatives (S-B, S-E, and S-F).

The capping alternatives (S-C and S-D) are much easier to implement, cost less, and provide better short-term effectiveness that the excavation alternatives (S-B, S-E, and S-F). The soil treatment remedies (S-E and S-F) provide for higher long-term effectiveness and meet the EPA's objective to reduce toxicity, mobility and volume through treatment. However, the costs are very high and the protection provided is the same.

ADEM has not provided any comments about the alternatives evaluated in the FS; however, the alternatives are similar to corrective measures previously evaluated by ADEM for this Facility. The community has expressed concern that monitoring of air and groundwater should continue during execution of the remedy to ensure that the community is protected. The community has also expressed interest in making sure that the money spent on the remedy remains in the community through hiring or other means. To that end, the community favors the more expensive excavation remedies.

Table 10-3 provides a summary of the relative rankings of the groundwater remedial alternatives for each of the nine NCP criteria. Three groundwater alternatives met the threshold criteria, although attainment of State and federal MCLs would be waived through the interim action waiver in CERCLA § 121(d)(4)(A) for all groundwater alternatives until a final remedy is selected. All can be designed and constructed to be protective of human health and the environment in the short-term.

The extended extraction alternatives (GW-B and GW-C) are easier to implement, cost less, and provide better short-term and long-term effectiveness. Although the reactive wall could achieve remedial goals eventually, the time-frame would be would be longer because the reactive wall is a passive system. The cost of the reactive wall outweighs the relative benefits provided.

Again, ADEM has not provided any comments about the alternatives evaluated in the FS. The current groundwater extraction system was approved by ADEM and it is assumed that ADEM would likely prefer an expansion to the current system rather than supplementing the system with a reactive wall. The community has expressed concern about the source of groundwater contamination at the northern end of the site, but they have not expressed concern about the alternatives proposed. The community has also expressed interest in making sure that the money spent on the remedy remains in the community through hiring or other means. To that end, it can only be assumed that the community favors the more expensive reactive wall.

TABLE 10-2: COMPARATIVE ANALYSIS OF SOIL ALTERNATIVES

Criterion	**Alternative S-B** Excavation and Off-Site Disposal	**Alternative S-C** Soil Capping Option 1	**Alternative S-D** Soil Capping Option 2	**Alternative S-E** Chemical Dehalogenation	**Alternative S-F** Thermal Desorption	**Alternative Ranking**
Threshold Criteria						
Overall Protectiveness	Protective	Protective	Protective	Protective	Protective	Equal
Compliance with ARARs						Ranked from easiest to hardest to comply S-B, S-F, S-E
Chemical-Specific	Complies	NA	NA	Complies	Complies	
Location-Specific	NA	NA	NA	NA	NA	NA
Action-Specific	Complies	Complies	Complies	Complies	Complies	Ranked from easiest to hardest to comply S-B, S-C, S-D, S-F, S-E
Balancing Criteria						
Long-term Effectiveness	High effectiveness because contaminants removed from facility and take offsite	Least moderately effective because less capping required	Moderately effective	Next highest effectiveness because volume of contaminants reduced	Highest effectiveness because contaminant destroyed	Ranked from most effective to least effective: S-F, S-E, S-B, S-D, S-C
Reduction of Toxicity, Mobility, and Volume Through Treatment	No treatment component	No treatment component	No treatment component	Toxicity, mobility and volume reduced through treatment	Toxicity, mobility and volume reduced through treatment	Ranked from most effective to least effective: S-F, S-E, S-B, S-D, S-C
Short-Term Effectiveness	Moderate STE because soil excavated then hauled offsite	Highest STE because only clean soil moved, least amt	High STE because only clean soil moved, larger amt	Low STE because soil excavated and treated ex-situ onsite	Low STE because soil excavated and treated ex-situ onsite	Ranked from most effective to least effective: S-C, S-D, S-B, S-F, S-E
Implementability	Moderate difficulty due to excavation in facility and hauling offsite	Easiest to implement, capping smallest area	Easy to implement, capping proven technology	Hard to implement with air and discharge requirements	Hard to implement with air and discharge requirements	Ranked from easiest to hardest to implement: S-C, S-D, S-B, S-F, S-E
Cost	$ 29, 498,000	$ 2,859,000	$ 5, 118,000	$ 40,018,000	$ 27,782,000	Ranked from least cost to high cost: S-C, S-D, S-F, S-B, S-E
Modifying Criteria						
State Acceptance	No comments	No comments	No comments	No comments	No comments	No preference from ADEM
Community Acceptance	Acceptable	Want higher cost remedy	Want higher cost remedy	Acceptable	Acceptable	Some of community prefers more expensive remedy than S-D. Rank by highest cost: S-E, S-B, S-F, S-D, S-C

TABLE 10-3: COMPARATIVE ANALYSIS OF GROUNDWATER ALTERNATIVES

Criterion	**Alternative GW-B** Expanded Groundwater Extraction	**Alternative GW-C** Expanded Groundwater Extraction with MNA	**Alternative GW-D** Zero Valent Iron (ZVI) Groundwater Treatment	**Alternative Ranking**
Threshold Criteria				
Overall Protectiveness	Protective	Protective	Protective	Equal
Compliance with ARARs *Chemical-Specific* *Location-Specific* *Action-Specific*	Interim Action Waiver Invoked	Interim Action Waiver Invoked	Interim Action Waiver Invoked	Ranked from easiest to hardest to comply GW-B, GW-C, GW-D
	NA	NA	NA	NA
	Complies	Complies	Complies	Ranked from easiest to hardest to comply GW-B, GW-C, GW-D
Balancing Criteria				
Long-term Effectiveness	Groundwater will be restored and provide long-term protection and effectiveness provided the system is maintained	Groundwater will be restored and provide long-term protection and effectiveness provided the system is maintained. MNA may allow better optimization and cleanup.	All of the contaminated groundwater may not get treated for a long time because this is a passive system.	Ranked from most effective to least effective: GW-C, GW-B, GW-D
Reduction of Toxicity, Mobility, and Volume Through Treatment	NA	NA	NA	NA
Short-Term Effectiveness	The expanded extraction system would require moderate opportunity for worker exposure and little opportunity for non-worker exposure or impacts.	The expanded extraction system would require moderate opportunity for worker exposure and little opportunity for non-worker exposure or impacts.	Because some soil would be disturbed to implement this remedy, if would have some short-term concerns to workers and adjacent businesses or residents	Ranked from most effective to least effective: GW-B, GW-C, GW-D
Implementability	Easy to expand existing extraction system	Easy to expand existing extraction system, but additional data collection and monitoring required	Most difficult to implement	Ranked from easiest to hardest to implement: GW-B, GW-C, GW-D
Cost	$ 2,307,000	$ 3,369,000	$ 13,450,000	Ranked from least cost to highest cost: GW-B, GW-C, GW-D
Modifying Criteria				
State Acceptance	No comments	No comments	No comments	No preference from ADEM
Community Acceptance	Want higher cost remedy	Want higher cost remedy	Acceptable	Some of community prefers more expensive remedy than GW-C. Rank by highest cost: GW-D, GW-C, GW-B

11.0 PRINCIPAL THREAT WASTE

The NCP establishes an expectation that the EPA will use treatment on principal threat wastes wherever practicable. Principal threat wastes are source materials that are considered highly toxic or highly mobile, that cannot be reliably contained, or that present a significant risk to human health or the environment. Generally, contaminated groundwater is not considered to be a source material and is therefore not generally considered to be a principal threat waste.

Because the South Landfill and West End Landfill operated as disposal areas for all Facility waste before environmental regulations were established, there is a high probability that principal threat wastes related to all of the historically manufactured products are present in the landfills. Because the exact location of principal threat waste in the landfills is not known and the landfills are large, it is not practicable to conduct activities to identify principal threat wastes. In addition, the EPA evaluated and determined that the landfills were providing sufficient containment to protect human health and the environment in their current condition.

For the South Landfill, cobalt, total PCBs, and 1,2,4-trichlorobenzene are the only contaminants that exceed RGs in at least one of the groundwater wells downgradient of the South Landfill and its corrective action system (OW-03, OW-04, MW-13A, MW-12A, MW-11A, OW-16A, OW-15, OW-15D). A corrective action system was installed to restore parathion and 4-nitrophenol concentrations in groundwater. OW-5D is actually upgradient and within the influence of the interceptor wells of the corrective action system, and it contains cobalt, total PCBs, methyl parathion, 4-nitrophenol, and pentachlorophenol in excess of RGs. Because PCB concentrations in groundwater are relatively high upgradient and downgradient of the corrective action system and the cap over the PCB cells (*i.e.*, Cells 1E, 2E, and 3E) has not been upgraded since the cells were closed, one alternative considered installing a more competent cap over the cells to improve groundwater quality and provide for more long-term protection of the Landfill and any principal threat waste within.

For the West End Landfill, total PCBs is the only contaminant that currently exceeds an RG in at least one of the groundwater wells downgradient of the West End Landfill (WEL-01, WEL-02, WEL-03, OWR-7D and OWR-10). The highest concentration of total PCBs detected was 0.72 µg/L. When filtered, that sample was below detection limits for PCBs. Based on the low PCB concentrations in groundwater, the upgraded cap, and the age of the waste in the West End Landfill, no additional action other than groundwater and surface water monitoring are warranted, even though principal threat waste are likely present in the Landfill.

In the Facility area, removals were conducted at two areas (impact Area A and impact Area B on Figure 8-1) where principal threat waste (PCB contaminated soil with concentrations greater than 500 mg/kg) were found. Extensive groundwater investigations were performed to determine if NAPL sources were present that would be persistent sources to groundwater contamination. No NAPL sources were found in OU3. No other principal threat waste is known to be present in the Facility or areas adjacent to the landfills. However, confirmation sampling in Area B is needed to confirm that no action to address principal threat wastes is needed.

12.0 SELECTED REMEDY

Alternative S-D (Soil Capping) and Alternative GW-C (Expanded Groundwater Extraction with MNA) were proposed as the preferred alternatives in the Proposed Plan, and they are the Selected Remedy to address contamination in OU3 of the Anniston PCB Site. The remedial components are shown in Figures 12-1 and 12-2. The rationale for the selection and details about the Selected Remedy are provided below.

12.1 Summary of the Rationale for the Selected Remedy

The main factors influencing the EPA in its selection of Alternative S-D (Soil Capping) and Alternative GW-C (Expanded Groundwater Extraction with MNA) as the OU3 remedy are:

- Current groundwater monitoring data demonstrates that containment is a viable alternative based on the hydrogeologic conditions in the subsurface.
- There is no indication that NAPL is present in soil or groundwater, so there is no evidence of principal threat waste remaining to be addressed at OU3 Facility.
- Capping of impacted soils and treatment of the source of the groundwater plumes will decrease the amount of contamination migrating from the soils into the aquifer and migrating downgradient in the groundwater.
- The community has expressed concern about community exposure to contaminants in ambient air; the Selected Remedy minimizes the opportunity for release of contaminants to ambient air.
- Because it is an operating facility, there is staff present to maintain caps and protective systems at OU3.

12.2 Description of the Selected Remedy

This remedy will contain contamination and will limit human exposure to ground water and soil contamination. The selected remedy consists of the following remedial actions:

- Accept all the interim and final corrective measures implemented at OU3 for soil prior to the IROD under CERCLA, except where modified by specifics of the Selected Remedy;
- Install a new, RCRA Subtitle C-compliant cap over the Cells 1E, 2E, and 3E of the South Landfill;
- Install a cap over impacted soils in Areas A and E to eliminate dermal contact, minimize potential soil leaching to groundwater, prevent erosion, and direct storm water away from the impacted area;
- Install a cap over impacted soils in Areas C and D to eliminate dermal contact exposure, prevent erosion, and direct storm water away from the impacted area;
- Enhance institutional controls with a "no dig policy" restricting excavations within the Facility (particularly in Area F);
- Install perimeter fencing in the northeast portion of the Facility and along the southern portion of the employee parking lot.

FIGURE 12-1: ALTERNATIVE S-D (SOIL CAPPING OPTION 2)

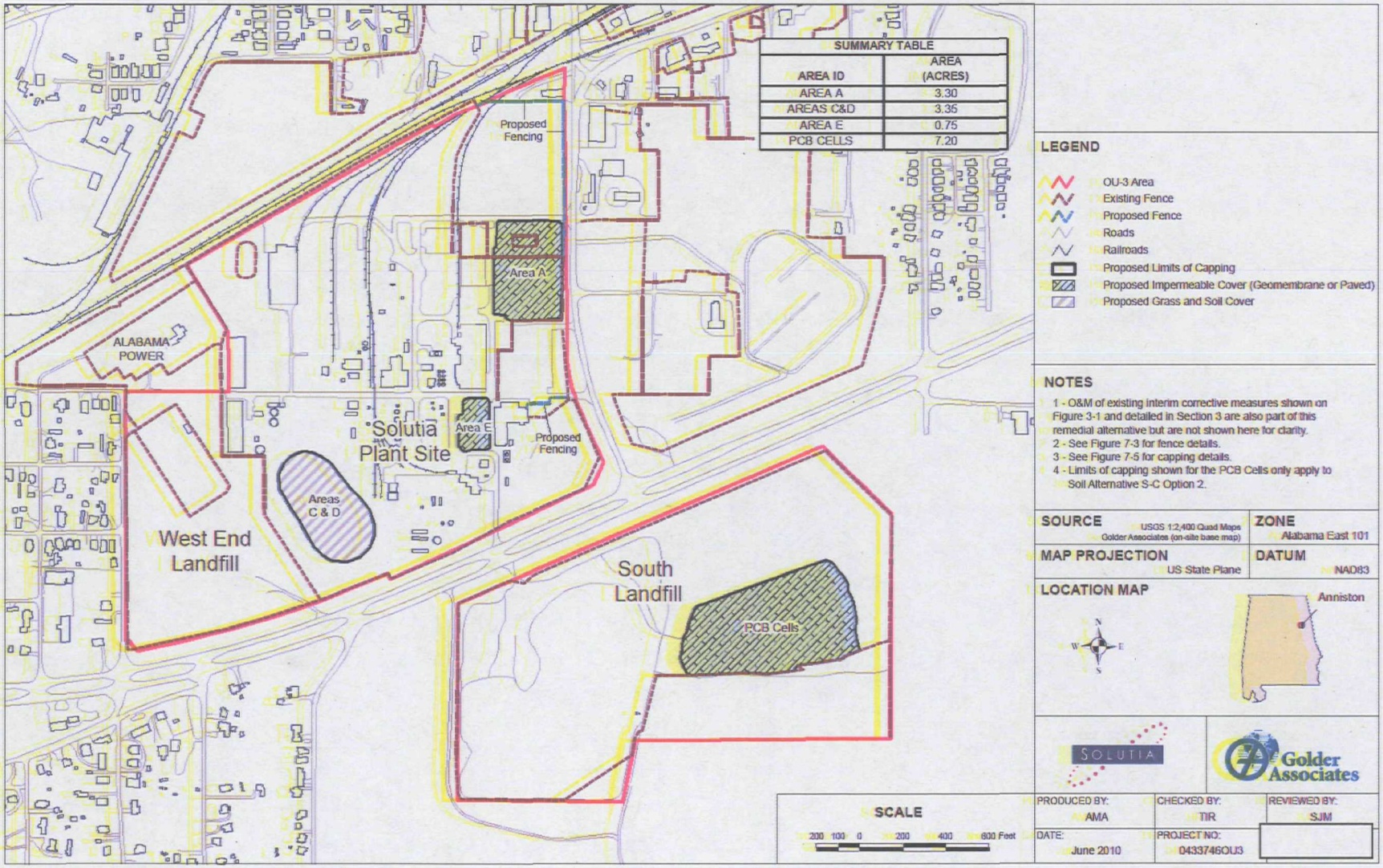
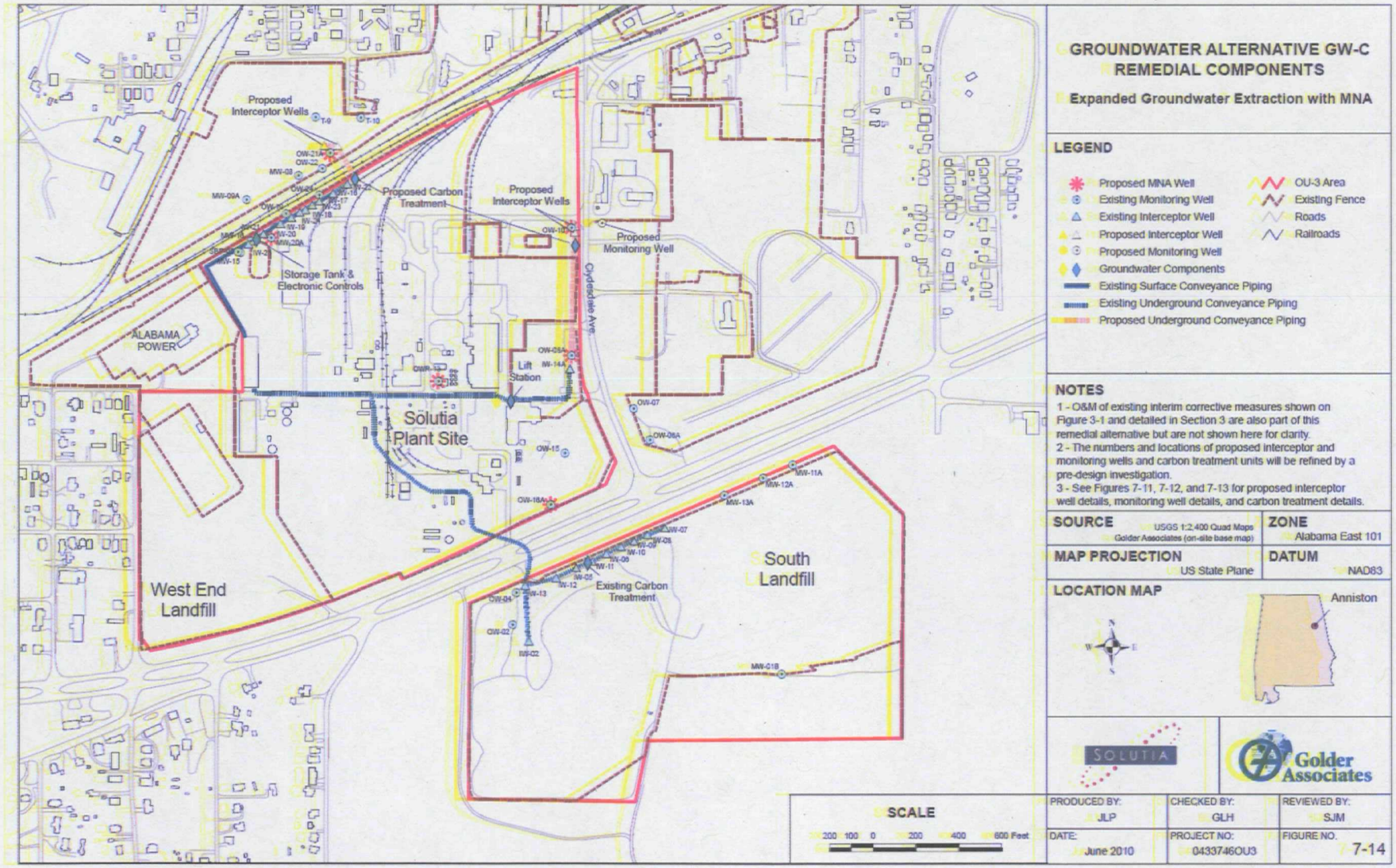


FIGURE 12-2: ALTERNATIVE GW-C (EXPANDED EXTRACTION WITH MNA)



- Verify with confirmation samples that the principal threat waste under cover in Area B has been removed;
- Verify with subsurface soil and/or groundwater confirmation samples that there are no groundwater impacts in Areas B, F, and G;
- Verify with confirmation samples that PCB remedial goal is protective of dioxin TEQ where dioxin TEQ includes dioxin like PCBs, PCDDs and PCDFs;
- Execute and record (by Solutia) an environmental covenant with ADEM to restrict land and groundwater use in the OU3 area and the North Side and East Side Properties (in the vicinity of monitoring wells OW-21A and OW-10);
- Monitor select wells for natural attenuation parameters to demonstrate continued natural attenuation of PNP and parathion;
- Optimize and expand the existing groundwater corrective action system to provide further containment of groundwater near OW-21A and Area A (OW-10/OW-11);
- Pre-treat extracted groundwater using a carbon filtration system;
- After filtration, allow the water to flow to the on-Site equalization basin for discharge to the Anniston POTW for further treatment; and
- Provide operation, monitoring, and maintenance of soil ICMs, caps, groundwater corrective action system, carbon filtration system, and institutional controls to ensure continued long-term effectiveness of the remedy.

12.3 Summary of Estimated Remedy Costs

Table 12-1 presents the following costs for the selected remedy:

- Capital costs;
- Annual costs of various O&M work activities;
- Total (undiscounted) costs for O&M activities;
- Total present worth of the O&M costs; and
- Total present worth for the selected remedy.

The following assumptions were made to generate the cost estimate:

- Capital costs for existing remedial measures are not included, but O&M costs for existing measures, including NPDES compliance sampling, are included.
- The total present worth cost of implementing the current O&M program estimates 30 years of continuous O&M activities.
- Undiscounted costs are in 2010 US dollars.
- A 7 % discount rate was used to calculate present worth

The values in the cost estimate summary table are based on the best available information regarding the expected scope of the remedy. It should be noted that the interim remedy may change somewhat as a result of the remedial design and construction processes. Changes to the remedy described in the IROD will be documented in the Final ROD in accordance with the

TABLE 12-1: COST ESTIMATE SUMMARY FOR THE SELECTED REMEDY

Activity	Unit Cost	Units	Quantity	Est. Cost
CAPITAL COSTS				
Soil Capping				
Mobilization/Demobilization[1]	$ 250,000	Lump Sum	1	$250,000
Temporary Facilities and Utilities	$50,000	Lump Sum	1	$50,000
Clearing and Site Preparation	$1,000	Acre	14.6	$14,600
Erosion, Sediment, and Stormwater Control[2]	$150,000	Lump Sum	1	$150,000
HDPE and Soil Cover System (Off-site Borrow)	$150,000	Acre	11.25	$1,687,500
Grass and Soil Cover System (Off-site Borrow)	$90,000	Acre	3.35	$301,500
Clean Soil Backfill (Off-site Borrow)[3]	$20	Cubic Yard	11,800	$236,000
Surveying	$50,000	Lump Sum	1	$50,000
Soil Sampling and Analytical Testing	$50,000	Lump Sum	1	$50,000
Impermeable Cover Materials Sampling and laboratory Testing	$20,000	Lump Sum	1	$20,000
Contractor Health and Safety/ Air Monitoring	$10,000	Month	6	$60,000
Enhanced Institutional Controls	$18,000	Lump Sum	1	$18,000
Pre-Design Investigation	$50,000	Lump Sum	1	$50,000
		Subtotal Soil Capping Capital Cost		$ 2,937,600
Expanded Extraction with MNA				
Proposed Interceptor Wells[1]	$15,000	Each	4	$60,000
Proposed Observation Wells[1]	$10,000	Each	1	$10,000
Trenching, Piping, and Right of Way Procurement	$20,000	Lump Sum	1	$20,000
Electrical Supply and Connection	$20,000	Lump Sum	1	$20,000
Carbon Treatment System	$25,000	Each	2	$50,000
Start-up/Optimization	$10,000	Lump Sum	1	$10,000
Pre-Design Investigation	$25,000	Lump Sum	1	$25,000
New MNA Wells[1]	$10,000	Each	2	$20,000
Development of MNA Protocols	$50,000	Lump Sum	1	$50,000
		Subtotal Expanded Groundwater with MNA Capital Costs		$265,000
		TOTAL CAPITAL COST		**$ 3,202,600**
ANNUAL OPERATION & MAINTENANCE COSTS				
Existing Soil Remedial Measures O&M				
Maintenance Costs (required upgrades and replacements to existing systems: landfills, ICMs, surface covers, etc.)	$30,000	Annual	1	$30,000
NPDES Monitoring and Analytical Costs	$10,000	Annual	1	$10,000
		Subtotal Existing Soil Remedial Measures O&M Cost		$40,000
Additional Soil Capping O&M				
Inspection and Maintenance of Cover Systems	$20,000	Annual	1	$20,000
Maintenance of Enhanced Institutional Controls	$1,000	Annual	1	$1,000
		Subtotal Additional Soil Capping O&M Cost		$30,000
Existing Groundwater Remedial Measures O&M				
Monitoring and Reporting for Groundwater Corrective Action – System and Other Wells (Semi-annually)	$42,500	Semi-annual	2	$85,000
Maintain Residential and Groundwater Deed Restrictions – (Including costs of legal counsel)	$5,000	Annual	1	$5,000
Maintenance Costs (Required upgrades and replacement to existing systems: ICMs, wells, pumps, piping, etc.)	$15,000	Annual	1	$15,000
Electricity	$5,000	Annual	1	$5,000
		Subtotal Existing Groundwater Remedial Measures O&M Costs		$110,000
Additional Expanded Extraction with MNA O&M				
Electricity	$1,000	Annual	1	$1,000
Maintenance, Parts Replacement, and Carbon Replacement	$5,000	Annual	1	$5,000
Groundwater Monitoring and Reporting	$10,000	Semi-annual	2	$10,000
MNA Monitoring and Reporting	$60,000	Semi-annual	2	$60,000
		Subtotal Existing Groundwater Remedial Measures O&M Costs		$76,000
		TOTAL ANNUAL O&M COST		**$256,000**

TABLE 12-1: COST ESTIMATE SUMMARY FOR THE SELECTED REMEDY

Activity	Unit Cost	Units	Quantity	Est. Cost
PRESENT WORTH OF O&M COSTS				
Years of O&M	30	Years		
Discount Rate	7	%		
PRESENT WORTH OF O&M COSTS (YEARS 1-30)				**$3,065,000**
PRESENT WORTH OF CAPITAL COSTS				**$3,203,000**
CAPITAL COST TOTAL				$3,203,000
CONSTRUCTION BONDING (3% of Capital Cost)				$96,000
PROJECT MANAGEMENT (8% of Capital Costs)				$168,000
PROJECT MANAGEMENT (8% of O&M Costs)				$223,000
ENGINEERING/PERMITTING (15% of Capital Costs)				$275,000
CONSTRUCTION MANAGEMENT (10% of Capital Costs)				$203,000
TOTAL PW OF O&M COSTS				$3,065,000
SUBTOTAL				$7,233,000
CONTINGENCY CAPITAL COSTS (10% scope + 10% bid)				$641,000
CONTINGENCY O&M COST(10% scope + 10% bid)				$613,000
TOTAL NET PRESENT WORTH COST				**$8,487,000**

procedures established by the EPA. This estimate is an order-of-magnitude engineering cost estimate. It is expected to be within +50 to (-) 30 percent of the actual cost of the remedy.

