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EPA Superfund
Record of Decision:

SANFORD GASIFICATION PLANT
EPA ID: FLD984169193
OU 03
SANFORD, FL
09/21/2006

RECORD OF DECISION

OPERABLE UNIT THREE

SANFORD GASIFICATION PLANT SITE

SANFORD, SEMINOLE COUNTY, FLORIDA

PREPARED BY:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

ATLANTA, GA

AMENDED
RECORD OF DECISION
OPERABLE UNIT THREE
SANFORD GASIFICATION PLANT SITE

Declaration

Site Name and Location

Sanford Gasification Plant Site
Sanford, Seminole County, Florida
FLD984169193

Statement of Basis and Purpose

This decision document presents the selected remedial action for Operable Unit Three (OU3) of the Sanford Gasification Plant Site ("the Site"), in Sanford, Seminole County, Florida, which was chosen 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), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based on the Administrative Record (AR) for the Site. The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has been the support agency during the remedial investigation/feasibility study process for the Site. In accordance with 40 CFR §300.430, as the support agency, FDEP has provided input during this process and has actively participated in the decision making process.

Assessment of the Site

Unacceptable risk associated with this Site is due to the potential release of hazardous substances to the environment and potential exposure of ecological receptors to sediment contamination in the Cloud Branch Creek. Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present endangerment to public health and welfare, and further harm to the environment. While OU1 includes all sediments south of West 3rd Street, OU3 will address sediments up to the confluence of Cloud Branch Creek with Mill Creek.

The Potentially Responsible Parties (PRPs) submitted the first draft of the ERA report in February 2004 and a revision in January 2005. After reviewing the revised Draft ERA report, EPA and FDEP found that some comments were still unaddressed and that the document was not scientifically accurate; therefore, the report was unacceptable.

In May 2005, EPA, in consultation with FDEP, presented to the Sanford PRP Group an extensive and substantial set of comments on behalf of both agencies for the revised OU3 ERA report. Both agencies felt that either the toxicity test should be redone, or a Risk Management Decision (RMD) could be made based on existing data. In August 2005, the Sanford PRP Group addressed a letter to EPA outlining their approach accepting both agencies' RMD of addressing the sediments in Cloud Branch Creek up to the Confluence with Mill Creek.

Description of the Selected Remedy

After reviewing the information available and after careful consideration of the various alternatives, EPA is selecting: Sediment Removal and Management, Installation of Culvert, Monitoring, and Institutional Controls. The selected remedy entails the removal of surficial sediments (a minimum of 2 ft) in Cloud Branch Creek; installation of a culvert and backfill; long-term monitoring to confirm the integrity of the remedy; and implementation of institutional controls to further ensure the integrity of the cover and mitigate the potential for human or environmental exposures to site-related constituents.

Excavation will be conducted in the bed of the channel and extend up the bank, as necessary to achieve the removal of a minimum of 2 feet of creek bed sediments, as well as providing an excavation of sufficient width and depth to install the culvert (including bedding material) with a minimum backfill cover over the culvert of at least 6-inches. The actual backfill or bedding materials to be used and their thicknesses will be determined during the remedial design. The removed sediments and bank soils will be transported to a central handling area and stockpiled pending transport for off-site disposal at a RCRA Subtitle D landfill.

Following installation of the culvert, backfill and establishment of vegetation, a long- term monitoring and maintenance program will be implemented. The City of Sanford will periodically clean out the channel to remove debris that may have washed into Cloud Branch Creek to maintain drainage capacity. Damage to the restored creek and banks will be repaired as appropriate to maintain the long-term effectiveness and reliability of the remedy.

This remedy also includes the implementation of institutional controls to facilitate the long- term effectiveness and integrity of the remedy and to minimize the potential for human and ecological exposure to the remaining subsurface polycyclic aromatic hydrocarbons and lead. Institutional Controls will be implemented that place restrictions on subsurface activities within the project area. Such institutional controls may include the following:

- Governmental controls and zoning restrictions and local ordinances requiring construction permits;

- Proprietary controls, deed modifications, standard easements, conservation easements, and/or restrictive covenants prohibiting certain activities on the properties;

- Informational devices, deed notices, advisories, and notifications; and

- Provide permanent access to subject property to EPA and FDEP and their agents and/or representatives.

The actual Institutional Controls would be determined in consultation with EPA and FDEP.

Statutory Determinations

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.

A review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

ROD Data Certification

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

- Current and future land use (page 20)

- Risk Assessment (pages 21-30)

- Remedial cleanup goals and the basis for the levels (page 31)

- Decisive factors that led to selecting the remedy (pages 32-36)

- Estimated capital, 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 (pages 37-40)

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INTRODUCTION

This decision document presents the Operable Unit Three (OU3) remedy selection for the Sanford Gasification Plant Site ("the Site"), in Sanford, Seminole County, Florida, which was chosen 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), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based in the Administrative Record (AR) for the Site. The Florida Department of Environmental Protection (FDEP) agrees with the cleanup approach for this Record of Decision (ROD). This ROD will become part of the AR file pursuant to NCP Section 300.825(a)(2).

Based on the current and past ownership/operation of the former plant and property, several parties have undertaken actions relating to environmental concerns at the Site. These parties are the Potentially Responsible Parties (PRPs) which make up the Sanford Gasification Plant Site Group (hereinafter "the Sanford PRP Group"). The Sanford PRP Group includes Florida Power Corporation, Atlanta Gas Light Company, Florida Power & Light Company, Florida Public Utilities Company (FPUC) and the City of Sanford.

EPA organized the cleanup efforts for the Site into three phases designated as Operable Unit One (OUI), Operable Unit Two (OU2) and OU3. These were defined as:

- OU1 Impacted soil (including saturated soil) at the former facility, between the former Sanford Gasification Plant (SGP) facility and West 3rd Street, including the unnamed tributary, and a portion of Cloud Branch Creek;

- OU2 Impacted groundwater; and

- OU3 Impacted sediments in Cloud Branch Creek from 3rd Street to the Cloud Branch Creek delta in Lake Monroe.

On July 5, 2000, the Environmental Protection Agency (EPA) issued the OU1 ROD. Upon completion of the OU1 ROD the Sanford PRP Group developed a Design Sampling and Analysis Plan (DSAP) to obtain information for the purpose of implementing the remedial design for the OUI remedy. The DSAP revealed that the estimated volume of soil exceeding the remedial cleanup goals established in the OUI ROD would actually be 4.5 times the original estimated quantity identified during the Remedial Investigation (RI). Correspondingly, the extent/volume assumptions utilized in the Feasibility Study (FS), which served as the basis for the OU1 ROD, were no longer accurate.

The OU1 soils impacted area was initially defined as the former SGP facility, the unnamed tributary, and the confluence of the unnamed tributary with Cloud Branch Creek. However, the DSAP results indicated that impacted surface and subsurface soils actually extend north of the confluence with Cloud Branch Creek up to south of West 3rd Street and east and west of the former SGP facility. Due to the location of subsurface soil contamination and the need to address them, the remediation of the subsurface soils will disturb any sediments above it. To facilitate the implementation of OU1 any sediments in the unnamed tributary and the Cloud Branch Creek up to south of West 3rd Street will be addressed under OU1.

An Amendment of the OU1 ROD is being issued concurrently with the OU3 ROD to select a new remedy: In-Situ Solidification/Stabilization, off-site disposal and optional use of Chemical Oxidation in non-Nonaqueous Phase Liquid (non-NAPL) areas. On June 12, 2001, EPA issued a ROD for OU2 to address the groundwater contamination. The selected remedy for OU2 was Monitored Natural Attenuation (MNA) and Institutional Controls.

The Remedial Investigation (RI) identified elevated levels of polycyclic aromatic hydrocarbons (PAHs) and metals in the OU3 sediments portion. The concentrations were found rapidly decreasing downstream from the former SGP facility. Regarding ecological receptors, the Ecological Risk Assessment (ERA) Compendium Step 1 for all Media, Steps 2 and 3 for Sediment and Surface Water (ERA Compendium 2) identified lead and PAHs as the contaminants of potential concern (COPCs) within Cloud Branch sediments upstream of the confluence with Mill Creek.

The Sanford PRP Group submitted the first draft of the ERA report in February 2004 and a revision in January 2005. After reviewing the revised Draft ERA report, EPA and FDEP found that some comments were still unaddressed and that the document was not scientifically accurate; therefore, the report was unacceptable.

In May 2005, EPA, in consultation with FDEP, presented to the Sanford PRP Group an extensive and substantial set of comments on behalf of both agencies for the revised OU3 ERA report. Both agencies felt that either the toxicity test should be redone, or a Risk Management Decision (RMD) could be made based on existing data. In August 2005, the Sanford PRP Group addressed a letter to EPA outlining their approach accepting both agencies' RMD of addressing the sediments in Cloud Branch Creek up to the Confluence with Mill Creek.

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1.0 SITE LOCATION AND DESCRIPTION

The CERCLIS identification number for this Site is FLD984169193.

The former SGP was located on the north and south sides of West 6th Street between Holly Avenue and the former Cedar Avenue in Sanford, Seminole County, Florida. The former SGP facility was located adjacent to an unnamed tributary (stream) which intermittently flows to Cloud Branch Creek. From that point, Cloud Branch Creek flows northward for approximately one half mile to Lake Monroe. Bordering the former facility to the north and northwest are properties currently owned by CSX and the City of Sanford. The Site, as defined by CERCLA, includes the former SGP facility, the unnamed tributary and Cloud Branch Creek from the unnamed tributary to where it discharges into Lake Monroe. The Site is located within a combination of residential, commercial and industrial district of Sanford (Figure 1). Currently, a good portion of the property upon which the SGP facility was located, is owned by FPUC. FPUC formerly maintained an office and natural/propane gas distribution center at that location until 2002 when the operations were relocated.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 Site History

Historically, the SGP was operated from the 1880's to approximately 1951. From the 1880's until 1951, water gas and carbureted water gas were manufactured at the SGP by carbonization or destructive distillation of bituminous coal and coke. Through the manufacturing process, gas holder tanks were used to store waste tars and condensates, frequently leaked resulting in contamination.

The SGP was owned and operated by Sanford Light and Fuel Company from the 1890's until 1914. From 1914 to 1924, the SGP was owned and operated by Southern Utilities Company. From 1924 until 1928, the City of Sanford owned and operated the SGP. From 1928 until 1932, the City of Sanford owned the SGP, but was operated by the Sanford Gas Company. In 1932, the Sanford Gas Company acquired the title to the SGP and continued operating until 1944, at which time Sanford Gas Company merged with Florida Power Corporation. Florida Power Corporation owned the Site and continued to operate the SGP until 1946, at which time the SGP was transferred to South Atlantic Gas Company. South Atlantic Gas Company owned and operated the SGP from 1946 to 1949. In 1949, title to the SGP was transferred to Florida Home Gas Company, which continued operating the SGP until approximately 1951, at which time gas manufacturing ceased. Florida Home Gas Company owned the property from 1949 to 1954, at which time it transferred the property title to Sanford Gas Company. In 1965, Sanford Gas Company transferred property title to the Florida Public Utilities Company, which has owned a portion of the former SGP to date. Four parcels south of West 6lh Street and east of FPUC property, are also a part of the former SGP, are owned by Armand Enterprises, Inc.

Based on the current and past ownership/operation of the former plant and property, several parties have undertaken actions relating to environmental concerns at the Site. These parties are the PRPs which make up the Sanford PRP Group. The Sanford PRP Group includes Florida Power Corporation, Atlanta Gas Light Company, Florida Power & Light Company, FPUC, and the City of Sanford. In 1991, 1992, and 1993, the Sanford PRP Group conducted soil, groundwater, and sediment sampling to delineate the extent of impacts at the Site as provided in an investigation plan approved by FDEP. The results of the investigation were presented in a report provided to FDEP in 1993.

EPA, FDEP and the PRPs have conducted separate environmental investigations at the Site to determine potential impacts to soil, groundwater, surface water and sediments from operations of the former gasification plant.

On July 11,1997, EPA issued Special Notice Letters to the Sanford PRP Group. The Special Notice Letters identified these parties as the PRPs for the Site and requested that they perform a Remedial Investigation/Feasibility Study (RI/FS) to characterize the extent of contamination.

In April 1998, the Sanford PRP Group and EPA executed an Administrative Order on Consent (AOC) to conduct the RI/FS. In August 1998, the Sanford PRP Group submitted the final Work Plan. Field work on the Site began in October 1998. Two new addendums to the original Work Plan were incorporated to accommodate new samples. First, an addendum was made to include samples at an area of contamination located at the City of Sanford Water Treatment Plant. Second, an addendum was made to include a collection of background samples at the Pebble Junction Property.

In April 1999, EPA focused the cleanup efforts for the Site into three (3) phases or Operable Units (OUs). EPA prioritized its actions on the Site beginning with the impacted soils first, groundwater second and sediments in the Cloud Branch Creek and the delta in Lake Monroe third.

The Feasibility Studies (FSs) for OU1 and OU2 were completed on January 20, 2000 and September 28, 2000, respectively. The FSs were developed based on previous investigations, RI data, the Human Baseline Risk Assessment (BRA) and steps one through three of the ERA for soils. EPA issued the OU1 ROD on July 5, 2000 and OU2 ROD on June 12, 2001. The OU1 ROD stipulates the remedial cleanup goals for contaminants of concern (COCs) in surface and subsurface soils. The remedy selected for OU1 involved the removal of impacted surface and subsurface soils with off-site Thermal Treatment and/or disposal in a landfill, and groundwater monitoring to verify the effectiveness of the source removal. Surface soil remedial cleanup goals were selected based on human health exposure risk factors and subsurface soil remedial cleanup goals were selected based on concerns regarding COCs leaching to groundwater. The OU2 ROD, which addressed the groundwater contamination, stipulates the selected remedy as MNA of COCs to drinking water standards.

Based on the selected OU1 remedy, the Sanford PRP Group, developed a DSAP to collect data to be used as part of the OU1 remedy design. Field activities lasted from January 2002 to June 2002.

The ERA process started in June 1998, with the first Site visit to conduct Step 1 of the ERA process. The revised version for the ERA report was submitted to EPA in January 2005.

2.2 Enforcement Activities

Preliminary Assessment

A Preliminary Assessment (PA) was conducted in March 1990, by FDEP to assess the potential for environmental impacts at the former SGP facility and to make recommendations regarding the need for further action under CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). The investigation involved a review of background information and existing state regulatory files relating to the former SGP. A "windshield survey" was also performed to confirm the location and physical appearance of the Site. The PA document provides a general overview of the site history, typical MGP production practices, and common contaminants found at gasification plant sites. FDEP recommended that a Site Screening Investigation (SSI) be performed on Site and along to the adjacent drainage ditch and the nearby Cloud Branch Creek.

Site Screening Investigation

In June 1991, Ecology and Environment, Inc. (E&E) produced a report for a Site Screening Investigation (SSI) for FDEP from a field work event conducted on Fall 1990. The study consisted of background information and FDEP file review, two days of site reconnaissance, and a limited sampling event. The results of E& E's investigation indicate that historic activities, namely generation of coal tar wastes and possible tar sludges at the Site, have released contaminants to the on- site soil and groundwater. The results indicated the potential for contamination of surface water and/or sediments via surface runoff. The SSI concluded that it was evident that soil and groundwater contamination at the Site with respect to polycyclic aromatic hydrocarbons (PAHs), metals, and total recoverable petroleum hydrocarbons were attributable to coal tar and/or tar sludge sources, from the location of the former tar well. Also, the report concluded that a more in- depth investigation to delineate the nature and extent of the contamination at the Site was necessary.

Soil Boring Investigation

In 1990, PRP, FPUC, the current owner of a portion of the Site, contracted with Environmental Consulting & Technology, Inc. (ECT) to perform a soil boring investigation to better delineate vertical and horizontal extent of soil impacts at the Site. Using a predefined soil boring grid, a series of 49 soil- hollow stem auger borings were advanced at selected points. Borings were advanced to a depth of 15 ft to 20 ft. Split-spoon soil samples were collected to better delineate the vertical extent. ECT stated in its report that tar was observed in 27 of the 49 borings.

Preliminary Investigation of Surface Soils and Sediments

In 1.991, PRP, City of Sanford, contracted ECT to investigate surface soils and sediments associated with the Cloud Branch Creek drainage system between West 6th and West 1st Streets. A total of 29 shallow (approximately 1-foot depth) hand augers borings were completed in the study area, with soil/sediment samples inspected for visible tar. Nine borings were completed along the length of the tributary and surrounding drainage basin. In addition to a visual inspection, the nine tributary borings were also sampled and analyzed with an organic vapor analyzer (OVA). A series of random borings were also made along Cloud Branch Creek, from West 6th Street to West 1st Street. No analyses for PAHs or volatile organic compounds (VOCs) were performed.

Preliminary Investigation of Groundwater

Atlanta Gas Light Company and FPUC installed five monitoring wells on and adjacent to the Site in June 1992. Three shallow monitoring wells were screened at the water table and two deeper wells were screened immediately below the shallowest confining unit. The groundwater from these wells was sampled and analyzed for VOCs and base neutral acid compounds.

Contamination Assessment

Atlantic Environmental Services, Inc. and Leggette, Brashears, & Graham, Inc. conducted contamination assessment (CA) field activities in 1993 for the Sanford PRP Group. The CA included a well survey, soil gas survey, installation of nine monitoring wells, sampling of 14 monitoring wells, collection of eight surface soil samples, collection of two surface sediment samples, collection of four surface water samples, collection of 11 subsurface soil samples, 27 soil borings, a total of nine transects subsurface soil samples along Cloud Branch Creek, and five slug tests in five of the monitoring wells to evaluate hydraulic conductivity.

A review of the St. Johns River Water Management District water well construction permits, and the water well and consumptive use permit inventory did not identify any water- supply wells within 0.5 miles of the Site.

Impacts related to operations of the former plant were found in on- site groundwater and soil, groundwater north of the Site, sediment from the unnamed tributary and Cloud Branch Creek, and soil along the unnamed tributary and Cloud Branch Creek.

Expanded Site Inspection

In June and July 1996, EPA conducted an Expanded Site Investigation (ESI). The ESI included the collection of thirty-four (34) surface soil samples, fourteen (14) subsurface soil samples, thirty-five (35) sediment samples, twenty-one (21) surface water samples, installation of seven (7) permanent wells and six (6) temporary wells, and a geophysical survey. The ESI report confirmed results from previous investigations. Data from the ESI report and previous investigations were used to prepare the Hazardous Ranking System Package in order to propose the Site for listing on the National Priorities List (NPL). Even though, the Site was determined to be of NPL caliber and the ranking package was completed, the Site was not listed on the NPL. The Sanford PRP Group negotiated with EPA to exclude the Site from listing in exchange for voluntarily conducting the investigation and cleanup activities.

Remedial Investigation

GEI Consultants, Inc., working on behalf of the Sanford PRP Group, completed the Remedial Investigation on July 29, 1999. As a part of this investigation, GEI Consultants collected 133 samples of the soil, groundwater, and sediments and analyzed the samples for metals, cyanide, volatile compounds (i.e., benzene, toluene and xylene), and semi-volatile compounds (i.e., PAHs). Sample locations included the former SGP, the unnamed tributary, Cloud Branch Creek, and the Cloud Branch Creek outfall in Lake Monroe.

Results from the investigation revealed that source material consisting of tar-saturated soil or sediments, coal/coke, black-stained soil, or sediments with a strong naphthalene odor were identified at some locations extending from land surface to the top of the confining unit (approximately 30 ft) on Site and along the unnamed tributary up to Cloud Branch Creek [approximately at depths up to 30 ft below land surface (bis)]. Source material in sediments along Cloud Branch Creek from the unnamed tributary to Mill Creek exists at various locations from the sediment water interface to a depth of 4ft. Tar saturated Nonaqueous Phase Liquid (NAPL) has been identified in soil near the confluence of Cloud Branch Creek and the unnamed tributary. NAPL has also been identified in a thin shell hash layer near the confluence of Cloud Branch Creek and Mill Creek. The NAPL present at the confluence of Cloud Branch Creek and the unnamed tributary is associated with overlying tar-saturated material at the same locations. The NAPL detected in the shell hash at the confluence of Cloud Branch Creek and Mill Creek is isolated in the thin shell hash layer at 20.5 ft bis.

Human Baseline Risk Assessment

On January 10, 2000, the Sanford PRP Group submitted the final BRA to identify those chemicals that were of concern to the human health for the Site. Remedial Goal Options for OU1 COCs, based on various exposure scenarios were presented in the BRA report. It was concluded that the OU3 sediments did not present an unacceptable risk to human health.

OU3 Ecological Risk Assessment

The problem formulation identified lead and PAHs as COPCs. Concerns over potential adverse ecological impacts resulted in further evaluation of the OU3 sediments through field samples conducted in August 2003. Sediment samples were collected during the field event for toxicity and chemical analysis.

The Sanford PRP Group submitted the first draft of the ERA report in February 2004 and a revision in January 2005. After reviewing the revised Draft ERA report, EPA and FDEP found that some comments were still unaddressed and that the document was not scientifically accurate; therefore, the report was unacceptable.

In May 2005, EPA, in consultation with FDEP, presented to the Sanford PRP Group an extensive and substantial set of comments in behalf of both agencies for the revised risk characterization report. Both agencies felt that either the toxicity test should be redone, or an RMD could be made based on existing data. In August 2005, the Sanford PRP Group addressed a letter to EPA outlining their approach accepting both agencies' RMD of addressing the sediments in Cloud Branch Creek up to the Confluence with Mill Creek.

3.0 SCOPE AND ROLE OF RECORD OF DECISION

This ROD will address the contaminated sediments in Cloud Branch Creek from its confluence with the unnamed tributary to the delta with Lake Monroe as OU3. This planned action is necessary to protect the ecological receptors in the Cloud Branch Creek. The soil and groundwater cleanups are being addressed under OU1 and OU2 RODs.

The purpose of this selected action is to prevent ecological receptors' exposure to contamination in Cloud Branch Creek. Remedial Action Objectives (RAOs) consist of media specific goals for protecting human health and the environment. While OU1 includes all sediments south of West 3rd Street, OU3 will address sediments up to the confluence of Cloud Branch Creek with Mill Creek (Figure 2).

The Sanford PRP Group prepared an ERA report in February 2004 and a revised report in January 2005. After reviewing the revised Draft ERA report, EPA and FDEP found some comments from the first set were still unaddressed; chemistry evaluation of total PAHs was inaccurate; interpretation of the benthic invertebrate community structure was not valid; and there were concerns with the presentation of the toxicity test results and the resulting culmination of the characterization of the risk at Cloud Branch Creek. EPA and FDEP's major issues with the evaluation of the toxicity tests were with the statistical analysis and interpretation of the data. EPA recognized the report contained valuable information; however, for the reasons previously established, the report was unacceptable.

In May 2005, EPA, in consultation with FDEP, presented to the Sanford PRP Group an extensive and substantial set of comments on behalf of both agencies for the revised Draft ERA report. Both agencies felt that either the toxicity test should be redone, or an RMD could be made based on existing data. The RMD offered by both agencies was to address Cloud Branch Creek up to the confluence with Mill Creek (Figure 3). This location exhibits PAH concentrations about two times the Florida Probable Effects Concentrations (PECs) of 23 mg/kg and has a very low TOC content of 0.27%. After this location, sample results indicate a significant drop in PAH concentrations. EPA recognizes this location as the indicative location of the Site-related contamination attribution. In August 2005, the Sanford PRP Group addressed a letter to EPA outlining their approach accepting both agencies' RMD of addressing the sediments in Cloud Branch Creek up to the Confluence with Mill Creek.

4.0 HISTORY OF COMMUNITY RELATIONS

To date, three (3) Open House Meetings and three (3) Proposed Plan Meetings have taken place at the West Sanford Boys and Girls Club. The first meeting was held on September 23, 1998, to inform the community of the status of the enforcement action and to announce the upcoming sampling event for the RI. Community interviews were conducted with local officials and residents in September 1998. Using information collected during these interviews, EPA developed a community relations plan to address the concerns and information needs of the community. It also identifies opportunities for the community to take part in cleanup decisions about the Site and the opportunity to form a Community Advisory Group (CAG). A second meeting was held on May 12, 1999, for the purpose of informing the community about the steps to form a CAG. A third meeting was held on September 22, 1999, to inform the community about the results of the RI. Additional Proposed Plan Meetings have been held for on April 18, 2000 and February 7, 2001, for OU1 and OU2 respectively. The most recent Proposed Plan meeting was held on June 7, 2006, to present to the community EPA's preferred alternatives for the amended cleanup action of the soil contamination at the Site and the sediments at the Cloud Branch Creek related to Site contamination.

Fact Sheets for the Site have been issued in September 1998, September 1999, April 2000 and January 2001. The most recent Proposed Plan Fact Sheet for the OU1 Amended ROD (AROD) and the OU3 ROD was issued on May 19, 2006. The comment period for the Proposed Plan started on May 24, 2006 and ended on June 24, 2006. No comments from the community were received during the comment period.

On April 13, 2006, representatives from EPA, FDEP and the Sanford PRP Group met informally with property owners that could be affected by Site remediation activities around the OU1 and OU3 areas to discuss findings and possible remedies. A number of property owners that would be impacted by the remediation of Cloud Branch Creek voiced their preference to place a culvert in the creek. The concerns were taken into consideration when making the final OU3 remedy selection.

On June 7, 2006, EPA presented its amended preferred remedy for the OU1 and the preferred remedy for OU3 during a public meeting. A transcript of that meeting is available at the Site information repositories. Another public meeting was scheduled and announced for June 8, 2006, however, it was cancelled due to lack of public attendance.

The AR has been updated to include documents used as the basis for the amended OU1 remedy and the OU3 remedy in accordance with Section 300.825(a)(2) of the NCP. The final EPA approved AROD, the Responsiveness Summary and the transcript of the Public meeting will also be included as part of the AR. The AR is available for public review and copying in the Site information repositories, located at EPA Region 4 in Atlanta, GA and at the North Branch Library, 150 North Palmetto Avenue, downtown Sanford.

5.0 SUMMARY OF SITE CHARACTERISTICS

5.1 Geology

Environmental and geotechnical soil borings completed at the Site during the DSAP field event were used to refine the current understanding of the Site geology. The shallow stratigraphy of the Site consists of five main units identified as: 1) sand with debris: 2) fine sand with varying amounts of silt and clay; 3) shell with fine sand; 4) fine sand with clay and shell; and 5) clay.

The sand with debris unit is typically dry and consists of gravel, coarse to fine sand, and varying amounts of brick, glass, metal, concrete rubble, wood, and clinker. Where present, the sand with debris unit extends from land surface to a maximum depth of approximately 12 ft bis.

A fine sand unit underlies the sand with debris unit and is generally present between 4 ft bis and 20 ft bis. The fine sand unit is described as fine sand with varying amounts of silt and clay, and is saturated. The fine sand unit consists of discontinuous layers of dense fine sand with clay and isolated clay lenses.

A shell with fine sand (referred as a "shell") unit underlies the fine sand unit north of West 5lh Street right-of-way (ROW). Where present, the average depth to the top of the shell unit is 18 ft bis, and the average depth of the bottom of the shell unit is 24 ft bis. The shell unit consists of shell with trace amounts to some fine-grained soil consisting of fine sand, silt and/or clay and is saturated. The most severe MGP-related impacts appeared to be concentrated in the shell unit most likely due to its permeability. The shell unit appears to be thickest in the vicinity of the Cloud Branch Creek channel. Where present, the thickness of the shell unit ranges from 0.1 ft to 18 ft, with an average thickness of approximately of 6 ft.

Thin, discontinuous layers of fine sand with clay and little to some shell are present below the fine sand unit south of the West 5th Street ROW and above and below the shell unit north of the West 5th Street ROW.

A clay unit underlies the fine sand unit, shell unit, and fine sand with clay and shell unit. The top of the clay unit ranges from 18.1 ft bis to 45.6 ft bis. The clay layer contains little amounts of fine sand, silt, and/or shell. It is very soft to very stiff (stiffness increases with depth) with a high plasticity, and is moist. Discontinuous lenses of sand and clay with shell were encountered with the clay unit. The visual observations of the NAPL on top of the clay unit and not within the clay suggests that the clay unit is confining to vertical dense nonaqueous phase liquid (DN APL) migration. The clay unit ranges in thickness from 1.6 ft to 18.3 ft at the Site.

The surface of the clay unit is comparatively low at the following locations:

- along the southern side of West 6th Street, south- southeast of the vacant FPUC office building;

- south of West 6th Street in the western portion of the Site;

- west of Cedar Avenue ROW, south of the unnamed tributary, and northwest of the vacant FPUC office building;

- along Cedar Avenue ROW, north/northwest of the vacant FPUC office building; and

- long the Cedar Avenue ROW, east of the culvert in the unnamed tributary.

In general, the top of the clay surface appears to slope away from the unnamed tributary and Cloud Branch Creek channels.

MGP impacts were observed at the top of the clay unit beginning just south of the unnamed tributary and Cloud Branch Creek confluence and appear to have migrated through the more permeable shell unit and along the top of the clay unit northward to West 3rd Street.

5.2 Hydrogeology

Three hydrogeologic units are located in the site vicinity: the Surficial, the Intermediate, and the Floridan aquifer systems. In Seminole County, the Surficial System is composed of Pleistocene to recent age fine to coarse-grained quartz sands. In Seminole County, the Surficial aquifer is an unconfined aquifer that typically ranges between 10 and 75 feet in thickness. The Surficial aquifer is primarily recharged by the direct infiltration of rainfall. Across Seminole County, water levels in the Surficial aquifer vary between land surface and 40 feet below ground surface. Naturally occurring iron concentrations in groundwater from the Surficial aquifer limits its use to primarily lawn irrigation, and less frequently domestic and livestock applications.

The Surficial aquifer is underlain by the Intermediate system, which consists of the blue clay and shell beds of differentiated Pliocene to Miocene-age deposits and the blue-to-gray, calcareous clays and interbedded cream to gray, sandy limestone of Miocene-age Hawthorn Group. Locally, the sandy limestone within the Intermediate System may be capable of yielding significant quantities of water. However, the low-permeability clay units within the Intermediate system separate the Surficial and the Floridan aquifers. The Intermediate system is present throughout most of Seminole County with a thickness of approximately 150 feet. However, in the northern part of the county, along the St. John's River and Lake Monroe, the intermediate deposits have been eroded.

The Intermediate system is underlain by the Eocene-age carbonate units of the karstic Floridan aquifer. The Floridan aquifer includes cream-to-tanish gray, soft-to-hard, granular porous, marine limestones of the Ocala Group (which may be absent in the northern part of Seminole County); the light gray-to-brown, porous-to-dense, granular-to-chalky limestones of the Avon Park Limestone; and the alternating layers of hard, brown, porous crystalline dolomites and hard, cream-to-tan, chalky limestone/dolomitic limestones of the Lake City Limestone.

The top of the Floridan aquifer generally occurs at depths of between 74 and 85 feet bis in the Site vicinity.

Groundwater in the Floridan aquifer exists under artesian conditions. Given that the Floridan aquifer potentiometric surface is similar to the Surficial aquifer water level elevations noted in the vicinity, downward leakage from the Surficial aquifer would not be expected.

Hydrogeology data collected during the DSAP investigation was used to estimate the hydraulic conductivity of the shallow and intermediate aquifers and to evaluate the vertical gradients and the hydrogeologic connection between the shallow, intermediate and deep aquifers. Several aquifer tests were conducted to evaluate hydrogeologic properties of the impacted units as well as the water bearing units below impacts for future remedial design purposes. Short term aquifer tests were conducted at two monitoring wells screened above the top of the clay confining unit and located within the area of the former SGP impacted soils.

The shallow aquifer is within the shallow and fine sand and shell encountered at the Site from land surface to generally 30 ft bis. The groundwater table ranges from a depth of 1 ft to 10 ft bis. Groundwater elevations measured in December 1998 and June 1999, in the vicinity of the confluence of Cloud Branch Creek and Mill Creek illustrated that groundwater flow is toward the creeks. A clay unit underlies the shallow aquifer and has been encountered between approximately 18 and 46 ft bis.

Groundwater in the area of the former facility is not used as a drinking water source. No Surficial aquifer system drinking water wells have been documented within four (4) mile radius of the Site. The Floridan aquifer is the principal source of potable water in the Sanford area. The City of Sanford Utility Department provides potable water with water obtained from wells located between 3 and 4 miles upgradient from the Site.

5.3 Soil Contamination

The majority of the former SGP structures were removed prior to 1962, and no above ground structures containing plant related residuals exists today. Previous investigations confirmed that no subsurface structures containing source materials are present today. However, source material has been identified, during the investigations, as tar-saturated soil or sediment (including sheen), coal/coke, and black stained soil or sediment with a strong naphthalene odor. These source materials have been identified in soil on- site, soil and sediment along Cloud Branch Creek, and sediments along Cloud Branch Creek downgradient of the confluence with the unnamed tributary.

Tar-saturated or stained soil was found on Site and along the unnamed tributary to the confluence with Cloud Branch Creek extending in some areas from land surface to the top of the clay layer (confining unit) at a depth of approximately 30 ft bis. Source material in sediments along Cloud Branch Creek exists from the sediment water interface up to a depth of at least 4 ft.

In depth characterization of the surface and subsurface soils is presented in the OU1 ROD Amendment.

5.4 Sediment Contamination

A ditch known as the "unnamed tributary" begins north of the existing paved portion of Cedar Avenue west of the vacant FPUC office and flows north/northwest to Cloud Branch Creek, crossing under a former railroad ROW. The source of the unnamed tributary is two storm sewer inlets in West 6lh Street which discharge to the unnamed tributary via a storm sewer pipe running north within the Cedar Avenue ROW. The unnamed tributary flows approximately 420 feet north/northwest to Cloud Branch Creek. Cloud Branch Creek flows from the unnamed tributary approximately 2,700 feet north to Lake Monroe. Between the unnamed tributary and Lake Monroe, Cloud Branch Creek flows through a 65- inch by 96-inch arch culvert under West 3rd Street, over a concrete-encased sanitary sewer in West2nd Street ROW, and through an approximate 84-inch by 84-inch box culvert under West 1st Street. Cloud Branch Creek merges with Mill Creek downstream of West 1st Street, and then flows under the bridge at Seminole Boulevard before discharging to Lake Monroe.

Flow conditions in Cloud Branch Creek are quite variable, such that the creek is nearly dry during winter and spring months and exceeds 450 cubic feet per second during 25-year storm events. At present, the City of Sanford is preparing improvements for Cloud Branch Creek, including retention ponds upstream of the Site that will reduce the post- development 10-year and 25-year 24-hour storm peak discharges to Lake Monroe by approximately 23% and 25%, respectively.

Due to the intermittent nature of the unnamed tributary, it was decided, early during the RI process, that sediment samples in the area of the unnamed tributary were to be considered surface soil samples and addressesed as part of the surface soil cleanup component of the OU1 remedy. In addition, to facilitating the implementation of the subsurface soil component of the OU1 remedy, Cloud Branch Creek sediments co- located with OU1 contaminated subsurface soils will be considered part of the OU1 remedy (Figure 2).

Low levels (26ug/Kg or less) of benzene, toluene, ethylbenzene and xylene (BTEX) were detected in all the RI sediment samples collected at Cloud Branch Creek downgradient of the Site; however, no BTEX were detected in any of the eight ESI samples (SD- B-4 through SD-CB-11) (Figure 3 of Appendix B) collected along Cloud Branch Creek, downgradient of the Site. Elevated levels of PAHs were detected in all sediment samples collected on Cloud Branch Creek downgradient of the Site. However, total PAH concentrations decrease significantly further downgradient of the Site. Total PAH concentrations in SD-6 near Lake Monroe are more than an order of magnitude lower than the total PAH concentration on SD- 5, and the SD-5 concentration is 2 to 3 times lower than the total PAH concentrations SD-4 and SD-3. Total PAH concentrations in SD-4 and SD-3 are an order of magnitude lower than the total PAH concentrations in SD-2 and SD-1, which are closest to the confluence of the Cloud Branch Creek and the unnamed tributary. Refer to Table 4-12 and 4-13 of Appendix B.

Low levels of BTEX were detected in 9 of the 19 RI (Figure 3 of Appendix B) sediments samples collected in Lake Monroe. The highest benzene concentration detected was 2 ug/kg at SD-23 and the highest BTEX concentration was 4 ug/kg (toluene only) detected at SD-24. PAHs were detected in 12 of the 19 sediment samples collected in Lake Monroe. Only two sediment samples (SD-16 and SD-20) out of the six sediment samples in Lake Monroe furthest from Cloud Branch Creek outfall (SD-16 through SD-20) had detectable levels of PAHs. Only one PAH, fluoranthene, was detected in SD-16. Five PAHs were detected in SD-20; the highest PAH concentration detected in SD-20 was pyrene at 530 ug/kg. Elevated levels of copper, iron, lead and zinc were detected in sediment samples collected in Lake Monroe. Cyanide was not detected in Lake Monroe. Refer to Tables 4-12 and 4-13 of Appendix B.

On September 19, 2001, the Sanford PRP Group submitted the ERA Compendium 2 (Problem Formulation). The document identified lead and PAHs as the COPCs within at least the Cloud Branch Creek sediments south of the confluence of Mill Creek. The COPCs were selected based on several lines of evidence, for example frequency of detection, documented relationship to MGP waste materials, exceedance of the EPA Region 4 Waste Management Division Sediment Screening Values (SSVs) for Hazardous Waste Sites or Alternative Toxicity Values, comparison with background concentrations, etc.

On August 17, 2003 through August 21, 2003 the Sanford PRP Group collected 16 sediment samples to conduct chemical analysis, toxicity testing and population/community structure evaluation, as part of the ERA Steps 6. Three reference sample locations (E-CB-REF1, E-CB-REF2, and E-MC-REF1) were selected and were at the same locations as previously collected reference samples. Based on previous data, those reference sampling locations were thought to be appropriate to be used as references for this sampling event as well. Sample locations can be found in Figure 3-1 of Appendix B.

Sample results can be found in Tables 4-4 and 4-5b of Appendix B. Table 4-4 presents inorganic constituents and Table 4- 5b presents analytical results for PAH constituents. Table 4-5b is presented in lieu of Table 4-5 of the January 2005 ERA report. The table was prepared by Ms. Linda George, EPA Region 4 Science and Ecosystems Support Division, to present the correct calculation for total PAHs. Results are further discussed in Section 7 of this ROD.

The conclusion of Step 3 for sediments is that lead and PAHs concentrations in sediments from Cloud Branch Creek, between the former SGP facility and its confluence with Mill Creek, may pose potential adverse health effects to animals foraging in this portion of the creek. Average concentration of the COPCs were significantly lower in sediments collected below (north of) the confluence of Mill Creek with Cloud Branch Creek, including samples from Lake Monroe, when compared with concentrations in the reach of Cloud Branch Creek near the Site to the confluence of Mill Creek.