12.4 Expected Outcome of the Selected Remedy

Although the Facility and Landfills are already subject to a restrictive covenant, the Selected Remedy requires Solutia to execute and record an environmental covenant with ADEM to restrict land use and groundwater use at OU3. This will provide stronger protection than the existing restrictive covenants, as the environmental covenant will be enforceable by ADEM. These controls will be used to prevent exposure to the contaminated soils and groundwater, preventing development that would be inconsistent with the selected remedy. OU3 will not be developed for residential use.

Additionally, Solutia's "no-dig policy" over the Facility area will prevent any maintenance or construction work below grade without prior sampling and removal of soils as necessary to make the work environment safe. This policy is an internal Solutia policy. Confirming that principal threat waste is not present in Area B and that soils in Areas B, F, and G are not impacting groundwater will reduce the uncertainty about the long-term risk from those areas. Also, testing to confirm that PCB surface and subsurface soil RGs provide adequate protection of dioxin TEQ will reduce uncertainty related to remedial goals for PCBs.

Capping of contaminated soil will prevent direct exposure and reduce the risk from soil to levels that are protective of human health. Improving the cap on Cells 1E, 2E and 3E of the South Landfill to a RCRA Subtitle C-compliant cap will provide for a more competent cap and will provide a more stringent barrier to infiltration, leading to reduced groundwater contamination

from the landfill. Capping of impacted soils in Areas A and E will prevent potential soil leaching to groundwater, and capping of Areas A, E, C and D will minimize migration of contaminants in surface soil to surface water. Ambient air monitoring for PCBs would not be necessary, only dust management, because contaminated soils would not be moved to any large degree. However, monitoring to address community concerns may be required. Contamination would be managed onsite rather being taken to another community. Operation and maintenance will be required in perpetuity.

Currently, there is no human exposure to the contaminated groundwater from OU3, because the Facility and all nearby residences and businesses are on public water. The existing groundwater pump-and-treat system is working to restore groundwater quality from sources previously addressed through interim measures. This alternative provides for expansion of the existing pump-and-treat system to address contamination in areas of impact. This also provides for collection of MNA parameters to assist in optimizing the existing pump-and-treat system at the South Landfill to account for natural attenuation of parathion and 4-nitrophenol in groundwater. If necessary, the groundwater recovery network will be modified periodically to support a final remedy that will be protective of beneficial use of groundwater and attain RGs throughout the contaminated groundwater plumes, or at and beyond the edge of the designated waste management areas. A Final ROD will be prepared when a demonstration can be made that, in conjunction with the soil and groundwater remedy selected, groundwater outside of the limits of designated waste management areas can be restored to satisfy RAOs. Monitoring of the remedy will be ongoing to provide the data to confirm restoration.

The soil and groundwater remedial goals are summarized in Table 12-2.

TABLE 12-2: REMEDIAL GOALS FOR CONTAMINANTS OF CONCERN

Constituent	Remedial Goal	Basis for Remedial Goal	Risk at Cleanup Goal	
			Cancer	Non-cancer
SURFACE SOIL (0-2 ft)	**(mg/kg)**			
PCBs	25	HHRA and Guidance	$7x10^{-6}$ current $2x10^{-5}$ future	0.6 current 1.67 future
Arsenic	66	HHRA	$1x10^{-5}$ current $3x10^{-5}$ future	< 0.1 current 0.2 future
SUBSURFACE SOIL	**(mg/kg)**			
PCBs	40	HHRA	$1.1x10^{-6}$	1
Arsenic	217	HHRA	$7x10^{-6}$	1
GROUNDWATER	**(µg/L)**			
o,o,o-Triethylphosphorothioate	310	ADEM Permit	--	--
1,1,2,2-Tetrachloroethane	0.067	R9PRG	$1x10^{-6}$	< 0.1
1,2,4-Trichlorobenzene	70	MCL	--	35
2,4,6-Trichlorophenol	13	HHRA	$8x10^{-6}$	1
4-Nitrophenol (PNP)	125	ADEM	--	1
Benzo(a) pyrene	0.2	MCL	--	--
Beryllium	4	MCL	--	--
Cobalt	73	R9PRG	$1x10^{-6}$	< 0.1
Gamma-BHC	0.2	MCL	$2x10^{-5}$	0.4
Indeno(1,2,3-cd)pyrene	0.02	HHRA	$1x10^{-6}$	--
Lead	15	MCL	--	--
Manganese	880	R9PRG	$1x10^{-6}$	< 0.1
Mercury	2	MCL	--	10
Methyl Parathion	4	HHRA	--	1
Methylene Chloride	5	MCL	--	--
Parathion	85	HHRA	--	1
PCBs	0.5	MCL	$2.5x10^{-5}$	10
Pentachlorophenol	1	MCL	$1x10^{-5}$	< 0.1
Tetraethyldithiopyrophosphate (Sulfotepp)	7	HHRA	--	1
Trichloroethylene	5	MCL	$1.25x10^{-4}$	1.67

-- Risk or hazard not determined by risk assessment.

13.0 STATUTORY DETERMINATIONS

The purpose of this section is to provide a brief, site-specific description of how the Selected Remedy satisfies the statutory requirements of CERCLA §121 (as required by NCP §300.430(f)(5)(ii)) and explain the five-year review requirements for the Selected Remedy. Although this interim action is not designed or expected to be final, the Selected Remedy represents the best balance of trade-offs among alternatives with respect to pertinent criteria.

13.1 Protection of Human Health and the Environment

The Selected Remedy will adequately protect human health and the environment through containment, engineering controls, and institutional controls. Capping will eliminate direct contact to contaminants above levels necessary to protect human health and the environment. Groundwater extraction and treatment in conjunction will capping to reduce infiltrations will control groundwater migration. Extraction and monitored natural attenuation will lead to restoration of groundwater to beneficial use.

Exposure levels will be reduced to ARAR levels or to within the EPA's generally acceptable risk range of $1x10^{-4}$ to $1x10^{-6}$ for carcinogenic risk and below the HI of 1 for non-carcinogens. The only exception to this is through a hypothetical future operations worker, in which case the HI would be between 1 and 2, which is still protective given the factor of safety (*i.e.*, 300) on the PCB reference dose used to calculate the hazards index.

The implementation of the Selected Remedy will not pose unacceptable short-term risks because contaminated media will not need to be excavated. The remedy seeks to reduce and eliminate soil to groundwater impacts and soil to surface water impacts through capping.

Finally, OU3 provides very poor habitat to ecological receptors. Although the proposed remedy does not address ecological interests, capping of areas where contamination exists will help protect any ecological receptors that might be present. A full ecological risk assessment is being performed for more appropriate habitats in OU4.

13.2 Compliance with Applicable or Relevant and Appropriate Requirements

The Selected Remedy will comply with Federal and State Action-Specific ARARs for both soil and groundwater remedial components. Because the Selected Remedy is an interim action, the Selected Remedy may not attain Chemical-Specific ARARs for groundwater and, therefore, this ROD invokes the interim action waiver under CERCLA § 121(d)(4)(A) for that scope of the Selected Remedy. However, it is anticipated that the final remedy will comply with Federal and State Chemical-Specific ARARs that have been identified herein. The ARARs for the remedy are identified in Appendix C.

13.3 Cost-Effectiveness

The Selected Remedy is determined to be cost effective. In making this determination, the

following definition set forth in the NCP was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." *See* 40 CFR §300.430(f)(1)(ii)(D). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfy the threshold criteria.

Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; and short- term effectiveness). With O&M, the capping remedy will be effective long-term. Treatment is not a part of the Selected Remedy, but this Remedy is highly effective in the short term, because no contaminated material is excavated, which reduces possible exposure during construction and operations.

Overall effectiveness was then compared to costs to determine cost effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs, and, hence, this alternative represents a reasonable value for the money to be spent. The estimated present worth cost of the selected remedy is as follows:

Alternative S-C Option 2	$ 5,118,000
Alternative GW-C	$ 3,369,000
Total present worth cost	$ 8,487,000

13.4 Utilization of Permanent Solutions or Alternative Treatment Technologies

The Selected Remedy does not use treatment as a major element for soil, but does use carbon treatment to remove PCBs from groundwater. The rationale for not making treatment a major element for soil in this Selected Remedy is:

- For most of the Facility concentrations of PCBs in soil are below the principal threat waste level of 500 mg/kg, making containment a viable alternative.
- In Area B, confirmation sampling is required to demonstrate that no PCB principal threat waste is present.
- It is impracticable to identify principal threat waste locations in the South and West End Landfill, as the location of the waste is unknown and the Landfills are large.
- Current monitoring data have not found any indication that there is source material or NAPLs in the groundwater, so there is no evidence of principal threat wastes at OU3.
- Groundwater monitoring data demonstrates that while contaminants will dissolve in groundwater, mobility is limited; since production of PCBs began in 1929, PCBs have remained on the Facility or near the boundary of the Facility.
- The institutional controls will eliminate or minimize the chance of a receptor being exposed to the contaminated groundwater or soil in the future.
- Monitoring of the groundwater from OU3 will provide a warning if contaminants levels downgradient of OU3 increase significantly.

13.5 Preference for Treatment as a Principal Element

Because this is an interim action, the statutory preference for treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances will be addressed in the Final ROD for OU3. The soil portion of the Selected Remedy does not include a treatment component. Given the concentrations in soil (*i.e.,* below principal threat levels) and the depth to groundwater (*i.e.,* 10 to15 feet), containment under surface caps is a viable option to eliminate exposure pathways and prevent future releases. The current Facility is expected to continue operation for the foreseeable future, and institutional controls are proposed to prevent future exposures. Treatment is therefore not a principal element of the soil component of this remedy.

13.6 Five-Year Review Requirements

Because this Selected Remedy will result in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

14.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan was released for public comment in September 2010. It identified as the preferred alternatives the same alternatives as those ultimately chosen as the Selected Remedy, although the name of the soil remedy changed. They are now called Alternative S-D (Soil Capping), previously identified as Alternative S-C Option 2 in the Proposed Plan, and GW-B (Expanded Extraction with MNA). Even though the Selected Remedy is the same at the preferred remedy in the Proposed Plan, one of the remedial action objectives listed for soil was to permanently and/or significantly reduce the mobility, toxicity, and/or volume of characteristic hazardous waste with treatment. Because no characteristic hazardous waste was identified in the RI/FS, this objective is not needed to provide protection. Additionally, the PCB subsurface soil RG was changed from 45 mg/kg to 40 mg/kg, which corresponds to an HI of 1 for the construction worker.

In addition, the Proposed Plan implied that the Preferred Alternative would be a final action for OU3. This decision document is now identifying the Selected Remedy as an interim action. The uncertainty related to the restoration of groundwater does not support this action as a final action. Confirmation and verification soil sampling will need to be conducted to confirm that PTW is not present and that remaining PCB and dioxin TEQ soil levels are protective of industrial use. Groundwater sampling will be conducted to demonstrate that MNA and expansion of the existing groundwater system will allow restoration of groundwater. A final remedy will be selected once this information is available.

PART 3: RESPONSIVENESS SUMMARY

1. OVERVIEW

This is a responsiveness summary, responding to comments that the public has made regarding the U.S. Environmental Protection Agency's (EPA's) Proposed Plan for the cleanup of hazardous substance contamination at Operable Unit 3 (OU3) of the Anniston PCB Site. The comments responded to in this responsiveness summary were taken from public comments received on the Proposed Plan (Appendix D) and the transcript of the public meeting for the Proposed Plan held on September 13, 2010 (Appendix E).

A responsiveness summary serves two functions: first, it provides the decision maker with information about the views of the public, government agencies, and potentially responsible parties (PRPs) regarding the proposed remedial action and other alternatives; and second, it documents the way in which public comments have been considered during the decision-making process and provide answers to significant comments.

Under the EPA policy, responsiveness summaries are divided into two parts. The first part is a summary of stakeholder issues and concerns, and generally it will expressly acknowledge and respond to those issues and concerns raised by major stakeholders. The second part is a comprehensive response to all significant comments. It is comprised mostly of specific legal and technical questions, and, if necessary, will elaborate with technical detail on answers covered in the first part of the responsiveness summary.

2. STAKEHOLDER ISSUES AND CONCERNS

2.1 **Comment:** The concern expressed most often by community members was that PCBs have affected their health. Some community members have been tested for PCBs and others have not. Some believe that cancer rates are higher in Anniston, as well as diabetes. What can community members do to get more information about PCBs and their health?

Response: Because of these concerns, Congress gave $3.2 million to the Agency for Toxic Substances and Disease Registry (ATSDR) to study the health effects of PCB exposure on Anniston residents. The findings of the study were released on April 1, 2008, and are available at http://www.jsu.edu/dept/nursing/PCB/pcb_brochure.pdf. The EPA acknowledges the health concerns and emphasizes that the cleanup efforts underway are ultimately intended to eliminate exposure to PCBs and other contaminants that are affecting health in the local community. The EPA refers people with specific health question about PCBs to the Calhoun County Health Department at 3400 McClellan Boulevard, Anniston, Alabama, (256) 237-7523.

2.2 **Comment:** Another concern expressed was about the jobs that have been lost in the community. It is important to the community that the money spent cleaning up Anniston makes its way back into the community, through job opportunities. A large number of

community members have been trained to work with hazardous substances over the last few years, through the EPA Brownfield Job Training Grants and others trade union classes.

Response: Solutia has shown interest in hiring local workers and construction companies where possible, and the EPA will continue to encourage Solutia to engage local workers in cleanup activities. It is cost effective for Solutia to obtain the materials and expertise required to implement the Selected Remedy locally, if they are available.

2.3 **Comment:** Along with jobs, many comments were received that disagreed with the Preferred Alternative, because it appeared to be the cheapest alternative. The community wants a more expensive remedy, local workers to perform the work, and the economy of Anniston to benefit from the cleanup.

Response: In evaluating the cleanup alternatives at all Superfund sites, the EPA uses a specific set of nine criteria that ask the following questions about each alternative:

- Overall protection of human health and the environment. Is it protective? How are risks eliminated, reduced, or controlled?
- Compliance with ARARs. Does it meet environmental laws or provide grounds for a waiver?
- Long-term effectiveness and permanence. Does it provide reliable protection over time?
- Reduction of toxicity, mobility, or volume through treatment. Does it use a treatment technology? This is preferred, if possible.
- Short-term effectiveness. Will the remedy be implemented fast enough to address short-term risks, and will there be adverse effects (human health or environmental) during construction /implementation?
- Implementability. How difficult will is be to implement (*e.g.*, availability of materials or coordination of Federal, State, and local agencies)?
- Cost Effectiveness. What are the estimated capital and operation and maintenance costs in comparison to other, equally-protective alternatives?
- State acceptance. Does the State agree with, oppose, or have no comment on it?
- Community acceptance. Does the community support, have reservations about, or oppose it?

The first seven criteria were used to compare the alternatives against one another to determine relative strengths and weaknesses. The EPA proposed the Preferred Alternative after comparing strengths and weaknesses of each alternative, as detailed in Part 2 of this IROD. There was no preferred alternative identified by the community, other than one that costs more money.

Economic benefits will result from cleanup activities, but they are not balancing criteria required to be assessed by the EPA under the NCP. The EPA uses all the criteria to

select a remedy; cost is only one criterion. However, the EPA will make every effort to encourage Solutia to use local contractors, within the EPA's authority under law.

2.4 **Comment:** The community would like the EPA to monitor air and groundwater during implementation of the Selected Remedy and make that data available to the public.

Response: The EPA will monitor particulates in air as actions are taken and periodically to assess improvements in ambient air quality after remedies are in place. Monthly status reports and data are provided to the CAG and posted on the CAG website. Monthly status reports will be made available through local information repositories during the remedial action. The EPA will continue to look for ways to get information to the community to alleviate any concerns that may arise during the cleanup. Groundwater monitoring takes place semi-annually under RCRA and will continue under the CERCLA remedy implementation.

2.5 **Comment:** The community should be kept well informed about cleanup boundaries and safe zones.

Response: The EPA agrees and will provide meetings, factsheets, and contact information to communities when cleanup is being conducted to ensure that no community members are put at risk.

3. TECHNICAL AND LEGAL ISSUES

3.1 **Comment:** The PRP identified a number of grammatical mistakes with the Proposed Plan as well as some inaccuracies. The grammatical mistakes will not be discussed in this summary. Inaccuracies were identified for the following:

- the description of the Facility boundary;
- the definition of the acronym NPDES;
- the New Limestone Bed designation;
- the frequency and range of PCB detections in surface water
- the non-cancer risk ranges for operations area worker with groundwater and O&M worker with groundwater;
- the range of detections for beryllium;
- samples for Area C and D are switched;
- the value for SWMU-25-6A is incorrect;
- the estimated quantity of soil removed is incorrect;
- the soil cap thickness in Alternative S-C Option 1 does not match the FS; and
- remedial goals for Cobalt and Manganese do not match the FS.

Response: The following corrections are acknowledged, but do not change the overall analysis or conclusions and were documented in the administrative record:

- The Facility Area is bounded to the west by the West End Landfill and Alabama Power Company, not 1st Avenue.
- NPDES stands for National Pollutant Discharge Elimination System, not National Pollution Discharge Elimination System.
- The New Limestone Bed is SWMU-11, not SWMU-10.
- The frequency of PCB detections in surface water are 25 in 63 (not 23 in 60) and the range of detections are 0.29 to 22 µg/L (not 0.23 to 22 µg/L).
- The range of detections for beryllium is 0.13 to 6.8 µg/L (not 1.3 to 6.8 µg/L).
- Sample SSR-7 is associated with Area C (not Area D) and sample SSR-9 is associated with Area D (not Area C).
- The value for SWMU-25-6A is 38.6 mg/kg, not 37.6 mg/kg.
- The estimated quantity of soil to be removed is 68,900 cubic yards (not 63,900 cubic yards).
- The soil cap thickness in Alternative S-C Option 1 is one foot (not two foot).

The following were not inaccuracies; an explanation is provided to justify the data presented in the Proposed Plan.

- Remedial goals for cobalt and manganese in the FS should have been the screening toxicity values in Table B-2.3 of the HHRA, not the concentration used for screening. For that reason, the goals in the Proposed Plan are 73 µg/L for cobalt (not 62 µg/L) and 880 µg/L for manganese (not 1300 µg/L).
- The non-cancer risk range for the future operations area worker with groundwater impact is 1,628 RME (includes 1212 for groundwater and 416 for soil and air) and 796 CTE (includes 432 for groundwater and 364 for soil and air). The non-cancer risk range for the future O&M worker with groundwater impact is 195 RME (includes 116 for groundwater and 79 for soil and air) and 86 CTE (includes 66 for groundwater and 20 for soil and air). The HHRA listed the groundwater impact only to each receptor. To get the impact of soil, air, and groundwater, the exposures needed to be added.

3.2 **Comment:** Explain how contamination can occur within groundwater without a source.

Response: Initially, a source generates the groundwater contamination. Once a removal, capping, or other source response action is taken, residual groundwater contamination may be left behind. In some locations at the Facility, the groundwater contamination is a residual from a former source.

3.3 **Comment:** Explain why the extent of groundwater contamination cannot be defined, when defining the plume is essential in monitoring natural attenuation.

Response: At the Facility, various site activities generated contamination in the groundwater. The groundwater plumes from these sources have historically been small, local, and controlled by both the site geology and the waste stream chemistry. For example, the Phosphoric Acid Basins, the Limestone Beds, Old PCB Production Area,

and the Landfills are all initial sources for groundwater contamination. In the Phosphoric Acid Basins and Limestone Beds, liquid waste provided contamination to groundwater. The liquid waste generated material that the PCBs attached to and migrated into groundwater. Once that combination reached groundwater, the chemistry of the material was changed and contaminant migration was slowed and eventually no longer took place. The groundwater plume that developed was a small, local occurrence. In the Old PCB Production Area, oils and PCB were mixed together, and sloppy production practices resulted in a phase of contamination that did not readily mix with water, but eventually did migrate into groundwater as well as being held within the soils overlying the groundwater. Once the oily material was removed and capped, the migration was greatly reduced horizontally and vertically and a large contaminant plume did not develop. Contaminated material from Facility processes and cleanup was placed in the Landfills. Groundwater contamination has resulted from leaching out of the Landfills but, due to the soil textures, large plumes have not developed. Therefore, a large plume has not developed at the Facility. Drawing a composite plume for these waste units is not possible since they do not overlap and such a depiction would misinform a remedial strategy. In other words, plume remediation is a combination of source treatment and groundwater treatment and drawing a large plume might lead to the conclusion that there is a large, composite source, and there is not.

Natural attenuation parameters have been collected in the past to document attenuation of parathion and 4-nitrophenol that discharged in groundwater from the South Landfill. Parathion and 4-nitrophenol has also been detected near the Old and New Limestone Beds. Corrective action systems have been installed to restore groundwater in both locations. The EPA has proposed to expand the system near OW-21A and OW-10 to ensure that the contaminants are contained. The extent of the plumes is defined, or will be defined during remedial design.

3.4 **Comment:** Explain how Natural Attenuation will be accomplished by abiotic or biotic processes. Will attenuation cause a more toxic compound to be released?

Response: Monitored natural attenuation processes include abiotic, biotic, anaerobic and aerobic degradation as well as dilution and sorption. At the Facility, a natural attenuation remedy has been proposed for 4-nitrophenol and parathion. Parathion is the common term for organophosphate o,o-diethyl-o-4-nitrophenyl phosphorothioate. This compound contains carbon, oxygen, hydrogen, sulfur, and phosphorus. Review of chemical and microbiological processes suggests that microorganisms incorporate carbon and phosphorus from the parathion into their cell structure. The parathion is biodegraded to 4-nitrophenol that biodegrades to carboxylic acid by mineralization of nitrogen and breaking of the six member carbon ring. The sulfur is released from the organic molecule as a reactive species, which is immediately scavenged by the cations in the soil.

Parathion and 4-nitrophenol degrade anaerobically. This is the same geochemical environment that promotes reductive dechlorination of chlorinated solvents and as such, much of the same analysis can be used to determine if strong reducing conditions exist

that could be causing the natural attenuation of parathion by reduction. In general, strong evidence of a reducing environment is indicated by: dissolved oxygen less than 0.9 mg/L; redox (eH) measurements less than 0 millivolts; nitrate less than 1 mg/L; iron II greater than 1 mg/L; sulfate less than 20 mg/L; sulfide greater than 1 mg/L; and alkalinity greater than two times background. Data shows that the environmental conditions at the Facility are conducive to natural attenuation, and, therefore, these breakdown products are likely present.

By far, the process most strongly involved in attenuating the 4-nitrophenol and parathion at the site is sorption. Both compounds have a high soil/water distribution coefficient. This means that they have a high capacity for attaching to soils. At the Facility the soil texture is clay and clay/silt mixture which has a high sorption capacity. Concentrations for 4-nitrophenol and parathion will also decrease as a result of contaminant sorption to soil.

3.5 **Comment:** How will groundwater near OW-21A and OW-10 not leave the plant site and why is the plant site border referenced?

Response: Groundwater contamination at OW-21 and OW-10 is outside of the Facility boundary. The Selected Remedy is intended to capture groundwater and restore contaminated groundwater to protective levels up to the edge of the waste management areas onsite.

3.6 **Comment:** Can the EPA explain the concept of Natural Attenuation in the areas where OW-21 and OW-10 are located.

Response: Natural Attenuation has been documented for parathion and 4-nitrophenol in groundwater associated with releases from the South Landfill and Monitored Natural Attenuation (MNA) is only proposed for parathion and 4-nitrophenol. The strongest evidence is decreasing concentrations over time. Parathion and 4-nitrophenol have been detected in OW-21A, but not in OW-10. Data will need to be collected during remedial design and remedial action to demonstrate that natural attenuation of parathion and 4-nitrophenol is also occurring near OW21A. That information will help optimize the groundwater extraction system selected in the Remedy.

3.7 **Comment:** There is no action proposed for the gravel cover area used by Alabama Power in the West landfill. Didn't the EPA decide that gravel was not sufficient? Will the EPA explain what will happen in this area over the coming years?

Response: Gravel is not normally considered to be adequate as a capping material. However, the switchyard is isolated from human contact with fences and the gravel layer is several feet thick. Because surface water and groundwater monitoring near the switchyard have not detected any significant releases of PCBs, the EPA has proposed to continue monitoring groundwater and surface water to ensure that no releases of PCBs occur in the future from this area.

3.8 **Comment:** What other alternatives were considered? Did the EPA consider a remedy that could aid the community, such as paving the landfill and developing a solar farm? What will happen to this area in the future? Local contractors should be used to lower costs and help the community.

Response: A wide array of alternatives was considered in the Feasibility Study (FS). For the first step in the FS process, General Response Actions (GRAs) and remedial technologies for soil and groundwater at the Facility were developed and screened. The potential technologies were first screened based on technical implementability only. Surviving technologies were then screened based on effectiveness, implementability and cost. The technologies that are not feasible or have limitations that might prevent achievement of RAOs were eliminated in the screening process, with the remaining technologies considered to be better suited for further consideration in developing remedial alternatives. The retained technologies were assembled into ten remedial action alternatives, five for soil and five for groundwater, to be considered for further evaluation.

The EPA did not consider paving the landfill and installing a solar farm. There is no plan to redevelop the landfill, but if a developer is interested in the property, the EPA and Solutia will work to make sure that the project is consistent with maintenance of the Remedy.

The EPA and Solutia are interested in using local contractors as much as possible. The EPA will make every effort to encourage this practice within our authority under law.

3.9 **Comment:** Will the excavated soil from "Operable Unit 3" be transported outside the city to a certified contaminated hazardous waste site?