The portion of the Cloud Branch Creek exhibiting elevated concentrations of COPCs is situated within an urbanized/industrialized area and has been channelized. The habitat value of this section of the channeled portion has been reduced as a result of development. Local government performs periodic maintenance activities to maintain its function in the conveyance of storm water.

The length of creek bed in OU3 that significantly exceeds the SSVs is less than

0.5 mile, and the effect of the channelization has also reduced the area of affected habitat.

5.5 Surface Water Contamination

Based on the RI data aluminum, arsenic, iron, lead and manganese were detected in surface water samples above the 1986 Federal Ambient Water Quality Criteria (AWQC). However, arsenic and manganese were detected above the Federal AWQC in only one surface water sample, SW-CB-06, downgradient of the Site. Arsenic was detected in only one surface water sample, SW-MC-02, above Federal AWQC. Surface water sample SW-MC-02 is from Mill Creek which does not receive surface or groundwater from the former facility. Iron was the only parameter detected above Federal AWQC in more than two samples. The highest iron, lead and manganese concentrations detected in surface water were from SW-CS-06 from Cloud Branch Creek approximately 600 feet down gradient of its confluence with the unnamed tributary. Iron in surface water samples SW-CB-06 and SW-LM-02 was the only metal detected at concentrations above Florida Surface Water Quality Criteria. Refer to Table 4-11 of Appendix B.

The BRA determined that there were no surface water COCs for human health risk.

The ERA Problem Formulation for sediments and surface water determined there were no surface water COPCs for ecological receptors.

6.0 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCES USES

Currently, a portion of the former SGP is owned by the FPUC which used to maintain an office and natural/propane gas distribution facility, now vacant. The other OU1 portions of the Site are currently owned by the City of Sanford, CSX Transportation, Armand Enterprises, Christian Prisons Ministries (CPM) and Codisco Inc. CPM operates a drug rehabilitation center and Codisco subleases two of their buildings to a maintenance operation. Currently, OU3 portions of the Creek are owned by Mr. Harry Ellis, Pine Crest Industrial Centre, Ms. Sally Rosemond and Florida Land and Colonization Company.

The Site is zoned as Restricted Industrial (RI-1) and General Commercial (GC-2). The Restricted Industrial designation is described as areas which "are intended for light wholesale and manufacturing uses and related accessory use." The General Commercial (GC-2) designation is described as areas which "accommodate community-oriented retail sales and services; highway-oriented sales and services; and other general commercial activities." Land uses for adjacent properties include multi-family residential, general commercial and restricted industrial land use.

The surficial aquifer is classified by FDEP as a Class G-II (potable water use). However, groundwater in the area of the former facility is not used as a drinking water source since there is community-supplied water. No surficial aquifer system drinking water wells have been documented within four mile radius of the Site.

The Site is expected to remain zoned Restricted Industrial (RI-1) and General Commercial (GC-2). No potable wells are expected to be developed from the Site area in the future.

7.0 SUMMARY OF SITE RISK

CERCLA directs EPA to conduct a BRA to determine whether a Superfund Site poses a current or potential threat to human health and the environment in the absence of any remedial action. The BRA provides the basis for taking action and indicates the exposure pathways that need to be addressed by the remedial action. This ROD is based on ecological risk only. The Human BRA determined there was no human health risk from the sediments or surface waters in Cloud Branch Creek. This section reports the results of the ERA conducted for this Site.

7.1 Environmental Risk

The purpose of the ERA was to evaluate whether releases of materials or byproducts from the former SGP facility are likely to result in adverse effects on the ecological communities within the vicinity of the Site. The ERA process has included field investigations, review of the Site records, and data evaluation by ecologists in accordance with EPA guidance.

Due to the intermittent nature of the unnamed tributary, it was decided, early during the RI process, that sediment samples in the area of the unnamed tributary were to be considered surface soil samples instead and addressed as part of the surface soil cleanup component of the OU1 remedy. In addition, to facilitate the implementation of the subsurface soil component of the OU1 remedy, Cloud Branch Creek sediments co-located with OU1 contaminated subsurface soils will be considered part of the OU1 remedy. OU1 extends to West 3rd Street (Figure 2).

7.1.1 Environmental Settings

Field surveys (Step 1) were conducted as a preliminary Site reconnaissance on May 22, 1998 and a more thorough Site-walkover on June 15, 1998. These field investigations have been supplemented by retrieval and review of the Florida Natural Areas Inventory Element Occurrence Records for the Site area, US Geological Survey topographical maps, and the Seminole County Soil Survey.

In general, the Site area is best characterized as a predominantly urban, urban/residential area that has been intensively managed and developed for well over 50 years. This is supported by the age of the neighborhoods that are adjacent to the Cloud Branch Creek. The creek has been channelized from a point just north of West 5lh Street all the way to Lake Monroe. Adjacent to the creek, there are some intermittent patches of forest where natural fires have been suppressed and hammock conditions prevail. Without exception, these areas are comprised of a mixture of native species and both invasive and/or ornamental exotics, typical of woodlots located within urban neighborhoods.

Communities within a One-Half Mile Radius

Upland Plant Communities The area within a one-half mile radius contains few natural habitats. The region is comprised of a grid- work of urban streets defining city blocks. The lots and roads surrounding the Site are well-shaded by mature oaks, usually live oak and laurel oak.

The wildlife community that is likely to utilize the Site area is most notably defined by the fragmented nature of the undeveloped habitats. Cloud Branch Creek is the only relatively natural feature that links several of these woodlots together. Because of the urbanized nature of the region, all fauna is susceptible to predation or disturbance from house cats, dogs and humans.

Fauna likely to utilize these forested areas are restricted to terrestrial species with small home ranges such as: the commensal house mouse, black rat, and Cuban anole, and native reptiles and amphibians including the eastern garter snake, southern black racer, gray squirrel, green treefrog, and squirrel tree frog. Terrestrial mammalian species that may travel along Cloud Branch Creek and periodically forage in and adjacent to the forested patches include: armadillo, racoon, opossum, feral and domestic cats, dogs, and perhaps on rare occasions, red or gray fox. Birds that may nest or periodically forage in the forested areas include the screech owl, barred owl, pileated woodpecker, red-bellied woodpecker, white-eyed vireo, northern parula, blue gray gnatcatcher, tufted titmouse, and the exotic (escaped from captivity) monk parakeet, a small green parrot species that is becoming established in urban areas of Central Florida.

Wetland Plant Communities The low lying areas adjacent to tributaries and ditches that drain through the region are vegetated with mixture of exotics including razor grass, primrose willow, and bamboo and natives including willow, elderberry, and cattail.

Two perennial creeks flow through the Site area: Cloud Branch Creek and Mill Creek. Both are well entrenched with a narrow littoral treatment zone. Vegetation in the channels includes: wild taro, water lettuce, duckweed, and pennywort.

The wildlife community that comprises the ditches are defined by three distinct characteristics: (1) the steep banks reduce the fish cover and creek access, (2) the predominant forested canopy reduce the creek's suitability as wading bird, osprey, bald eagle, and belted kingfisher foraging habitat, (3) fish use is a direct function of water depth. More fish diversity occurs downstream towards Lake Monroe. Gar and perch have been observed north of the confluence of Mill Creek and Cloud Branch Creek. Only mosquitofish were observed in the vicinity of the former SGP facility and the unnamed tributary, along with raccoon tracks.

Habitat in and adjacent to the ditches that drain the former SGP location

Habitats in and adjacent to the ditch as well as the control area upstream of the former SGP facility were characterized during the field survey.

Control Site (Section of Cloud Branch Creek next to the former SGP facility) This section of Cloud Branch Creek is relatively free of vegetation in the channel. The banks are dominated with wild taro, elderberrry, primrose willow, ragweed, Spanish-needle, carpetweed, castor bean, and beach sunflower. North of West 6th Street, the same vegetation is present along with ceaserweed, razor grass, and bamboo.

Unnamed Tributary The ditch flows intermittently. Razor grass, bamboo, and willow dominate the bank vegetation. Duck potato, ragweed, and mullberry and elderberry are common, and wax myrtle, common nightshade, and primrose willow less common.

Mosquito fish were observed in the ditch. Great crested flycatcher, tufted titmouse, boat-tailed grackle, and black racer were observed within the sediments in the channel.

Cloud Branch Creek The creek has been channelized through the stretch which lies between West 3rd Street and West 1st Street. Storm events, which can bring large volumes of water flowing through the West 3rd Street roadway culvert, have created a pool just below the culvert that us large enough to contain larger fish and turtles. Despite the more gradual banks in this region, vegetation is sparse due ti the dense canopy of mature oaks and pines that line the bank and decrease light levels at ground level.

Confluence with Mill Creek to Lake Monroe The channel is greatly widened downstream of the confluence with Mill Creek. There is a narrow littoral zone associated with this portion of the channelized creek. Vegetation in the water includes water lettuce, duckweed, and pennywort. The exotic castor bean dominates the shoreline.

Lake Monroe Lake Monroe is a large lake that was created with an impoundment on the St. Johns River. Where Cloud Branch Creek enters the lake there is a large alluvial deposition of sandy substrate that has been colonized by willows. Osprey, common moorhens, snowy egret, tricolored herons, least terns, boat-tailed grackles, American alligator, and a striped mud turtle were observed in the lake or overflying it.

The channel greatly widens downstream of the confluence with Mill Creek. Lake Monroe is a large lake that was created with an impoundment on the St. Johns River. Where Cloud Branch Creek enters the lake there is a large alluvial sand deposition area.

Federal and State Protected ("Listed') Species The United States and Florida have laws that protect species that are known to or potentially use habitats represented within a one- mile radius of the former SGP facility.

Federal Laws:

- The Endangered Species Act of 1973 (16 USC 1531) prohibits the "taking of any Endangered Species.
- The Bald Eagle Protection Act (16 USC 668- 668- d) prohibits the "taking" of any bald eagle.

Florida Laws:

- The Endangered and Threatened Species Act (Section 372.0725, Florida Statutes) prevents the taking of any fish or wildlife designated by the Florida Game and Fresh Water Fish Commission (GFC) as Endangered, Threatened, or of Special Concern.

Without exception, all federally protected species are additionally listed by the GFC as Endangered, Threatened, or of Special Concern.

There are no Florida Natural Areas Inventory (FNAI) Element Occurrence Records for the one-half mile Facility area. However, several federally and/or state listed species may occur within the Site area. Federally listed species that are known to occur or potentially use habitats represented within a on-half mile radius of the Site are: the southern bald eagle, wood stork, and the American alligator which is protected due to its similarity of appearance to other crocodilians. The eastern indigo snake is not likely to occur in the Site area.

State listed species known or likely to utilize the Lake Monroe portion of the Site are the little blue heron, roseate spoonbill, limpkin, snowy egret, tri-colored heron, and the white ibis.

<u>Southern Bald Eagle</u> The closest known southern bald eagle nest is outside of the "primary and secondary management zones." These eagles and several others that nest in the vicinity may occasionally forage on the fish and carrion in the palustrine and lacustrine (wetland and lake) systems within one-half mile radius of the Site. However, the fish within the ditch and creek system are certainly too small to provide suitable prey for eagles and characteristics of the creeks do not match the structural habitat requirements for bald eagles.

<u>Wood Storks and roseate spoonbill</u> feed predominantly in the water column sweeping their open bills back and forth and snapping then shut on prey. On the listed wading birds, they are least likely to incidentally ingest sediment or soil materials.

<u>Little blue heron, tri-colored heron, snowy egret, and limpkin</u> feed by stabbing fish with their long sharp bills. All will pirate prey from other species such as white and glossy ibis.

<u>White ibis</u> probe the ground in search for invertebrates. This species is most likely to incidentally ingest soil or sediments while foraging relative to other species of wading birds. White ibis may also feed in and along the Cloud Branch Creek and the ditches to the south. Foraging suitability for all these species is directly related to water levels. For example, as water is drawing down from the unnamed tributary, ibis may forage in the newly exposed alluvium and exposed sediment in an opportunistic fashion.

The American alligator is listed as threatened by the US Fish and Wildlife Service due to its skin's resemblance to other protected crocodilians, specifically the South American caiman, and to a lesser extent the American crocodile, a critically endangered species in southern Florida. This listing does not provide any special protection for the alligator or its habitat.

Nevertheless, the alligator is known to forage from the confluence of Mill Creek to and including Lake Monroe, and represents the top level predator in the local aquatic food chain.

Wildlife Resources of Special Interest Wildlife resources of special interest include areas that may be of significant economic or recreational importance, due to the habitat provided. Lake Monroe may offer refuge and/or breeding opportunities to game or sport- fishing species. The Site area does not offer any unique habitat or wildlife. No state or federally owned preserves occur within the vicinity of the Site area.

Protected Habitats and Special Interest Plant Communities The protected habitats within the study area include any jurisdiction wetlands, which would include the channelized creeks. Activities that would alter the vegetation, water quality, or wildlife habitat benefits provided be any wetlands require coordination with the US Army Corps of Engineers Section 404 permitting program, and an Environmental Resource Permit from the St, John Rivers Water Management District.

7.1.2 Problem Formulation

7.1.2.1 Identification of Chemicals of Potential Concern

The ERA process establishes the selection of COPCs throughout a series of Steps. Step One included the Site visit and survey to described the Environmental Settings and it is included in the ERA Compendium Step 1 for all Media, Steps 2 and 3 for Soil (ERA Compendium 1) report. The Screening Level Exposure Estimate (Step 2 of the ERA process) eliminates chemicals from further ecological concern if the maximum value detected is below its EPA Region 4 Screening Value, or the chemical was not detected and the maximum detection limit is below its EPA Region 4 Screening Value. Chemicals are carried to Step 3 of the ERA process. In Step 3 of the ERA process, further lines-of-evidence are evaluated to refine the list of COPCs. Examples of lines-of-evidence that may justify the elimination of a screening level COPC from further ecological concern include:

- The frequency at which the chemical is detected
- Alternative toxicity values and/or toxicity data
- The number of samples in which the chemical exceeds its toxicity value
- The number of samples in which the chemical detection limit exceeds its toxicity value
- The magnitude to which the chemical or its detection limit exceeds the toxicity value
- The location of the samples which chemicals exceeding the screening value
- The persistence of the chemical in the environment
- The mean chemical concentration compared to toxicity values
- Comparison to natural background concentrations

Steps 2 and 3 of the ERA process for soils for OU1 were completed and provided in the ERA Compendium 1 in February 2001.

Steps 2 and 3 of the ERA process for sediments and surface waters, considered to be OU3, were completed in the ERA Compendium 2 in September 2001. At the completion of Step 2, 161 of 162. In Step 3, the COPCs from Step 2 were compared with Alternative Toxicity Values. Use of these Alternative Toxicity Values reduced the number of COPCs in sediments from 157 to 72. Out of these 72, 36 were not detected in any sediment sample (meaning 36 were detected). Roughly half of the detected chemicals were PAHs. Use of Alternative Toxicity Values for surface water COPCs reduced the number of COPCs from 90 to 39. Out of these 39, only four were detected in any surface water sample.

Closer examination of these 36 detected chemicals in sediments resulted in the elimination of all chemicals with the exception of PAHs and lead. Closer examination of the four detected chemicals in surface water resulted in their elimination as COPCs.

Therefore, the conclusion of Step 3 for sediments is that lead and PAHs concentrations in sediments from Cloud Branch Creek, between the former SGP facility and its confluence with Mill Creek, may pose potential adverse health effects to animals foraging in this portion of the creek. In addition, it concluded that further field sampling investigation was needed to continue with the ERA process.

7.1.2.2 Ecological Conceptual Site Model

COPCs have migrated from the site to the sediments of Cloud Branch Creek as a result of surface runoff. COPCs have accumulated in sediments within Cloud Branch Creek between West 3rd Street and the confluence with Mill Creek and currently exist at concentrations that exceed sediments screening values for shallow sediments. Benthic macroinvertebrates are the primary receptors exposed to these COPCs, and maintenance of this population will support the limited function of the stream ecosystem, providing food sources for predators.

The Ecological Conceptual Site Model was prepared for OU3 and is included in the ERA Compendium 1 (Problem Formulation Step 3) prepared by the Sanford PRP Group on February 15, 2001.

The surrounding OU3 area is predominantly urban, urban/residential and has been intensively managed for well over 50 years. The well-established neighborhood is comprised of grid-work of urban streets that define city blocks. Because of the urbanized nature of the region, all fauna is susceptible to predation or disturbance from house cats, dogs and humans. Areas immediately adjacent to the creek are comprised of a mixture of native species and both, invasive and ornamental exotics. Cloud Branch Creek itself is well entrenched with a narrow littoral zone. The steep banks reduce fish cover and creek access by wildlife, and vegetation is sparse due to the dense canopy of mature oaks and pines that line the bank and decrease level of light near the ground surface. The occurrence of fish is strictly dependent on water depth. OU3 does not offer any unique habitat or wildlife, nor are there any state or federally owned preserves in the vicinity of Cloud Branch Creek.

The conceptual Site model for Cloud Branch Creek is shown in Figure 1-2 of Appendix B.

COPCs present in deeper sediment beneath the shallow zone (if any) are assumed to be relatively immobile. In addition, planned OU1 remedial action will remediate soil impacts on south of West 3rd Street, which is expected to eliminate the largest source of COPCs to the stream sediments.

7.1.2.3 Assessment Endpoint

The purpose of the problem formulation in the ERA process is to determine the Assessment Endpoints for the Site, EPA defines assessment endpoints as explicit expressions of the actual environmental values (e.g., ecological resources) that are to be protected. Ecological risk involves multiple species that are likely to be exposed to differing degrees and to respond differently to the same contaminant. But it is not practical or possible to directly evaluate risks to all of the individual components of the ecosystem at a site. Instead assessment endpoints focus the risk assessment on particular components of the ecosystem that could be adversely affected by contaminants from the site. Because assessment endpoints focus the risk assessment design and analysis, appropriate selection and definition of these endpoints are critical to the utility of a risk assessment. The Assessment Endpoint for this Site is "*Sediments should support and maintain benthic macroinvertebrate communities.*"

7.1.3 Measurement Endpoints

The Measurement Endpoints (Step 4) selected to evaluate the Assessment Endpoint include: survival and growth of benthic macroinvertabrate species that are representative of the site-specific ecosystem, and which are known to be sensitive to the COPCs, and benthic community structure indices. Survival and growth were to be determined by laboratory toxicity testing of sediments collected at the Site, which exhibit a COPC concentration gradient and include samples from reference locations on the same or similar water bodies, but unaffected by the Site.

The Sanford PRP Group verified that the samples could be collected according to the Work Plan (Step 5).

7.1.4 Exposure Assessment

On August 17, 2003 through August 21, 2003 the Sanford PRP Group collected 16 sediment samples to conduct chemical analysis, toxicity testing and population/community structure evaluation, as part of the ERA Steps 6. Three reference sample locations (E-CB- REF1, E-CB-REF2, and E-MC-REF1) were selected and were at the same locations as previously collected reference samples. Based on previous data, those reference sampling locations were thought to be appropriate to be used as references for this sampling event as well. Sample locations can be found in Figure 3-1 of Appendix B.

The toxicity of sediment samples from OU3 was characterized using two tests:

- USEPA Test Method 110.0, *Hyallelah azteca* (an amphipod) 10-day Survival and Growth Test for Sediments, and

- USEPA Test Method 11.2, *Chironomus tentans* (a midge) 10-day Survival and Growth Test for Sediments.