Response: The Selected Remedy does not call for excavation of contaminated soil. If conditions change and excavation is required, the community will be informed about why excavation is occurring and the disposition of any soils removed. Typically, the EPA documents such a change in the Selected Remedy through either an Explanation of Significant Differences (ESD) or ROD Amendment. In the past, soil with PCB concentrations greater than 50 mg/kg has been transported to a licensed hazardous waste disposal facility in Emelle, Alabama. Soil with PCB concentrations less than 50 mg/kg has been transported to non- hazardous waste disposal facilities near the Site.

3.10 **Comment:** One person objected to the EPA referring to the onsite land disposal areas as landfills. The community knows they are dump sites; calling them landfills does not make them safer or more protective.

Response: The reason the EPA refers to the onsite land disposal areas as landfills is because the operators of the Facility purposely disposed of all of the Facility's waste through land disposal and acknowledged those disposal practices and areas to regulatory

officials when laws came into effect to regulate those disposal areas. Dump sites are typically areas where waste has been abandoned and no one claims to have generated waste or maintained the area.

3.11 **Comment:** Will capping the landfills prevent all contaminants from leaking out into groundwater?

Response: Yes, but monitoring will be performed to ensure that contamination is contained beneath the cap. Under the Selected Remedy, the EPA will require a new, RCRA-compliant cap to be installed on Cells 1E, 2E, and 3E of the South Landfill. Cells 4E and 5E of the South Landfill are currently covered with a RCRA-compliant cap. The purpose of the new, RCRA-compliant cap over South Landfill Cells 1E, 2E, and 3E and the existing RCRA-compliant cap over South Landfill Cells 4E and 5Eis to prevent rainwater from infiltrating into the waste in these cells and mobilizing contamination. All contaminants under the new and existing RCRA-compliant South Landfill caps will be protected from rainfall and kept from being mobilized in groundwater. The existing high-density polyethylene (HDPE) cap over Cells 2W, 2WA, 3W, and 4W of the South Landfill also prevents infiltration of rainwater into the waste in these cells and thus mobilization of contamination. The effectiveness of the South Landfill caps is currently monitored by ADEM's existing groundwater monitoring program under the Facility's RCRA Permit.

Additionally, Solutia constructed a high-density polyethylene (HDPE) cap over the West End Landfill and a soil cover on the areas immediately adjacent to the West End Landfill in 1996. Groundwater samples downgradient of the West End Landfill indicate that the only contaminant that currently exceeds RGs in at least one of the groundwater wells downgradient of the West End Landfill (WEL-01, WEL-02, WEL-03, OWR-7D and OWR-10) is total PCBs. The highest concentration of total PCBs detected was 0.72 µg/L. When filtered, that sample was below detection limits for PCBs. In a previous sampling event, lead was also detected above the RG at the West End Landfill, although recent sampling has not detected lead in groundwater. The EPA believes that the cap is adequately preventing the mobilization of contaminants to groundwater.

3.12 **Comment:** What years were hot spots of PCB contamination at SRI-18 and SSRI-11 (shown on a map during the Proposed Plan meeting) removed? Where was the soil disposed of? Did these areas cause contaminants to leach to groundwater? What was put in place after the removals to prevent leaching?

Response: The highly PCB contaminated soil at SRI-18 was removed in 2002, and the highly PCB contaminated soil at SSRI-11 was removed in April 2010. The soil was disposed of at the Chemical Waste Management facility in Emelle, Alabama. Both areas had concentrations sufficient to leach to groundwater, and wells in both areas have detections of PCBs in groundwater. The area around sample SRI-18 was covered with concrete after the removal, and the Selected Remedy requires that confirmation sampling be performed in this area to verify that the waste was fully removed from this area. No

further action has been taken near SSRI-11, though the Selected Remedy calls for capping of the area to prevent infiltration of water into the area and prevent further leaching to groundwater.

3.13 **Comment:** One person suggested that the EPA combine the lead and PCB cleanups in Anniston, because the wastes are co-located and both contaminants should get complete cleanups.

Response: In the early 2000s, the EPA decided to address lead and PCB contamination in the Anniston area through the designation of two "facilities" (known more colloquially as "sites"). One such "facility" in Anniston is the PCB contamination in the area; the other "facility" is the lead contamination. Thus, the Anniston PCB Site consists of the entire geographic area where PCBs have come to be located, and the Anniston Lead Site consists of the entire geographic area where lead has come to be located. Although some relatively limited areas in Anniston and its environs exist which are contaminated at levels of concern to the EPA for both lead and PCBs, other larger areas are contaminated with only lead or only PCBs at levels of concern.

While the Anniston PCB Site and the Anniston Lead Site do overlap geographically in some areas where both lead and PCB contamination are present, the EPA believes that the Sites can be more efficiently and effectively cleaned up by the parties responsible if the Sites are separate. The parties responsible for cleaning up the Sites are nevertheless obligated to conduct full cleanups of the properties at those Sites, regardless of the contaminants present.

APPENDIX A

SUMMARY OF ERT REPORT IMPLEMENTATION

Recommendations	Implementation	Reference
ERT Recommendation #1: • Continue the operation of the groundwater corrective action systems. **NCP:** • §300.415(b)(1)	The corrective action system has continued to be operated under the RCRA Part B Permit. The proposed remedy requires continued operation of the corrective action systems.	AHWMMA Post-Closure Permit SDMS DocID 10744538 or AR Index for OU3 Section 9.1.4 Remedial Investigation SDMS DocID 10744516 AR Index for OU3 Section 3.10.11 Pages 60 of 1017 Feasibility Study SDMS DocID 10744532 or AR Index for OU3 Section 4.9.2 Pages 175 of 607
ERT Recommendation #2: • Refine information on groundwater elevations and flow paths at and near the northern end of the Solutia property. Because of logistical problems on the Solutia property, this would ideally involve installation of additional monitoring wells off-site to obtain the necessary spatial coverage. This recommendation can be integrated with a similar one included in Section 5.2.3;	Groundwater elevations were measured and pieziometric surface maps were constructed to predict groundwater flow. EPA conducted separate analysis of groundwater flow path. Data in wells support the EPA model, which is similar to the RI/FS model. An angled boring investigation was conducted to determine the hydrogeologic properties of the residual soil across a discontinuity located north of the Facility. A pathway for groundwater transport from the Facility was not found in the angled boring that was installed. Recharge to the fault is unlikely to occur at the Facility due to the significant thickness (60 to 100 feet) of low-permeability clay residuum overlying bedrock	Supplemental RFI/CS Work Plan SDMS DocID 10744572 or AR Index for OU3 20.4.8 Pages Remedial Investigation SDMS DocID 10744516 or AR Index for OU3 Section 3.10.11 Pages 75 of 1017; 80 of 1017; 114 of 1017

Recommendations	Implementation	Reference
NCP: • §300.430(b)(5)/ ("identify the type, quality and quality of the data that will be collected during the RI/FS . . .") • §300.430(d)(1) and (2)/ ("Collect data necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives..."); ("Characterize the nature of and threat posed by the hazardous substances and hazardous materials and father data necessary to assess...")	One temporary well (T-04) was installed on6/9/2005 south (upgradient) of well OW-21A. MW-07 was installed on 12/30/1994 and was sampled to determine the nature and downgradient extent of PCBs and other constituents reported at well OW-21A. This well is approximately 100 feet down-gradient of OW-21A. As part of the offsite GW investigation, two shallow, temporary wells were installed north of the OW-21A area. One of these two wells (T-09) was installed with the intent of being directly downgradient of the T-04/OW-21A/MW-07 location, while the second well (T-10) was installed east of the first, to provide for potential variations in groundwater flow direction.	See page 1
ERT Recommendation #3: • Verify groundwater elevations and apparent flow directions in the shallow bedrock by additional groundwater measurements in existing wells; **NCP:** • §300.430 above	Groundwater elevations were measured and piezíometric surface maps were constructed to predict groundwater flow. Water levels were measured in new and existing wells to enhance the understanding of groundwater flow patterns at the Facility. A potable well survey was also performed as part of the RI/FS program.	Remedial Investigation SDMS DocID 10744516 AR Index for OU3 Section 3.10.11 Page 78-81 of 1017; 85 of 1017; 413-415 of 1017

Recommendations	Implementation	Reference
ERT Recommendation #4: • Using both existing data and any new data developed after the release of the RFI/CS draft report, determine a probable range of groundwater travel times from the South Landfill to the northern edge of the Solutia property since the installation of the landfill; **NCP:** • §300.430 above	Groundwater velocity was determined in the RI report between 0.5 and 5 ft/year. The South Landfill began operation in 1960. From 1960 to 2010, groundwater would have moved 25 to 250 ft. If contamination moves in the shallow residuum, it will never reach the northern boundary, because it will travel northeast. If contamination moves in the deeper residuum and we ignore retardation of PCBs and the NE trend, it will take from 400 to 4000 years for contaminated groundwater to travel from the South Landfill to the northern property boundary. Consideration of retardation would significantly increase that travel time. If preferential flow paths such as lenses of sand or partially weathered rock occur periodically, they would decrease the flow time.	Remedial Investigation SDMS DocID 10744516 AR Index for OU3 Section 3.10.11 Page 84 of 1017
ERT Recommendation #5: • Perform both ambient air sampling and an air flux study at the manufacturing facility and at each of the two landfills to determine whether the structure is giving off PCB-containing vapor and the concentrations of PCBs in the ambient air around the Solutia property. **NCP:**	EPA and ADEM agreed to withdraw the Flux Chamber Study on 5/14/2001, because neither EPA nor ADEM had a set protocol for conducting Flux Chamber studies, or interpreting the results from these studies. EPA and ADEM agreed on a more detailed air monitoring study which was completed in 2004. The approved Work Plan is part of the administrative record. The data is presented in the RI and used in the risk assessment. The ambient air study identified that concentrations were higher closer to the plant and landfills, but risk associated with the	Air Monitoring Work Plan SDMS DocID 10744574 AR Index for OU3 Section 20.4.10 Remedial Investigation SDMS DocID 10744516 AR Index for OU3 Section 3.10.11 Page 70-71 of 1017; 138 of 1017

Recommendations	Implementation	Reference
• §300.430 above	concentrations were not outside EPA's risk range and did not warrant a CERCLA action to address air releases. EPA does not believe that the flux study would have changed that determination.	See Page 3
ERT Recommendation #6: • Cover the following areas with impervious materials, such as asphalt or concrete, to minimize the potential of PCB-contaminated particulates residing in void spaces and migrating off-site until a permanent remedial alternative is identified: - Former Parathion Area (SWMU 41); - Former Phosphorus Pentasulfide Production Area (SWMU 43); - Former Holding Tanks, Aeration Basins, and Clarifiers (SWMU 46);	Former Parathion Area (SWMU 41): This unit was used to produce parathion. Production ceased in **1986**. The unit was decommissioned pursuant to RCRA, including removal of affected soil up to a depth of 20 feet. The area was backfilled, and the surface was covered with gravel. The dismantled structures and excavated soil were disposed of in the RCRA portion of the South Landfill. A surface sample collected from 0.83 ft to 3 ft bgs, SSR-16, was non-detect for PCBs. A sample collected from 6-10 ft bgs, SSR-11 had 0.204 mg/kg total PCBs. Based on soil data there is no need for additional capping. Former Phosphorus Pentasulfide Production Area (SWMU 43): The area was began use in the 1920s and was decommissioned in **1988**. (See RFA) The existing concrete slab was left in place, and other areas were covered with gravel. This unit was used to produce elemental phosphorus, phosphate salts, and phosphorous pentasulfide. Corrosive wastewaters from this unit were discharged to the Phosphoric Acid Basins. At SSRI-02, total PCBs were 0.175 ppm PCBs at 0-0.5 ft and 40.4 ppm at	RCRA Facility Assessment SDMS DocID 10744565 or AR Index for OU3 Section 20.4.1. Page 87 of 386; 96 of 386; 113 of 386; 130 of 386 RFI/CS Report, Volume I of III SDMS DocID 10744574 or AR Index for OU3 Section 20.4.11. Page 19 of 172 Remedial Investigation SDMS DocID 10744516 AR Index for OU3 Section 3.10.11 Pages 38 of 1017; 95-98 of 1017; Feasibility Study SDMS DocID 10744532 or AR Index for OU3 Section 4.9.2 Pages 181-184 of 607

Recommendations	Implementation	Reference
- Phosphate Landfill (SWMU 6); - Santotar® Pit (SWMU 7); - Phosphoric Acid Basins (SWMU 12); - Waste Drum Satellite Accumulation Area (SWMU 44); **NCP:** • §300.415(b)(1)	3-4 ft depth. At SSR-19, total PCBs were estimated at 0.51 mg/kg. Downgradient wells 0W-19 and MW-20A are non-detect for PCBs, although there are other COCs present. Based on soil and groundwater data, there is no need for additional capping. Former Holding Tanks, Aeration Basins, and Clarifiers (SWMU 46): These units treated wastewaters that contained parathion, PNP and acetone still bottoms. These units were cleaned, demolished and closed in place in **1988**; and the area was covered with gravel. Sample SSR-17 collected from 15 inches bgs had total PCBs of 0.205 ppm. Sample SSR-10 collected from 19-21 ft bgs had total PCBs of 0.087.ppm. Based on soil data there does not appear to be a need for additional capping. Adjacent wells OWR-02S, OWR-02D, MW-15, MW-16, MW-20A, and OWR-3S are all non-detect for PCBs and based on other migration times, sufficient time has elapsed for the non-detects to be a meaningful measure for the migration potential from this unit. Other COCs present in groundwater. Based on the empirical data from groundwater, concentrations in soil are not high enough to impact GW. No additional action at this unit is recommended in the FS. Phosphate Landfill (SWMU6): Described as more of a staging area for phosphate slag and tailings being transported to the landfills.	See Page 4

Recommendations	Implementation	Reference
	This area was also used as a neutralization pit for the treatment of acidic wastewater from the parathion production process and likely contained limestone as a treatment media. This basin received acidic wastewater from the scrubber system of the sulfur incinerator which was used to burn residues from intermediates of the parathion production process. The effluent from the neutralization basin was discharged through the plant sewer system to the Phosphoric Acid Basins. The area was approximately 150 feet long by 170 feet wide. Currently, the area is covered with two to eight inches of gravel. (See RFA) Operations in this area ended in **1986**. Samples SSR-6 and SSR-7 were taken below gravel cover between 0.67 feet and 2 feet bgs and analyzed for the list of COIs. Total PCBs at SSR-6 was 9.3 mg/kg. Total PCBs at SSR-7 was 229 mg/kg. Total PCB concentrations in two wells (OWR-03S and WEL-04) downgradient of SWMU 6 were non-detect. Therefore, a cap is recommended for direct contact protection only in this SWMU. Santotar® Pit (SWMU 7): Staging area for molten Santotar. Once the Santotar solidified, it was dug up and moved to the landfill. This unit closed in **1989** and was filled with clay, topped with gravel. (See RFA) Two samples collected from below the base of the gravel cap. SSR-8 was collected from 1 to 3 feet bgs and had total PCBs at 0.034 mg/kg. SSR-9 was collected from 0.6 to 2 feet bgs and had total	See Page 4

Recommendations	Implementation	Reference
	PCBs at 282 mg/kg. Two wells are downgradient of SWMU 7. Total PCB concentrations in two wells (OWR-03S and WEL-04) downgradient of SWMU 6 were non-detect. Therefore, a cap is recommended for direct contact protection only in this area. This will be documented in the ROD. Phosphoric Acid Basins (SWMU 12): These units were used to neutralize acidic wastewaters from various production processes. The north basin was backfilled and the surface was seeded in **1994**. The south basin was excavated, backfilled, and covered with asphalt in 1988. ADEM deferred the oversight of further action for this SWMU to the EPA. Surface soil samples were collected near the north basin (SSR-3 and SSR-5) and from the grassy area north (SSRI=11). SSR-3 had total PCBs at 2.2 mg/kg. SSR-5 had total PCBs at 106 mg/kg. SSRI-11 had total PCBs at 930 mg/kg. Subsurface soil within the northern most basin was collected at 5 ft and 10 ft depth: SSR-4 had total PCBs at 104 mg/kg; and SSR-15 had total PCBs at 483 mg/kg (average). Nine samples (SWMU-12-24A to SWMU-12-24I) were collected from the 1-2 feet depth with PCB concentrations ranging from 0.54 ppm to 169 ppm. Observation well OWR-11 was installed 1/20/2003 to evaluate the groundwater quality in the vicinity of SSR-15. PCBs were detected in the unfiltered sample at a concentration of 170 /ug/L and in the filtered sample at 20 /ug/L. OW-10 was installed in 1998 and was sampled in	See Page 4

Recommendations	Implementation	Reference
	2005 because it was downgradient of SSRI-11. PCBs were detected in the unfiltered sample at a concentration of 6.2 ug/L (estimated) and in the filtered sample PCBs were non-detect. Groundwater remediation is proposed in this area. An impervious cap is required to protect groundwater and to prevent direct contact. This will be documented in the ROD. Waste Drum Satellite Accumulation Area (SWMU 44): This unit was adjacent to the former PCB Production Unit. This unit managed drums of Therminol® and Santotar® and potentially hazardous wastes waiting toxicity characteristic leachate procedure (TCLP) analysis. SSR-18 had an estimated 16,620 mg/kg total PCBs. In 2002, soil and contamination was excavated and removed from this area, including sumps, and a 4-inch thick concrete cover was placed over the surface. Since no confirmation sample was collected, EPA will require confirmation that principal threat waste level (500 ppm) has been removed as part of RD. Concentrations of PCBs from this area have likely contributed to groundwater contamination in OWR-13 (PCBs = 250 ppb) and OWR-14D (PCBs = 5 ppb). Further monitoring of OWR-13 and OWR-14D should be required during RD and long-term as necessary. Monitoring wells were installed in the vicinity of the former PCB production area to evaluate the presence of a NAPL phase. No NAPL was found so the	See Page 4

Recommendations	Implementation	Reference
	ongoing source appears to have been removed during the remedial activity for the former PCB Production area. This will be documented in the ROD. While permanent capping will be required, as noted in the ERT report, asphalt or concrete may not be the only materials that are protective.	See Page 4
ERT Recommendation #7: • Collect surficial and subsurface soil samples in Stormwater Drainage System (Production Area Portion, SWMU 37a), Scrap Yard Waste Oil Satellite Accumulation Area (SWMU 17), Boiler Feed Tank (SWMU 25), Steam Cleaning Pad (SWMU 31), and Product Storage Tank (AOC A) for PCB analysis since confirmatory sampling is required for these areas; **NCP:** • §300.430 above	Stormwater Drainage System (Production Area Portion, SWMU 37a) This system manages stormwater from within the production area of the Facility. Extensive investigations and interim measures have been completed for this unit, including sealing off areas no longer in use and lining pipes from the PCB production area. This system is monitored through an NPDES permit. SSR-2 was taken in open grassed in DSN 005 drainage area, where upgrades were not performed. Total PCBs at SSR-2 measured 11.2 mg/kg. Surface water samples DSN 004 and DSN 005 were analyzed for COPCs. The only constituents detected in these samples were arsenic in DSN 004 at a concentration of 0.011 mg/L and barium at concentrations of 0.036 mg/L and 0.013 mg/L in DSN 004 and DSN 005, respectively. No further action was required for the stormwater drainage system. This will be documented in the ROD. Scrap Yard Waste Oil Satellite Accumulation Area (SWMU 17): This unit manages used compressor oils and	RCRA Facility Assessment SDMS DocID 10744565 or AR Index for OU3 Section 20.4.1. Page 87 of 386; 96 of 386; 113 of 386; 130 of 386 RFI/CS Report, Volume I of III SDMS DocID 10744574 or AR Index for OU3 Section 20.4.11. Page 44 of 590; Remedial Investigation SDMS DocID 10744516 AR Index for OU3 Section 3.10.11 Page 40-45 of 1017; 58 of 1017; 68-69 of 1017; 95 of 1017; 99 of 1017; 426 of 1017

Recommendations	Implementation	Reference
	consists of two concrete pads with roofs. This oil is stored in 55-gallon drums on a non-curbed concrete pad, and then is shipped off-site for incineration. Sample SWMU-17-6A was collected from the surface to 0.5 feet bgs and had a total PCB concentration of 4.1 mg/kg (estimated). Based on the concentration in surface soil no further sampling was determined to be necessary at his location. . This will be documented in the ROD. Boiler Feed Tank (SWMU 25): Received blended fuel from fuel from blending tank (Dismantled in 1995) This unit managed Therminol® ends. Therminol® is produced from polyethylbenzene. A leaking flange was observed during the RFA. The area around the flange was cleaned and the tank has since been dismantled. This unit is adjacent to the former PCB Production Area (SWMU 42). A sample collected from the top 6 inches of surface soil, SWMU-25-6A, had 38.6 ppm total PCBs. Based on the function of the unit and proximity to SWMU 42, no additional subsurface sampling was required. . This will be documented in the ROD. Steam Cleaning Pad (SWMU 31), This unit manages oily condensate from steam cleaning. The unit consists of a 10'x10'concrete pad with a 3" concrete curb surrounded by a gravel covered areas. A concrete sump 4'x3' and	See Page 9

Recommendations	Implementation	Reference
	6' deep is located in the center of the unit. Sump discharged to WWTP. SWMU-31-6A had 13.7 ppm PCBs and was collected below a gravel cover. Although further action at this unit was deferred to EPA at this time, it is an operating unit and it may be subject to RCRA corrective measures in the future. Total PCBs were found at 13.7 ppm in surface soil adjacent to the pad. This concentration is not high for industrial exposure and not likely to result in groundwater contamination. No further sampling was deemed necessary for this unit. This will be documented in the ROD. Product Storage Tank (AOC A) This tank managed Santowax®. Santowax® is composed of tertiary and quaternary phenyls manufactured as part of the polyphenyl production process. Santowax® is hydrogenated with Raney nickel catalyst to produce Therminol®. The base of the secondary containment was previously graveled. The soil sample AOC-A-6A collected six inches below the base of the gravel cover had 5.7 mg/kg of total PCBs. The spill containment was upgraded with a concrete floor, and level control circuitry has been updated on the tank. Containment was upgraded. Because the PCB concentration was low and PCBs were never managed in this area, no additional work was determined to be necessary. This will be documented in the ROD.	See Page 10

Recommendations	Implementation	Reference
	Surficial soil samples were collected in all the areas recommended in the ERT report. Subsurface soil sample locations were selected based upon the results of surficial soil sampling and groundwater sampling. From this sampling, risks were evaluated for appropriate CERCLA action.	See page 10
ERT Recommendation #8: ◦ Delineate the horizontal and vertical extent of PCB-contaminated soil at the manufacturing facility since it is not defined currently; and **NCP:** ◦ §300.430 above	The area was decommissioned in 1972 and covered with asphalt. Samples were collected two feet below the (4 ft thick) asphalt cap, collected from 6-8 ft bgs. SSR-12 had 0.67 mg/kg PCBs and SSR-13 had 16 PCBs. Because PCB concentrations beneath the cap over the unit were relatively low, adjacent areas were investigated. SSR-18 with PCBs = 16,620 ppm at 3-6 inches was north of SWMU 42, and SSRI-07 with PCBs = 250 ppm at 0-6 inches and 56ppm at 3.5-4 ft was east of SWMU 42. SWMU-25-6A with PCBs = 38.6 ppm at 0-6 inches was south of SWMU 42. Excavation and capping at SSR-18 was conducted after the RFI, but no confirmation sample was taken. Downgradient groundwater wells OWR-13 and OWR-14D and adjacent well T-6 have PCB concentrations of 250 ppb, 5 ppb, and 3.2 ppb, respectively. To further characterize groundwater in the area of the former PCB Production area, monitoring wells T-5 (2.9 ppb) and T-6 (3.2 ppb) were installed in October, 2006. The possible presence of NAPL was EPA's concern. The field work performed	Remedial Investigation SDMS DocID 10744516 or AR Index for OU3 Section 3.10.11 Page 57 of 1017; 96 of 1017; 99 of 1017; 116 of 1017

Recommendations	Implementation	Reference
	involved soil and groundwater sampling from the T-5 and T-6 locations. EPA was onsite during the whole process and observed no NAPL and NAPL class concentrations in the field testing performed on the soil samples. The wells were constructed and sampled for both Aroclors and homologues. The results of the T-5 and T-6 borings/monitoring well installation then informed the vertical extent of contamination and coupled with existing wells, the horizontal extent of contamination was informed. No NAPL was found so the ongoing source appears to have been very local and removed during the RFA remedial activity for the former PCB Production area. Although the concentrations in T-5 and T-6 exceed PCB MCLs they are well below what would be expected if a NAPL source were present in the area. Propose action in Area E to reduce groundwater impacts and confirmation sampling at SSR-18 to determine that principal threat waste was completely removed.	See Page 12
ERT Recommendation #9: • Install additional monitoring wells further north of wells OW-21 and OW-22 to determine if the groundwater contamination has migrated further off-site to the north.	One temporary well (T-04) was installed on 6/9/2005 south (upgradient) of well OW-21A. MW-07 was installed on 12/30/1994 and was sampled to determine the nature and downgradient extent of PCBs and other constituents reported at well OW-21A. This well is approximately 100 feet down-gradient of OW-21A. As part of the	Remedial Investigation SDMS DocID 10744516 or AR Index for OU3 Section 3.10.11 Page 114-115 of 1017

Recommendations	Implementation	Reference
NCP: • §300.430 above	offsite GW investigation, two shallow, temporary wells were installed north of the OW-21A area. One of these two wells (T-09) was installed with the intent of being directly downgradient of the T-04/OW-21A/MW-07 location, while the second well (T-10) was installed east of the first, to provide for potential variations in groundwater flow direction	See Page 13
ERT Recommendation #10: • Cover Cells 1E, 2E, 3E, 4E, 5E, and 1W at the South Landfill with geosynthetic membrane because the existing soil cover can erode; otherwise, provide maintenance on vegetation cover; **NCP:** • §300.415(b)(1)	Solutia outlined maintenance required on soil cover for cells 4E and 5E as well as the rest of the South Landfill when the cells were closed under RCRA in 1989. MW-11A, MW-12A, and MW-13A monitor groundwater from Cells 4E and 5E. No groundwater standards have been exceeded in these wells. The contents of Cell 1W were relocated to cell 4E when Hwy 202 was constructed in late 1970s. A geotextile marker layer and soil and vegetative cover was placed over the area immediately adjacent to the landfill cells, when the landfill was capped in 1998, including the area where Cell 1W was once located. PCB concentrations in the adjacent areas ranged from non-detect to 39 ppm prior to placement of the soil cap. The cap over cells 1E, 2E, and 3E was investigated. The cap was determined to be a minimum of 2 ft thick. Soils had a hydraulic conductivity of 4.14×10^{-6} and a surface water seep was detected on the cap with detections of 1,4-	Remedial Investigation SDMS DocID 10744516 or AR Index for OU3 Section 3.10.11 Page 46-50 of 1017; 113 of 1017; Appendix A RI Addendum SL Cap SDMS DocID 10744518 or AR Index for OU3 Section 3.10.10

Recommendations	Implementation	Reference
	dichlorobenzene at a concentration of 1.4 J µg/l for the original sample and 1.6 J µg/l for the duplicate sample and PCBs ranged from non detect to 0.59 J µg/l. Since these cells were identified as PCB waste cells and since OWR-5D located upgradient of the corrective action system has significant detections for PCBs, EPA is proposing recapping of these cells.	See Page 14
ERT Recommendation #11: • Collect a representative number of soil samples from the uppermost topsoil cover of the South Landfill for PCB analysis to ensure the absence of PCBs in the topsoil cover; **NCP:** • §300.430 above	Four initial composite samples (SL-3A, SL-3B, SL-3C, and SL-3D) were collected on the closed South Landfill (after completion of interim measures) and analyzed for PCBs. The results were 0.168 mg/kg (SL-3A), 0.07 mg/kg (SL-3B), 6.29 mg/kg (SL-3C), and non detect (SL-3D). Five additional samples (LFSL-89, LFSL-93, LFSL-94, LFSL-99, and LFSL-103) were collected on the closed South Landfill eastern cells prior to the RFI/CS Program. The results of these analyses were 10 mg/kg, 4.1 mg/kg, 1.3 mg/kg, 6.7 mg/kg, Four additional composite samples (SLGM-3A, SLGM-3B, SLGM-3C, and SLGM-3D) were collected from the uppermost topsoil cover overlying the portion of the closed South Landfill that has been capped with a geomembrane cover system. The samples were collected at a depth from 0 to three inches below ground surface and	Remedial Investigation SDMS DocID 10744516 or AR Index for OU3 Section 3.10.11 Page 104 of 1017

Recommendations	Implementation	Reference
	analyzed for PCBs. SLGM-3A had no PCBs reported above the detection limit. SLGM-3B, SLGM-3C and SLGM-3D had total PCB concentrations of 0.071 mg/kg (estimated), 0.23 mg/kg (estimated), and 0.073 mg/kg (estimated), respectively. The results were used in the Human health risk assessment and determined that the risk to all pathways was less than $1x10^{-6}$ as a result of the PCBs present.	See page 15
ERT Recommendation #12: • Further assess the extent of groundwater contamination in the deep residuum because the only deep well installed in the South Landfill, OWR-5D, contained PCBs **NCP:** • §300.430 above	OWR-15D was installed downgradient to further assess the extent of groundwater contamination in the deep residuum. OWR-15D was installed in close proximity to OW-16/16A (a shallow residuum well) and downgradient of OWR-05D. Results from the OWR-15D sample collected in June 2005 indicated a total estimated PCB concentration of 128 ug/L. An additional sample was collected in April 2006 with a total estimated PCB concentration of 8.4 ug/l. (Results for ten deep residuum wells were evaluated in the RI.) Because of the results at OW-15D, two additional wells were installed in the shallow bedrock (T-5 and T-6). The estimated PCB concentration in these wells after installation was 2.9 ug/L and 3.2 ug/L respectively. Monitoring of these wells over time is recommended to determine if chemistry	Remedial Investigation SDMS DocID 10744516 AR Index for OU3 Section 3.10.11 Page 118-120 of 1017

Recommendations	Implementation	Reference
	changes associated with well installation may be affecting the results. Monitoring requirements will be in the ROD.	See Page 16
ERT Recommendation #13: • Remediate the concrete-lined drainage ditch along Highway 202 and subsequently perform sediment sampling for PCBs on a regular basis to determine any on-going releases from the South Landfill; and **NCP:** • §300.415(b)(1) • §300.430 above	Solutia periodically cleans sediment from the concrete-lined drainage ditch along Highway 202 as part of its operation and maintenance activities at the South Landfill. EPA will require continued O&M in the ROD. Sampling of the groundwater did not indicate the concrete lined ditch to be a source of groundwater contamination, so there was no basis to remediate the ditch. Maintaining the ditch is part of Solutia's required O&M activities.	Remedial Investigation SDMS DocID 10744516 or AR Index for OU3 Section 3.10.11 Page 49-50 of 1017 Feasibility Study SDMS DocID 10744532 or AR Index for OU3 Section 4.9.2 Pages 176 of 607
ERT Recommendation #14: • Collect sediment samples from the Lower Detention Pond to determine if the South Landfill is an ongoing source of PCB release since the landfill was capped. **NCP:** • §300.415(b)(1) • §300.430 above	LDP-3A collected from lower detention pond had PCB concentration of 1.1 ppm. The pond was put in place before the cap upgrades to the South Landfill were installed in the late 1990s. Since this pond is actually part of OU2, a determination as to acceptable PCB concentrations will be determined in the future.	Will be documented in RI/FS for OU1/OU2

Recommendations	Implementation	Reference
ERT Recommendation #15: • Remove PCB-contaminated subsurface soil (underneath the existing vegetative cover and general fill) in the adjacent areas surrounding the West End Landfill to prevent contaminated soil becoming mobile because the existing soil cover can erode; otherwise, cover the adjacent areas with geosynthetic membrane; **NCP:** • §300.415(b)(1) • §300.430 above	Solutia provided documentation that contaminated soil in adjacent areas was scraped from the areas disposed of offsite or placed under an HDPE cap. Solutia provided subsurface sampling results for Adjacent Area 2 where highest PCB detections were found prior to closure. EPA reviewed groundwater data and determined that additional action is not warranted. This has been documented in the RI and RI Addendum referenced and will be documented in the ROD. The APCO switchyard is adjacent area 3 at the West End Landfill. It has a soil PCB concentration of 138 ppm below several feet of gravel cover. Ideally, gravel would not be considered as a cover material. Because the equipment itself is a danger to human health, the switchyard is surrounded by extensive fencing. APCO workers rarely access this area. Since no significant groundwater or surface water contamination has been reported from the West End Landfill GW sampling, the recommended remedy in this area is to require monitoring of groundwater and surface water runoff to ensure no PCBs are released. This will be documented in the ROD.	Remedial Investigation SDMS DocID 10744516 and 10744517 or AR Index for OU3 Section 3.10.11 Page 54-55 of 1017; RI Addendum SL Cap & WEL SDMS DocID 10744518 or AR Index for OU3 Section 3.10.10
ERT Recommendation #16: • Install monitoring wells along the northwestern perimeter of the Solutia property to	OWR-10 was installed in 2003 during the SRFI/CS. The initial concentration of PCBs was 1.8 ug/L. Subsequent samples (3 rounds over 3	Remedial Investigation SDMS DocID 10744516 or AR Index for OU3 Section 3.10.11

Recommendations	Implementation	Reference
monitor the downgradient area of the West End Landfill; **NCP:** • §300.430 above	years) have been non-detect.	Page 63 of 1017; 66 of 1017
ERT Recommendation #17: • Further assess the extent of groundwater contamination in the deep residuum because the only deep well installed in the West End Landfill, OWR-7D, contained PCBs; and **NCP:** • §300.430 above •	OWR-10 was installed in 2003 during the SRFI/CS. The initial concentration of PCBs was 1.8 ug/L. Subsequent samples (3 rounds over 3 years) have been non-detect.	Remedial Investigation SDMS DocID 10744516 or AR Index for OU3 Section 3.10.11 Page 63 of 1017; 66 of 1017; 217 of 1017

Recommendations	Implementation	Reference
ERT Recommendation #18: • Include the five monitoring wells in the West End Landfill in the semi-annual ground water detection monitoring and corrective action program. Groundwater samples from these wells should be analyzed for PCBs. **NCP:** • §300.430 above • Soil impact areas • Ground water	Monitoring plan will be developed during RD. Semi-annual groundwater monitoring for a two-year period was conducted as part of the RFI/CS and completed in 2004. One additional round of sampling as conducted as part of the RI Program. The results for well WEL-01 from the four events included initial low level detections of PCBs that decreased to non detect and fluctuated to 0.66 µg/l in the most recent event. Well WEL-02 had no detections during the sampling program. Well WEL-03 had an initial detection for PCBs, but had no detections above the MCL in the last two sampling events. Observation well OWR-10 had very low concentrations of PCBs initially (1.8 µg/l), and the samples were non detect for the last three events. The results for OWR-07D (a deep residuum well in the vicinity of the closed West End Landfill) indicated a decreasing trend in PCB concentrations to below the detection limit, but had fluctuated back to 0.72 µg/l in the most recent event. In all cases, the filtered sample results were reported as non-detect.	Remedial Investigation SDMS DocID 10744516 or AR Index for OU3 Section 3.10.11 Page 53-55 of 1017; Page 115 of 1017 Feasibility Study SDMS DocID 10744532 or AR Index for OU3 Section 4.9.2 Pages 176 of 607

APPENDIX B

ADMINISTRATIVE RECORD INDEX

[Draft]

Administrative Record Index for the ANNISTON PCB (MONSANTO CO.) (Operable Unit #3) ALD000400123

1.0 PRE-REMEDIAL

1. 9 Site Inspection Documents

1. Memorandum from Albert Hanke, USEPA to John Dickson, USEPA. Subject: Recent CEI Inspection, Monsanto, Anniston, AL. (March 31, 1990)
2. "Anniston West End Landfill, Site Investigation, Monsanto Company, Anniston, Alabama," Geraghty & Miller. (August 1994)

2.0 REMOVAL RESPONSE

2. 2 Sampling and Analysis Data

1. Letter from Alan Faust, Solutia to Wm. Gerald Hardy, Alabama Department of Environmental Management. Subject: Action Items for Solutia under its RCRA Post-Closure permit. (July 20, 1999)

2. 4 Work Plans and Progress Reports

1. Letter from Stephen Cobb, Alabama Department of Environmental Management to Wes Hardegree, USEPA. Subject: Major permit modifications. (January 08, 2001)
2. Letter from Narindar Kumar, USEPA to Gerald Hardy, Alabama Department of Environmental Management. Subject: EPA comments on the Preliminary Draft Permit Modification. (January 23, 2001)
3. Letter from Craig Branchfield, Solutia to Cavy Chu, Lockheed Martin. Subject: response to questions. (January 29, 2001)

2. 8 Removal Response Reports

1. Cross Reference: Letter from Robert G. Kalley, Solutia to Jeffrey P. Koplan, ATSDR. Transmitting comments of Solutia on health consultations conducted by ATSDR at the site. (May 02, 2000) [Filed and cited as entry number 8 under 2.8 REMOVAL RESPONSE - Removal Response Reports in the Removal Administrative Record dated January 16, 2002].

3.0 REMEDIAL INVESTIGATION (RI)

3. 1 Correspondence

1. Polychlorinated Biphenyl Ambient Air Study, Anniston, Alabama. (June 2000)
2. Letter from Jesse Baskerville, USEPA to James Warr, Alabama Department of Environmental Management. Regarding the release or threatened release of hazardous substances at the site. (February 08, 2001)
3. Letter from Craig Branchfield, Solutia to Steve Spurlin, USEPA. Regarding Final Summary Report of Technical Review and Evaluation of Potential PCB Releases. (October 08, 2001)
4. Email correspondence regarding PRGs for soil to groundwater. (January 17, 2003)
5. Memorandum from Jerry Burger, USEPA to Pam Scully, USEPA. Subject: Solutia ambient air monitoring site review. (March 27, 2003)

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3.0 REMEDIAL INVESTIGATION (RI)

3. 1 *Correspondence*

6. Letter from Craig Branchfield, Solutia to Pamela Langston Scully, USEPA. Providing response to comments on the Phase I - Conceptual Site Model, Volumes 1-2. (April 16, 2003)

7. Email from Kay Wischkaemper, USEPA to Addressees. Subject: Getting your assistance on PCB issues. (3:37 PM). (March 23, 2006)

8. Letter from Kay Wischkaemper, USEPA to Craig Branchfield, Solutia. Regarding request for data. (June 07, 2006)

9. Letter from Pamela Langston Scully, USEPA to Craig Branchfield, Solutia. Providing EPA's approval of the Site Characterization Report and Addendum and the Screening Level Ecological Risk Assessment. (November 08, 2007)

10. Memorandum from Kevin Koporec, USEPA to Pam Scully, USEPA. Subject: Review of proposed remedial level for Triethylphosphorothionate. (September 25, 2009)

11. Letter from Craig Branchfield, Solutia to Pamela Langston Scully, USEPA. Request for meeting to discuss Operable Unit 3 Remedial Investigation/Feasibility Study. (November 10, 2009)

12. Letter from E. Gayle Macolly, Solutia to Addressees. Regarding Notice of Dispute and Objections to EPA's responses and comments on the RI Report and FS. (February 08, 2010)

13. Letter from Pamela Langston Scully, USEPA to E. Gayle Macolly, Solutia. Subject: Schedule for resolving dispute and finalizing RI/FS. (March 30, 2010)

14. Letter from E. Gayle Macolly, Solutia to Pamela Langston Scully, USEPA. Subject: Request to Stay Dispute regarding EPA's responses and comments on RI/FS Reports. (April 01, 2010)

15. Letter from E. Gayle Macolly, Solutia to William Weinischke, US Department of Justice. Subject: Withdrawal of dispute letter regarding EPA's responses and comments in RI/FS reports. (April 22, 2010)

16. Memorandum from Pamela Langston Scully, USEPA to Anniston PCB Site File. Subject: Comparison of 2001 ERT Report Recommendations and the Proposed Plan for Operable Unit 3. (September 27, 2010)

17. Email from Glenn Adams, USEPA to Addressees. Subject: Order of Magnitude for Reference Doses. (4:08 PM). (November 02, 2010)

18. Email from Kevin Koporec, USEPA to Addressees. Subject: Justification for Higher Remedial Level for Construction Worker. (11:43 AM). (September 15, 2011)

19. Memorandum from Pamela Langston Scully, USEPA to File. Subject: Comparison of 2001 ERT Report Recommendations and the Proposed Plan for Operable Unit 3 of the Anniston PCB Site. (September 15, 2011)

3. 2 Sampling and Analysis Data

1. Memorandum from Tim Slagle, USEPA to Wes Hardegree, USEPA. Subject: Laboratory Results of PCB Air Study, Anniston, Alabama, June 28 to July 1, 1999. (August 17, 1999)

2. Memorandum from Tim Slagle, USEPA to D. Karen Knight, USEPA. Subject: Results, June 2000 Polychlorinated Biphenyl Ambient Air Study. (August 10, 2000)

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3.0 REMEDIAL INVESTIGATION (RI)

3. 2 Sampling and Analysis Data

3. "Operable Unit 3 Field Sampling Plan, Anniston PCB Site, Anniston, Alabama," Golder Associates. (February 2005)

4. Response to USEPA Comments on the OU-3 Field Sampling Plan. (February 17, 2005)

5. Letter from Craig Branchfield, Solutia to Pamela Langston Scully, USEPA. Subject: OU3 Field Sampling Plan Addendum No. 1, DQO for Shallow Bedrock Wells. (June 28, 2006)

6. Letter from Craig Branchfield, Solutia to Pamela Langston Scully, USEPA. Subject: OU3 Field Sampling Plan Addendum No. 1 - Revised, DQO for Shallow Bedrock Wells. (August 14, 2006)

7. Memorandum from Kay Wischkaemper, USEPA to Pamela Langston Scully, USEPA. Subject: Review of the August 13, 2006 OU3 Field Sampling Plan Addendum No. 1 - Revised, DQO for Bedrock Wells. (August 18, 2006)

3. 4 Work Plans and Progress Reports

1. Letter from Craig Branchfield, Solutia to Wm. Gerald Hardy, Alabama Department of Environmental Management. Subject: Work Plan for Estimating PCB Vapor Flux from Solutia Landfills. (March 27, 2000)

2. "Work Plan for Estimating Ambient PCB Levels in the Vicinity of Solutia's Anniston, AL Facility," ENSR. (April 2000)

3. Letter from Craig Branchfield, Solutia to Pamela Langston Scully, USEPA. Subject: Response to USEPA Comments on the RI/FS Work Plan, OU-3 Field Sampling Plan and OU-4 Field Sampling Plan. (July 16, 2004)

4. "Remedial Investigation/Feasibility Study Work Plan, Revision 2," Blasland, Bouck & Lee. (December 2004)

5. Responses to USEPA Comments on the RI/FS Work Plan, Revision 1. (December 22, 2004)

6. Letter from E. Gayle Macolly, Solutia to Pamela Langston Scully, USEPA. Subject: Work Plan for Removal Action at Area A, Remedial Investigation and Feasibility Study for Operable Unit 3. (April 06, 2010)

7. Letter from E. Gayle Macolly, Solutia to Pamela Langston Scully, USEPA. Subject: Work Plan for Additional Sampling at the South and West End Landfills, Remedial Investigation and Feasibility Study for Operable Unit 3. (April 06, 2010)

8. Letter from Pamela Langston Scully, USEPA to E. Gayle Macolly, Solutia. Providing EPA's approval of the Work Plan for Additional Sampling at the South and West End Landfills. (April 07, 2010)

9. Letter from Pamela Langston Scully, USEPA to E. Gayle Macolly, Solutia. Providing EPA's approval of the Work Plan for Removal Action at Area A. (April 07, 2010)

3. 7 Applicable or Relevant and Appropriate Requirements (ARARs)

1. Letter from Pamela Langston Scully, USEPA to Kristen Alston, Alabama Department of Environmental Management. Subject: Applicable or Relevant and Appropriate Requirements (ARARs). (February 04, 2009)

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3.0 REMEDIAL INVESTIGATION (RI)

3. 7 Applicable or Relevant and Appropriate Requirements (ARARs)

2. Letter from Jeffery Kitchens, Alabama Department of Environmental Management to Pamela Langston Scully, USEPA. Subject: Identification of State Applicable or Relevant and Appropriate Requirements (ARARs). (March 05, 2009)

3. 8 Interim Deliverables

1. "Technical Memorandum on Preliminary Remedial Action Objectives and Alternatives, Anniston PCB Site," Solutia. (April 23, 2002)
2. "Technical Memorandum on Site Specific Objectives and General Management Approach, Anniston PCB Site," Solutia. (April 23, 2002)
3. "Site-Wide Health and Safety Plan for the Anniston PCB Site, Revision 0, Anniston, Alabama," Blasland, Bouck & Lee. (June 2004)
4. "Technical Memorandum Identifying Candidate Technologies for OU-1/OU-2, OU-3 and OU-4," Blasland, Bouck & Lee. (March 2005)
5. Memorandum from Marc Greenberg, USEPA to Pamela Langston Scully, USEPA. Subject: Comments on Quality Assurance Project Plan for the Anniston PCB Site (Revision 2). (March 30, 2005)
6. "Preliminary Site Characterization Summary Report on Operable Unit 3, Solutia Inc. Facility," Solutia. (December 2005)
7. Letter from Craig Branchfield, Solutia to Pamela Langston Scully, USEPA. Subject: Addendum to Preliminary Site Characterization report for Operable Unit 3. (January 03, 2006)
8. Memorandum from Sharon Thoms, USEPA to Pam Scully, USEPA. Subject: Risk review comments for the Preliminary Site Characterization Summary for Operable unit 3. (February 06, 2006)
9. "Technical Memorandum on Modeling of Site Characteristics for OU-1/OU-2, OU-3 and OU-4, Revision 1," Solutia. (April 2006)
10. Letter from Pamela Langston Scully, USEPA to Craig Branchfield, Solutia. Subject: EPA's comments on the Preliminary Site Characterization Summary Report on Operable Unit 3. (May 03, 2006)
11. Letter from Craig Branchfield, Solutia to Pamela Langston Scully, USEPA. Subject: Response to Comments, Preliminary Site Characterization Summary Report on Operable Unit 3. (May 23, 2006)
12. Memorandum from Marc Greenberg, USEPA to Pamela Langston Scully, USEPA. Subject: Comments on Site-Wide Quality Assurance Project Plan, Revision 3. (November 30, 2006)
13. "Preliminary Site Characterization Summary Addendum Report for Operable Unit 3, Anniston PCB Site, Revision 0," Solutia. (February 2007)
14. "Quality Assurance Project Plan for the Anniston PCB Site, Revision 4," Arcadis. (February 2007)
15. Letter from Craig Branchfield, Solutia to Pamela Langston Scully, USEPA. Subject: Revision 4 of the Quality Assurance Project Plan and Response to USEPA Comments. (February 08, 2007)

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3.0 REMEDIAL INVESTIGATION (RI)

3. 8 Interim Deliverables

16. Responses to USEPA Comments on Revision 3 of the Quality Assurance Project Plan. (February 08, 2007)

17. Letter from E. Gayle Macolly, Solutia to Pamela Langston Scully, USEPA. Subject: Memorandum on Remedial Action Objectives (RAOs) for Operable Unit 3. (March 01, 2008)

3.10 Remedial Investigation (RI) Reports

1. "Final Summary Report of Technical Review and Evaluation of Potential PCB Releases, Anniston PCB Site, Anniston, Alabama," USEPA. (May 09, 2001)

2. Letter from Wm. Gerald Hardy, Alabama Department of Environmental Management. Subject: Comments on the Final Summary Report of Technical Review and Evaluation of Potential PCB Releases. (June 29, 2001)

3. Letter from Pamela Langston Scully, USEPA to E. Gayle Macolly, Solutia. Subject: Comments on Draft Remedial Investigation and Feasibility Study for Operable Unit 3. (January 22, 2009)

4. Memorandum from Kay Wischkaemper, USEPA to Pamela Scully, USEPA. Subject: Comments on the March 2009 RI Report for Operable Unit 3 at the South Site. (May 13, 2009)

5. Letter from Pamela Langston Scully, USEPA to E. Gayle Macolly, Solutia. Subject: EPA comments on Revision 1 of the Report on Remedial Investigations for Operable Unit 3. (August 26, 2009)

6. Email from Kevin Koporec, USEPA to Addressees. Subject: Re: Fw: Anniston OU3 RGO Addendum. (5:10 PM). (September 03, 2009)

7. Email from Pam Scully, USEPA to Addressees. Subject: Fw: Response to EPA Comments on March 2009 RI and May 2009 FS. (7:06 AM). (December 16, 2009)

8. Letter from Pamela Langston Scully, USEPA to E. Gayle Macolly, Solutia. Subject: Additional Responses to Comment-Response Document for Operable Unit 3 Remedial Investigation and Feasibility Study. (January 19, 2010)

9. Letter from Pamela Langston Scully, USEPA to E. Gayle Macolly, Solutia. Subject: Comments on Remedial Investigations/Feasibility Study Reports, Operable Unit 3. (April 19, 2010)

10. "Report on Remedial Investigation Addendum, Area A Removal Action for the Anniston PCB Site," Golder Associates. (May 20, 2010)

11. "Report on Remedial Investigation for Operable Unit 3 for the Anniston PCB Site," Golder Associates. (May 20, 2010)

12. "Report on Remedial Investigation Addendum, South Landfill Cap Assessment and West End Landfill Confirmation Sampling for the Anniston PCB Site," Golder Associates. (May 28, 2010)

3.11 Health Assessments

1. Health Consultations, January 1996 through August 2000, Agency for Toxic Substances and Disease Registry (ATSDR). (January 17, 1996)

2. "Public Health Assessment for Monsanto Company/Solutia Incorporated [a/k/a Anniston PCB Site], Anniston, Calhoun County, Alabama," Agency for Toxic Substances and Disease Registry (ATSDR). (May 17, 2001)

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3.0 REMEDIAL INVESTIGATION (RI)

3.11 Health Assessments

3. "Public Health Assessment for Monsanto Company/Solutia Incorporated [a/k/a Anniston PCB Site], Anniston, Calhoun County, Alabama," Agency for Toxic Substances and Disease Registry (ATSDR). (February 26, 2002)

4. "Health Consultation, Public Comment Release, Anniston PCB Air Sampling, Anniston PCB Site (Monsanto Company), Anniston, Calhoun County, Alabama," Agency for Toxic Substances and Disease Registry (ATSDR). (January 17, 2003)

5. "Health Consultation, Polychlorinated Biphenyls, Dioxins and Pesticides in Soil, Blood and Air from Anniston, Alabama, Anniston PCB Site (Monsanto Company), Anniston, Calhoun County, Alabama," Agency for Toxic Substances and Diease Registry (ATSDR). (July 30, 2003)

6. "Final Pathways Analysis Report for the Baseline Risk Assessment for Anniston PCB Site, Operable Unit 3, Anniston, Alabama," CDM Federal Programs Corporation. (October 2006)

7. Letter from Craig Branchfield, Solutia to Pamela Langston Scully, USEPA. Providing Solutia's comments on the Final Pathways Analysis Report for the Baseline Risk Assessment for Operable Unit 3. (January 29, 2007)

8. "Revised Final Human Health Baseline Risk Assessment Report for Anniston PCB Site, Operable Unit 3, Anniston, Alabama," CDM Federal Programs Corporation. (January 2008)

3.12 Endangerment Assessments

1. "Screening Level Ecological Risk Assessment (SLERA) for Operable Units 1, 2, and 3 of the Anniston PCB Site," BBL. (December 2005)

4.0 FEASIBILITY STUDY (FS)

4. 1 Correspondence

1. Letter from E. Gayle Macolly, Solutia to Pamela Langston Scully, USEPA. Subject: Request for Schedule Extension and Meeting and Response to EPA's Comment Letter for the Feasibility Study. (November 20, 2009)

4. 8 Interim Deliverables

1. "Technical Memorandum on Remedial Technologies, Alternatives and Screening, Anniston PCB Site, Anniston, Alabama," Golder Associates. (April 2008)

2. Memorandum from Kay Wischkaemper, USEPA to Pamela Scully, USEPA. Subject: Comments on the April 2008 Technical Memorandum on Remedial Technologies, Alternatives and Screening for the Solutia Site. (April 28, 2010)

4. 9 Feasibility Study (FS) Reports

1. Letter from Pamela Langston Scully, USEPA to E. Gayle Macolly, Solutia. Subject: EPA Comments on the Feasibility Study for Operable Unit 3. (November 13, 2009)

2. "Feasibility Study for Operable Unit 3, Anniston PCB Site, Revision 1.0," Golder Associates. (June 2010)

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4.0 FEASIBILITY STUDY (FS)

4.10 Proposed Plans for Selected Remedial Action

1. Public Comment Sheets on the Proposed Plan for Operable Unit 3. (DATE UNKNOWN) [Redacted by Suzanne Armor, Attorney, under FOIA Exemption 6 - Personal Privacy].
2. "Superfund Proposed Plan, Operable Unit 3 of the Anniston PCB Site, Anniston, Calhoun County, Alabama," EPA Region 4. (August 2010)
3. Email from Gayle Macolly, Solutia to Pam Scully, USEPA. Subject: Proposed Plan. (12:00 PM). (September 07, 2010)
4. Letters from Residents to Pamela Scully, USEPA. Subject: Comments on the preferred alternative for OU3. (October 12, 2010) [Redacted by Suzanne Armor, Attorney, under FOIA Exemption 6 - Personal Privacy].
5. Letter from Bertrand Thomas, West Anniston Foundation to Pamela Langston Scully, USEPA. Subject: Comments on Preferred Alternatives for OU3. (October 27, 2010)
6. Letters from Residents to Pam Scully, USEPA. Subject: Comments on the preferred alternative for OU3. (October 29, 2010) [Redacted by Suzanne Armor, Attorney, under FOIA Exemption 6 - Personal Privacy].