Along with the toxicity testing all samples were analyzed for VOCs, PAHs, pesticides/polychlorinated biphenyl compounds, Semivolatile organic chemicals (SVOCs), metals, cyanide and TOC. Description of all tests can be found in Table 2- 1 of Appendix B. Description of sediment sampling field observation and location can be found in Table 3-1 of Appendix B. Physical characteristics of OU3 sediments can be found in Table 4-3 of Appendix B.

Sample results can be found in Tables 4-4 and Table 4-5b of Appendix B. Table 4-4 of Appendix B presents inorganic constituents and Table 4-5b of Appendix B presents analytical results for PAH constituents,

7.1.5 Ecological Effects Assessment

The Sanford PRP Group submitted the first draft of the ERA (Step 7) report on February 9, 2004. After subsequent reviews and comments from EPA and FDEP the Sanford PRP Group submitted a revision of the Draft ERA report on January 17, 2005. After reviewing the revised Draft ERA report, EPA and FDEP found some comments from the first set were still unaddressed, chemistry evaluation of total PAHs was inaccurate, interpretation of the benthic invertebrate community structure was not valid, and there were concerns with the presentation of the toxicity test results and the resulting culmination of the characterization of the risk at Cloud Branch Creek. EPA and FDEP's major issues with the evaluation of the toxicity tests were with the statistical analysis and interpretation of the data. EPA recognizes the report has valuable information; however, for the reasons previously established, the report was unacceptable. The toxicity test results and the ERA report (Step 7) will not be further discussed as part of this ROD.

7.2 Risk Management Decision (Step 8)

FDEP has sediment quality assessment guidelines for the protection of sediment-dwelling organisms in Florida, and these values were used for the risk assessment. FDEP obtained the values for lead and total PAHs from a publication by MacDonald et al. Two sediment quality guidelines (SQG) were derived for various chemicals and metals: the threshold effect concentration (TEC) and the PEC, both of which are dry-weight normalized values at 1% organic carbon. The TEC is a value that provides an accurate basis for predicting the absence of sediment toxicity (i.e., below which adverse effects to sediment-dwelling organisms are not expected to occur). The PEC is a value that provides an accurate basis for predicting sediment toxicity (i.e., above which adverse effects on sediment-dwelling organisms are likely to be observed). The reliability of the SQG was evaluated by comparing sediment chemistry to toxicity data from field studies conducted throughout the United States.

The PEC was considered to be reliable if greater than 75% of the sediment samples were correctly predicted to be toxic using the PEC (accepting 25% of both false positives and false negatives). 347 samples were evaluated for the derivation of the PEC for lead, and 167 samples were evaluated for the PEC for total PAHs. The predictive ability of the consensus-based PECs for total PAHs and lead are thought to be a reliable predictor of toxicity in freshwater sediments because the PEC values were able to predict toxicity among the samples that were used to develop these values, 89.6% of the time and 100% of the time, respectively.

On May 4, 2005, EPA, in consultation with FDEP, offered the Sanford PRP Group the option of redoing the toxicity test but extending the test to 28 days as originally requested by EPA and resubmitting the ERA report (Step 7) addressing all comments, or the option of making an RMD based on the existing Cloud Branch Creek data. The RMD offered by both agencies was to address Cloud Branch Creek up to the confluence with Mill Creek, near location E-CB-8. (Figure 3-1 of Appendix B). This location exhibited PAH concentrations about two times the Florida PEC value of 23 mg/kg and had a very low TOC content of 0.27%. Total PAH concentrations and TOC percentage per location are presented in Table 4-5b of Appendix B. All sample locations downstream from the Mill Creek confluence are below the PEC value.

All PAH compounds were detected at levels exceeding PEC in one or more samples. The PEC value for total PAHs is 23 mg/kg. Total PAH concentrations exceeded their PEC in nine samples, including reference location E-MC-REF1, and eight samples downstream of the former SGP facility at locations E-CB-1, E-CB-2, E-CB-4, E-CB-5, E-CB-6, E-CB-7, and E-CB-8. Concentrations of total PAHs did not exceed the PEC downstream (north of) the confluence with Mill Creek. Refer to Table 4-5b of Appendix B.

Lead is a COPC for the OU3 area of interest. The PEC for lead is 130mg/kg. Lead exceeded its PEC in two samples E-CB-1, E-CB-4. The E-CB-1 location will be addressed as part of the OU1 remedy and location E-CB-4 is located in between West 1st and West 3rd Streets. In addition, lead exceeds its. TEC value at E-CB-1, E-CB-2 and its duplicate E-CB-4, E-CB-5, E-CB-6 and E-CB-7 and its duplicate. All other samples collected downstream have lead concentrations below the TEC value of 30 mg/kg. Refer to Table 4-4 of Appendix B.

From previous RI data there were few isolated sediment samples in Lake Monroe delta that had detections of various PAHs above the Screening Values. However, Lake Monroe at that point receives discharges from other urban sources that could be contributing to those results.

7.3 Risk Uncertainty

There are uncertainties which are inherent in the risk assessment process. The calculations and conclusions which are presented in the BRA report include uncertainties which may arise from assumptions used in several steps of the assessment. The factors which may lead to either overestimation or an underestimation of the potential adverse effects and associated environmental risks posed by exposure to analytes at the former Sanford facility, depending on the relationship of actual conditions to assumptions employed in the calculations, include the following:

- Uncertainties are inherent in the use of screening values such as the PEC. The PEC was developed to define a concentration "above which adverse effects are expected to occur more than not." The uncertainties associated with the PECs stem from their dependence upon an underlying data set which may not be representative of the sediments of interest, the bioavailability of the sediment-associated contaminants, and the effects of chemical mixtures (i.e., synergistic or antagonistic effects), among other variables. Thus, exceedance of these benchmarks indicates a potential risk and cause for further ecological risk evaluation, not a definitive finding. PECs are not site-specific values and as such it could be a more conservative or less conservative value.

- The quantification of PAH constituent contaminations is uncertain. Two analytical methods were used, and the results were not always consistent. When, both methods were unable to detect a PAH constituent, the value is reported as less than the lower detection limit (which is usually the detection limit of the more sensitive method, EPA SW 846-8270 by SIM). Otherwise, the higher of the two reported values was conservatively assumed to be representative for the sample.

- the analytical data presented here may not reflect actual site conditions for all analytes at the present time. Data have been collected during several years of the former facility investigations. However, concentrations in other areas are not expected to be higher than the values presented in the report because the site equipment has been dismantled, activities have ceased, and no new sources have been added. It is expected that the concentrations presented in the report may actually overestimate the true exposure conditions in the future due to processes such as biodegration and dilution.

8.0 REMEDIATION OBJECTIVES

Based on the RMD taken among the parties, surficial sediments of Cloud Branch Creek north of OU1 to the confluence with Mill Creek are the media to be remediated for OU3. Alternatives to address the OU3 sediments were based upon the following OU1 remedial action objectives:

- Address sediments containing PAHs and lead at elevated concentrations (i.e., reduce potential exposure to ecological receptors) in a manner consistent with the risk management objectives in the remediation area defined above;
- Maintain consistency with City of Sanford, Water Management District, and State of Florida long-term requirements for surface water drainage capacity in the remediation area defined above; and
- Establish appropriate controls to address potential human exposure from reasonable anticipated future disturbances within the remediation area described above.

Since an RMD was made based on existing Site data before Step 7 of the ERA process was completed or approved, no site-specific remedial goal options were developed. Instead, the remedial goals adopted for the Site will be the PEC values for lead and total PAHs. As previously discussed, the extent of the Cloud Branch cleanup under this ROD will be determined by the use of the PEC values for lead and total PAHs which are 130 mg/kg and 23 mg/kg, respectively. Based on existing data all sample locations downstream from the Mill Creek confluence are below the PEC value for lead and total PAHs, which is the basis for both agencies' offer to address Cloud Branch Creek up to the confluence with Mill Creek, as part of the RMD.

9.0 SUMMARY OF ALTERNATIVES

In considering OU3 (Cloud Branch Creek sediments) RAOs, the analysis presented below reflects the fundamental components of the various alternatives developed to address it. These alternatives have been presented in detail in the FS report dated April 2006.

Alternative 1: No Action

The no action alternative serves as a baseline for comparing the overall effectiveness of the other remedial alternatives. Under the "no action" alternative, the site is left "as is" and no funds are expended to actively control or cleanup the site related contamination and no reduction in risk would be achieved. No remedial action would be taken. The alternative relies on natural attenuation processes to reduce the concentrations of constituents of interest in sediments.

Alternative 2: Institutional and Engineering Controls

This alternative involves physical and legal controls to restrict human behavior and reduce risk to human health. Engineering Controls, or physical controls would involve the use of posted signs warning to avoid contact with sediments due to impacts to limit future exposure to contaminated areas at the Site. Legal controls would involve the filing of deed notices and restrictive covenants with the state and local government. The present worth cost of this remedy represents only periodic sign maintenance and repairs. This alternative reduces the potential risk associated with dermal contact with soil/sediment by minimizing exposure to the Site. This alternative poses little risk short-term or long-term, as long as access restrictions are enforced. Mobility, toxicity and volume are not reduced by this remedy.

Alternative 3: Sediment Removal and Management, Installation of Engineered Soil Cover, Monitoring and Institutional Controls

This alternative will include the removal of surficial sediments in and along the Cloud Branch Creek, installation of an engineered channel with future requirements for enhancing surface water flows in the creek.

Under this remedial alternative, surficial sediments will be removed from the Cloud Branch Creek channel to a nominal depth of 2 ft below existing grade. Additional removal of bank soils may be necessary to achieve a stable angle of repose and meet requirements of the City of Sanford for drainage of surface water within the remediated segment of Cloud Branch Creek. An engineered cover will be installed over the area of excavated sediments, consisting of a protective fill layer and a channel armoring layer. The area of excavated bank soils will be backfilled with a foot of topsoil or other appropriate cover material. Monitoring and Institutional Controls will be implemented to ensure the long-term integrity of the remedy.

Alternative 4: Incidental Sediment Removal and Management, Installation of Culvert, Monitoring and Institutional Controls

This alternative will include the removal of sediments in the Cloud Branch Creek channel sufficient to install an enclosed culvert system that will isolate PAHs and lead from the creek, and be consistent with future requirements for enhancing surface water flows in the creek.

Under this alternative, a number of Institutional Controls would be implemented to reduce the potential risk associated with exposure to impacts at the Site. Institutional Controls would include restricting property for industrial or commercial use only (non- residential use); restricting unauthorized excavation on the property (authorized excavation would require a health and safety plan and oversight); allowing no water supply wells to be drilled; fencing to mitigate the potential for trespassers to access the area; and placing deed restrictions on properties notifying present and future property owners of the presence of impacted soil in the subsurface. In addition, this alternative would include groundwater monitoring for 30 years.

Alternative 5: Sediment Removal and Management, Installation of Culvert, Monitoring and Institutional Controls

Alternative 5 is a combination of portions of Alternatives 3 and 4. Alternative 5 entails the removal of surficial sediments (a minimum of 2 ft) in Cloud Branch Creek as described in Alternative 3; installation of a culvert and backfill as described in Alternative 4; long-term monitoring to confirm the integrity of the remedy as described in Alternative 3; and implementation of institutional controls to further ensure the integrity of the cover and mitigate the potential for human or environmental exposures to site-related constituents as described in Alternative 3.

10.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

EPA has established nine criteria which are used in comparing the advantages and disadvantages of each alternative.

The alternatives are evaluated against one another by using the following nine criteria:

- Overall protection of human health and the environment
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
- Long term effectiveness and permanence
- Reduction of toxicity, mobility, or volume through treatment
- Short term effectiveness
- Implementability
- Costs
- State Acceptance
- Community Acceptance

The NCP has categorized the nine criteria into three groups:

(1) Threshold criteria: the first two criteria, overall protection of human health and the environment and compliance with ARARs (or invoking a waiver), are the minimum criteria that must be met in order for an alternative to be eligible for selection;

(2) Primary balancing criteria: the next five criteria are considered primary balancing criteria and are used to weigh major trade- offs among alternative cleanup methods; and

(3) Modifying criteria: state and community acceptance are modifying criteria that are formally taken into account after public comment is received on the proposed plan. Community acceptance is addressed in the responsiveness summary of the ROD.

Overall Protection of Human Health and the Environment

Overall protection of human health and the environment would be achieved under Alternatives 3, 4 and 5 since the potential exposure from contaminated sediments to ecological receptors would be eliminated through either capping and/or removal. Alternatives 3 and 5 would provide the greatest degree of protection because the sediments would be excavated.

Alternative 1 would not be protective of human health or the environment. Therefore, it is eliminated from further consideration. Alternative 2 would offer only restricted use of the property and would only prevent site exposure to human health. However, it would not prevent ecological receptors' exposure to contaminated sediments. Therefore, it is also eliminated from further consideration. Alternative 1 would not be protective of human health. Therefore, it is eliminated from further consideration. Alternative 2 would offer only restricted use of the property and will not completely eliminate site exposure or human health risk. Therefore, it is also eliminated from further consideration.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Alternatives 3, 4 and 5 can be designed to attain ARARs.

Long-Term Effectiveness and Permanence

Alternatives 3, 4 and 5 achieve long-term effectiveness and permanence since they provide either disposal or containment. In addition, Institutional Controls provide restrictions and limits on what could be done once the remedy is implemented. Alternatives 3 and 5 would achieve most long-term effectiveness because both remove contaminated sediments.

Reduction of Toxicity, Mobility, or Volume

Alternative 3 and 5 would be the most effective in reduction of toxicity, mobility or volume through excavation and off-site disposal. Alternative 4, would only reduce mobility and some volume, because it only removes incidental sediments. Alternative 4 would not reduce toxicity.

Short-Term Effectiveness

Alternative 4 would provide the most short-term effectiveness, as it will cause the least impacts to workers and the community, since relatively small quantities of contaminated sediments would be excavated, thus minimizing the potential for air releases during construction activities. Alternatives 3 and 5 would increase the potential for exposure for the workers and the community due to the excavation, dust and increase vehicular traffic. Engineering controls would be developed during the design to limit negative impacts.

Implementability

Alternative 4 would be the most implementable as it involves capping contaminated sediments in-place. Alternative 4 could be implemented over a relatively short period of time. Alternatives 3, 4 and 5 would utilize conventional construction techniques and have a large pool of experienced contractors.

Cost

Overall Protection of Human Health and the Environment; Compliance with ARARs; Reduction of Toxicity, Mobility, or Volume; Long-Term Effectiveness and Permanence; and Short-Term Effectiveness are also to be considered and have more weight as the basis for the remedy selection. EPA does not use cost as the primary basis for the selection. However, EPA does take in consideration the cost effectiveness of an alternative.

The most costly alternative would be Alternative 3. The least costly alternative would be Alternative 4, other than the No Action and Engineering/Institutional Controls Alternatives 1 and 2, respectively. A summary of the present worth costs, which includes capital as well as the O&M costs for each of the alternatives is presented in Table 1.

State Acceptance

In accordance with 40 CFR 300.430, the State of Florida has been involved in the process and has not expressed an opposition to the selected alternative.

Community Acceptance

On April 13, 2006, representatives from EPA, FDEP and the Sanford PRP Group met informally with property owners that could be affected by Site remediation activities around the OU1 and OU3 areas to discuss findings and possible remedies. A number of property owners that would be impacted by the remediation of Cloud Branch Creek voiced their preference to place a culvert in the creek. The concerns were taken into consideration when making the final OU3 remedy selection.

During the comment period for the Proposed Plan for ROD no comments were received from the community. Based on this observation, it is EPA understanding that the community is not opposed to the selected remedy.

11.0 SELECTED REMEDY

After reviewing the information available and after careful consideration of the various alternatives, EPA is selecting Alternative 5: Sediment Removal and Management, Installation of Culvert, Monitoring, and Institutional Controls.

11.1 Description of Remedy

For this alternative it is assumed that sediment removal will be done "in the dry," employing water diversion/control techniques to keep surface water from entering the excavation area. Removal will be conducted during the relatively dry winter season when water levels and creek flow rates are typically lowest. Remediation activities will not be conducted during high flow conditions. Sequential sections of the creek will be isolated for removal activities with the use of berms upstream and downstream of the removal area, with pumps used to route water past the work area as needed. Sediments will be removed to a nominal depth of 2 ft below existing grade. Excavation will be conducted in the bed of the channel and extend up the bank, as necessary to achieve the removal of a minimum of 2 feet of creek bed sediments, as well as providing an excavation of sufficient width and depth to install the culvert (including bedding material) with a minimum backfill cover over the culvert of at least 6-inches. The actual backfill or bedding materials to be used and their thicknesses will be determined during the remedial design. The removed sediments and bank soils will be transported to a central handling area and stockpiled pending transport for off- site disposal at a RCRA Subtitle D landfill.

At present, the City of Sanford is preparing improvements for Cloud Branch Creek, including retention upstream of the Site that will reduce the post-development 10-year and 25-year 24-hour storm peak discharges to Lake Monroe by approximately 23% and 25%, respectively. The City submitted a permit application to St. John Water Management District for improving flood control along Cloud Branch Creek, which included a proposal to replace the existing culvert under West 3rd Street with a double 60-inch x 144-inch concrete box culvert. It is anticipated the culvert will be replaced by the Sanford PRP Group during the construction phase of OU1 and OU3 remedies.

The areas between the culvert pipes will be backfilled with compacted soil fill, and covered with a minimum of 6 inches of topsoil. The final grade of the area above the culvert will be contoured to convey surface water to collection vaults connected to the culvert. Surface water collection vaults will be installed at grade at appropriate locations along the creek to direct surface water flow into the culvert system.

Following installation of the culvert, backfill and establishment of vegetation, a long-term monitoring and maintenance program will be implemented. This program would involve monitoring of the removal and backfill area for 20 years. Site inspections will be conducted quarterly for the first year, annually for the next 4 years, and once every 5 years, thereafter for a total period of 20 years after closure. Site inspections will be conducted following significant storm events (i.e., a 10-year storm), until a sufficient number (i.e., 3) of the storm events have been observed not to adversely threaten the remedy. The City of Sanford would periodically clean out the channel to remove debris that may have washed into Cloud Branch Creek to maintain drainage capacity. Damage to the restored creek and banks will be repaired as appropriate to maintain the long-term effectiveness and reliability of the remedy.

It is estimated that the implementation of this remedy will remediate approximately 1,900 cubic yards of sediments from the creek and banks of Cloud Branch Creek.

11.2 Institutional and Engineering Controls

This alternative also includes the implementation of institutional controls to facilitate the long-term effectiveness and integrity of the remedy and minimize the potential for human and ecological exposure to the remaining subsurface PAHs and lead. Institutional controls will be implemented that place restrictions on subsurface activities within the project area. Such institutional controls may include the following:

- Governmental controls and zoning restrictions and local ordinances requiring construction permits;

- Proprietary controls, deed modifications, standard easements, conservation easements, and/or restrictive covenants prohibiting certain activities on the properties;

- Informational devices, deed notices, advisories, and notifications; and

- Provide permanent access to subject property to EPA and FDEP and their agents and/or representatives.

The actual institutional controls would be determined in consultation with EPA and FDEP.

11.3 Summary of the Estimated Remedy Costs

The total estimated cost of the selected alternative, including Engineering and Institutional Controls, is $1,400,000.00. The detail costs could be found in Table 2.

11.4 Expected Outcome of Selected Remedy

The expected outcome of this action is to reduce the potential exposure of ecological receptors to COCs in the OU3 sediments. This remedy will be implemented concurrently with the OU1 remedy. It is expected that both remedies will take about 12 to 15 months of implementation.