8.0 SITE CLOSEOUT

8. 3 Operations and Maintenance

1. "Comprehensive Operations and Maintenance Plan for Remedial/Corrective Action Projects, Solutia, Inc., Anniston, Alabama, Revision 2.0," Solutia. (April 01, 2003)

9.0 STATE COORDINATION

9. 1 Correspondence

1. Letter from Wm. Gerald Hardy, Alabama Department of Environmental Management to Winston Smith, USEPA. Subject: Anniston PCB Consent Decree. (August 25, 2003)
2. Letter from Wm. Gerald Hardy, Alabama Department of Environmental Management to Franklin Hill, USEPA. Regarding the Alabama Risk Based Corrective Action Guidance Manual. (February 29, 2008)
3. Letter from Franklin Hill, USEPA to Gerald Hardy, Alabama Department of Environmental Management. Regarding the Alabama Risk Based Corrective Action Guidance Manual. (April 04, 2008)
4. Letter from Wm. Gerald Hardy, Alabama Department of Environmental Management to Gayle Macolly, Solutia. Subject: AHWMMA Post-Closure Permit Issuance. (October 31, 2008)

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10.0 ENFORCEMENT

10. 1 Correspondence

1. Letter from Wm. Gerald Hardy, Alabama Department of Environmental Management to U.S. Department of Justice. Subject: United States v. Pharmacia Corporation (p/k/a Monsanto Company) and Solutia, Inc. (May 17, 2002)
2. Letter from Suzanne Armor, USEPA to Cathleen Bumb, Solutia. Subject: Notice of Dispute Resolution, Anniston PCB site. (February 09, 2010)
3. Letter from William Weinischke, US Department of Justice to Honorable Paul Greene, US District Court, Northern District of Alabama. Regarding withdrawal of the Order dated February 16, 2010. (February 26, 2010)

10. 6 State and Local Enforcement Records

1. NPDES Permit Application for Storm Water Discharges Associated with Industrial Activity at Monsanto Chemical Company, Anniston, Alabama, Monsanto Chemical Company. (January 01, 1992)
2. NPDES Permit Application for Storm Water Discharges Associated with Industrial Activity at Monsanto Chemical Company, Anniston, Alabama, Monsanto Chemical Company. (September 24, 1992)
3. State Indirect Discharge (SID) Permit Application - Monsanto Company. (March 21, 1997)

10.10 PRP-Specific Negotiations

1. Stipulation and Agreement of the Parties Clarifying Partial Consent Decree. (July 06, 2006)

10.11 EPA Administrative Orders

1. Partial Consent Decree, In the Matter of Anniston PCB, Pharmacia Corporation (p/k/a Monsanto Company) and Solutia, Inc., Defendants, Civil Action No. CV-02-PT-0749-E. (October 14, 2002)
2. Order, In the Matter of Anniston PCB Site, Pharmacia Corporation (p/k/a Monsanto Corporation and Solutia, Inc., Defendants, Civil Action No. CV-02-PWG-0749-E. (February 16, 2010)

11.0 POTENTIALLY RESPONSIBLE PARTIES (PRP)

11. 9 PRP-Specific Correspondence

1. Letter from Jewel Harper, USEPA to Allan Topol, Covington & Burling. Transmitting the Special Notice Letter for Remedial Investigation/Feasibility Study (RI/FS) and Demand for payment. (November 19, 2001)

13.0 COMMUNITY RELATIONS

13. 8 Public Meetings

1. Transcript - Proposed Plan Public Meeting for Anniston PCB, Operable Unit 3. (September 13, 2010)

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14.0 CONGRESSIONAL RELATIONS

14. 2 Transcripts

1. PCB Contamination in Anniston, Alabama - Hearing before a Subcommittee of the Committee on Appropriations, United States Senate. (April 19, 2002)

16.0 NATURAL RESOURCE TRUSTEE

16. 1 Correspondence

1. Letter from Jesse Baskerville, USEPA to James Lee, US Department of the Interior. Regarding the release or threatened release of hazardous substances, pollutants or contaminants at the Anniston PCB site. (February 08, 2001)
2. Letter from Jesse Baskerville, USEPA to Tom Dillon, National Oceanic and Atmospheric Administration (NOAA). Regarding the release or threatened release of hazardous substances, pollutants or contaminants at the Anniston PCB site. (February 08, 2001)

17.0 SITE MANAGEMENT RECORDS

17. 4 Site Audio-Visuals

1. "Historical Aerial Photographic Analysis, Anniston PCB Site, Anniston, Alabama," USEPA. (June 2001)

17. 7 Reference Documents

1. Expert Report - PCB Source, Transport and Fate in the Anniston Area, prepared by A. Medine, V. Lamarra, V. Guvanasen and J. Patel. (January 11, 2006)
2. Human Health Risk Assessment Bulletins -- Supplement to RAGS. (September 2008)
3. 4-Nitrophenol Fact Sheet, Technology Tansfer Network Air Toxics Website. (August 19, 2009)
4. Regional Screening Levels for Chemical Contaminants at Superfund Sites, USEPA. (August 19, 2009)
5. Tetraethyldithiopyrophosphate Fact Sheet, Integrated Risk Information System. (August 19, 2009)
6. Tetraethyldithiopyrophosphate Quickview, Integrated Risk Information System. (August 19, 2009)

17. 8 State and Local Technical Records

1. Cross Reference: Letter from Wm. Gerald Hardy, Alabama Department of Environmental Management to Alan Faust, Solutia. Subject: Request for RCRA Activities Associated with Off-Site Residential Areas. (September 08, 1999) [Filed and cited as entry number 2 to 17.8 SITE MANAGEMENT RECORDS - State and Local Technical Records in the Removal Administrative Record dated January 16, 2002].
2. Letter from Craig Branchfield, Solutia to Stephen Cobb, Alabama Department of Environmental Management. Subject: SWMU Assessment report, MCC Warehouse. (August 01, 2001)

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20.0 RESOURCE CONSERVATION & RECOVERY ACT (RCRA) RECORDS

20. 1 Correspondence

1. Letter from Richard Green, USEPA to Stephen Cobb, Alabama Department of Environmental Management. Subject: Comments on the On-Site RFI/CS Draft Report. (May 08, 2002)
2. Letter from Wm. Gerald Hardy, Alabama Department of Environmental Management to Craig Branchfield, Solutia. Subject: Onsite RFI/CS Report. (September 05, 2003)
3. Letter from Phillip Davis, Alabama Department of Environmental Management to Craig Branchfield, Solutia. Subject: Proposed Modification to SWMU-1 Corrective Action System. (February 18, 2004)
4. Letter from Craig Branchfield, Solutia to Phillip Davis, Alabama Department of Environmental Management. Subject: Application for Minor Permit Modification, AHWMMA Post-Closure Permit. (November 19, 2004)
5. Letter from E. Gayle Macolly, Solutia to Wm. Gerald Hardy, Alabama Department of Environmental Managament. Subject: Response to Comments, Second Notice of Deficiency. (July 09, 2008)

20. 3 Notification Form -- Part B

1. "RCRA Part B Post-Closure Permit Application for the Anniston Alabama Facility," Solutia. (July 2006)

20. 4 RCRA Facility Inspection Reports

1. Letter from Denise Turner, A.T. Kearney to Rowena Sheffield, USEPA. Providing the RCRA Facility Assessment (RFA). (August 16, 1991)
2. Letter from J.S. Mayausky, Monsanto to John Poole, Alabama Department of Environmental Management. Subject: Revision to RCRA Part B Post-Closure Permit Application. (May 01, 1996)
3. "RFI/CS Work Plan for the Anniston, Alabama Facility," Solutia. (November 1997)
4. Letter from Alan Faust, Solutia to Gerald Hardy, Alabama Department of Environmental Management. Regarding responses to comments on the RFI/CS Work Plan. (March 25, 1998)
5. Memorandum from S.E. Matthews, USEPA to Laurie Benton, USEPA. Subject: SESD-HWS Comprehensive Ground Water Monitoring Evaluation. (April 26, 1999)
6. Letter from Craig Branchfield, Solutia to Wm. Gerald Hardy, Alabama Department of Environmental Management. Subject: RCRA Facility Work Plan for Focused Ambient Air Evaluation. (January 19, 2001)
7. Letter from Craig Branchfield, Solutia to Stephen Cobb, Alabama Department of Environmental Management. Subject: Response to Second Notice of Deficiency. (August 07, 2001)
8. "Supplemental RFI/CS Work Plan, Solutia Facility, Anniston, Alabama," Solutia. (August 2002)
9. "MCC Warehouse Interim Measures Report, Solutia Inc. Facility, Anniston, Alabama," Roux Associates. (September 06, 2002)
10. "RFI/CS Air Monitoring Work Plan, Revison 2.0," Solutia. (October 2002)
11. "RFI/CS Report, Volume I of III for the Anniston, Alabama Facility," Solutia. (October 2002)

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20.0 RESOURCE CONSERVATION & RECOVERY ACT (RCRA) RECORDS

20. 4 RCRA Facility Inspection Reports

12. "RFI/CS Report, Volume II of III for the Anniston, Alabama Facility," Solutia. (October 2002)

13. "RFI/CS Report, Volume III of III for the Anniston, Alabama Facility," Solutia. (October 2002)

14. "Corrective Measures Implementation Work Plan, Excavated Soil Stockpile at Choccolocco Creek Wastewater Treatment Plant, Anniston, Alabama," Solutia. (January 2003)

15. Letter from Phillip Davis, Alabama Department of Environmental Management to Craig Branchfield, Solutia. Subject: Draft AHWMMA Permit and Corrective Measures Implementation Work Plan. (September 03, 2003)

16. Letter from Craig Branchfield, Solutia to Phillip David, Alabama Department of Environmental Management. Subject: Proposed Modifications to SWMU 1 Corrective Action System. (December 10, 2003)

17. Letter from Craig Branchfield, Solutia to Wm. Gerald Hardy, Alabama Department of Environmental Management. Subject: Application for Permit Modification, AHWMMA Post-Closure Permit. (April 14, 2004)

18. Letter from Craig Branchfield, Solutia to Phillip Davis, Alabama Department of Environmental Management. Subject: Major Modification Request for AHWMMA Post-Closure Permit. (December 06, 2005)

19. RCRA Part B Post-Closure Permit Application, Revision 1, Anniston Alabama Facility, Solutia. (March 2007)

20. "Phase II/Final Completion Report, Corrective Measures Implementation, Highway 21 Bridge at Choccolocco Creek," Solutia. (March 2008)

APPENDIX C

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Table C-1
Chemical-Specific Applicable and Relevant and Appropriate Requirements and To-Be Considered Guidance (TBC)

Anniston PCB Site Operable Unit No. 3
Anniston, Calhoun County, Alabama

Action/Medium	Requirements	Prerequisite	Citation
Restoration of groundwater to its beneficial uses	May not exceed MCLs for organics and inorganics established under the Safe Drinking Water Act National Revised Primary Drinking Water Regulations for community water systems.	Presence of contaminants in groundwater of the State designated as potential underground sources of drinking water as defined in ADEM Admin. Code. r. 335-6-8-.03 – **relevant and appropriate**	40 C.F.R. § 141.61(a) and (c) 40 C.F.R. § 141.62(b) ADEM Admin. Code r. 335-7-2-.03(1) ADEM Admin. Code r. 335-7-2-.04(1) ADEM Admin. Code r. 335-7-2-.05(1)
Cleanup of PCB contaminated soil at sites in industrial areas	Recommends cleanup levels should be established within a range of 10 to 25ppm PCB. Recommends treatment, where practicable, for principle threat wastes (*i.e.*, soils contaminated with PCBs greater than or equal to 500ppm).	CERCLA site with PCB contamination in soil requiring response action – **To Be Considered (TBC)**	U.S. EPA *Guidance on Remedial Actions for Superfund Sites with PCB Contamination* [EPA/540/G-90/007]

Table C-2 Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance Anniston PCB Site Operable Unit No. 3 Anniston, Calhoun County, Alabama			
Action	**Requirements**	**Prerequisite**	**Citation**
	General Construction Standards – All Land Disturbing Activities		
Activities causing stormwater runoff (*e.g.*, clearing, grading, excavation)	Shall fully implement and regularly maintain effective best management practices (BMPs) to the maximum extent practicable, and in accordance with the operator's Construction Best Management Practices Plan (CBMPP). Appropriate, effective pollution abatement/prevention facilities, structural and nonstructural BMPs, and management strategies shall be fully implemented prior to and concurrent with commencement of the regulated activities and regularly maintained during construction as needed at the site to meet or exceed the requirements of this chapter until construction is complete, effective reclamation and/or stormwater quality remediation is achieved.	All new and existing construction activities as defined in ADEM Admin. Code r. 335-6-12-.02(e) disturbing one (1) acre or more in size - **applicable**	ADEM Admin. Code r. 335-6-12-.05(2)
	The operator shall take all reasonable steps to prevent and/or minimize, to the maximum extent practicable, any discharge in violation of this chapter or which has a reasonable likelihood of adversely affecting the quality of groundwater or surface water receiving the discharge(s).		ADEM Admin. Code r. 335-6-12-.06(4)
	Implement a comprehensive CBMPP appropriate for site conditions consistent with the substantive requirements of ADEM Admin. Code r. 335-6-12-.21 that has been prepared and certified by a Qualified Credentialed Professional (QCP).		ADEM Admin. Code r. 335-6-12-.21(2)(a)
	The CBMPP shall include a description of appropriate, effective water quality BMPs to be implemented at the site as needed to ensure compliance with this chapter and include but not limited to the measures provided in subsections 1. thru 14.		ADEM Admin. Code r. 335-6-12-.21(2)(b)

Table C-2 Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance Anniston PCB Site Operable Unit No. 3 Anniston, Calhoun County, Alabama			
Action	**Requirements**	**Prerequisite**	**Citation**
	BMPs shall be designed, implemented, and regularly maintained to provide effective treatment of discharges of pollutants in stormwater resulting from runoff generated by probable storm events expected/predicted during construction disturbance based on historic precipitation information, and during extended periods of adverse weather and seasonal conditions		ADEM Admin. Code r. 335-6-12-.21(4)
Activities causing fugitive dust emissions	Shall not cause, suffer, allow or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used . . . without taking reasonable precautions to prevent particulate matter from becoming airborne.	Fugitive emissions from construction operations, grading, or the clearing of land – **TBC**	ADEM Admin. Code r. 335-3-4-.02(1)[1]
	Shall not cause or permit the discharge of visible fugitive dust emissions beyond the lot line of the property on which the emissions originate.		ADEM Admin. Code r. 335-3-4-.02(2)[2]
Groundwater Monitoring/Extraction Well Installation, Operation, and Abandonment			
Construction of extraction and monitoring wells	All materials used in the construction of a water well shall have the structural strength to accomplish the purpose for which they are installed. Must meet any relevant substantive requirements under ADEM Admin. Code r. 335-9-1-.05 *Materials* and Admin. Code r. 335-9-1-.06 *Construction Standards* related to casings, liners, screens, development and capping of wells.	Installation of wells as defined in ADEM Admin. Code r. 335-9-1-.02(g) – **relevant and appropriate**	ADEM Admin. Code r. 335-9-1-.05(a)- (c) ADEM Admin. Code r. 335-9-1-.06(a), (b), (c), (d), (e) & (h)
	Any holes remaining after construction or testing attempts shall be properly backfilled		ADEM Admin. Code r. 335-9-1-.06(h)

[1] ADEM Admin. Code r. 335-3-4-.02(1) and (2) were held unconstitutional for being unduly vague (335-3-4-.02(1)) and too restrictive (335-3-4-.02(2)). See Ross Neeley Express, Inc. v. Ala. Dep't of Envtl. Mgmt., 437 So.2d 82 (Ala. 1983).

[2] See supra n.1.

Table C-2
Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance

Anniston PCB Site Operable Unit No. 3
Anniston, Calhoun County, Alabama

Action	Requirements	Prerequisite	Citation
Construction of monitoring wells	Must be cased in a manner that maintains the integrity of the monitoring well bore hole. This casing must be screened or perforated, and packed with gravel or sand where necessary, to enable sample collection at depths where appropriate aquifer flow zones exist. The annular space (*i.e.*, the space between the bore hole and well casing) above the sampling depth must be sealed with a suitable material (*e.g.*, cement grout or bentonite slurry) to prevent contamination of samples and the groundwater. Monitoring wells must be operated and maintained in a manner to prevent soil, surface water, and/or groundwater contamination. This requirement includes the installation of protective barriers around monitoring wells where necessary to prevent damage to the well from traffic or other causes. All monitoring wells must have functional key or combination locks on the wellhead covers to prevent unauthorized access. All monitoring wells must be assigned an identifying number by the facility, and such numbers must be permanently affixed to the outer casing of each monitoring well.	Installation of groundwater monitoring wells at a RCRA facility in order to detect any statistically significant amounts of hazardous waste or hazardous waste constituents – **relevant and appropriate**	ADEM Admin. Code r. 335-14-5-.06(8)(c)
Abandonment of extraction wells, monitoring wells, and boreholes	Any well to be abandoned shall be permanently sealed in the following manner: The well must be filled with a puddled clay material containing 50 ppm of chlorine to within 20 feet of the top of the well. The top 20 feet shall be filled with cement grout or concrete.	Abandonment of extraction wells, monitoring wells, and boreholes – **relevant and appropriate**	ADEM Admin. Code r. 335-9-1-.06(g)
Activity associated with Class V injection wells (e.g., ZVI injections)	Injection activity cannot allow the movement of fluid containing any contaminant into drinking water, if the presence of that contaminant may cause a violation of the primary drinking water standards under 40 CFR part 141, other health based standards, or may otherwise adversely affect the health of persons.	Construction, operation, maintenance, conversion, plugging, or closure of Class V injection wells associated with remedial activity – **relevant and appropriate**	40 C.F.R. § 144.82(a)(1) ADEM Admin. Code r. 335-6-8-.05(1)(d)

Table C-2 Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance Anniston PCB Site Operable Unit No. 3 Anniston, Calhoun County, Alabama			
Action	**Requirements**	**Prerequisite**	**Citation**
Waste Generation, Characterization, Segregation, and Storage			
Characterization of solid waste (all primary and secondary wastes)	Must determine if solid waste is excluded from regulation under 40 C.F.R. § 261.4(b); and	Generation of solid waste as defined in 40 C.F.R. § 261.2 —**applicable**	40 C.F.R. § 262.11(a)
	Must determine if waste is listed as hazardous waste under subpart D 40 C.F.R. Part 261; or	Generation of solid waste which is not excluded under 40 C.F.R. § 261.4(a) —**applicable**	40 C.F.R.§ 262.11(b)
	Must determine whether the waste is (characteristic waste) identified in subpart C of 40 CFR part 261by either: (1) Testing the waste according to the methods set forth in subpart C of 40 CFR part 261, or according to an equivalent method approved by the Administrator under 40 CFR 260.21; or (2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.		40 C.F.R. § 262.11(c)
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste which is determined to be hazardous waste – **applicable**	40 C.F.R. § 262.11(d)
Characterization of hazardous waste (all primary and secondary wastes)	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 C.F.R. Parts 264 and 268.	Generation of RCRA-hazardous waste for storage, treatment or disposal – **applicable**	40 C.F.R. § 264.13(a)(1)

Table C-2 Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance Anniston PCB Site Operable Unit No. 3 Anniston, Calhoun County, Alabama			
Action	**Requirements**	**Prerequisite**	**Citation**
Determinations for management of hazardous waste	Must determine each EPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under 40 CFR 268 *et seq.*. *Note:* This determination may be made concurrently with the hazardous waste determination required in Sec. 262.11 of this chapter.	Generation of hazardous waste for storage, treatment or disposal – **applicable**	40 C.F.R. § 268.9(a)
	Must determine the underlying hazardous constituents [as defined in 40 C.F.R. § 268.2(i)] in the waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment or disposal – **applicable**	40 C.F.R. § 268.9(a)
	Must determine if the hazardous waste meets the treatment standards in 40 *CFR* 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste. *Note:* This determination can be made concurrently with the hazardous waste determination required in 40 CFR 262.11.		40 C.F.R. § 268.7(a)
Temporary on-site storage of hazardous waste in containers	A generator may accumulate hazardous waste at the facility provided that: • waste is placed in containers that comply with 40 C.F.R. §§ 265.171-173; and	Accumulation of RCRA hazardous waste on site as defined in 40 C.F.R. § 260.10 – **applicable**	40 C.F.R. § 262.34(a) 40 C.F.R. § 262.34(a)(1)(i)
	• the date upon which accumulation begins is clearly marked and visible for inspection on each container; and		40 C.F.R. § 262.34(a)(2)

Table C-2 Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance Anniston PCB Site Operable Unit No. 3 Anniston, Calhoun County, Alabama			
Action	**Requirements**	**Prerequisite**	**Citation**
	• container is marked with the words "hazardous waste"; or		40 C.F.R. § 264.34(a)(3)
	• container may be marked with other words that identify the contents.	Accumulation of 55 gal. or less of RCRA hazardous waste or one quart of acutely hazardous waste listed in 261.33(e) at or near any point of generation – **applicable**	40 C.F.R. § 262.34(c)(1)
Use and management of hazardous waste in containers	If container is not in good condition (*e.g.*, severe rusting, structural defects) or if it begins to leak, must transfer waste into container in good condition.	Storage of RCRA hazardous waste in containers – **applicable**	40 C.F.R. § 265.171
	Use container made or lined with materials compatible with waste to be stored so that the ability of the container is not impaired.		40 C.F.R. § 265.172
	Keep containers closed during storage, except to add/remove waste.		40 C.F.R. § 265.173(a)
	Open, handle, and store containers in a manner that will not cause containers to rupture or leak.		40 C.F.R. § 265.173(b)
Storage of hazardous waste in container area	Area must have a containment system designed and operated in accordance with 40 C.F.R. § 264.175(b).	Storage of RCRA hazardous waste in containers *with free liquids* – **applicable**	40 C.F.R. § 264.175(a)
	Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or Containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage of RCRA-hazardous waste in containers that *do not contain free liquids* (other than F020, F021, F022, F023, F026 and F027) – **applicable**	40 C.F.R. § 264.175(c)

Table C-2
Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance

Anniston PCB Site Operable Unit No. 3
Anniston, Calhoun County, Alabama

Action	Requirements	Prerequisite	Citation
Temporary on-site storage of remediation waste in staging piles (*e.g.*, excavated soils)	Must be located within the contiguous property under the control of the owner/operator where the wastes are to be managed in the staging pile originated.	Accumulation of non-flowing hazardous remediation waste (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 C.F.R. § 260.10 – **applicable**	40 C.F.R. § 264.554(a)(1)
	May be temporarily stored, (including mixing, sizing, blending or other similar physical operations intended to prepare the wastes for subsequent management or treatment) at a facility if used only during remedial operations provided that the staging pile:		40 C.F.R. § 264.554(a)(1)
	• must facilitate a reliable, effective and protective remedy;		40 C.F.R. § 264.554(d)(1)(i)
	• must be designed to prevent or minimize releases of hazardous wastes and constituents into the environment, and minimize or adequately control cross-media transfer as necessary to protect human health and the environment (*e.g.*, use of liners, covers, run-off/run-on controls); and		40 C.F.R. § 264.554(d)(1)(ii)
	• must not operate for more than 2 years, except when an operating term extension under 40 CFR 264.554(i) is granted. *Note:* Must measure the 2-year limit (or other operating term specified) from first time remediation waste placed in staging pile. Must not use staging pile longer than the length of time designated by EPA in appropriate decision document		40 C.F.R. § 264.554(d)(1)(iii) 40 C.F.R. § 264.554(i)(1)

Table C-2 Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance Anniston PCB Site Operable Unit No. 3 Anniston, Calhoun County, Alabama			
Action	**Requirements**	**Prerequisite**	**Citation**
	Extension of up to an additional 180 days beyond the operating term limit may be granted provided the continued operation of the staging pile: • Will not pose a threat to human health and the environment; and • Is necessary to ensure timely and efficient implementation of remedial actions at the facility.		40 CFR 264.554(i)(1)(i) and (ii)
	In setting standards and design criteria, must consider the following factors: • Length of time pile will be in operation; • Volumes of waste you intend to store in the pile; • Physical and chemical characteristics of the wastes to be stored in the unit; • Potential for releases from the unit; • Hydrogeological and other relevant environmental conditions at the facility that may influence the migration of any potential releases; and • Potential for human and environmental exposure to potential releases from the unit.		40 C.F.R. § 264.554(d)(2)(i) –(vi)
	Must not place ignitable or reactive remediation waste in a staging pile unless the remediation waste has been treated, rendered, or mixed before placed in the staging pile so that:	Storage of ignitable or reactive remediation waste in staging pile—**applicable**.	40 C.F.R. §264.554(e)
	The remediation waste no longer meets the definition of ignitable or reactive under 40 CFR 261.21 or 40 CFR 261.23: and You have complied with 40 C.F.R. §264.17(b); or		40 C.F.R. §264.554(e)(1)(i) and (ii)