12.0 STATUTORY DETERMINATIONS

EPA has determined that the selected remedy will satisfy the statutory determinations of Section 121 of CERCLA. The remedy will be protective of human health and the environment, will comply with ARARs, will be cost effective, and will use permanent solutions and alternative treatment technologies to the maximum extent practicable.

12.1 Protection of Human Health and the Environment

The remedy will prevent ecological receptors from been exposed to the contaminated sediments in Cloud Branch Creek. No potential human risk was determined as part of the Baseline Risk Assessment. The potential risk will be eliminated because the contaminated sediments will be excavated and disposed off Site.

12.2 Compliance with ARARs

The selected remedy will comply with the substantive requirements of Federal ARARs and State ARARs listed in Table 3.

12.3 Cost Effectiveness

EPA evaluated all of the alternatives which satisfy the two threshold criteria, protection of human health and the environment and attainment of ARARs. Section 300.430(f)(1)(ii)(D) of the NCP also requires EPA to evaluate three out of five balancing criteria to determine overall effectiveness; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; and short-term effectiveness. Overall effectiveness is then compared to cost to ensure that the remedy is cost-effective. EPA has concluded that the Selected Remedy, Sediment Removal and Management, Installation of Culvert, Monitoring, and Institutional Controls, affords the highest level of overall effectiveness proportional to its cost.

12.4 Utilization of Permanent Solutions or alternative treatment technologies to the maximum extent practicable

This remedy will be a permanent solution for the OU3 sediments in that all exposed sediment will be removed and disposed off Site, thus preventing direct exposure to benthic organisms. This is a common treatment method used for sediment contamination at Superfund sites. It will be a permanent remedy.

12.5 Preference for Treatment

The preference for treatment is satisfied because the contaminated source material will be removed and disposed for off-site disposal. The selected remedy is widely used and accepted treatment for contaminated sediments among different EPA Regions across the Unites States.

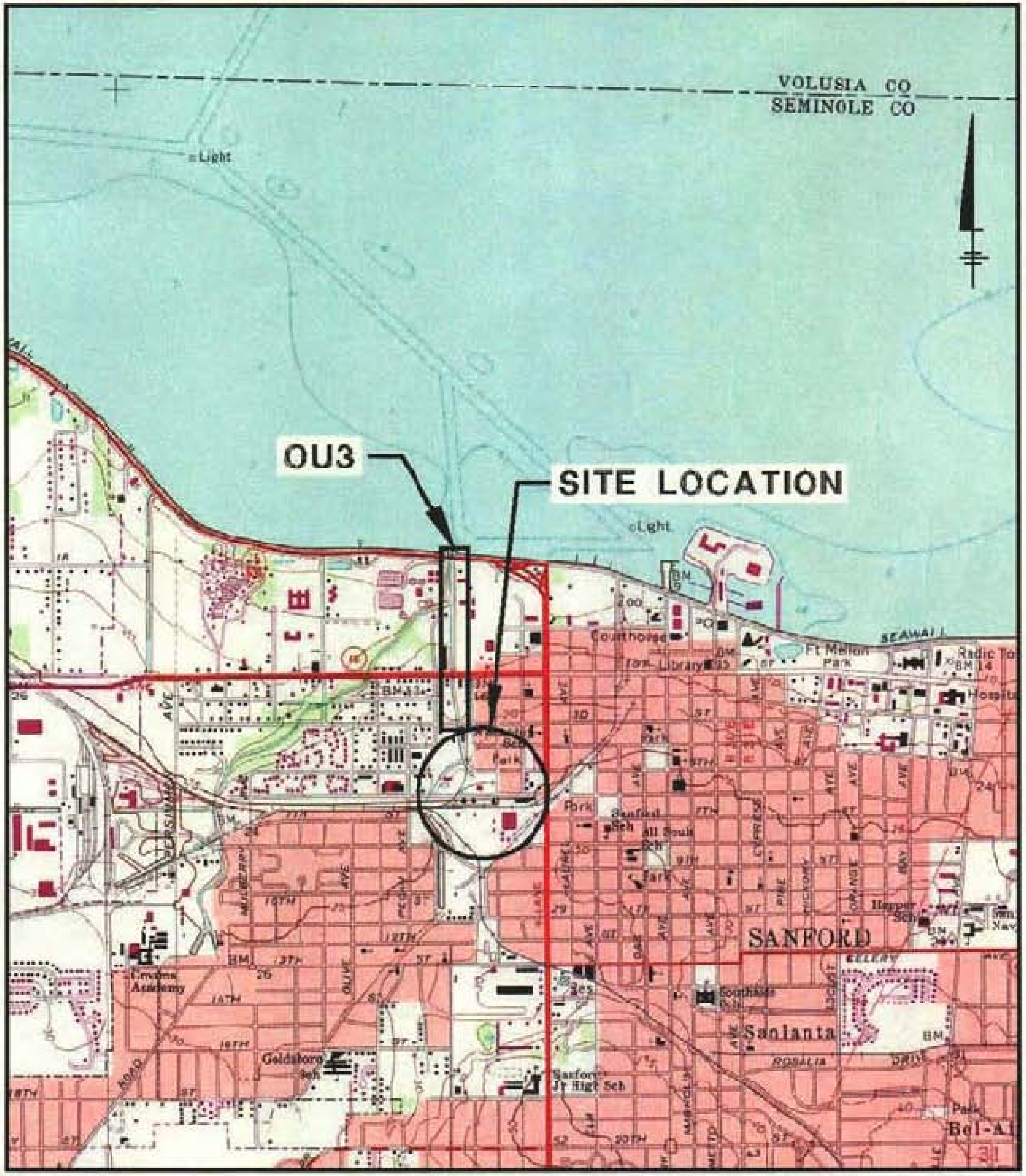
12.5 Five-Year-Review Requirement

Because this remedy will not result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestrictive exposure, however, it will take more than five years to attain RAOs, a policy review may be conducted every five years until RAOs are met.

12.6 Explanation of Significant Changes

The remedy described in this ROD is the preferred alternative described in the Proposed Plan for the OU3 phase. There have been no significant changes in the selected remedy.

FIGURES



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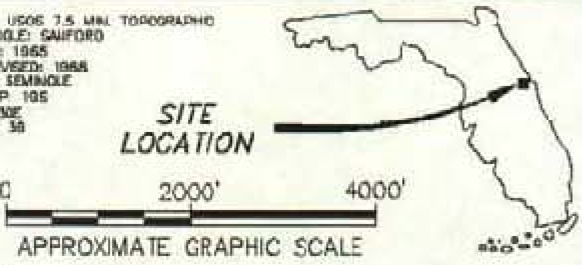
SECTION: 38



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SANFORD GASIFICATION PLANT
SANFORD, FLORIDA
OU3 FOCUSED FEASIBILITY STUDY

SITE LOCATION MAP

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

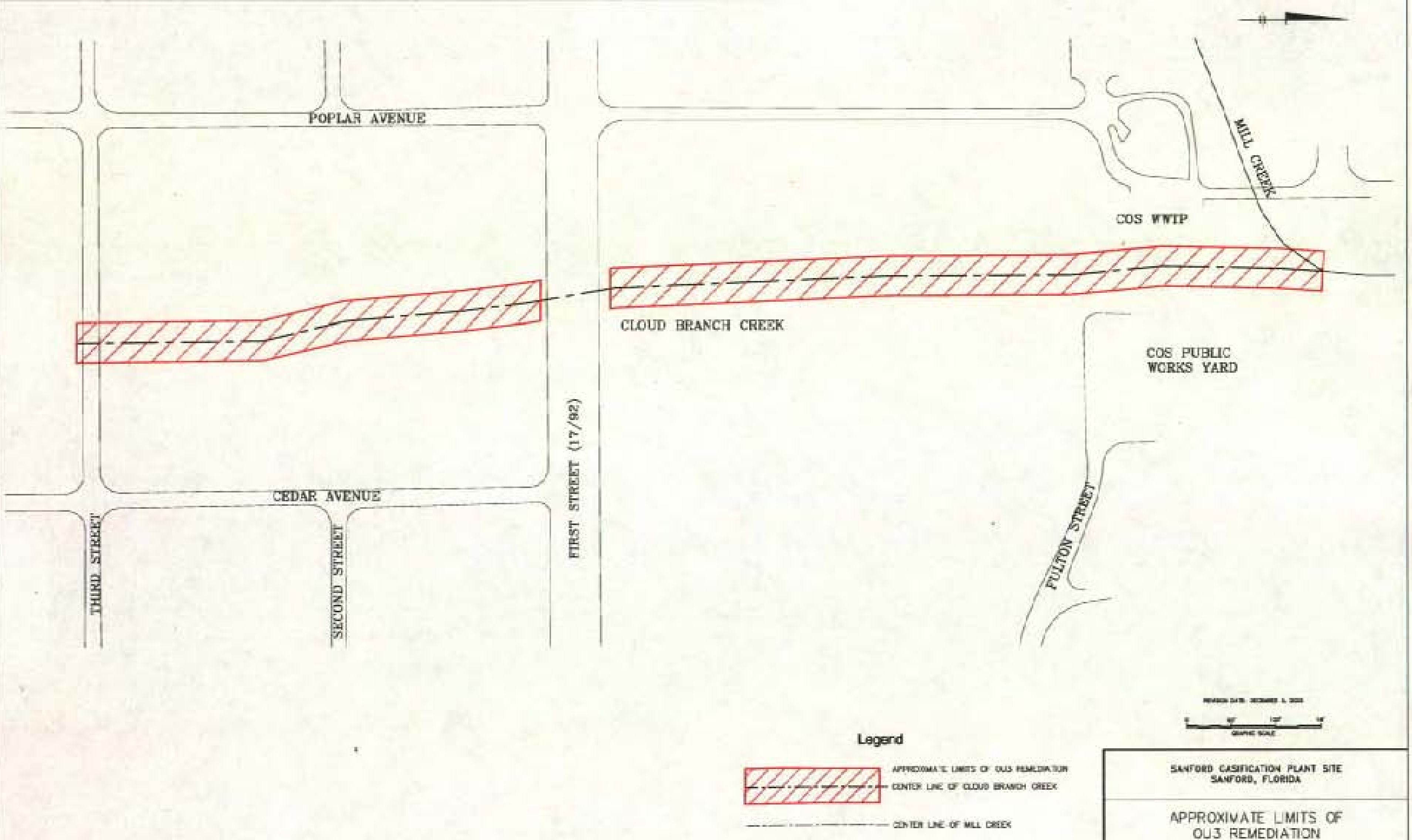
FIGURE
1

SANFORD GASIFICATION PLANT SITE
SANFORD, FLORIDA
OU3 FOCUSED FEASIBILITY STUDY

APPROXIMATE EXTENT OF OU3 AREA TO BE REMEDIATED

BBL

FIGURE 2



SANFORD GASIFICATION PLANT SITE
SANFORD, FLORIDA

APPROXIMATE LIMITS OF
OU3 REMEDIATION

BBL

FIGURE 3

TABLE 1: OU3 ALTERNATIVE COST SUMMARY				
	ALTERNATIVE	CAPITAL COST ($)	ANNUAL O&M ($)	PRESENT WORTH ($)
1	No Action			
2	Engineering and Institutional Controls	5,000.00	2,500.00	33,000.00
3	Sediment Removal and Management Installation of Engineered Soil Cover, Monitoring and Institutional Controls	2,200,000.00	2,500.00	2,300,000.00
4	Incidental Sediment Removal and Management, Installation of Culvert, Monitoring and Institutional Controls	1,100,000.00	2,500.00	1,200,000.00
5	Sediment Removal and Management, Installation of Culvert, Monitoring and Institutional Controls	1,400,000.00	2,500.00	1,400,000.00

Table 2
Alternative 5: Sediment Removal with Culvert
Sanford Gasification Plant Site
Sanford, Florida
OU3 Focused Feasibility Study

Item	Unit Cost	Units	Total
CAPITAL COSTS			
CONSTRUCTION			
1. Oversight	$3,000 / day	45	$135,000
2. Mobilization/demobilization	$65,300 / Is	1	$65,300
3. Clearing and grubbing	$6,000 / ac	3.7	$22,200
4. Construction of staging/decon areas	$40,000 / Is	1	$40,000
5. Construction of access roads	$25 / If	1,700	$42,500
6. Erosion/sedimentation controls	$4 /If	3,400	$13,600
7. Dewatering control	$2,000 / day	35	$70,000
8. Excavation, handling of bed materials	$30 /cy	1,900	$57,000
9. Nonwoven geotextile {lay before placing bed backfill)	$1 /sy	2,800	$2,800
10. Backfill of bed {fill below culvert)	$15 /cy	1,400	$21,000
11. 36" diameter corrugated HDPE pipe	$26 / If	4,800	$124,800
12. Catch basins	$5,000 / ea	10	$50,000
13. Anti-seep collars	$500 / ea	8	$4,000
14. Backfill (around and top of culvert)	$15/cy	2,900	$43,500
15. Topsoil	$18/cy	660	$11,880
16. Erosion control blanket	$1 /sy	4,700	$4,700
17. Hydroseeding	$3,500 / ac	3.5	$12,149
18. Odor and vapor control	$1,000/day	35	$35,000
19. Air monitoring	$2,500 / day	35	$87,500
20. Misc. site restoration	$10,000 / is	1	$10,000
21. Offsite transportation and landfilling of excavated soil	$28 / ton	2,600	$72,800
Capital Cost Subtotal			$925,729
Contingency (20%)			$185,146
Pre-Design Investigations, sampling, and studies			$100,000
Engineering, administration, and management (20%)			$185,146
CAPITAL COST TOTAL			$1,396,020
ANNUAL O&M COSTS			
22. Site inspection/walk and summary letter			
Year 1	$2,500 / event	4	$10,000
Years 2-5, 10.15 and 20 **(Present Worth @ 5% discount rate)**	$2,500 / event	7	$12,122
Contingency (20%)			$4,424
O&M COST TOTAL			$26,546
TOTAL COST			$1,423,000

General Assumptions:

- Costs are based on current Site information and project understanding. Costs may change following collection of additional data and/or actual project design.

- Costs include materials, equipment, and labor unless otherwise noted.
- Unit costs are in 2006 dollars and are estimated using standard estimating guides (e.g., Means Site Work and Landscape Cost Data), vendors, professional judgment, and experience from similar projects.

- O&M costs are presented as a 20-year present worth cost assuming a 5% discount rate.
- Construction activities have been assumed to be performed in modified Level D protection.
- The creek is assumed to be 1,700 feet long and 15 feet wide for relevant quantity calculations.
- It is assumed that no excavated material will be reused; all excavated material will be disposed of offsite.

Alternative 5 Assumptions:

1. Assumed removal/backfill rate of 100 feet of creek length per day. The contractor will only remove as much volume as can be backfilled before the end of the day.
2. Assumed to be 10% of construction costs.
3. Assumes clearing and grubbing of 50' wide swath one side of the creek plus clearing and grubbing for staging/decon areas.
4. Includes the costs to construct areas for staging equipment and materials and for decontaminating equipment.
5. Assumes construction of an access road along one side of the creek.
6. Assumes placement of hay bales and silt fence along the length of the creek throughout construction activities.
7. Assumes placement of sand bags/cut off berm at the upstream and downstream ends of the work area each day. No water treatment is expected. No construction activities are expected during storm/high flow events.
8. Includes costs to excavate and handle two feet of material from the creek bed for the entire length of the creek.
9. Includes costs to procure and place 8 oz. nonwoven geotextile between native soil and fill materials.
10. Includes costs to procure and place general backfill material in bed area, less approximately 1 foot half the length of the creek bed.
11. Includes costs to procure and place 36" diameter ADS N-12 IB WT HDPE pipe in the creek.
12. Includes costs to construct precast concrete surface water collection vaults approximately every 200 feet in the creek and upstream/downstream of bridge structures.
13. Includes costs to procure and install anti-seep collars approximately every 200 feet in the creek.
14. Includes costs to procure and place general backfill material in excavated areas, as specified.
15. Includes costs to procure and place topsoil in surficial creek and bank areas, as specified.
16. Includes costs to procure and place erosion control blanket throughout the seeded area, as specified.
17. Assumes that all cleared and grubbed areas, staging/decon areas, and regraded creek banks will be hydroseeded.
18. Assumes that odor and vapor control will be required during intrusive work activities.
19. Assumes that air monitoring will be required during intrusive work activities.
20. Includes costs to perform grading/compaction to achieve pre-construction topographic contours in areas used for access, staging, and decon.
21. Includes costs to transport all excavated material to a RCRA Subtitle D landfill facility. Possible landfills are located in Okeechobee, Florida and Folkston, Georgia, and are operated by Waste Management, Inc. It is assumed that wet creek materials will be blended with dry bank materials to meet any moisture content requirements for the landfill.
22. Includes costs for conducting a site walk and summarizing the findings in a letter to the Agency: quarterly in year 1 and at least once in years 2, 3, 4, 5, 10, 15 and 20.

Table 3
Sanford Gasification Plant Site
OU3 Focused Feasibility Study
Applicable or Relevant and Appropriate Requirements Provisions Contained in the following Statutes, Standard, Rules, Criteria, or Limitations

Law/Regulation/ Guidance	Citation	Potential ARAR	Description	Rationale
			CHEMICAL-SPECIFIC ARARs	
Federal				
Clean Water Act Ambient Water Quality Criteria(AWQC)	40 CFR 130.131	ARAR		
	EPA 440/5-86/001 "Quality Criteria for Water - 1986"superseded by EPA-822 R-O2-O47 – "National Recommended Water Quality Criteria: 2002"	TBC	Criteria for the protection of aquatic life and/or human health depending on the designated human use.	Applies to remedial alternatives that would involve removal of sediment and/or the discharge of water to surface water.
Clean Water Act	33 USC 1344 Section 404	ARAR	Regulates discharges to surface water or ocean, indirect discharges to POTWs, and discharge of dredged or fill material into waters of the United States, including wetlands	Applies to remedial alternatives that include capping, removal of sediment and/or the discharge of water to surface water.
National Pretreatment Standards	40 CFR Part 403	ARAR	Outlines responsibilities of Federal, State, and local government, industry and the public to implement National Pretreatment Standards to control pollutants which pass through of interfere with treatment processes in POTWs or which may contaminate sewage sludge.	Applies to remedial alternatives that would involve treatment of water prior to discharge to surface water.
National Primary and Secondary Ambient Air Quality Standards	4O CFR 5O	ARAR	Defines the level of air quality which is necessary, with an adequate margin of safety, to protect the public hearth.	Applies to remedial alternatives that produce air emissions, including removal of soil Of sediment.
Ecotox Thresholds -Freshwater - Tier II or AWQC and FCV	USEPA, January 1996	TBC	Guidelines for evaluating potential risk to ecological receptors exposed to surface water.	Applies to remedial alternatives that would involve removal of sediment and/or the discharge of water to surface water.
State				
Surface Water Quality Standards	62-302, FAC	ARAR	Standards for the protection of surface water quality	May be Applies to remedial alternatives that would involve removal of sediment and/or the discharge of water to surface water.
Air Pollution Control - General Provisions	62-210, FAC	ARAR	Establishes maximum allowable levels of pollutants in the ambient air, necessary to protect human health and public welfare.	May apply to remedial alternatives that produce air emissions, including removal of soil or sediment.
Contaminant Cleanup Target Levels	62-777, FAC	TBC	Provides criteria that apply to rehabilitation at contaminated sites.	Applies to determining cleanup levels for bank soils for remedial alternatives.
Sediment Quality Assessment Guidelines	N/A	TBC	Establishes numerical sediment quality assessment guidelines, for assessing the potential for adverse biological effects associated with exposure to contaminated sediments.	May apply to determining cleanup levels for sediment for remedial alternatives.