Table C-2
Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance

Anniston PCB Site Operable Unit No. 3
Anniston, Calhoun County, Alabama

Action	Requirements	Prerequisite	Citation
	Must manage the remediation waste to protect it from exposure to any material or condition that may cause it to ignite or react.		40 C.F.R. §264.554(e)(2)
	Must not place in the same staging pile unless you have complied with 40 C.F.R. § 264.17(b)	Storage of "incompatible" remediation waste (as defined in 40 C.F.R. § 260.10) in staging pile in – **applicable**	40 C.F.R. § 264.554(f)(1)
	Must separate the incompatible waste or materials, or protect them from on another by using a dike, berm, wall, or other device.	Staging pile of remediation waste stored nearby to incompatible wastes or materials in containers, other piles, open tanks or land disposal units—**applicable**.	40 C.F.R. § 264.554(f)(2)
	Must not pile remediation waste on same base where incompatible wastes or materials were previously piled unless you have sufficiently decontaminated the base to comply with 40 C.F.R. § 264.17(b).		40 C.F.R. § 264.554(f)(3)
Waste Treatment and Disposal — Contaminated Groundwater, Excavated Soils, Debris, and Secondary Wastes			
Discharge of treated groundwater to POTW	Shall not introduce into publicly or privately owned treatment works any pollutant(s) which, alone on in conjunction with a discharge or discharges from other sources, cause pass through or interference or in any other manner adversely impact the operation or performance of the treatment works, to include the method of sludge disposal in use by the publicly or privately owned treatment works.	Discharge pollutants into POTW or privately-owned treatment facility operated by a person other than the indirect discharger – **applicable**	ADEM Admin. Code r. 335-6-5-.03(1)
	The following pollutants may not be introduced into a POTW:		ADEM Admin. Code r. 335-6-5-.03(2)

Table C-2
Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance

Anniston PCB Site Operable Unit No. 3
Anniston, Calhoun County, Alabama

Action	Requirements	Prerequisite	Citation
	• Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 C.F.R. § 261.21;		ADEM Admin. Code r. 335-6-5-.03(2)(a)
	• Pollutants which will cause corrosive structural damage to the treatment works, but in no case discharges with pH lower than 5.0, unless the treatment works are specifically designed to accommodate such discharges;		ADEM Admin. Code r. 335-6-5-.03(2)(b)
	• Solid or viscous pollutants in amounts which will cause obstruction to the flow in sewers, or other interference with the operation of the treatment works;		ADEM Admin. Code r. 335-6-5-.03(2)(c)
	• Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge of such volume or strength as to cause interference in the treatment works;		ADEM Admin. Code r. 335-6-5-.03(2)(d)
	• Heat in amounts which will inhibit biological activity in the treatment plant resulting in interference but in no case in such quantities that the temperature of the influent, at the treatment plant, exceeds 40 °C (104 °F) unless the treatment plant is designed to accommodate such heat;		ADEM Admin. Code r. 335-6-5-.03(2)(e)
	• Pollutants which result in the presence of toxic gases, vapors, or fumes within the treatment works in a quantity that may cause acute worker health and safety problems;		ADEM Admin. Code r. 335-6-5-.03(2)(f)
	• Any trucked or hauled pollutants, except at discharge points designated by the treatment works; and		ADEM Admin. Code r. 335-6-5-.03(2)(g)
	• Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.		ADEM Admin. Code r. 335-6-5-.03(2)(h)
PCB Waste Generation, Management and Storage			

Table C-2
Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance

Anniston PCB Site Operable Unit No. 3
Anniston, Calhoun County, Alabama

Action	Requirements	Prerequisite	Citation
Management of PCB waste (*e.g.*, contaminated PPE, equipment, wastewater)	Any person storing or disposing of PCB waste must do so in accordance with 40 C.F.R. § 761, Subpart D.	Generation of waste containing PCBs at concentrations ≥50 ppm **—applicable**	40 C.F.R. § 761.50(a)
Management of PCB remediation waste	Any person cleaning up and disposing of PCBs shall do so based on the concentration at which the PCBs are found.	Generation of PCB remediation waste as defined in 40 C.F.R. § 761.3 — **applicable**	40 C.F.R. § 761.61
Temporary storage of PCB waste in a container(s)	Container(s) shall be marked as illustrated in 40 C.F.R. § 761.45(a).	Storage of PCBs and PCB Items at concentrations ≥50 ppm for disposal— **applicable**	40 C.F.R. § 761.40(a)(1)
	Storage area must be properly marked as required by 40 C.F.R. § 761.40(a)(10).		40 C.F.R. § 761.65(c)(3)
	Any leaking PCB Items and their contents shall be transferred immediately to a properly marked non-leaking container(s).		40 C.F.R. § 761.65(c)(5)
	Container(s) shall be in accordance with requirements set forth in DOT HMR at 49 C.F.R. §§ 171-180.		40 C.F.R. § 761.65(c)(6)
Storage of PCB waste in non-RCRA regulated unit	Storage facility must have: • Adequate roof and walls to prevent rainwater from reaching stored PCBs and PCB items;	Storage of PCBs and PCB Items at concentrations 50 ppm or greater for disposal — **applicable**	40 C.F.R. § 761.65(b)(1) 40 C.F.R. § 761.65(b)(1)(i)
	• Adequate floor that has continuous curbing with a minimum six-inch high curb. Floor and curb must provide a containment volume equal to at least two times the internal volume of the largest PCB article or container or 25% of the internal volume of all articles or containers stored there, whichever is greater.		40 C.F.R. § 761.65(b)(1)(ii)

Table C-2
Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance

Anniston PCB Site Operable Unit No. 3
Anniston, Calhoun County, Alabama

Action	Requirements	Prerequisite	Citation
	• No drain valves, floor drains, expansion joints, sewer lines, or other openings that would permit liquids to flow from curbed area;		40 C.F.R. § 761.65(b)(1)(iii)
	• Floors and curbing constructed of Portland cement, concrete, or a continuous, smooth, non-porous surface that prevents or minimizes penetration of PCBs; and		40 C.F.R. § 761.65(b)(1)(iv)
	Storage facility must not located at a site that is below the 100-year flood water elevation.		40 C.F.R. § 761.65(b)(1)(v)
	Storage area must be properly marked as required by 40 C.F.R. § 761.40(a)(10).		40 C.F.R. § 761.65(c)(3)
Storage of PCB waste in a RCRA-regulated container storage area	Does not have to meet storage unit requirements in 40 C.F.R. § 761.65(b)(1) provided unit:	Storage of PCBs and PCB Items designated for disposal — **applicable**	40 C.F.R. § 761.65(b)(2)
	• is permitted by EPA under RCRA § 3004 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 C.F.R. § 761; or		40 C.F.R. § 761.65(b)(2)(i)
	• qualifies for interim status under RCRA § 3005 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 C.F.R. § 761; or		40 C.F.R. § 761.65(b)(2)(ii)
	• is permitted by an authorized state under RCRA § 3006 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 C.F.R. § 761		40 C.F.R. § 761.65(b)(2)(iii)
Temporary storage of Bulk PCB remediation waste in a waste pile	May be stored at the clean-up site or site of generation for 180 days subject to the following conditions: • waste must be placed in a pile is designed and operated to control dispersal by wind, where necessary, by means other than wetting;	Storage of PCB remediation waste or PCB bulk product waste in a waste pile—**applicable**	40 C.F.R. § 761.65(c)(9)(i)

Table C-2 Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance Anniston PCB Site Operable Unit No. 3 Anniston, Calhoun County, Alabama			
Action	**Requirements**	**Prerequisite**	**Citation**
	• waste must not generate leachate through decomposition or other reactions.		40 C.F.R. § 761.65(c)(9)(ii)
	Storage site must have a liner designed, constructed, and installed to prevent any migration of wastes off or through liner into adjacent subsurface soil, groundwater or surface water at any time during the active life (including closure period) of the storage site.		40 C.F.R. § 761.65(c)(9)(iii)(A)
	Liner must be: • constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure because of pressure gradients, physical contact with waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;		40 C.F.R. § 761.65(c)(9)(iii)(A)(1)
	• placed on foundation or base capable of providing support to liner and resistance to pressure gradients above and below the liner to present failure because of settlement compression or uplift;		40 C.F.R. § 761.65(c)(9)(iii)(A)(2)
	• installed to cover all surrounding earth likely to be in contact with waste.		40 C.F.R. § 761.65(c)(9)(iii)(A)(3)
	Has a cover that meets the above requirements and installed to cover all of the stored waste likely to be contacted by precipitation, and is secured so as not to be functionally disabled by winds expected under normal weather conditions at the storage site; and		40 C.F.R. § 761.65(c)(9)(iii)(B)
	Has a run-on control system designed, constructed, operated and maintained such that it:		40 C.F.R. § 761.65(c)(9)(iii)(C)
	• prevents flow on the stored waste during peak discharge from at least a 25-year storm:		40 C.F.R. § 761.65(c)(9)(iii)(C)(1)

Table C-2 Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance Anniston PCB Site Operable Unit No. 3 Anniston, Calhoun County, Alabama			
Action	**Requirements**	**Prerequisite**	**Citation**
	• collects and controls at least the water volume resulting from a 24-hour, 25-year storm.		40 C.F.R. § 761.65(c)(9)(iii)(C)(*2*)
	Collection and holding facilities (*e.g.*, tanks or basins) must be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system.		
	Requirements of 40 C.F.R. § 761.65(c)(9) may be modified under the risk-based disposal option of 40 C.F.R.§ 761.61(c).		40 C.F.R. § 761.65(c)(9)(iv)
	PCB Treatment/Disposal		
Disposal of decontamination waste and residues	Such waste shall be disposed of at their existing PCB concentration unless otherwise specified in 40 C.F.R. § 761.79(g)(1) – (6).	Decontamination waste and residues — **applicable**	40 C.F.R. § 761.79(g)
	Are regulated for disposal as PCB remediation waste.	Distillation bottoms or residues and filter media — **applicable**	40 C.F.R. § 761.79(g)(1)
	Are regulated for disposal at their original concentration.	PCBs physically separated from regulated waste during decontamination, other than distillation bottoms and filter media — **applicable**	40 C.F.R. § 761.79(g)(2)

Table C-2
Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance

Anniston PCB Site Operable Unit No. 3
Anniston, Calhoun County, Alabama

Action	Requirements	Prerequisite	Citation
Disposal of PCB cleanup wastes (*e.g.*, PPE, rags, non-liquid cleaning materials)	Shall be disposed of either: • in a facility permitted, licensed or registered by a State to manage municipal solid waste under 40 C.F.R. § 258 or non-municipal, non-hazardous waste subject to 40 C.F.R. §§ 257.5 thru 257.30; or • in a RCRA Subtitle C landfill permitted by a State to accept PCB waste; or • in an approved PCB disposal facility; or • through decontamination under 40 C.F.R. § 761.79(b) or (c).	Generation of non-liquid PCBs at any concentration during and from the cleanup of PCB remediation waste — **applicable**	40 C.F.R. § 761.61(a)(5)(v)(A)
Disposal of PCB cleaning solvents, abrasives and equipment	May be reused after decontamination in accordance with 40 C.F.R. §761.79; or For liquids, disposed in accordance with 40 C.F.R. § 761.60(a).	Generation of PCB wastes from the cleanup of PCB remediation waste — **applicable**	40 C.F.R. § 761.61(a)(5)(v)(B) 40 C.F.R. § 761.60(b)(1)(i)(B)
Performance-based disposal of PCB remediation waste	May dispose by one of the following methods: • in a high-temperature incinerator approved under 40 C.F.R. § 761.70(b);	Disposal of non-liquid PCB remediation waste (as defined in 40 C.F.R. § 761.3) — **applicable**	40 C.F.R. § 761.61(b)(2) 40 C.F.R. § 761.61(b)(2)(i)
	• by an alternate disposal method approved under 40 C.F.R. § 761.60(e);		
	• in a chemical waste landfill approved under 40 C.F.R. § 761.75;		
	• in a facility with a coordinated approval issued under 40 C.F.R. § 761.77; or		
	• through decontamination in accordance with 40 C.F.R. § 761.79.		40 C.F.R. § 761.61(b)(2)(ii)

Table C-2
Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance

Anniston PCB Site Operable Unit No. 3
Anniston, Calhoun County, Alabama

Action	Requirements	Prerequisite	Citation
	Shall be disposed according to 40 C.F.R. § 761.60(a) or (e), or decontaminate in accordance with 40 C.F.R. § 761.79.	Disposal of liquid PCB remediation waste — **applicable**	40 C.F.R. § 761.61(b)(1)
Risk-based disposal of PCB remediation waste	May dispose of in a manner other than prescribed in 40 C.F.R. § 761.61(a) or (b) if approved in writing by EPA and method will not pose an unreasonable risk of injury to [sic] human health or the environment. *Note:* EPA approval of alternative disposal method will be obtained by approval of the CERCLA document (*e.g.*, ROD).	Disposal of PCB remediation waste — **relevant and appropriate**	40 C.F.R. § 761.61(c)
	PCB Decontamination/Cleanup		
Decontamination of PCB contaminated water	For discharge to a treatment works as defined in 40 C.F.R. § 503.9 (aa), or discharge to navigable waters, meet standard of < 3 ppb PCBs; or	Water containing PCBs regulated for disposal — **applicable**	40 C.F.R. § 761.79(b)(1)(ii)
	For unrestricted use, meet standard of . 0.5 ppb PCBs.		40 C.F.R. § 761.79(b)(1)(iii)
	Transportation of Wastes		
Transportation of PCB wastes off-site	Must comply with the manifesting provisions at 40 C.F.R. §§ 761.207 through 761.218.	Relinquishment of control over PCB wastes by transporting or offering for transport – **applicable**	40 C.F.R.§ 761.207(a)
Transportation of hazardous materials	Shall be subject to and must comply with all applicable provisions of the HMTA and HMR at 49 C.F.R. §§ 171–180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material – **applicable**	49 C.F.R. § 171.1(c)
	Capping Waste in Place		

Table C-2
Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance
Anniston PCB Site Operable Unit No. 3
Anniston, Calhoun County, Alabama

Action	Requirements	Prerequisite	Citation
Landfill closure performance standard for South Landfill 1E, 2E and 3E	Must close the unit in a matter that minimizes the need for further maintenance; and controls, minimizes, or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to ground or surface waters or to the atmosphere; and complies with the relevant closure and post closure requirements of 40 C.F.R. § 264.310.	Closure of a RCRA hazardous waste management unit – **relevant and appropriate**	40 C.F.R. § 264.111(a) – (c) ADEM 335-14-5-.07(2)
Landfill cover design and construction for South Landfill Cells 1E, 2E and 3E	Must cover the landfill or cell with a final cover designed and constructed to: • Provide long-term minimization of migration of liquids through the closed landfill; • Function with minimum maintenance; • Promote drainage and minimize erosion or abrasion of the cover; • Accommodate settling and subsidence so that the cover's integrity is maintained; and • Have a permeability less than or equal to the permeability of any bottom liner system or natural sub-soils present.	Closure of a RCRA hazardous waste management unit – **relevant and appropriate** •	40 C.F.R. §§ 264.310(a) and (a)(1)-(5) ADEM 335-14-6-.14(11)(a)
	This document recommends and describes a design for landfill covers that will meet the requirements of RCRA regulations. It is a multilayered system consisting, from the top down, of: • a top layer of at least 60 cm of soil, either vegetated or armored at the surface; • a granular or geosynthetic drainage layer with a hydraulic transmissivity no less than 3 x 10"5 cm /sec; and	Construction of a RCRA hazardous waste landfill final cover –**TBC**	*EPA Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments*, EPA OSWER 530- SW-89-047, (July 1989)

Table C-2 Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance Anniston PCB Site Operable Unit No. 3 Anniston, Calhoun County, Alabama			
Action	**Requirements**	**Prerequisite**	**Citation**
	• a two-component low permeability layer comprised of (1) a flexible membrane liner installed directly on (2) a compacted soil component with an hydraulic conductivity no greater than 1 x 10~7 cm/sec. Optional layers may be added, e.g., a biotic barrier layer or a gas vent layer, depending on the need.		
Run-on/runoff control systems for landfill cover for South Landfill Cells 1E, 2E and 3E	Run-on control system must be capable of preventing flow onto the active portion of the landfill during peak discharge from a 25-year storm event.	Construction of a RCRA landfill cover – **relevant and appropriate**	40 C.F.R. § 264.301(g) ADEM 335-14-6-.14(2)(e)
	Run-off management system must be able to collect and control the water volume from a runoff resulting from a 24-hour, 25-year storm event.	Construction of a RCRA landfill cover – **relevant and appropriate**	40 C.F.R. § 264.301(h) ADEM 335-14-6-.14(2)(f)
	Post-closure use of property must never be allowed to disturb the integrity of the final cover, liners, or any other components of the containment system or the facility's monitoring system unless necessary to reduce a threat to human health or the environment.	Closure of a RCRA landfill – **relevant and appropriate**	40 C.F.R. § 264.117(c) ADEM 335-14-5-.07(8)©
General post-closure care of closed landfill for South Landfill Cells 1E, 2E and 3E	Owner or operator must: • Maintain the effectiveness and integrity of the final cover including making repairs to the cap as necessary to correct effects of settling, erosion, etc. • Prevent run-on and run-off from eroding or otherwise damaging final cover; and • Protect and maintain surveyed benchmarks used to locate waste	Closure of a RCRA landfill – relevant and appropriate	40 C.F.R. §§ 264.310(b)(1), (b)(5), and (b)(6) ADEM 335-14-6-14(11)(d)

Table C-2 Action-Specific Applicable and Relevant and Appropriate Requirements and To-Be-Considered Guidance Anniston PCB Site Operable Unit No. 3 Anniston, Calhoun County, Alabama			
Action	**Requirements**	**Prerequisite**	**Citation**
	cells.		
Capping of PCB-contaminated soils at Soil Impact Areas A, E, C and D	Recommends capping designs and considerations for various levels of PCB-contaminated soils left in-place at industrial soils.	CERCLA site with PCB contamination in soil requiring response action – **To Be Considered (TBC)**	U.S. EPA *Guidance on Remedial Actions for Superfund Sites with PCB Contamination* [EPA/540/G-90/007]

ARAR = applicable or relevant and appropriate requirement
C.F.R. = *Code of Federal Regulations*
DOT = U.S. Department of Transportation
> = greater than
< = less than
≥ = greater than or equal to
≤ = less than or equal to
HMR = Hazardous Materials Regulations
HMTA = Hazardous Materials Transportation Act
PCB = polychlorinated biphenyl
PPE = personal protective equipment
RCRA = Resource Conservation and Recovery Act of 1976
TSCA = Toxic Substances Control Act of 1976

APPENDIX D

PUBLIC COMMENTS ON THE PROPOSED PLAN FOR OU3 OF THE ANNISTON PCB SITE

ANNISTON PCB SUPERFUND SITE PUBLIC COMMENT SHEET

Your input on the Proposed Plan for the Anniston PCB Superfund Site is important in helping EPA select a remedy for the Site. You may use the space below to write your comments, then fold and mail, or deliver to EPA's Public Outreach Office at 902 Noble Street, Anniston, Alabama. A response to your comment will be included in the Responsiveness Summary.

Name [redacted]

Address [redacted]

City [redacted]

State and Zip [redacted]

Comment:

I fill like me and my Kids were treated unfair because we were tested for PCB and they said that the tests were lost So I was wondering how can we be tested again. [redacted] where we can be reached I have High Blood pressure arthritis (opertune)

ANNISTON PCB SUPERFUND SITE PUBLIC COMMENT SHEET

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Name [redacted]

Address [redacted]

City [redacted]

State and Zip [redacted]

Comment:

I always just read about the PCB but I have been testing water. The information was not in that testing.

ANNISTON PCB SUPERFUND SITE PUBLIC COMMENT SHEET

Your input on the Proposed Plan for the Anniston PCB Superfund Site is important in helping EPA select a remedy for the Site. You may use the space below to write your comments, then fold and mail, or deliver to EPA's Public Outreach Office at 902 Noble Street, Anniston, Alabama. A response to your comment will be included in the Responsiveness Summary.

Name [redacted]

Address [redacted]

City [redacted]

State and Zip [redacted]

Comment:

THIS LAND HAS CAUSED HEATH PROBLEMS CANCER & MANY OTHER HEALTH PROBLEMS I THINK THIS NEEDS TO LOOKING INTO BECAUSE THE MONEY HAS ALL BEEN GIVING TO THE LAWYERS TO GET THEM RICH & CAUSE ITS ALL THE HEALTH PROBLEMS

P.S. [redacted]

ANNISTON PCB SUPERFUND SITE PUBLIC COMMENT SHEET

Your input on the Proposed Plan for the Anniston PCB Superfund Site is important in helping EPA select a remedy for the Site. You may use the space below to write your comments, then fold and mail, or deliver to EPA's Public Outreach Office at 902 Noble Street, Anniston, Alabama. A response to your comment will be included in the Responsiveness Summary.

Name [redacted]

Address [redacted]

City [redacted]

State and Zip [redacted]

Comment:

PCB's caused me a lot of Health problem Lupus, Kidney failure dialysis, Hypothyroid, Chloroacne. also my house has PCBS in it + iron + lead

Proposed Plan
Macolly, E Gayle
to:
Pam Scully
09/07/2010 12:00 PM
Cc:
todahl
Show Details

Hi Pam,

We have reviewed the Proposed Plan for Operable Unit 3 (OU-3) of the Anniston PCB Site. We really appreciate your role in helping to bring the Remedial Investigation and Feasibility Study for OU-3 to a close. We understand the many challenges that you faced in order to bring the project to this point. Through our review we noted some minor grammatical mistakes and identified a few potential inaccuracies in the document that we wanted to bring to your attention. We have listed them below. If you have any questions regarding these items, please let us know.

- Pg 3, 1st full paragraph: the Plant is bounded to the west by the West End Landfill and the Alabama Power Company, not 1st Avenue.
- Pg 5, 1st sentence: "The RI for began in 2004." The RI for what – OU3?
- Pg 6, 1st paragraph: NPDES stands for National Pollutant Discharge Elimination System.
- Pg 8, 1st full paragraph: The New Limestone Bed is SWMU-11 not SWMU-10.
- Pg 8, 2nd paragraph under Surface Water: Based on Table 2-7 provided in the RI Report, PCBs have been detected in 25 of 63 surface water samples (not 23 of 60). The range of concentrations is 0.29 to 22.0 ug/L (not 0.23 to 22 ug/L).
- Pg 12, 1st bullet, last sentence: "...may be lower than the presented in Figures...." Unclear what the represents.
- Pg 12, 2nd bullet, last sentence: "...Solutia conducted a removals of principal threat waste at the soil locations driving ..." remove a before removals.
- Pg 12, 3rd bullet, last sentence: "...the actual risk may be lower than the presented in Figures..." Unclear what the represents.
- Pg 12, last bullet, 2nd sentence: something appears to be missing from sentence: "The highest risks for is a conservative estimate."
- Pg 14, Figure 11: The risk ranges for Operations Area Worker with GW and O&M Worker with GW are inconsistent with the HHRA. The HHRA indicates 432-1212 and 66-116, respectively.
- Pg 15, Remedial Action Objectives and Remedial Goals, 1st paragraph, last sentence: change "...RGS..." to read "...RGs..."
- Pg 17, Table 2: The range of detections for Beryllium is 0.13-6.8 ug/L.
- Pg 19, 1st full paragraph: "This area and the sumps were subsequently partially excavated and covered with a concrete." Remove "a".
- Pg 19, 2nd and 3rd paragraphs: Areas C and D, the samples indentified for these two areas appear to be

switched. SSR-7 is for Area C and SSR-9 is for Area D as included on Table 5-2A of the FS Report.

- Pg 20, 1st paragraph: Area G, the value for SWMU-25-6A is 38.6 not 37.6.
- Pg 22, 1st bullet of 1st full paragraph: there is an extra "and" at the end of the bullet.
- Pg 22 and elsewhere: The estimated quantity of soil to be removed is reported as 63,900 cubic yards instead of the 68,900 cubic yards indicated in the FS. Cost estimates were based on 68,900 cubic yards.
- Pg 23, 2nd paragraph under S-C Option 1: the text indicates that the soil cap will be 2-foot thick, while Figure 13 shows a one-foot cover. The costs included in the FS and PRAP are based on a one-foot cover.
- Pg 25, 1st paragraph: the last sentence should be bulleted.
- Pg 25, 1st full paragraph: the text indicates that the soil cap will be 2-foot thick, while Figure 13 shows a one-foot cover. The costs included in the FS and PRAP are based on a one-foot cover.
- Pg 27, 3rd full paragraph, 1st sentence: "will be collected" is included twice.
- Pg 29, Overall protection of human health and the environment, last sentence: change "...protective..." to read "...protection..."
- Pg 30, 1st full paragraph, 1st sentence: ".... because contaminated soil is not be excavated and treated on-site." Change "is" to "will".
- Pg 30, Cost: reference to Table 5 should be changed to Table 4.
- Pg 32, under Public Meeting, change "..will be held at on Monday" to "...will be held on Monday."
- Several of the scanned figures are not completely legible, e.g., Figure 4.

Additionally, we noted the following changes in the Remedial Goals table. Were these changes intentional and if so, what was the driver behind the changes?

- Pg 17, Table 2 – Changed the RG for Cobalt from 62 to 73 ug/L and changed the RG basis to RSL instead of HHRA.
- Pg 17, Table 2 – Changed the RG for Manganese from 1,300 to 880 ug/L and changed the RG basis to RSL instead of HHRA.

Take Care,
Gayle

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West Anniston Foundation
Bertrand Thomas, P.G.
1700 West 10th Street
Anniston, Al 36201

October 27, 2010

US EPA, Region 4
Superfund Remediation Branch
Ms. Pamela J. Langston Scully, P.E.,R.P.M.
61 Forsyth Street, S.W.
Atlanta, Ga. 30303

Ref: Comments on Preferred Alternatives OU 3

Dear Ms. Pam Scully,

The purpose of this communication is to provide independent peer review of the referenced document with emphasis on the US Environmental Protection Agency (EPA) Operable Unit 3 Preferred Alternatives.

The review evaluated whether the approaches used, assumptions made, conclusions drawn based on the data presented in the report, and any actions recommended are clear, scientifically defensible, and protective of human health.