Table 3
Sanford Gasification Plant Site
OU3 Focused Feasibility Study

Applicable or Relevant and Appropriate Requirements Provisions Contained in the following Statutes, Standard, Rules, Criteria, or Limitations

Law/Regulation/ Guidance	Citation	Potential ARAR	Description	Rationale
LOCATION-SPECIFIC ARARs				
Federal				
Wetlands, Floodplain Management	40 CFR 6 Appendix A	ARAR	Describes actions that must be taken to reduce the risk of flood loss, minimize the impact of floods on human safety, and restore and preserve the natural and beneficial values of areas within 100-yearfloodplain.	May apply to remedial alternatives conducted in wetlands or within 100-year floodplains.
Executive Orders 11988 and 11990	40 CFR 6.302			
	10 CFR 1022			
Rivers and Harbors Act, Sections 9 and 10	40 CFR 122	ARAR	Outlines engineering controls and best management practices that are to be used control runoff from construction activities in areas that potentially erode or release sediment.	Applies where runoff controls are to be used during remedial construction.
Rivers and Harbors Act, Sections 9 and 10	33 USC 401/403	ARAR	Prohibits unauthorized obstruction or alteration of navigable waters of the US (dredging, fill, cofferdams, piers, etc). Requirements for permits affecting navigable waters of the US.	May apply to remedial alternatives that fill, span, or otherwise change the cross-sectional profile of a channel.
	33 CFR Parts 320-330			
Endangered Species Act	Federal Endangered Species Act of 1973, I6 USC 1531 et seq.	ARAR	Requires action to conserve endangered species within critical habitats on which endangered species depend and includes consultation with the Department of the Interior.	May apply to remedial alternatives conducted in area occupied by endangered species
Fish and Wildlife Coordination Act	16 USC 661 et seq.	ARAR	Criteria to provide assistance to, and cooperate with agencies in the development, protection of wildlife and their habitat.	May apply to remedial alternatives that adversely impact fish and wildlife, and their habitat.
State				
Contaminated Site Cleanup Criteria	62-780. FAC	ARAR	Prevent adverse effects on human health, pubic safety, and the environment that maybe caused by contaminants released into the environment by implementing risk-based corrective action provisions of 376.30701(2) F.S.	May assist in the development of bank soils cleanup goats for remedial alternatives.
Stormwater Discharge	62-25. FAC	ARAR	Provides for the regulation of untreated stormwater, to prevent pollution of waters of the state by stormwater discharges.	May apply to remedial alternatives that include the possibility of stormwater discharge.
Local				
Local Building Permits	N/A	TBC	Local authorities may require a building permit for any permanent or semi-permanent structure, such as an on-site water treatment system building, or a retaining wall.	Substantive provisions are potentially applicable to remedial alternatives that require construction of permanent or semi-permanent structures.

Table 3

Sanford Gasification Plant Site
OU3 Focused Feasibility Study

Applicable or Relevant and Appropriate Requirements Provisions Contained in the following Statutes, Standard, Rules, Criteria, or Limitations

Law/Regulation/ Guidance	Citation	Potential ARAR	Description	Rationale
ACTION-SPECIFIC ARARs				
Federal				
Hazardous Waste Transport	49CFR 170, 171.1-172.56B	ARAR	Outlines procedures for the packaging, labeling, manifesting, and transporting of hazardous materials.	Potentially applies to any company contracted to transport hazardous material from the Project Area.
OSHA Standards for Hazardous Materials Response	29 CFR 1904, 1910, 1926	ARAR	Recording and reporting occupational injuries and illness, health and safety standards - general and for construction.	Applies to all active remedial alternatives.
NPDES Program Requirements - Administered by FDEP	40 CFR 122, 125, 301, 303, 307 Administered by Florida Statutes 403.0885	ARAR	Establishes permitting requirements for point source discharges; regulates discharge of water into navigable waters, including quantity/quality of discharge.	Applies to remedial alternatives that would involve live discharge of treated water to surface water.
State				
Environmental Resource Permit Requirements	Chapters 373 and 403, Florida Statutes, Publication 92-500, Title 62 and Rule 62-312, FAC	ARAR	Criteria for issuance of permits through the FDEP for the excavation and backfill activities within surface waters and wetlands.	Applies to remedial alternatives that involve excavation and backfill of sediments.
Dredge and Fill Activities	62-312, FAC	ARAR	Criteria for permits for work in the Waters in Florida.	Applies to remedial alternatives that involve active remediation within Cloud Branch Creek.
Water Management District Regulations	62-40, FAC	ARAR	Establishes usage regulations for waters of the state.	May apply to remedial alternatives conducted in or near waters of the state.
Florida Hazardous Waste Rule	62-730, FAC	ARAR	Criteria governing generation and transportation of hazardous waste.	Applies to remedial alternatives that generate hazardous waste.
Florida Soil Treatment Facilities Rule	62-713, FAC	ARAR	Criteria governing the frequency and method of chemical anayses for the characterization of soil to be treated or disposed.	Applies lo remedial alternatives that treat or landfill soil at Florida permitted facilities.
Local				
Procedures for Development Approval	Article III, Land Development Regulations, City of Sanford	ARAR	Appoints an Administrative Official authorized to administer and enforce Land Develop Regulations.	May apply to active remedial alternatives.
Drainage, Easements, and Site Preparation/ Excavation Requirements	Schedule O, Land Development Regulations, City of Sanford	ARAR	Provides for adequate stormwater or drainage management to protect public health, safely and welfare by establishing general criteria for public and private improvements.	May apply to remedial alternatives that involve modification to stormwater/drainage management systems.

APPENDIX A: RESPONSIVENESS SUMMARY

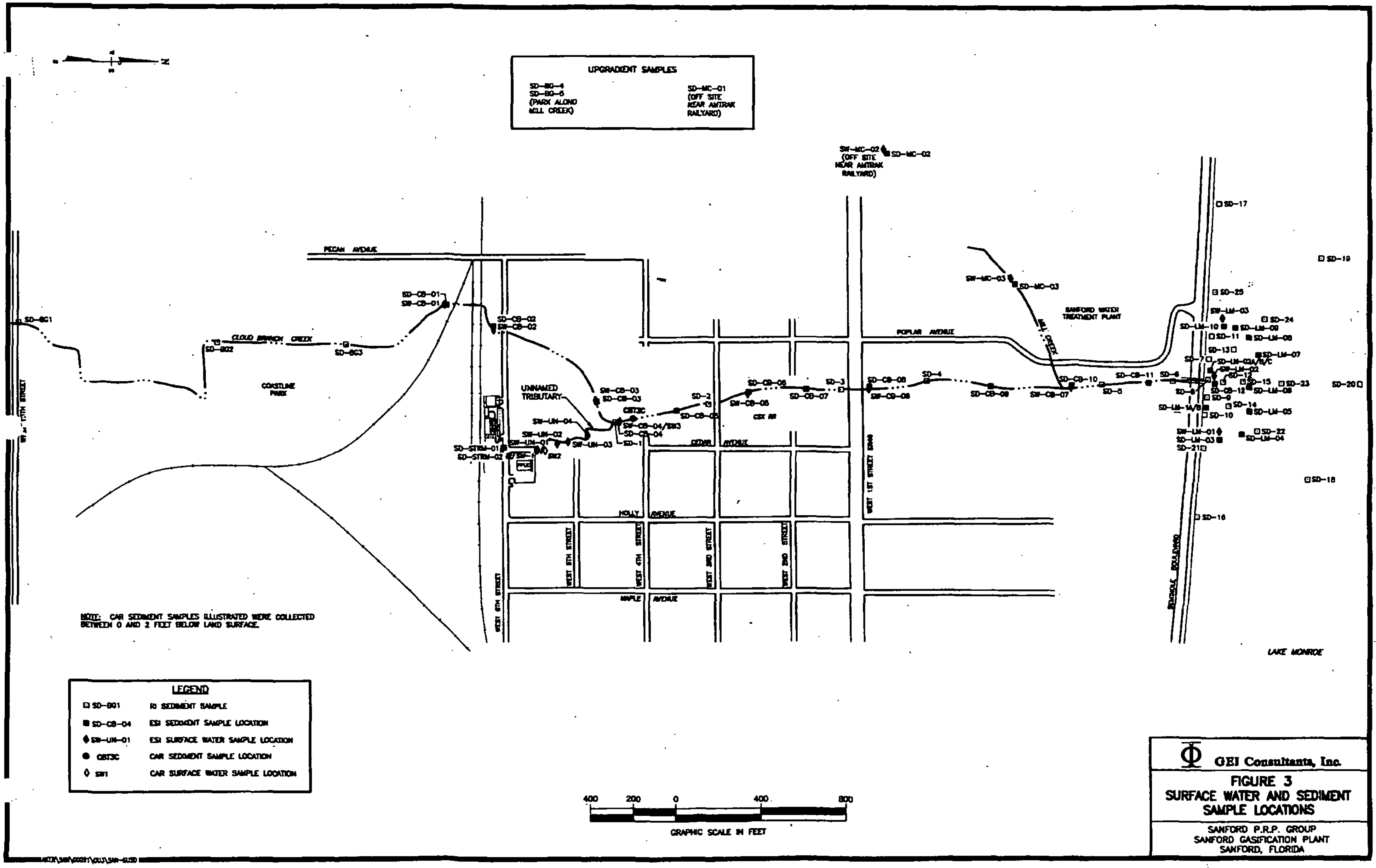
RESPONSIVENESS SUMMARY

The Proposed Plan meeting was held on June 7, 2006, to present to the community EPA's preferred alternatives for the amended cleanup action of the soil contamination at the Site (OU1) and the sediments at the Cloud Branch Creek related to Site contamination (OU3).

The Proposed Plan Fact Sheet for the OU1 AROD and the OU3 ROD was issued on May 19, 2006. The comment period for the Proposed Plan started on May 24, 2006 and ended on June 24, 2006. No comments from the community were received during the comment period.

APPENDIX B:

REMEDIAL INVESTIGATION AND ECOLOGICAL RISK INFORMATION

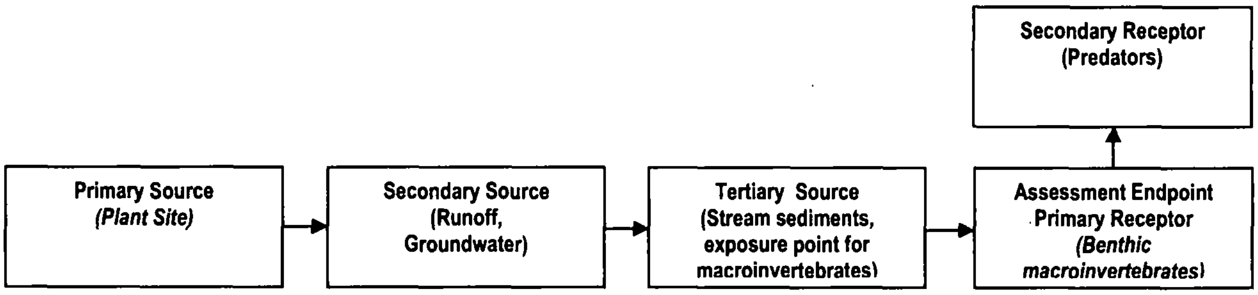


GEI Consultants, Inc.

FIGURE 3
SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

SANFORD P.R.P. GROUP
SANFORD GASIFICATION PLANT
SANFORD, FLORIDA

Figure 1-2. Site Conceptual Model

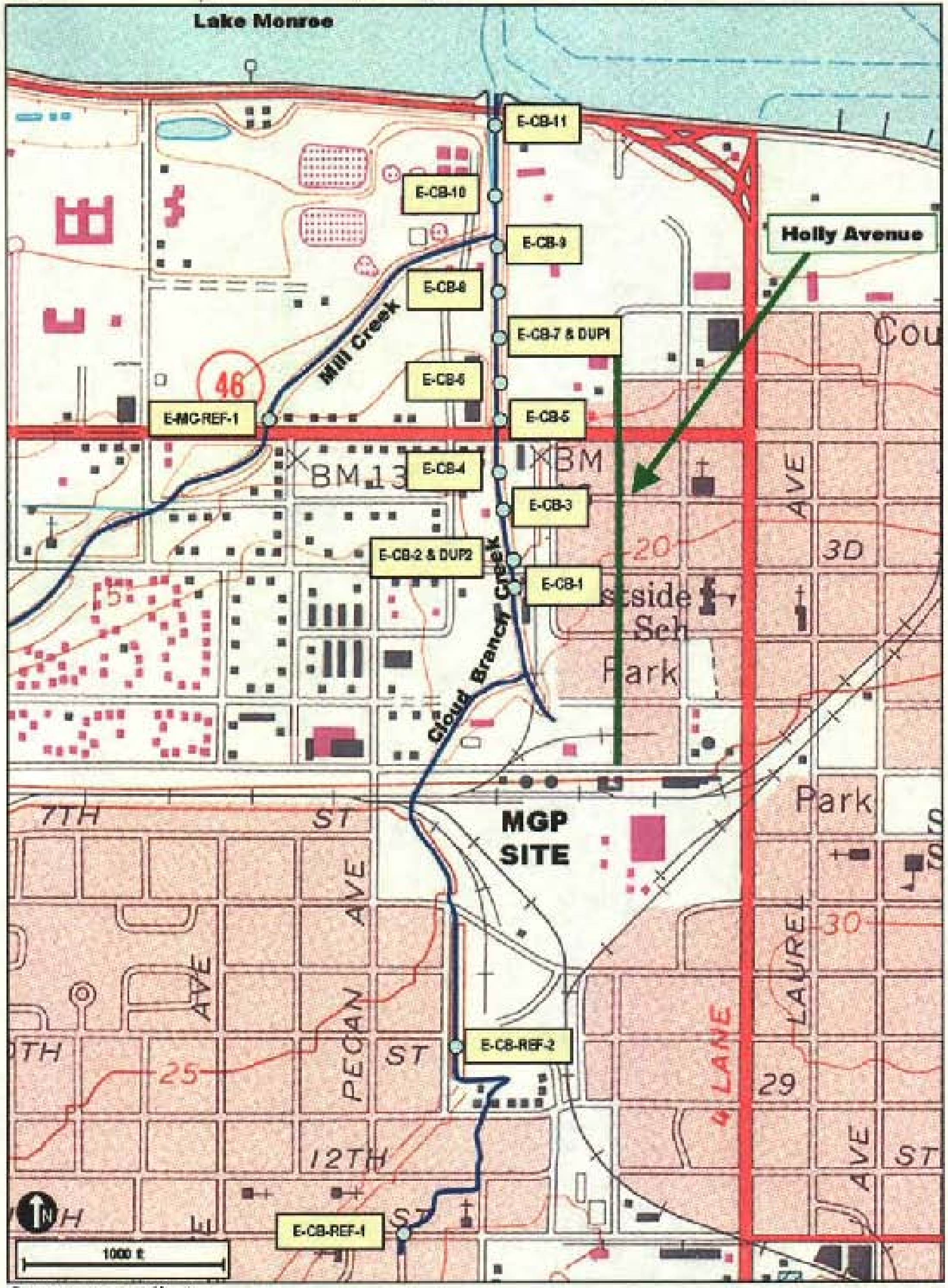


Runoff = This source to be substantially mitigated by OU1 remedy, underway
Groundwater = This source expected to mitigate gradually by natural attenuation (OU2)

Source: MACTEC, 2003.

Created by: WAT Reviewed by: ABS

Figure 3-1. Sample Locations, Ecological Risk Assessment, OU3



Source: Appendix A.

Created by: CAH Reviewed by: WAT

Table 2-1. Testing and Analysis Program Summary

Sampling Area	Number of Samples	Duplicate Samples	Rationale	Analytical Parameters and USEPA Methods	Physical Characterization and ASTM Test Method	Toxicity Testing and USEPA Methods	Benthic Macroinvertebrate Testing and Method
Reference	**3** E-CB-Ref-1 and 2, E-MC-Ref-1	N/A	Locations unaffected by the site, otherwise similar ecosystem	TAL/TCL VOCs (5035/8260); PAHs (3550/8270 SIM); OCPs/PCBs (3550/8081); Semivolatiles (3550/8270 BNA); Metals (3050/6010); Cyanide, Total (9010); Organic Carbon (Walkley Black)	Moisture Content by ASTM Test Method D 2216 Particle Size Analysis for percent fines, grain size maximum / minimum density and unit weight by ASTM Testing Method D 422 Hydrometer Testing by ASTM Method D 422 where applicable	USEPA Test Method 100.1 (*H. azteca*) 10 day survival and growth test for sediment and for USEPA Test Method 100.2 (*C. tentans*) 10 day survival and growth test for sediments (8 replicates/sample); Test conditions monitored for ammonia, sulfide, pH, and dissolved oxygen using USEPA Test Methods 350.2, 376.2, 150.2, and 360.1, respectively	Taxonomically classified to lowest practicable taxonomic level and the two key families. The number of organisms within each of these families were enumerated to identify bioassay test organisms.
Downstream of Mill Creek/Low Concentrations of COPCs	**2** E-CB-10 and 11	N/A	Low density sampling to confirm no adverse effect				Samples stored for potential subsequent population / community structure evaluation if necessary to reduce uncertainty in the risk characterization.*
COPC Concentration Transition Zone	**8** E-CB-2 through 9	**2** ECB-2 and 7	Higher density to resolve the area where a transition from effect to no effect may occur				
Upstream of 4th Street/High Concentrations of COPCs	**1** E-CB-1	N/A	Limited sampling, short reach, effects expected				

Note: ASTM = American Society for Testing and Material
OCP = Organochlorine Pesticides
PCB = polychlorinated biphenyls
* = Upon review of preliminary results, these archived samples were taxonomically characterized.

Source: MACTEC (2003).