Please contact me at bertrandthomas@comcast.net or 678-772-1146 or Ms. Beard by email (kaybeard@bellsouth.net) if you require clarification.

Sincerely,

Bertrand L. Thomas, P.G., TA

Cc: Ms. Kay Beard

Attachment

ATTACHMENT
TECHNICAL REVIEW COMMENTS:
OU3 Superfund Proposed Plan

General Comments:

1. **Groundwater near OW-21A and Area (OW-10/OW-11) :** Reviewed the US EPA Proposed Plan for Operable Unit 3 (OU 3) for groundwater at location **OW-21A and Area (OW-10/OW-11:**

   Page 6, ph 1.....The scope of the RI included: compiling data to close gaps in site characterization; identify the nature and extent of contamination. (RI focused on locations where there was no available data and also locations where additional data was needed).

   Page 20, P 2, S 4-8. ...Total PCBs (7,400 ug/l, PNP (16,000 ug/l), parathion (11,000 ug/L), and sulfotepp (59 ug/L). Several wells were installed to define the extent of contamination. Existing data indicated a localized area of groundwater impacts, separate from WMA II. The attempt to locate an upgradient source was not successful because moving further upgradient from a temporary monitoring well T-04 would have run into successive obstructions of the railroad and the WMA II Groundwater Corrective Action System.

   A subsurface soil and groundwater investigation took place in March 2008 to determine a possible source for the OW-21A contamination. The soil remaining in place does not appear to be providing an ongoing source to groundwater.

   The US EPA chose Alternative GW-C which includes the optimization and expansion of the existing groundwater corrective action system as described in GW-B. GW-C also provides for the use of natural attenuation parameters to optimize PNP and parathion recovery.

   A. **Could US EPA provide material to the community explaining how contamination can occur within groundwater without a source?**
   B. **Could US EPA explain to the community how the extent of groundwater contamination cannot be defined, when defining the plume is essential in monitoring natural attenuation?**
   C. **The document does not explain how Natural Attenuation will be accomplished by abiotic or biotic processes. Will attenuation cause a more toxic compound?**
   D. **Can US EPA explain how the groundwater in this area will not leave the plant site and why the document is referencing areas the plant site border?**
   E. **There are still unanswered questions concerning this area, before EPA choose a ROD, can US EPA explain the concept of Natural Attenuation in this area?**

EPA should define natural attenuation processes occurring without intervention. The key question, for responsible parties, regulators, and the public is, to what degree those processes are likely to contribute to the achievement of remedial action goals.

In considering monitored natural attenuation as a remedy, it is necessary to evaluate the potential for biodegradation, chemical degradation, dispersion, dilution, sorption, and volatilization, Strauss, 1998. The community does not understand the natural attenuation process. Neither do they understand how EPA can leave compounds in the ground for 25 years and it supposedly will vanish. If that is the case, why are the PCBs that have been buried in the landfills, not gone away? The landfills have been there for over 50 years. EPA should provide a discussion regarding natural attenuation before a ROD is decided.

2. **Page 20, Ph 4, The PCBs concentrations ranged from non-detect to 21 mg/kg. The higher concentrations were measured along the fence line...**

Ph 5, although no additional capping of this area was completed as part of the interim measures, Alabama Power maintains a substantial gravel cover over the area and restrict access to the switchyard to its employees only.

F. In the Preferred Alternative Option 2 there is no statement addressing the West Landfill gravel cover. Was there not a meeting between Solutia and US EPA that stated that gravel is not a sufficient cover for PCBs? Will US EPA explain what will happen in this area over the coming years?

Looking at the Alternatives that US EPA has presented to the community, did US EPA take into account any economic solutions that may aid in helping the Community and Solutia on a short and long range basis? For example:

Paving the land fill and developing a solar farm. The energy from the farm could offset energy cost for the Plant. Using local Contractors would lower construction cost and help the community. By doing this, the stakeholders of the community (i.e. vendors, laborers, households, etc.) could benefit significantly.

G. What other alternatives were considered?

H. Although there were no problems with air emission, the community would like for US EPA to include an air monitoring program as part of the ROD. This program would be part of the five year review and the results would be reported in the communication sector around the Anniston area. Will US EPA consider this request as part of the ROD?

September 29, 2010

Pam Scully, Remedial Project Manager
U.S. EPA, Region 4
Superfund Remedial Branch
61 Forsyth Street SW
Atlanta, GA 30303

RE: Community Comments for Operable Unit 3 of the Anniston PCB Site

To Pam Scully:

I [redacted] a citizen of Anniston, AL have the following comments regarding the proposed plan for ***"Operable Unit 3"***:

- During the clean-up process for operable unit 3, there should be a thorough community awareness notification done so that all area businesses and resident citizens will know the clean-up boundaries safe zones
- Have quarterly monitoring well(s) reports from all the monitored sites available for the community through the CAG office
- Will the excavated soil from ***"Operable Unit 3"*** be transported outside the city to a certified contaminated hazardous waste site?

Thank you for your time, I remain.

Sincerely,

[redacted]

Ms. Scully

These letters are concerns from the Community. Please take them into consideration.

David Baker
Executive Director
Community Against Pollution

October 12, 2010

Pamela Scully
US EPA
61 Forsyth Street S.W.
Atlanta. GA 30303-3104

Ms. Scully,

I oppose with your decision of preferred alternative for the OU3 . We need to chose young men and women from the community. It's our community that being cleaned up and the community need to be apart of that process. We need the money put back into our community and put our young men and women to work.

Let our community take this stand for this Project.

Sincerely yours,

October 12, 2010

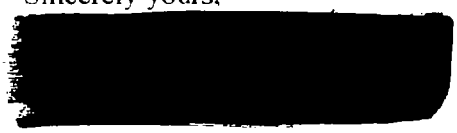
Pamela Scully
US EPA
61 Forsyth Street S.W.
Atlanta, GA 30303-3104

Ms. Scully,

I disagree with your decision of preferred alternative for the OU3. There is another alternative plan and it involves the Community. We need to choose young men and women from the community. It's our community that being cleaned up and the community need to be apart of that process. We need the money put back into our community and put our young men and women to work.

Let our community take this stand for this Project.

Sincerely yours,



October 12, 2010

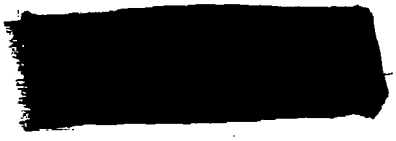
Pamela Scully
US EPA
61 Forsyth Street S.W.
Atlanta, GA 30303-3104

Ms. Scully,

I disagree with your decision for the OU3 Project. It's our community that being cleaned up and the community need to be apart of that process. We need the money put back into our community and put our young men and women to work.

Let our community take this stand for this Project.

Sincerely yours,



October 12, 2010

Pamela Scully
US EPA
61 Forsyth Street S.W.
Atlanta, GA 30303-3104

Ms. Scully,

I oppose your decision of preferred alternative for the OU3. There is another alternative plan and it involves the Community. We need to choose young men and women from the community. It's our community that being cleaned up and the community need to be apart of that process. We need the money put back into our community and put our young men and women to work.

Let go back to the table and discuss this again.

[redacted]

Sincerely yours,

October 12, 2010

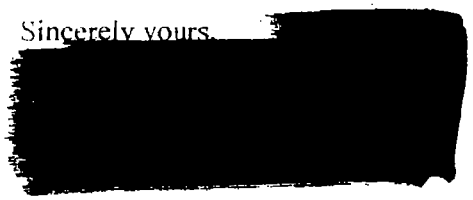
Pamela Scully
US EPA
61 Forsyth Street S.W.
Atlanta, GA 30303-3104

Ms. Scully,

I oppose your decision of preferred alternative for the OU3. There is another alternative plan and it involves the Community. We need to choose young men and women from the community. It's our community that being cleaned up and the community need to be apart of that process. We need the money put back into our community and put our young men and women to work.

Let go back to the table and discuss this again.

Sincerely yours,



October 12, 2010

Pamela Scully
US EPA
61 Forsyth Street S.W.
Atlanta, GA 30303-3104

Ms. Scully,

I disagree with your decision of preferred alternative for the OU3. There is another alternative plan and it involves the Community. We need to choose young men and women from the community. It's our community that being cleaned up and the community need to be apart of that process. We need the money put back into our community and put our young men and women to work.

Let our community take this stand for this Project.

[redacted]

Sincerely yours,

October 12, 2010

Pamela Scully
US EPA
61 Forsyth Street S.W.
Atlanta, GA 30303-3104

Ms. Scully,

I disagree with your decision of preferred alternative for the OU3. There is another alternative plan and it involves the Community. We need to choose young men and women from the community. It's our community that being cleaned up and the community need to be apart of that process. We need the money put back into our community and put our young men and women to work.

Let our community take this stand for this Project.

[redacted]

Sincerely yours,

October 12, 2010

Pamela Scully
EPA
61 Forsyth Street, S.W.
Atlanta, GA. 30303-3104

Dear Ms.Scully

I've read your preferred alternative for OU3 and I disagree. There should be another alternative other than the one you've chosen.

We need another community meeting and bring all parties to the table and discuss this matter.

Respectfully,

[redacted]

October 12, 2010

Pamela Scully
Remedial Project Manager
US EPA
Atlanta Federal Center
61 Forsyth Street, S.W.
Atlanta, GA. 30303-3104

OU 3 Preferred Alternative

Dear Ms.Scully

I am writing regarding the preferred alternative that EPA has chosen for OU3. I think EPA should look into another alternative. Have you thought about black topping the landfills and putting solar panels on it. I think this would be beneficial to the community.

My question is, who will be doing the work, will local residents already trained be employed? Will a local engineering company be employed? Will the firm or firms be required to hire local residents? I would like to know the economic impact that this will have on the community at large.

Sincerely,

[redacted]

October 12, 2010

Pamela Scully
U S EPA
61 Forsyth Street, S.W.
Atlanta, GA. 30303-3104

Ms. Scully

I disagree with your preferred alternative for OU3. Choose another alternative. Is this the cheapest way out and that's why it was chosen? Why it is the residents are always receiving the short end of the stick. Put some money in this community and hire local residents to do the work that has been trained.

Its time Solutia step up to the plate and be more transparent.

We need another meeting.

Yours truly,

[redacted]

October 12, 2010

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U S EPA
61 Forsyth Street, S.W.
Atlanta, GA. 30303-3104

Ms. Scully

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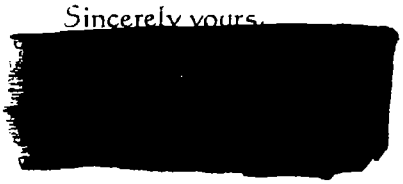

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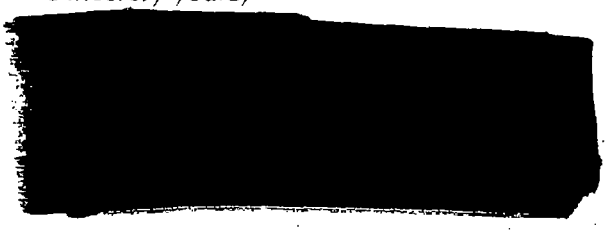

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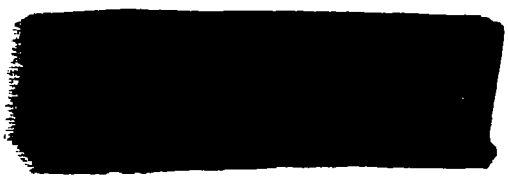

APPENDIX E

TRANSCRIPT OF PUBLIC MEETING ON THE PROPOSED PLAN FOR OU3 OF THE ANNISTON PCB SITE

U.S. ENVIRONMENTAL PROTECTION AGENCY

SUPERFUND PROPOSED PLAN

OPERABLE UNIT 3 OF THE

ANNISTON PCB SITE

ANNISTON, CALHOUN COUNTY, ALABAMA

September 13, 2010

6:00 p.m.

ORIGINAL

MS. BROWN: Good evening, everyone. I'm Stephanie Brown, Committee Involvement Coordinator for the Environmental Protection Agency, Region 4. I want to thank you all, first of all, for coming out tonight for the presentation on the Anniston PCB site, Operable Unit 3, the site proposed plan presentation.

Tonight we have with us Pam Scully, who we all know is the RPM for the site. Also from EPA we have Derek Matory, Pam's immediate supervisor; Kay Wischkaemper, who is the Hydrogeologist for the site. Did I get that right?

MS. WISCHKAEMPER: Yes.

MS. BROWN: Kevin Koporec, who is the risk assessor; Suzanne Armor, the attorney for the site. And then from ADEM we had Levine Shama and Brian Espy. I'm just going to give you a little bit of what's going to happen tonight. Pam is going to give you the presentation about the information that's in the proposed plan. Then there will be an opportunity for you guys to ask any questions you may have, to

make any comments.

What I want to say, and I'll come back and say it again once we get to the question and answer portion of the presentation tonight, we do have a court reporter here tonight. One of the requirements that we have for these types of presentations is that we record every comment and actually put it into the official record and then respond to those comments and the official response to comments on this proposed plan. So once we get to that portion, I'll let you know all the logistics about that.

So I'm not going to take up any more time because I know you want to hear what Pam has to say about Operable Unit 3. So here's Pam Scully.

MS. SCULLY: Hi. Thank you all for coming out tonight. First I want to tell you a little bit about the Superfund process. I know if you've been to our meetings before, you've heard a lot of this already. I'm going to go really fast. If I'm going too fast, just raise your hand and

I'll try to slow down.

For Superfund a site is discovered, and then we go through an assessment, a preliminary assessment and a site investigation. It's usually done by the State of Alabama. They would then try to score the site. In Superfund a site has to reach score of 28.5 in order to become a Superfund site. This site was scored; however, it was not put on the MPL.

In Region 4 we clean up sites under a Superfund alternative process where we don't list it on the MPL to save time and money with the listing provided a responsible party agrees to implement the investigation and cleanup. So in this case, Solutia agreed to go forward with the investigation. And we signed a consent decree. So we don't have an MPL listing at this site, but the site is being cleaned up using the Superfund process like all the other Superfund sites.

After the site is listed, we then go do a remedial investigation. And the remedial investigation is to determine

what the contaminants are at the site and what the risks from those contaminants are to the community or to the workers at the site. After the remedial investigation, we then do a feasibility study to evaluate what are the alternatives we can look at to clean up or reduce the risks at the site.

After we have done the remedial investigation and feasibility study, which is where we are right now on this operable unit, we would then come out with a proposed plan, which is what we have sent out, what we have available at the desk outside the room, a proposed plan for how we want -- what we found and how we want to clean that up.

Once we come to you with a proposed plan, we open that plan up to you for comment. And this is your opportunity to give us comments on the remedial investigation, the human health risk assessment and the feasibility study and also what we have proposed as a preferred alternative. So you can send those comments, you can e-mail those comments, or

you can call and tell us what your comments are. And we will respond to that in a responsiveness summary.

After we finish the proposed plan and get your comments, we will come out with what we call record of decision, which is EPA's final decision on how to implement the cleanup. When we come out with a record of decision, in it we'll attach to it the responsiveness summary with all the comments and responses to those comments. If we have your information separately and you would like to receive a response to your comment separately, we can also provide that.

So, once the record of decision has been signed and approved, we will notify you. And then we would go into a period of negotiation with Solutia or Pharmacia, Monsanto, whatever the PRP list is. We would go into negotiations with them to implement that decision that came out in the record of decision.

And then after we get an agreement with them to implement it, we would come out with a remedial design and a

remedial action and go into a period of either operation in maintenance or whatever's required in the record of decision. And once that has been fulfilled and the site meets all of the obligations in the record of decision, we would delist the site.

In this case, we wouldn't have to delist the site because it hasn't been listed. But that's the process for Superfund.

At this site we have -- Kay, you may have to use the pointer to show that we have a number of operable units. We originally divided the site into four operable units. The first one was residential areas around Snow Creek and up toward the site from I-20 up to Snow Creek, up Snow Creek to the facility on Highway 202 and then the neighborhoods around the facility.

That area was divided into Operable Unit 1 for residential and Operable Unit 2 for the nonresidential properties in that floodplain area and that area. We

decided to combine those into one operable unit, so now we just call it Operable Unit 1/Operable Unit 2. And that's what that area is.

If you -- oh-oh. The facility itself was listed as Operable Unit 3, and that's what we're going to be talking about tonight. And then downstream -- downstream of Operable Unit 2, Operable Unit 1 and 2. Choccolocco Creek, along the Choccolocco Creek and that floodplain is Operable Unit 4. So we'll be coming out with records of decision and proposed plans for each of these areas, but tonight we're here to talk about Operable Unit 3, which is the plant, the plant area, the Solutia facility and the two adjacent landfills, the west end landfill and the south landfill.

That's the west end landfill (indicating), and then this is the south landfill (indicating). But that's the general area we're investigating. So the remedial investigation, when we took -- we went and gathered data, we used existing data that was collected under a ADEM's

Resource Conservation and Recovery Act program.

The RCRA program has collected a lot of data already, and we used that data. We also went and collected additional data. And primarily we were looking for PCBs. There is a lot of data that's been collected under ADEM on the different contaminants and products that were manufactured at the site, but there wasn't a lot of information on PCBs. So we focused primarily on PCBs. We did include all the other data, and we did look for some additional contaminants. But primarily we focused on PCBs.

This map, I know you cannot see it really clearly, but what I'm trying to show you in this is really the areas where we took collected samples. So you'll see points, and I know you all have copies of the fact sheet. You can see that we've collected a number of soil samples.

On the soil samples, what we found was in surface soil we had PCBs that ranged anywhere from .023 to 930 part per million. We also had arsenic. I'm only

bringing up these two because these are the two soil contaminants that created risk for us at the site. Arsenic from 3.1 to 390 part per million, those concentrations were a risk in surficial soil.

We also had subsurface soil that we looked at. In areas where it may have been covered in concrete, we had PCBs that increased in range up to 16,620 part per million.

I brought this map up to show you that the high concentrations of PCBs and the high concentrations of arsenic were found in these two hot spot locations. This (indicating) hot spot location was in the middle of the facility at the production unit. And we had that concentration in our risk assessment.

But at some point after -- during the RCRA investigation, Solutia went in and excavated that area out. That would have been what we considered a principal threat waste. It was a risk to the source -- it was a source risk. And that was excavated out. However, there wasn't a

confirmation sample collected there, so we used that initial value in our risk assessment to assess risk.

In the area to the north here (indicating), that was our highest location that we found during the remedial investigation where we found 930 part per million PCBs and we found 390 part per million arsenic. In the process of going through this investigation, that area was outside of Solutia's fence.

So Solutia opted at that time to go in and do a removal of the principal threat waste, everything above 500 part per million to eliminate risk to anyone who might come in contact with it. So both of those areas we've had removals conducted.

So our risk at the site is not as substantial as we're going to portray it as part of this investigation. But those things happened after we had already done the risk assessment.

Groundwater, this map is in here really just to show you how many wells exist at the site. A lot of wells were sampled as

part of this investigation and are sampled ADEM as part of the ongoing RCRA activities at the site.

There are two areas where we have groundwater collection systems, one in the north and then one in the south area where there already are systems that collect groundwater and treat that groundwater so that it -- so that it doesn't continue to migrate from the site.

I put this list in here primarily so you could see that there are a number of contaminants in groundwater, a lot more contaminants than we had to worry about in soil. And primarily there's a lot of pesticides and breakdown products from pesticides. There are also PCBs, which is what we were primarily concentrating on. And they ranged from .32 part per billion to 15,000 part per billion, which is very high. The standard, drinking water standard for PCBs is .5 part per billion.

Okay. This map is really -- we don't have a very continuous plume of contamination at the site, but we drew these

areas so you could see where PCBs, which is what we were looking for primarily, are higher than the drinking water standard. And they are not consistent across the area. There are some points that are higher than others because that's the way the groundwater is at our site. But we wanted to show you the areas we have some contamination.

So primarily it's on the eastern side of the site. We have a little bit of contamination over at the west end landfill, but not very much. And then we have another area of contamination north of the site, and it's shallow groundwater.

And then there's been a lot of questions over the last few years about air sampling at the site. And there have been four air sampling studies. And this is just to show you the different locations where air was sampled. A lot of them were right around the facility. And then there are others that go off into the community and down Snow Creek.

And I tried to summarize for you

what the data was because there's been a lot of questions about air. The results from the 2000 to 2002 study ranged from nondetect to 116 nanograms per cubic meter, which is a unit that we use to measure air concentrations. There was a mean PCB concentration of 12.5 nanograms per cubit meter.

In 2000 EPA came out and sampled an additional eight areas, areas A through H, those sample points. And we detected PCBs in air from nondetect to 16.2 nanograms per cubic meter with a mean of 1 nanogram per cubit meter. And that was further out into the community. So what we had was higher concentrations close to the site and lower concentrations away from the site.

And then in 2003 -- from 2003 to 2004 under ADEM, Solutia went and did another air study. They collected a whole lot of samples that ranged from nondetect to 145.4 nanograms per cubic meter with a mean concentration of 13.5 nanograms per cubic meter. And that's the data that was used in the risk assessment for Operable Unit 3.

There was another study done in 2006 that collected two additional points down north and south on Snow Creek to use in the risk assessment for OU 1, OU 2. And that data ranged from 1.4 to 14.5 nanograms per cubic meter with an average of 7.18 nanograms per cubic meter.

Which if you're not used to dealing with air, it's a very nebulous concept of that is. But I did want to report that out primarily because we get a lot of questions in every meeting we have about what those concentrations are and have we ever sampled air. And I wanted to make sure I showed you that we have sampled air, we do have the data, and we are using it to assess risk from the site.

Surface water, we don't really have surface water bodies on OU 3. Because the way we've defined OU 3 as the landfills and the plant, there aren't any surface water bodies. There are surface body waters off the plant. And what happens is Solutia is required to monitor the surface water that they release off the site.

They do that at this point, which is right along 10th Street. Most of their drainage from the facility comes to this point. There are a couple of other discharge points that do not come to this and are no longer monitored because they were not detecting anything in those points.

At this area, the data ranges from there were 23 out of 60 samples that had PCB detections in it over the time we looked at it for the investigation. And they range from .23 to 22 part per billion PCBs coming off the facility in the water, surface water bodies. And the reason we look at that is because we need to know are we having big releases come off the site. It would indicate to us that we have a source and surface somewhere that needs to be controlled. And that's why we look at this data.

We took all that data and we used it in a risk assessment. And what we did for the facility was we looked at operations workers; we looked at O&M workers; we looked at construction workers;

we looked at trespassers at the facility. And then because the community had a question about people who lived next door to the site, what if they were walking down the street every day and breathing the same air that was coming off the facility.

So we also looked at an offsite resident who might breathe that air coming from the facility. We looked at that risk both to an adult and a child. And carcinogens, what we found was the only real exceedance -- EPA has a risk range for cancer that's one times ten to minus four to one times ten to minus six. And what that means is you would not have excess cancer one in ten thousand to one in one million people get excess -- in excess cancer.

Now, for cancer, it's generally in the general population, one in three to one in four people will get cancer. That's just whether you live next to this site or any other site. If you live in the United States, you'll probably get -- one in three people or one in four will get cancer.

What this means is we can't have

any excess -- we can't have any extra cancers. The lower range is one in a million. So if we cleaned up to the one times ten to minus six range, we'd be saying we're not going to have more than one cancer in a million people created by this site. The cleanup to the top range is one in ten thousand people.

I'm not sure that's a very clear explanation, but that's where those risk ranges come from, is those are in the law, the Superfund law. And that's the risk range we use for cancer. You can see that primarily the operations worker is the one that exceeds the highest value. Most of the people wind up in between the risk range. And there are a few scenarios mainly from the landfills, workers on the landfills where's really not a lot you can be exposed to, where we were below EPA's risk range. You wouldn't be able to take an action there at all.

Then we have what's called a hazard index. PCBs can cause things other than cancer. And I know there's been health

study done here in Anniston that talks about diabetes and high blood pressure and things like that. So those are what we call the noncarcinogens. And we evaluate those with what we call a hazard index.

And for there to be nothing, we would expect that if we had a hazard index of one, there would be absolutely no effect among the community if we had a hazard index of one. So there are some exposure where we don't -- we fall below one and we wouldn't expect any -- am I doing that or you?

So you can see there are some things like construction worker where people get down in the soil and work among the soil where we would expect there to be a higher incident of noncancer issues or diseases or exposures. And so, that was -- those two slides I showed you are for the current worker.

We had higher concentrations below concrete and below areas that are covered at the plant. And what we did for the future worker was we had just assumed that the plant wasn't there anymore and the

concrete was gone and people were getting exposed to everything that would be under there.

And so you will see that our future exposure numbers are much higher than our current exposure numbers because we assumed very worst case. And even the soil that's already been taken out, we assumed it was -- in those two locations was assumed to still be there. So you'll see that most of the exposures will rise in the future scenario as well as the hazard index. Most of them are above one.

And we use that information to go back and calculate what kind of cleanup would we have to conduct to bring everybody back into the risk range, EPA's risk range or close to a hazard index of one. And what we came up with for soil is for surface soil we need a PCB cleanup goal of 25 part per million. And for arsenic we need -- arsenic cleanup goal is 66 part per million. For subsurface soil, we need a PCB cleanup goal of 45 part per million and an arsenic goal of 217.

So we use that risk assessment to back calculate what kind of number we could clean up to that would be safe for all the exposures. We did the same thing with groundwater. We had a lot of contaminants that we found in groundwater. And we had to either use a drinking water standard or the risk assessment value or in some cases just a screening level that EPA uses in order to come up with a goal for that. Okay. So that's where these numbers, this list of numbers came from (indicating).

Once we take all that information about what our cleanup goals need to look like, what our groundwater standards need to be, we came up with an -- looking at the site to figure out what areas are impacted. And we found a lot of areas that had potential impacts. Those are the ones that are colored. The ones that are hatched also have groundwater impacts and -- okay. I'll do it here.

So this is the map that shows you how we came up with the areas we found were contaminated. And what I wanted to

show you was if we look at historical maps, the areas where we're finding contamination make a lot of sense. Because this map is from 1937, and the only thing being produced at the site was polyphenol and PCBs.

And you can see -- you can just see the drainage areas. This area was not a landfill yet. The west end landfill was being used. And you can see how drainage was coming off the site. And as you go through the slides year after year -- this a 1940 photo -- you can see the development and you can see where drainage came off the site.

And you guys may have to move closer. Can't convince you of that. But what we do is we have historical photos that we look at to see how drainage was coming off the site to help us see that the areas we're talking about cleaning up were primarily areas where drainage would have come through, drainage from the landfills and other areas.

In 19 -- this is 1957, and you can see the drainage coming off. You can

see where the landfill is being developed. In 1969 they started using the south landfill. In 1960 the south landfill started being used. So in this photo you can see -- okay. Where are we? In 1969 you can see they started using the south landfill and the drainage is still coming off here.

And then in 1977 you see Highway 202 come in. And you can see that this area used to have a lot of drainage going through, but now it's been cut off. These areas are not primarily going through here (indicating). There's a lot of surface water drainage that's still coming off this area of the plant.

And that's one of the areas that you're going to see we -- you can just see it progress, the south landfill continually being used again. So you'll see a lot of drainage went through these areas and these areas. That's just trying to give you a picture of how we go about looking for areas where we might find contamination. And it sort of explains how that pathway occurred.

So we took all that information and we evaluated five alternatives for soil and five alternatives for groundwater. And in those soil ones, in all of them, in each, both the soil and the groundwater remedies we have a no action remedy.

The reason we have a no action remedy is because we're required by law to have that. And at some sites we find that we don't have enough risk to require a cleanup and we would write a no action rod. So it's something that we always do at Superfund sites. And I'm not going to discuss the no action remedy. Just know that the first soil and the first groundwater remedy that we would evaluate would be a no action remedy.

I think I hit something wrong.

Okay. The soil alternatives. So, for soil, the alternatives we looked at were -- each one of them requires additional institutional and engineering controls. But the first one is the no action remedy. Then soil SB is the second soil alternative we looked at. And it is excavation. And I'm

going to go through each one of these to show you how we would implement that, but it's an excavation remedy.

The next SC is a capping remedy. And then SD is another excavation remedy. The first SB is excavation with offsite disposal. SD is excavation with treating the soil onsite using chemical dehalogenization and then putting the soil back in place. And the last one, SE, is treating the soil onsite with thermal desorption and then putting the soil back in place.

So those are the soil remedies we looked at. Common to each of these, in all of the soil alternatives we included these elements. Maintaining and -- finalizing and maintaining all of the current soil corrective measures that have been put in place under RCRA. So there are a lot of things that have already been done at the site that we would adopt, that have been done under RCRA that we would adopt under CERCLA. The landfill caps that are already out there, some of the other areas

that have been excavated and capped, we would adopt all of those.

We would also require that Solutia get a covenant with ADEM. They already have a deed restriction at the facility so that no one can go in and, you know, create a residential neighborhood or anything like that on the facility. ADEM has new requirements that are out, and we would require that those be implemented now so that it just follows the guidance that ADEM has.

Then we would also have some institutional controls like a no dig policy at the site, which would prevent the construction worker exposure. We would have additional fencing to fence off areas where we know are outside the fence that someone could come in contact with. So those are going to be in each one of the soil remedies.

The first soil remedy that we're going to look at is the excavation and offsite disposal remedy. The areas that we would require excavation would be -- I'm

going to show you on the map again -- area A, C, D and E.

And the soil would be excavated, hauled offsite to whichever facility it needed to go to. If it was above fifty, it would have to go to Emelle, Alabama or a chemical waste landfill. If it was below fifty, it could go to a different landfill.

That cost of that remedy is close to $30 million. It could be done over a couple of years. And, so, we would achieve our remedial action goals within two years. And these are the areas that we would have to excavate in order to meet our goals. The Area A would have to be excavated to about ten feet, Area B would have to be excavated to about four feet, and Areas C and D would be excavated for two feet. And this is an offsite disposal alternative.

The next alternatives we looked at were capping alternatives. And we had two options we looked at here. Option one required capping Areas A and E because we have leaching, potential leaching of

groundwaters in those areas with an impermeable cap. And it required capping Areas C and D with a cap that just prevented exposure. It didn't have to be impermeable.

And that alternative -- and then maintaining those caps, obviously. But that alternative is worth a little bit less than $3 million and would, again, take a couple of years to implement.

Another alternative, another option for the capping remedy would be also to go in and cap cells 1E, 2E and 3E in the south landfill in addition to the caps that we showed for option one. And that would be about $5.1 million remedy. And what you see is we still have these areas capped, and we would also go in and recap PCB cells in the south landfill (indicating).

And the reason this is in here is because we had some PCB contamination that has come off the south landfill. This area, all of the western cells were recapped in the '90s because of parathion and PNP in groundwater. There are two cells located right here that were capped with a RCRA cap

under RCRA. But these cells were never recapped. They had an original soil cap on them. We looked at that soil cap and decided that we could probably upgrade that cap and do a better job with groundwater coming from that area.

So, the next alternative we looked at was again an excavation remedy of areas A, C, D and E, which are the same areas we've been looking at, and treating that soil with chemical dehalogenization and then taking the contaminants away for disposal. And we would be able to reuse the soil. And that's a $40 million remedy.

This is just a process diagram that shows you, you know, chemical dehalogenization has been done before at other places. So there's a whole process that's been worked out for how we'd do that. At our site, we would have to run a treatability study in order to make sure we knew how this operation worked. But there is a process already out there for that.

And the areas again would be area A, E, C and D. And then the area we're

showing up here (indicating) would be where we would have to build the facility to do the chemical dehalogenization.

The final soil remedy would be excavation but would be treating the soil with thermal desorption. And it's the same has the previous one, it would cost $27 million. There is a process for thermal desorption. It's been done at many sites. We would have to do a treatability study to figure out how we would do with the soil we have. And again, it's the same map as D. Just we would be doing thermal desorption in the northern part of the site.

So those are our soil remedies. We also have groundwater remedies. We wound up with four. I guess it's four, not five groundwater remedies. The first one is no action, so we're not going to talk about that anymore. But common to all of the other three is that we would continue to maintain, finalize and maintain all of the groundwater corrective measures that are currently out there, we enter into a covenant with ADEM to control groundwater

use at the site, and we would have some additional institutional controls.

There are two areas where we have groundwater going off the site where we would have to implement groundwater use restrictions on those areas that are not currently covered under the current permit.

So, our first option for groundwater would be to optimize and expand the groundwater collection system in two areas near well A21A and near well OW10, which I'm going to show you. And then the groundwater would be pretreated and then discharged to the sewer system, which is what currently happens at the site. It's worth $2.3 million.

And this is harder to see from this far away, but there are two areas where we would put in two new wells, in this area (indicating) and up here in the northern part of the site (indicating). Because those are the areas where groundwater is currently going offsite. So -- did I just move that?

The next alternative would be

it's the same as alternative groundwater GW-B except that it also includes collection of natural attenuation parameters for parathion and PNP. Parathion and PNP were the groundwater contamination issues at the site for a number of years. They are still in groundwater, but the concentrations are decreasing, particularly after the landfills have been capped.

And we would like to be able to optimize the system to get that groundwater cleaned up faster, and we could do that by collecting the monitored natural attenuation parameters. That's a $3.3 million remedy.

And again, it's difficult to see on here, but there were some wells. There's some little pink stars around, and those are the wells where we would want to collect additional information as well as to expand the two groundwater collection systems.

The final one would be to go in and try to look at is there something we can do in situ that would treat groundwater before it discharged off the site. And that is looking at zero-valent iron walls. Those

would be installed and is a $13 million remedy. And they would be installed in these areas where we previously had additional wells.

It's a passive system, so, again, it would take thirty years for it to clean up because one of the difficulties that we have out here is the soil is very tight and it's difficult for groundwater to move through the soil, so it's difficult for us to take it out and clean it up once it gets to groundwater.

That was my fireworks. That means you're almost to the end. Thanks for hanging in there with me.

What we have proposed is alternative S-C option two, which is to cap areas A, C, D, E and the cells in the south landfill as well as a groundwater remedy C, which is to expand the existing collection system in two areas and to collect the monitored natural attenuation data. For us this is a good combination of alternatives that will get us where we need to be, and it's worth close to $8.5 million, that

combination.

So, I'm getting to the comment period. I just want to tell you we did mail out close to sixteen hundred fax sheets to the community. I think I've had about a hundred returned so far. If you know somebody that wants a fax sheet, you can call our office here in Anniston. We have them. Or you can call or e-mail me and I can send you one.

We've distributed copies to churches, we've made them available at the EPA website, and we've run a number of ads. We did try to run a radio ad, but we never got a call back from the radio station. So we may continue to try to do that so that people know that we are in a comment period.

Also I just wanted to remind you that the comment period lasts from September 1st to September 30th. We are having the public meeting tonight. This is our official public meeting, but we'll also be talking at the CAG meeting, the community advisor group meeting next Monday. We'll be talking at the technical advisors meeting on

September 21st. And we're doing a radio interview with West Anniston Foundation on September 23rd.

So there are a lot of different opportunities for people to hear about this proposed plan. This is the one where we're going to be recording the official minutes and getting comments, but we can certainly take comments at any other time.

But let me just tell you that we have already had a request to extend the comment period because it is a lot of information. And we want people to have time, so we are going to be granting an extension from October 1st through October 30th. We'll be advertising that again. We'll update the administrative record during that time so that by the time we go to that extension, we'll have updated more information in the administrative record.

We may end up revising the fact sheet to make it more clear. If there's something that you think that we could make more clear, we'd be happy to listen to you. And if we do revise the fact sheet, it would

come out again October 1st, so at the start of the next thirty-day comment period.

And that's really all I have. For the questions and comments, I would say we have a court reporter here. If you would just state your name, we have a microphone over here. Or if you think you can talk loud enough so that we can all hear, you're welcome to just shout it out. And we're going to open it up for questions and comments.

MR. DAVID BAKER: I have a comment and a question.

MS. SCULLY: Okay.

MS. BROWN: Please state your name for the record.

MS. SCULLY: State your name.

MR. DAVID BAKER: My name is David Baker. I live at 1115 West 17th Street. I'm also the chairman of the CAG, community advisory group here in Anniston, and president or executive director or CAG representative.

Let me just make an observation about the fact that you keep calling capping

a landfill. I mean that's the confusion of this community. You can't cap a landfill. A landfill is already capped and in place. It's a dump site. And I think that the wording has confused this community. They call it a dump site, and you-all call it a landfill. It is confusing because I just had that meaning put to me the other day that over the years it was a dump site. And it's still a dump site. Putting a dress on a pig don't make it look more better. So I just wanted you to know that.

Let me also say that the fact that you are going to be monitoring and I think the EPA should never leave the site in terms of monitoring. The reason why is that ADEM have let us down over the years. There's no question about it. It might be a little better now, but this community was victimized over the years. It didn't take less than one year. It took years and years.

ADEM has been in place and is supposed to be the one to monitor and keep us safe, and they failed their job. And

based on the fact that it was like a conclusion with them, this community has no faith in anything that they would do in terms of being the co-person with or co-entity with anybody at this juncture.

I also notice that you found more contaminants in some of the things that you were pointing out. And I noticed that you had found lead, which is common in this area. You can find it almost anywhere in this area and in this city. I've been doing some study on that myself. But the fact that there's other chemicals that -- could that be -- could they be broken down when you do a capping on the landfill and will that stop them from leaking out and sneaking out?

And that's another question that we might want to take into consideration. We have been victimized over thirty something, forty something years. I think that it's time that during this era that we, you know, close the books, but open up the new books in terms of trying to get -- making sure that we don't be recontaminated.

And the institution control, I'm working closely with Solutia on that item, and that's got to be trust. And it's trust-building. It's a building process. And I think that this and these meetings, these type of meetings is the only way that that can be restored into this community, is to open the books, let everybody see what's going on and let them comment on it on the basis of what you're doing now. And I think that's a find job.

So I just wanted to, you know, make them comments and say those words, and I can go to the football game. Thank you.

MS. SCULLY: You don't want to listen to everybody else? All right. Rose. Can you just state your name real quick?

MS. ROSE: My name is Rose (inaudible), and I'm a resident of Anniston, used to live in west Anniston. I'm away from the foundry, but I wanted to ask some questions on those hot bed sites. What year were they excavated out, the hot bed sites?

MS. SCULLY: The hot spots?

MS. ROSE: Hot spots.

MS. SCULLY: I would say the hot spot that's in the middle of the oil production area I think was 2002. It was before we started our investigation.

MR. DAVID BAKER: 2002 or 2003.

MS. SCULLY: Okay. And the one that we discovered as part of our investigation was excavated this past April.

MS. ROSE: Okay. So where was that taken to?

MS. SCULLY: All of that soil that was excavated was greater than 500 part per million, which meant it had to go to Emelle, Chemical Waste landfill. And I believe if it's above five hundred, it has to be treated.

MS. ROSE: Once that was done, what type of barrier system and leaching prevention systems were put in place that would monitor wells and things --

MS. SCULLY: Okay. At the facility in the production area, the whole area was capped with concrete. There are a number of wells around that area that we use. In fact, two of the -- one of the

wells was installed during the RCRA investigation and one was installed several -- several, actually three or four around that area were installed as part of our investigation, so we have a number of wells.

In the other area, that's one of the areas we're proposing -- that's area A that we're proposing to do this remedy, you know, the excavation or the capping or any of those. That's one of the big areas where we're proposing to work. There are a number of wells around that area now.

MS. ROSE: So were any of those reports of spillage -- you know we have a lot of rain and stuff like that.

MS. SCULLY: Right.

MS. ROSE: Since those wells have been put in, because that was such a hot spot, has that shown any leaching out --

MS. SCULLY: We do have groundwater contamination around area A. That's one of the areas that we're looking -- that's one of the areas we've said that's high potential for leaching the groundwater in that area. That's why it's one of the

areas we proposed to clean up.

And next to -- the one that's near the production facility, the area that we proposed to clean up in that area where have potential leach in the groundwater is right next to where Solutia cleaned up previously to that hot spot. So both of those areas where we have had hot spot cleanups are areas where we're proposing some additional cleanup, close to it.

MS. ROSE: The reason why I ask all these questions, I just think a lot of confusion comes when people feel that you're doing things -- David mentioned some things. But we are all in this community, and I think I told Solutia before, Solutia does great things. And we're going to be here. They're going to be here. And we've just got to find a way where we can work better.

And I think if more people -- we know the ones who come to the meetings. And I think sometimes if those people were more involved -- and I answer things like what my idea about environmental. And one of my concerns has always been, and I hope it's

being placed, when you're cleaning up your site, will there be monitoring?

You know dust flies. And people, even though they may walk through later on, what is going to be the parameter range? Because I know when they were doing the housing cleanup, you had a two-hundred-fifty-foot radius range. What type of range will it be when it goes to clean up the OU 3 site? Is there going to be a range?

Because there are businesses that's right across the street. So if you're digging up dust, air flying, are they going to be in that range? Will those people be required to be protected, their business for a while until we clean up, or what type of barriers will be put in?

MS. SCULLY: Well, we haven't done the design yet for how we would do this. The remedy that we have proposed is the capping remedy. So there wouldn't be anything dug up. It would be a cap built over it. So the only soil that would be moved really would be clean soil. And

obviously we still have to keep dust from clean soil down because it becomes a nuisance to people and there are people with respiratory illnesses and things where you can't have that. So most of our activity would not be related to contamination in what we've proposed.

In some of the other remedies, obviously if we did one of the excavation remedies, that would be a vital concern to us. Primarily what we have done in the past is we have monitors that monitor particulates, which is what dust would be. And if we start getting anything really on our monitors, we have to shut down and wet the area or do something to control dust.

There are a lot of sites that have done different things to control dust. They've used foam. They've used tents. They've used a lot of different things to control dust. And we would have to have a whole plan worked out to do that if we picked a different remedy, if we picked an excavation remedy.

MS. ROSE: Since you're deciding

on the capping --

MS. SCULLY: That's what we proposed. Certainly you're welcome to say which remedy, and we would welcome you to send us a comment and say which remedy you think we should propose. That's what we have proposed, the capping remedy. And it's not unusual for other people to think we should do excavation. And that decision can't be made really until we get all the comments in.

MS. ROSE: Well, if that is the one that is chosen, the only thing I would recommend, just like the -- because you're going have all these monitoring wells, just like the water company sends out their quality reports every so often, as a resident we get a copy. I know Solutia does the monitoring. It would be wise. I'll just put it that way.

MS. SCULLY: To warn the community?

MS. ROSE: For them to send out to the public. Here is our report like the water company sends. At least it would give

them something than having to say well, you keeping evidence away from me. If you periodically send out your reports that we are monitored, this is what we found, there's this much PCBs that we found or the level, maybe that will calm down some of the distrustness here.

People just -- if you're well educated, you have a better understanding of what's going on. When you're not educated, that keeps the confusion because you have people who are not so educated in understanding and gets the information out. It adds to the confusion. So my recommendation would be, if that is the plan decided, periodically Solutia, for your point, to make people know that you're not trying to hide a thing around here.

Here is a periodic report of our monitoring well results that people can actually read and have on hand. Some might not understand it. There will be others who do. At least it lets people know that I'm not trying to hide anything. You have an opportunity. Here's the report. That's

what the water company does, and I think they do a great job when they periodically send us the water report.

MS. SCULLY: I think that's a great comment. Thank you.

Anybody else with a comment about Operable Unit 3?

(No response.)

MS. SCULLY: Okay. Well, do you have a comment about anything else, any of the other -- okay.

MR. KEN RAY: I guess when you were saying, talking about --

MS. SCULLY: I'm sorry. Can you tell us your name? Somebody needs to use that microphone.

MR. KEN RAY: My name is Ken Ray, and I live 3514 Dale Hollow Road, Golden Springs, Anniston area. And I guess my question is -- and I was listening. You were saying, you know, about cancer, that's it's about average and diabetes. And it seems like to me, now, and the doctors -- I've worked at a hospital for thirty-eight years. And most of the doctors always be

saying that we have more cancer in this area than they've ever seen or heard of. But yet you're saying it's normal.

MS. SCULLY: I'm --

MR. KEN RAY: And let me ask you this. Solutia also produced Agent Orange, which probably caused diabetes. Now, we have diabetes so much, everybody has diabetes just about in this city. And I'm just wondering doing this study, is it diabetes that's something that's more or higher?

MS. SCULLY: Okay. Let me first say that we did not do an investigation on whether cancer was high or low. What we did was take the soil concentrations and the groundwater concentrations and try to figure out what would the risk be to the community. And we have guidelines that we can't allow this site to contribute excess cancer risk above the range that we provided.

When I was talking about what happens in the community, those are just statistics across the country. We didn't did a cancer investigation, and we -- when I

was describing what we would account for in a hazard index, those are things like diabetes and high blood pressure. When we clean up to get to a lower hazard index, those are the things we are protecting for.

But EPA did not do a health study. A health study was done by Jacksonville State University with ATSDR, the Agency for Toxic Substances and Disease Registry. And they did do a health study, and they have produced information that indicates that there are some noncancer effects that are higher in this community. They didn't do a cancer study, I believe. I think they just looked at noncancer effects, but they have done a study about diabetes and high blood pressure.

It's not part of the investigation we did because we look at things like soil and groundwater and we don't test blood and things like that. That's what the health department does, and that's why ATSDR and Jacksonville State did the health study. It wasn't done by EPA.

MS. WISCHKAEMPER: And that

study should be in the laboratory --

MS. SCULLY: I don't know -- yeah, I don't know how they released that study, but there is a health study that was done by Jacksonville State.

PUBLIC: How can we get that study?

MR. DAVID BAKER: You can go to the library.

MS. SCULLY: Is it in the library?

MR. DAVID BAKER: It's in the library on 14th Street, the one up at 10th Street. I think I got a copy of it.

MS. SCULLY: The health study should have been released. What I can do is try to -- I'll get the information from ATSDR on where the health study is and where it can be found and provide that information to the community in a fact sheet. If we revise the fact sheet, I'll put it in there; okay? I'll try to make that data more available to you. Did you have something else, David?

MR. DAVID BAKER: No. No. No.

No.

MS. SCULLY: Anybody else have a question you want to ask about anything? This is your big chance.

MR. DAVID BAKER: I do have one more comment, and I just have to say this. Here we are talking about PCBs as if it was the only toxic that we had in this community. The EPA done a -- entered in AOC with the lead, with the foundries. And that is another confusion factor that we ave. Here lead has already been found to do damage to children, brain damage and all these different illnesses and causes cancers as well. It's already written in the books that that is a problem.

It's a problem because what PCBs does cause. It's still out. The jury is still out on it. But we as the people that live in this community -- and you can take this back to the EPA. And I've said it before, that they give them folks a get out of jail free card. They have not had any type of leaders of this nature to explain to the community how and what they are doing.

And here we are still on the battlefield about the PCBs.

I think that the EPA us down on that issue. The lawyers who drew up that AOC did not look up all the factors. It's behind us now, but it's something that can come back up. I think that it's important that you have two cleanups going. And the two cleanups, when lead folks go in, it's a different -- in terms of them removing soil than PCBs.

And then people are getting confused about the PCB cleanup as well as lead. So you've got these two cleanups, but you've got almost everybody looking alike when they come in. They are doing the same thing but for a different reason.

So I think if anything -- and I have said this openly, and I'm still going to keep talking about it. I conveyed this to Franklin and his predecessor. That the lead folks is not giving the type of -- is not giving the type of cleanup that I feel --

I know where dump sites are all

over this city, and I haven't told your colleagues -- it's all over the place. They dump dirt and lead and stuff all over this city. It was a red dirt city. It was a red dirt town. And for no reason or another it had to become black dump because of the foundries dumping dirt all over the place, 10th Street, Mountain, all over. That's what foundries do.

And yet they got a get out of jail free card in terms of them in terms of cleanup. They stepped up to the plate quicker than Solutia did, I guess. And it's taken a while for Solutia to understand -- I mean Monsanto to understand that, you know, it was coming, this day was coming.

But the thing I'm saying is that here you've already got a PCB cleanup, and to me I don't have a problem with it. I have a problem with the lead cleanup because it's not doing what I think and many other people think and people that I have talked to and looked at it, it is not doing the same.

So I think that what we ought to

do and what the EPA ought to do is combine the cleanups in terms of sitting down. And certainly you're going to find that when you're digging up PCBs, you digging up lead. If you're digging up lead, you're digging up PCBs. PCBs might be a lower concentration than lead. Lead might be a lower concentration than PCBs at times.

So I think that the cleanup should be across the board. PRPs are PRPs. Ain't no difference in them. If it's contaminants, it's contaminants. And I think that that's why it's confusion in this community that -- and I keep hearing it, and I know other folks -- I know Rose probably has heard it and other people here every day, that lead will -- lead is dangerous. It has already been proven that it will lame kids, brain damage, all this, cancer, causes cancer.

I know. I work at the funeral home. I've worked at a funeral home. I've been burying so many of my friends and so many folks in Anniston until it's ridiculous. I'm talking about we're not

just burying old folks. We're burying young folks. And when I say young, I'm talking about below fifty and forty years old. When you start going down that low, you start looking at things that when you've got contaminants --

Like I said, I'm not an environmentalist. PCBs, if it's causing it, fine. Lead, if it's causing it, I'm not separating either one. I'm just saying that my job is to try to get Anniston clean, period, whether it's benzene. Whatever is on the ground or in the water or whatever, I mean, I get calls on it.

So I think it's important that the EPA focus back on the lead as much as well -- as well as PCBs. And I appreciate the fact that Solutia did and Monsanto did step up to the plate, even though it took a while and took a struggle. But they are at the table, and they're at the table every time we meet. We mect once a month. We haven't met with the lead folks no time. And they have not had a meeting of this nature, and they have not stood out on the

-- over on Carter Street where they had to dig down almost forty feet, almost dug to China. They left America digging down and almost dug down to China to remove all this stuff out and left them people over there desolate, water running down through their houses and everything. And, you know, it's sad that it took Warren, myself, God and everybody else to just make them understand that what they was doing, they was doing wrong. And they still are not coming to the table and talking fairly with the people. And so I just wanted to let that be a comment and statement from me. Thank you.

MS. SCULLY: Thank you, David.

MR. DAVID BAKER: All right.

MS. SCULLY: Okay. The only thing I can say about the lead site is that it primarily focused on residential because we were concerned about foundry sand that went to residential properties. And most of the foundries were in some way being taken care of in another environmental program. And we were primarily concerned because we were cleaning PCBs up in residential areas

and wanted to make sure the lead also got removed. So it focuses on residential. But we'll take that comment. Anybody else have a comment?

MS. ROSE: Being in a medical background and being in the environmental atmosphere, the one thing that can stop the confusion about lead, lead comes in manufacturers. And lead paint was all over. There's a lot of kids, and it has to be ingested to get harmed. And children -- and years ago houses built with lead paint, shivers and pilling, clay, dirt, mouth, hand, foot, mouth.

I wish we had talked to lead people, but they explained that it was more than foundry sand, that we should stop confusion, that lead can be in many fashions, not just in foundry sand. And maybe that type of confusion would calm people down around here. I think that's where the confusion is coming, and we need to stop it. We need to stop it in its place. People are out of order. One thing, this is a PCB meeting and not a lead

meeting. And it should not be allowed to be discussed. There is a lead issue. Take it to the lead meetings.

MS. SCULLY: This definitely is just a meeting about the PCB site and primarily about OU 3. But if anybody wants to make a comment, we're going to record it, but it definitely is a PCB site issue we're discussing today.

Are there any other issues or comments that anyone would like to make? Okay.

Well, thank you all for coming tonight. I'll be around for a while. If any of you want to talk to me specifically about an issue, I'll be here. And we have given you, I hope, in that fact sheet our telephone numbers and our e-mail addresses. And you can send it to our address here in Anniston. We have an office on Noble Street. Any way you can get an comment to us, we'd appreciate it. Thank you for coming.

(The meeting was concluded and off the record at 7:08 p.m.)

REPORTER'S CERTIFICATE

STATE OF ALABAMA)

JEFFERSON COUNTY)

I hereby certify that the above and foregoing deposition was taken down by me in stenotype, and the questions and answers thereto were transcribed by means of computer-aided transcription, and that the foregoing represents a true and correct transcript of the testimony given by said witness upon said hearing, to the best of my ability and understanding.

I further certify that I am neither of counsel, nor of kin to the parties to the action, nor am I in anywise interested in the result of said cause.

_____

Ashley L. Phillips, CCR

My Commission expires:

December 12, 2012

Alabama ACCR #490