Created by: WAT Reviewed by: ABS

Table 3-1. Sediment Sampling at Sanford MGP, August 2003, Field Sampling Observations (Page 1 of 2)

Sample ID	Collection Date	Collection Time	GPS 1	Location	Creek Width (ft)	Open Water Width (ft)	Sample Depth (ft)	Emergent vegetation present	Substrate qualities	Water Characteristics	Flow	Bank Characteristics	Riparian vegetation width
E-MC-REF-1	08/19/03	1000	N 28° 48' 44.1", W 81° 16' 50.1"	Mill Creek, just north of SR46	14	13	2.3	No	Sand	No odor, opaque, tannic	NR	(a)	2 – 3
E-CB-REF-1	08/20/03	1600	N 28° 48' 03.4", W 81° 16' 41.3"	Just north of 13th Street	6	5	1.0 (b)	Yes	Sand, with some organic matter	No odor, clear (clarity and color)	NR	Steep (b)	2
E-CB-REF-2	08/20/03	1430	N 28° 48' 12.5", W 81° 16' 39.8"	Adjacent to Coastline Park (c)	6	6	0.2	Small patch in middle of creek	Sand, shell pieces	No odor, clear, tannic	2"/sec		2
E-CB-01	08/20/03	1215	N 28° 48' 35.0", W 81° 16' 37.0"	Just south of 3rd Street	6	6	1.2	Yes	Rocky	No odor, min oil blobs, opaque/turbid (d), tannic	6"/sec	(d)	0.5
E-CB-02	08/20/03	1100	N 28° 48' 36.6", W 81° 16' 36.7"	Btw 1st St. and 3rd Street (e)	NR	NR	0.7	NR	Sand, silt, debris, rocks	No odor, opaque, tannic	3"/sec	Small area of erosion	10
DUP-2	08/20/03	1100	N 28° 48' 36.6", W 81° 16' 36.7"	Btw 1st St. and 3rd Street (e)	NR	NR	0.7	NR	Sand, silt, debris, rocks	No odor, opaque, tannic	3"/sec	Small area of erosion	10
E-CB-03	08/20/03	0945	N 28° 48' 38.6", W 81° 16' 37.1"	Btw 1st St. and 3rd Street (f)	8	8	1.0	NR	Sand & silt	No odor, has sheen, opaque, tannic	6"/sec	(f)	3 east, 12 west
E-CB-04	08/19/03	1655	N 28° 48' 40.1", W 81° 16' 37.2"	Btw 1st St. and 3rd Street	8	8	0.5	Minimal	Sand & rocks	No odor, has sheen, opaque, tannic	NR	Collapsed east bank	NR
E-CB-05	08/19/03	1545	N 28° 48' 42.7", W 81° 16' 37.1"	Just north of SR46	8	8	2.5	Yes, in stream middle	NR	No odor, has sheen, opaque, tannic	1'/sec	NR	8
E-CB-06	08/19/03	1415	N 28° 48' 43.8", W 81° 16' 37.4"	Btw Seminole Blvd & SR46	8	8	1.6	No	Very rocky	No odor, turbid, tannic	3"/sec	East 45 degree slope, some slope approx 10 ft from shore	8
E-CB-07	08/19/03	1145	N 28° 48' 46.8", W 81° 16' 37.3"	Btw Seminole Blvd & SR46	12	12	2	No	Sand	Petro odor, opaque, slight oily sheen, tannic	NR	NR	10
DUP-1	08/19/03	1145	N 28° 48' 46.8", W 81° 16' 37.3"	Btw Seminole Blvd & SR46	12	12	2	No	Sand	Petro odor, opaque, slight oily sheen, tannic	NR	NR	10

Table 3-1. Sediment Sampling at Sanford MGP, August 2003, Field Sampling Observations (Page 2 of 2)

Sample ID	Collection Date	Collection Time	GPS 1	Location	Creek Width (ft)	Open Water Width (ft)	Sample Depth (ft)	Emergent vegetation present	Substrate qualities	Water Characteristics	Flow	Bank Characteristics	Riparian vegetation width
E-CB-08	08/18/03	1645	N 28° 48' 48.7", W 81° 16' 38.2"	Btw Seminole Blvd & SR46	16	NR	1.5	No	Sand	No odor, opaque, tannic, min oil globs	NR	Steep, 7 ft high	6
E-CB-09	08/18/03	1530	N 28° 48' 48.8", W 81° 16' 39.0"	Btw Seminole Blvd & SR46	25	NR	3	Yes	Rock-like	No odor, tannic, clear, slight sheen	NR	NR	12
E-CB-10	08/18/03	1345	N 28° 48' 53.1", W 81° 16' 38.0"	Btw Seminole Blvd & SR46	25	16	3	Yes	Sand	No odor, tannic, slight sheen	NR	Steep	20
E-CB-11	08/18/03	1035	N 28° 48' 56.9", W 81° 16' 39.3"	Btw Seminole Blvd & SR46	25	6	5	Yes	Sand	No odor, clear, tannic	Nearly stagnant	Steep	10

Note:
(a) ~ 25 ft upstream of sample pt E-MC-Ref-1, a 4" white PVC pipe outflow observed on east bank, with no flow. ~50 ft upstream of sample pt, 12" outflow pipe observed, with high volume flow, creating water disturbance 5 ft in diameter, and creates aerated water for 2 ft downstream.
(b) E-CB-Ref-1. Sample collected from depositional point on west side of creek. Concrete retaining wall (~40 ft long), observed on east bank, downstream of sampling point.
(c) E-CB-Ref-2. Stream emerges from two culvert pipes, just upstream of sampling point.
(d) E-CB-01 has very narrow riparian zone. Mowed grass nearly to edge of creek. Industrial buildings located on each side of creek. Clarity of water becomes more turbid as move upstream.
(e) E-CB-02. Personal communication: locals fish from 3rd Street, snapping turtles observed, was former dump site, currently active site for antique bottle collectors.
(f) This sample pt (E-CB-03) accessed from east bank. All other sample points accessed from west bank. Approximately 12 ft upstream of sample E-CB-03, a pipe (former sewer pipe, per Julie Santiago, USEPA) observed.

NR – Not Recorded

Source: Appendix A.

Created by: JR   Reviewed by: WAT

Table 4-3. Physical Characteristics of OU3 Sediments

Site	Description	Hydraulic Gradient* (%)	Gravel (%)	Sand (%)	Fines (%)	D_{10} (mm)	TOC (%)
E-CB-REF1	Brown fine sand with trace organics	0.4	0.0	98.0	2.0	0.105	0.298
E-CB-REF2	Brown fine sand with trace rock fragments	0.3	0.1	99.7	0.2	0.171	0.242
E-MC-REF1	Brown fine sand with trace organics	0.2	0.2	99.4	0.4	0.112	0.251
E-CB-1	Brown fine sand with little rock and shell fragments and debris	0.5	18.7	81.0	0.3	0.168	0.259
E-CB-2	Brown fine sand with few rock and shell fragments and debris	1.0	5.6	93.9	0.5	0.153	0.278
DUP-2 (E-CB-2)	Brown fine sand with few rock fragments and debris	1.0	5.1	94.4	0.5	0.153	0.230
E-CB-3	Brown fine sand with trace rock fragments	1.0	2.0	98.0	0.0	0.152	0.131
E-CB-4	Brown fine sand with little rock and shell fragments and debris	1.0	12.6	87.0	0.4	0.166	0.244
E-CB-5	Brown fine sand with trace organics	0.1	1.8	97.5	0.7	0.151	0.392
E-CB-6	Brown fine sand with few rock and shell fragments and debris	<0.1	9.1	89.9	1.0	0.154	0.274
E-CB-7	Brown fine sand with few rock and shell fragments and debris	<0.1	5.1	94.5	0.4	0.167	0.426
DUP-1(E-CB-7)	Brown fine sand with few rock fragments and organics and debris	<0.1	4.5	95.1	0.4	0.169	0.254
E-CB-8	Brown fine sand with trace rock and shell fragments	<0.1	1.2	98.4	0.4	0.125	0.207
E-CB-9	Brown fine sand with trace rock and shell fragments	<0.1	.5	99.4	0.1	0.154	0.143
E-CB-10	Brown fine sand with trace organics	<0.1	0.1	99.3	0.6	0.106	0.336
E-CB-11	Brown fine sand with trace organics	<0.1	0.0	99.8	0.2	0.118	0.104
Control	Tan medium fine sand	NA	0.0	99.4	0.6	0.120	0.040

Note: D_{10} = diameter of 10^{th} percentile of particle size distribution in millimeters (mm).
NA = Not Applicable

* Conklin, Porter, and Holmes (1988)

Source: Appendix B-2.

Created by: M. Coleman Reviewed by: WAT

Table 4-4. Concentrations of Inorganic Constituents Detected in OU3 Sediments, August 2003 (Page 1 of 2)

Parameter	E-CB-REF-1		E-CB-REF-2		E-MC-REF-1		E-CB-01		E-CB-02		DUP-2		E-CB-03		E-CB-04	
	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	780		910		810		810		550		530		460		1200	
Arsenic	0.6	U	0.6	U	0.7	U	12		1.6		1.6		0.6	U	5.2	
Barium	26	U	26	U	27	U	25	U	26	U	26	U	26	U	200	
Calcium	7900		36000		5100		45000		20000		13000		3200		25000	
Chromium	2		4.4		1.8		29		4.2		4.1		2.9		16	
Copper	6	U	6	U	7	U	56		18		16		6	U	51	
Cyanide, Total	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Iron	330		2300		1000		68000		8400		10000		1400		20000	
Lead (Pb)	7.6		14		5.5		450		75		72		32		1100	
Magnesium	120		1200		120		640		240		210		210		670	
Manganese	3.8		18		9		140		28		26		12		80	
Mercury	0.01	U	0.01	U	0.01	U	0.042		0.014		0.02		0.01	U	0.018	
Nickel	6	U	6	U	7	U	12		6	U	6	U	6	U	6	U
Potassium	33	U	68		72		94		33	U	33	U	34		51	
Sodium	33	U	80		35		92		58		33	U	33	U	68	
Vanadium	2.2		3.1		1.5		4		2.2		1.6		1	U	4.9	
Zinc (Zn)	12		34		22		160		97		86		34		400	

Note: Q = Qualifier.
U = Compound was analyzed for but not detected to the level shown.
All concentrations in mg/kg.

Source: Appendix B-1.

Created by: LBD Reviewed by: SDS

Table 4-4. Concentrations of Inorganic Constituents Detected in OU3 Sediments, August 2003 (Page 2 of 2)

Parameter	E-CB-05		E-CB-06		E-CB-07		DUP-1		E-CB-08		E-CB-09		E-CB-10		E-CB-11	
	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	740		660		620		630		490		310		450		230	
Arsenic	0.9		2.4		1		0.67		0.6	U	0.6	U	0.7	U	0.6	U
Barium	27	U	26		26	U	26	U	26	U	26	U	27	U	26	U
Calcium	13000		53000		27000		28000		7500		9400		4200		2400	
Chromium	3.2		6.7		3.6		2.8		2.1		1.9		1.8		1	U
Copper	72		18		320		9.9		11		6	U	8.1		6	U
Cyanide, Total	0.1	U	1		0.1		0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Iron	5100		11000		4700		4500		1700		3500		1200		590	
Lead	68		120		51		39		25		14		19		7.2	
Magnesium	360		800		400		360		120		130		99		47	
Manganese	32		44		20		20		53		12		6.6		2.9	
Mercury	0.016		0.01	U	0.032		0.01	U	0.03		0.01	U	0.01	U	0.01	U
Nickel	7	U	6	U	6	U	6	U	6	U	6	U	7	U	6	U
Potassium	72		32	U	35		33	U	33	U	32	U	34	U	32	U
Sodium	57		61		41		68		59		32	U	34	U	32	U
Vanadium	2.4		3.5		2		2.4		1.4		1	U	1	U	1	U
Zinc	110		120		100		87		59		33		48		23	

Note: Q = Qualifier.
U = Compound was analyzed for but not detected to the level shown.
All concentrations in mg/kg.

Source: Appendix B-1.

Created by: LBD Reviewed by: SDS

Sanford Gasification Site - Step 7 total PAH Concentrations
Table 4-5b OU3 ROD

detected concentrations only
(ug/kg)

	E-CB-1	E-CB-2 (dup-2)	E-CB-3	E-CB-4	E-CB-5	Q	E-CB-6	E-CB-7	Q	E-CB-8	E-CB-9	E-CB-10	E-CB-11
1-methylnaphthalene	5500	nd	nd	510	590		nd	770		nd	nd	nd	29
2-methylnaphthalene	700	nd	nd	220	320		nd	280		nd	nd	nd	nd
acenaphthene	16000	5100	250	3700	6200		860	3800		740	380	550	360
acenaphthylene	600	450	95	560	860		370	2300		290	180	290	38
anthracene	2500	500	130	2500	3100		320	1300		320	nd	330	33
benzo(a)anthracene	2800	5000	450	6200	9700		5100	15000		5000	2300	1800	200
benzo(a)pyrene	3000	5600	550	5900	9400		5900	15000		5300	2600	2500	260
benzo(b)fluoranthene	3000	4200	580	5300	11000		5100	17000		5100	2700	2600	300
benzo(g,h,i)perylene	1200	2400	320	2500	5900		2300	7200		2400	770	1100	190
benzo(k)fluoranthene	850	2400	210	1100	3400		2600	3800		3000	360	550	120
chrysene	2400	4200	420	6100	8600		5100	11000		5100	2300	1400	220
dibenzo(a,h)anthracene	310	430	87	610	1500		400	2200		290	200	290	49
fluoranthene	7500	5000	760	8200	22000	J	6300	19000	J	4700	3200	2300	380
fluorene	7000	950	140	2400	3200		380	1500		220	nd	290	120
indeno(1,2,3-cd)pyrene	1100	1400	260	2200	5400		1400	6700		1000	670	930	150
naphthalene	1100	nd	nd	nd	240		nd	560		nd	nd	nd	nd
phenanthrene	10000	2500	340	8900	12000		810	3600		840	320	880	130
pyrene	12000	8400	1300	14000	26000		11000	36000	J	9200	4900	3800	560
Total PAH (ug/kg)	77560	48530	5892	70900	129410	J	47940	147010	J	43500	20880	19610	3139
Total PAH (mg/kg)	**78**	**49**	**6**	**71**	**129**	**J**	**48**	**147**	**J**	**44**	**21**	**20**	**3**
TOC - %	0.259	0.23	0.131	0.244	0.392		0.274	0.426		0.207	0.143	0.336	0.104
TOC-normalized PAH Concentration (mg/kg)	**29946**	**21100**	**4498**	**29057**	**33013**	**J**	**17496**	**34509**	**J**	**21014**	**14601**	**5836**	**3018**

notes:
- PAH = polycyclic aromatic hydrocarbon
- ug/kg = microgram per kilogram
- dup = duplicate sample
- nd = not detected
- TOC - total organic carbon

Table 4-11
Summary of Inorganic Chemicals in Surface Water Exceeding Federal AWQC
Sanford Gasification Plant

Chemical	Highest Background Concentration (ug/L)	Region 4 Screening [1] Toxicity Value (ug/L)	Potential ARAR/TBC Value (ug/L)	Potential ARAR/TBC Source	Number of Exceedences[2]	Location	Concentration (ug/L)
Aluminum	1,400	NF	NF		1	SW-MC-03	1,400
Arsenic	7 J	0.0022	50	FDEP 62-302	2	SW-CB-03	5J
						SW-MC-03	7J
Iron	1,500	300	1,000	FDEP 62-302	14/2	SW-CB-06	2,700
						SW-LM-02	1,600
						Too Numerous To List	
Lead	13	15	NF		2	SW-CB-06	38
						SW-LM-02	17
Manganese	51	50	NF		2	SW-CB-06	78
						SW-MC-01	51

Notes:

[1] The 1986 Federal ambient water quality criteria (AWQC).

[2] The number of samples exceeding the AWQC. Iron includes exceedences of Region 4 screening criteria and highest background concentrations since numerous samples exceed Region 4 criteria.
The location and maximum concentration of iron are provided since the other exceedences are too numerous to list.

J = Estimated value.

Table 4-12
Sediment Analytical Results from the CAR and ESI
Sanford Gas Plant

ANALYTE	ESI SD-STRM-01 (mg/kg)	ESI SD-STRM-02 (mg/kg)	ESI SD-MC-01 (mg/kg)	ESI SD-MC-02 (mg/kg)	ESI SD-MC-03 (mg/kg)	ESI SD-CB-01 (mg/kg)	ESI SD-CB-02 (mg/kg)	ESI SD-CB-03 (mg/kg)	ESI SD-CB-04 (mg/kg)	ESI SD-CB-05 (mg/kg)	ESI SD-CB-06 (mg/kg)	ESI SD-CB-07 (mg/kg)
Acenaphthene	0.43 U	0.14 J	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	0.39 J	0.98	3.7	0.29 J
Acenaphthylene	0.43 U	0.47 U	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	0.096 J	0.27 J	0.26 J	0.16 J
Acetone	NR	NR	0.02 U	0.02 U	0.03 U	NR	NR	NR	0.02 U	0.017 U	NR	NR
Aldrin	NR	0.0025 U	0.00038 J	0.002 U	NR	0.0022 U	0.000062 JN	0.0022 U	NR	0.00049 J	0.0027 U	0.0021 U
Aluminum	700	920	210	160 U	160 U	540	2,600	1,000	2,200	570	2,000	1,900
Anthracene	0.43 U	0.12 J	0.43 U	0.4 U	0.4 U	0.06 J	0.059 J	0.42 U	0.18 J	0.34 J	0.47 J	0.15 J
Antimony	1 U	2.6 J	0.74 U	0.66 U	0.74 U	0.70 U	0.75 U	6.6 J	0.88 J	0.70 U	11 J	2.7 J
Arsenic	2 U	2.4 J	0.46 U	0.41 U	0.46 U	0.44 U	2 U	2.4 J	2.5	0.84 J	16	8
Barium	13	18	3 U	4 U	2 U	9 U	40	19	41	20 U	89	55
Benzene	0.013 U	0.015 U	0.013 U	0.012 U	0.012 U	0.013 U	0.014 U	NR	0.013 U	0.017 U	0.016 U	0.016 U
Benzo(a)anthracene	0.14 J	0.58	0.43 U	0.038 J	0.031 J	0.26 J	0.22 J	0.11 J	0.8	0.79	1.6	0.91
Benzo(a)pyrene	0.12 J	0.56	0.43 U	0.053 J	0.04 J	0.23 J	0.22 J	0.11 J	0.65	0.83	1.0	0.81
Benzo(b and/or k)fluoranthene	0.37 J	1.4	0.43 U	0.13 J	0.086 J	0.46	0.55	0.24 J	1.4 J	1.4	1.7	1.2
Benzo(b)fluoranthene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(g,h,i)perylene	0.43 U	0.47 U	0.43 U	0.4 U	0.4 U	0.074 J	0.059 J	0.052 J	0.25 J	0.16 J	0.22 J	0.16 J
Benzo(k)fluoranthene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BHC, alpha-	NR	0.0025 U	0.0022 U	0.002 U	NR	0.0022 U	0.0024 U	0.0022 U	NR	0.0028 U	0.0027 U	0.0021 U
BHC, delta-	NR	0.0025 U	0.0022 U	0.002 U	NR	0.0022 U	0.0024 U	0.0022 U	NR	0.0028 U	0.0027 U	0.0021 U
BHC, gamma- (Lindane)	NR	0.0025 U	0.0022 U	0.002 U	NR	0.0022 U	0.0024 U	0.0022 U	NR	0.0028 U	0.0027 U	0.0021 U
Bis(2-ethylhexyl)phthalate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butanone, 2- (MEK)	0.007 J	0.012 J	0.013 U	0.012 U	0.012 U	0.013 U	0.014 U	NR	0.013 U	0.017 U	0.016 U	0.016 U
Butylbenzene, n-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butylbenzene, s-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butylphthalate, di-n-	2.5	2.3	0.43 U	0.4 U	0.4 U	0.49	0.46 U	0.5 U	0.42 U	0.55 U	0.52 U	0.42 U
Cadmium	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 U	1.9	2 U
Calcium	35,000	29,000	1,400	8,900	3,600	8,400	8,200	37,000	69,000	8,700	49,000	90,000
Carbazole	0.43 U	0.088 J	0.43 U	0.4 U	0.4 U	0.43 U	0.09 J	0.42 U	0.078 J	0.55 U	0.52 U	0.42 U
Chlordane, alpha-	NR	0.0025 U	0.0022 U	0.0015 JN	NR	0.0022 U	0.0024 U	0.0030 U	NR	0.0015 JN	0.0027 U	0.0021 U
Chlordane, gamma-	NR	0.0025 U	0.0022 U	0.002 U	NR	0.0022 U	0.0024 U	0.0022 U	NR	0.0028 U	0.0031 U	0.009 U
Chloromethane	NR	NR	0.013 U	0.012 U	0.012 U	NR	NR	NR	0.013 U	0.017 U	NR	NR
Chlorophenol, 2-	0.43 U	0.47 U	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	0.42 U	0.55 U	0.52 U	0.42 U
Chromium	3.7	4.4	0.75 J	5.9	0.95 J	33	11	12	7.2	14	41	13
Chrysene	0.25 J	0.78	0.43 U	0.081 J	0.045 J	0.32 J	0.35 J	0.11 J	0.69	0.88	1.3	0.68
Cobalt	1 U	1 U	0.31 U	0.27 U	0.31 U	2 J	0.88 J	0.52 J	1 U	0.29 U	6 J	3.3 J
Copper	7.1	27	2 U	2 U	3 U	4 U	5 U	58 J	16 J	7.8	220	79
Cyanide	0.6 U	0.2 U	0.05 U	0.05 U	0.1 U	0.05 U	0.2 U	0.2 U	0.94	0.2 U	0.3 U	0.4 U

NR Not reported.
I Value detected between MDL and PQL.
J Estimated value.
N Presumptive evidence.
U Material was analyzed for but not detected. The number is the minimum quantitation limit.

Table 4-12
Sediment Analytical Results from the CAR and ESI
Sanford Gas Plant

ANALYTE	ESI SD-CB-08 (mg/kg)	ESI SD-CB-09 (mg/kg)	ESI SD-CB-10 (mg/kg)	ESI SD-CB-11 (mg/kg)	ESI SD-CB-12 (mg/kg)	ESI SD-LM-01A (mg/kg)	ESI SD-LM-01B (mg/kg)	ESI SD-LM-02A (mg/kg)	ESI SD-LM-02B (mg/kg)	ESI SD-LM-02C (mg/kg)	ESI SD-LM-03 (mg/kg)	ESI SD-LM-04 (mg/kg)
Acenaphthene	2.6	1.6	0.056 J	0.052 J	0.41 U	0.1 J	0.11 J	1.4	0.21 J	0.14 J	0.45 U	0.47 U
Acenaphthylene	1.4	0.33 J	0.41 U	0.1 J	0.057 J	0.38 J	0.67	0.48 U	0.3 J	0.88	0.45 U	0.47 U
Acetone	0.02 U	NR	0.02 U	0.013 U	0.08 U	0.02 U	0.03 U	0.014 U	0.03 U	0.03 U	0.03 U	0.014 U
Aldrin	0.00053 J	0.00099 JN	0.0021 U	0.026	0.0021 U	0.0023 U	0.0023 U	0.0025 U	0.0022 U	NR	0.0023 UJ	0.0024 UJ
Aluminum	900	800	170 U	190 J	200 J	480 J	550 J	720 J	210 J	490 J	220 J	160 J
Anthracene	2.0	0.95	0.41 U	0.05 J	0.41 U	0.14 J	0.22 J	0.48 U	0.13 J	0.46 J	0.45 U	0.47 U
Antimony	0.72 U	0.76 U	0.69 U	2.3 U	2.4 U	2.4	2.3 U	2.7 U	2.4 U	2.9 U	2.4 U	2.5 U
Arsenic	1.7 J	1 U	0.43 U	0.93 U	2 J	0.96 U	1.5J	2 UJ	0.96 U	1.2 U	0.96 U	1 U
Barium	21	26	3 U	3 UJ	3.2 J	5.9 J	8.2 J	9.2 J	16 J	12 J	2 UJ	2 UJ
Benzene	0.017 U	0.013 U	0.012 U	0.013 U	0.012 U	0.014 U	0.014 U	0.014 U	0.013 U	0.015 U	0.014 U	0.014 U
Benzo(a)anthracene	4.5	2.3	0.052 J	0.18 J	0.12 J	0.65	1.6	0.11 J	0.56	2.0	0.45 U	0.47 U
Benzo(a)pyrene	3.9	1.5	0.07 J	0.17 J	0.13 J	0.76	1.6	0.16 J	0.67	2.2	0.45 U	0.47 U
Benzo(b and/or k)fluoranthene	4.9	3.0	0.13 J	0.27 J	0.2 J	1.1	2.4	0.43 J	0.97	3.8	0.45 U	0.47 U
Benzo(b)fluoranthene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(g,h,i)perylene	0.66	0.3 J	0.41 U	0.43 U	0.41 U	0.049 J	0.073 J	0.48 U	0.069 J	0.098 J	0.45 U	0.47 U
Benzo(k)fluoranthene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BHC, alpha-	0.00014 JN	0.0022 U	0.0021 U	0.0022 U	0.0021 U	0.0023 U	0.0023 U	0.0025 U	0.0022 U	NR	0.0023 UJ	0.0024 UJ
BHC, delta-	0.0029 U	0.0022 U	0.0021 U	0.00036 J	0.0021 U	0.0023 U	0.0023 U	0.0025 U	0.0022 U	NR	0.0023 UJ	0.0024 UJ
BHC, gamma- (Lindane)	0.0029 U	0.0022 U	0.00025 J	0.014	0.0021 U	0.0023 U	0.0023 U	0.0025 U	0.0022 U	NR	0.0023 UJ	0.0024 UJ
Bis(2-ethylhexyl)phthalate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butanone, 2- (MEK)	0.017 U	0.004 J	0.012 U	0.013 U	0.012 U	0.014 U	0.014 U	0.014 U	0.013 U	0.015 U	0.014 U	0.014 U
Butylbenzene, n-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butylbenzene, s-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butylphthalate, di-n-	0.57 U	0.42 U	0.41 U	0.43 U	0.41 U	0.44 U	0.44 U	0.48 U	0.43 U	0.49 U	1.0	0.98
Cadmium	1 U	1 U	1 U	0.24 U	0.25 U	0.25 U	0.24 U	0.29 U	0.24 U	0.30 U	0.25 U	0.26 U
Calcium	26,000	20,000	1,400	1,800 J	2,600 J	1,900 J	2,700 J	2,400 J	1,800 J	7,600 J	400 J	280 J
Carbazole	0.57 U	0.36 J	0.41 U	0.43 U	0.41 U	0.44 U	0.44 U	0.48 U	0.43 U	0.28 J	0.45 U	0.47 U
Chlordane, alpha-	0.0029 U	0.0022 U	0.0021 U	0.0022 U	0.0021 U	0.0023 U	0.0023 U	0.007 U	0.003 U	NR	0.0014 J	0.0024 UJ
Chlordane, gamma-	0.0029 U	0.0022 U	0.0021 U	0.0022 U	0.0021 U	0.0023 U	0.0032 N	0.006 U	0.0022 U	NR	0.0023 UJ	0.0024 UJ
Chloromethane	0.017 U	NR	0.012 U	0.013 U	0.012 U	0.014 U	0.014 U	0.014 U	0.013 U	0.015 U	0.014 U	0.014 U
Chlorophenol, 2-	0.57 U	0.42 U	0.41 U	0.43 U	0.41 U	0.44 U	0.44 U	1.6	0.43 U	0.49 U	0.45 U	0.47 U
Chromium	4	3.1	0.72 J	0.81 U	0.84 U	3 UJ	2 UJ	2 UJ	0.83 U	2 UJ	0.84 U	0.88 U
Chrysene	4.2	1.3	0.076 J	0.2 J	0.13 J	0.46	0.65	0.19 J	0.54	1.8	0.45 U	0.47 U
Cobalt	0.87 J	0.36 J	0.29 U	0.59 U	1 U	0.61 U	0.61 U	0.71 U	0.61 U	0.75 U	0.62 U	0.65 U
Copper	19	9.7	4 U	3 UJ	7.1 J	8.3 J	9.7 J	14 J	7.2 J	12 J	1 UJ	0.70 U
Cyanide	0.2 U	0.2 U	0.05 U	0.13 U	0.13 U	0.14 U	0.2 U	0.15 U	1	0.17 U	0.71	0.14 U

NR Not reported.
I Value detected between MDL and PQL.
J Estimated value.
N Presumptive evidence.
U Material was analyzed for but not detected. The number is the minimum quantitation limit.

Table 4-12
Sediment Analytical Results from the CAR and ESI
Sanford Gas Plant

ANALYTE	ESI SD-LM-05 (mg/kg)	ESI SD-LM-06 (mg/kg)	ESI SD-LM-07 (mg/kg)	ESI SD-LM-08 (mg/kg)	ESI SD-LM-09 (mg/kg)	ESI SD-LM-10 (mg/kg)	CAR CBT1A (2.1-2.5 ft) (mg/kg)	CAR CBT3C (0-1.5 ft) (mg/kg)	CAR CBT4C (2.55-3.15 ft) (mg/kg)	CAR UTT1A (1-1.5 ft) (mg/kg)	CAR UTT2A (1.2-3 ft) (mg/kg)	CAR UTT3B (1.5-2 ft) (mg/kg)
Acenaphthene	0.44 U	0.43 U	0.049 J	0.43 U	0.47 UJ	0.46 U	230	30	1,000	48	1,100	3,600
Acenaphthylene	0.44 U	0.43 U	0.44 U	0.43 U	0.07 UJ	0.46 U	23	6	160 U	21	305 U	690
Acetone	0.013 U	0.013 U	0.014 U	0.02 U	0.014 U	0.014 U	7.7 J	5 U	16 J	5 U	62 U	6 U
Aldrin	0.0009 J	0.0022 UJ	0.0023 UJ	0.0022 UJ	0.0024 UJ	0.0023 UJ	NR	NR	NR	NR	NR	NR
Aluminum	NR	200 J	1,300 J	160 J	280 J	320 J	NR	NR	NR	NR	NR	NR
Anthracene	0.44 U	0.43 U	0.44 U	0.43 U	0.47 UJ	0.46 U	120	6	380	49	1,000	2,100
Antimony	NR	2.4 U	2.4 U	2.3 U	2.4 U	2.5 U	NR	NR	NR	NR	NR	NR
Arsenic	NR	0.98 U	2 UJ	0.92 U	0.96 U	1 U	1.2	5.9	1 U	6.4	13	16
Barium	NR	4.5 J	19 J	2 UJ	3.5 J	3.1 J	14 J	85 J	18 J	12 J	53 J	66 J
Benzene	0.013 U	0.013 U	0.014 U	0.013 U	0.014 U	0.014 U	12 U	1 U	31 U	1 U	12 U	64
Benzo(a)anthracene	0.44 U	0.086 J	0.27 J	0.43 U	0.45 J	0.063 J	56 J	13 J	160 U	95 J	400 J	1,000 J
Benzo(a)pyrene	0.44 U	0.13 J	0.31	0.061 J	0.52 J	0.097 J	50	14	160 U	100	305 U	800
Benzo(b and/or k)fluoranthene	0.44 U	0.15 J	0.47	0.071 J	0.65 J	0.12 J	47	15	160 U	100	305 U	830
Benzo(b)fluoranthene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(g,h,i)perylene	0.44 U	0.08 J	0.2 J	0.43 U	0.11 J	0.053 J	19 U	6 J	160 U	28 J	305 U	344 U
Benzo(k)fluoranthene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BHC, alpha-	0.0022 UJ	0.0022 UJ	0.0023 UJ	0.000071 J	0.0024 UJ	0.0023 UJ	NR	NR	NR	NR	NR	NR
BHC, delta-	0.0022 UJ	0.0022 UJ	0.0023 UJ	0.0022 UJ	0.0017 J	0.0023 UJ	NR	NR	NR	NR	NR	NR
BHC, gamma- (Lindane)	0.0022 UJ	0.0022 UJ	0.0023 UJ	0.0022 UJ	0.0024 UJ	0.0023 UJ	NR	NR	NR	NR	NR	NR
Bis(2-ethylhexyl)phthalate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butanone, 2- (MEK)	0.013 U	0.013 U	0.014 U	0.013 U	0.014 U	0.014 U	NR	NR	NR	NR	NR	NR
Butylbenzene, n-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butylbenzene, s-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butylphthalate, di-n-	0.68	1.0	0.93	1.0	0.47 UJ	0.86	NR	NR	NR	NR	NR	NR
Cadmium	NR	0.25 U	0.25 U	0.24 U	0.25 U	0.26 U	1 U	1.2	1 U	1 U	1 U	1
Calcium	NR	2,300 J	5,700 J	290 J	1,200 J	800 J	NR	NR	NR	NR	NR	NR
Carbazole	0.44 U	0.43 U	0.44 U	0.43 U	0.47 UJ	0.46 U	NR	NR	NR	NR	NR	NR
Chlordane, alpha-	0.0022 UJ	0.0022 UJ	0.0023 UJ	0.0012 JN	0.003 UJ	0.0016 J	NR	NR	NR	NR	NR	NR
Chlordane, gamma-	0.0022 UJ	0.0022 UJ	0.00097 J	0.0022 UJ	0.0024 UJ	0.0023 UJ	NR	NR	NR	NR	NR	NR
Chloromethane	0.013 U	0.013 U	0.014 U	0.013 U	0.014 U	0.014 U	NR	NR	NR	NR	NR	NR
Chlorophenol, 2-	0.44 U	0.43 U	0.44 U	0.43 U	0.47 UJ	0.46 U	NR	NR	NR	NR	NR	NR
Chromium	NR	0.85 U	5 J	0.80 U	0.84 U	0.87 U	3.6	14	3.1	3 U	3 U	11
Chrysene	0.44 U	0.09 J	0.3 J	0.43 U	0.37 J	0.064 J	58	14	160 U	110	380	1,000
Cobalt	NR	0.63 U	0.64 U	0.59 U	0.62 U	0.64 U	NR	NR	NR	NR	NR	NR
Copper	NR	1.1 J	20 J	8.3 J	1.7 J	2 UJ	NR	NR	NR	NR	NR	NR
Cyanide	NR	0.14 U	0.13 U	0.13 U	0.15 U	0.13 U	0.5 U	0.5 U	0.5 U	0.5 U	13	0.5 U

NR Not reported.
I Value detected between MDL and PQL.
J Estimated value.
N Presumptive evidence.
U Material was analyzed for but not detected. The number is the minimum quantitation limit.

Table 4-12
Sediment Analytical Results from the CAR and ESI
Sanford Gas Plant

ANALYTE	ESI SD-STRM-01 (mg/kg)	ESI SD-STRM-02 (mg/kg)	ESI SD-MC-01 (mg/kg)	ESI SD-MC-02 (mg/kg)	ESI SD-MC-03 (mg/kg)	ESI SD-CB-01 (mg/kg)	ESI SD-CB-02 (mg/kg)	ESI SD-CB-03 (mg/kg)	ESI SD-CB-04 (mg/kg)	ESI SD-CB-05 (mg/kg)	ESI SD-CB-06 (mg/kg)	ESI SD-CB-07 (mg/kg)
DDD, 4,4'-	NR	0.0054	0.0043 U	0.0039 U	NR	0.0043 U	0.0046 U	0.002 J	NR	0.0055 U	0.0052 U	0.0041 U
DDE, 4,4'-	NR	0.0058	0.0043 U	0.00096 J	NR	0.00035 JN	0.00047 JN	0.0024 J	NR	0.0055 U	0.0052 U	0.0025 J
DDT, 4,4'-	NR	0.00065 JN	0.0043 U	0.0039 U	NR	0.0043 U	0.0046 U	0.0014 JN	NR	0.0031 J	0.0052 U	0.0041 U
Dibenzo(a,h)anthracene	0.43 U	0.47 U	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	0.046 J	0.072 J	0.092 J	0.42 U
Dibenzofuran	0.43 U	0.47 U	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	0.049 J	0.55 U	0.15 J	0.42 U
Dibromo-3-chloropropane, 1,2-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dichlorobenzene, 1,4-	0.43 U	0.47 U	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	0.42 U	0.55 U	0.52 U	0.42 U
Dichloroethane, 1,1-	NR	NR	0.013 U	0.012 U	0.012 U	NR	NR	NR	0.013 U	0.017 U	NR	NR
Dichloroethene, cis-1,2-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dichloroethene, trans-1,2-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dieldrin	NR	0.0098 U	0.0043 U	0.0039 U	NR	0.00014 JN	0.00024 J	0.00088 J	NR	0.0016 JN	0.0058	0.0041 U
Dinitrotoluene, 2,4-	0.43 U	0.47 U	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	1 U	0.55 U	0.52 U	0.42 U
Endosulfan II	NR	0.0058 U	0.0043 U	0.023	NR	0.00032 JN	0.0046 U	0.0042 U	NR	0.0055 U	0.0052 U	0.0041 U
Endosulfan sulfate	NR	0.0054 U	0.0043 U	0.0039 U	NR	0.0043 U	0.0046 U	0.0042 U	NR	0.0055 U	0.0052 U	0.0041 U
Endrin	NR	0.0058 U	0.0043 U	0.0039 U	NR	0.0043 U	0.0046 U	0.0042 U	NR	0.0055 U	0.0062 U	0.0041 U
Endrin aldehyde	NR	0.0049 U	0.0043 U	0.0039 U	NR	0.0043 U	0.0046 U	0.0042 U	NR	0.00014 JN	0.0052 U	0.0041 U
Endrin ketone	NR	0.0049 U	0.0043 U	0.0039 U	NR	0.0043 U	0.0046 U	0.0042 U	NR	0.0055 U	0.0063	0.005 U
Ethylbenzene	0.013 U	0.015 U	0.013 U	0.012 U	0.012 U	0.013 U	0.014 U	NR	0.013 U	0.017 U	0.016 U	0.016 U
Fluoranthene	0.460 U	1.700 U	0.43 U	0.13 J	0.083 J	0.7	0.65	0.2 J	1.2	1.4	2	1.1
Fluorene	0.43 U	0.085 J	0.43 U	0.4 U	0.4 U	0.43 U	0.051 J	0.42 U	0.19 J	0.53 J	1.4	0.096 J
Heptachlor	NR	0.0025 U	0.0022 U	0.002 U	NR	0.0022 U	0.00018 JN	0.0022 U	NR	0.00048 JN	0.0027 U	0.0021 U
Heptachlor epoxide	NR	0.0025 U	0.0022 U	0.002 U	NR	0.0022 U	0.0024 U	0.0022 U	NR	0.0028 U	0.0027 U	0.0021 U
Indeno(1,2,3-c,d)pyrene	0.43 U	0.47 U	0.43 U	0.4 U	0.4 U	0.091 J	0.098 J	0.071 J	0.23 J	0.27 J	0.34 J	0.23 J
Iron	5,500 J	2,300 J	330	710	670	710	2,600	6,800	8,100	2,900	95,000	43,000
Isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Isopropyltoluene, p-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lead	86	110	2.1	3.9	2.3	42	11	1,000	100	63	1,300	160
Magnesium	860	770	40 U	80 U	70 U	140	250	340	1,600	200	690	1,400
Manganese	45	32	2.2 J	4.5	3.9	4.3	19	31	59	15	290	210
Mercury	0.05 U	0.06 U	0.07 U	0.05 U	0.05 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U
Methyl tert-butyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylnaphthalene, 1-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylnaphthalene, 2-	0.43 U	0.47 U	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	0.19 J	0.091 J	0.1 J	0.42 U
N-Nitrosodi-n-propylamine	0.43 U	0.47 U	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	0.42 U	0.55 U	0.52 U	0.42 U

NR Not reported.
I Value detected between MDL and PQL.
J Estimated value.
N Presumptive evidence.
U Material was analyzed for but not detected. The number is the minimum quantitation limit.

Table 4-12
Sediment Analytical Results from the CAR and ESI
Sanford Gas Plant

ANALYTE	ESI SD-CB-08 (mg/kg)	ESI SD-CB-09 (mg/kg)	ESI SD-CB-10 (mg/kg)	ESI SD-CB-11 (mg/kg)	ESI SD-CB-12 (mg/kg)	ESI SD-LM-01A (mg/kg)	ESI SD-LM-01B (mg/kg)	ESI SD-LM-02A (mg/kg)	ESI SD-LM-02B (mg/kg)	ESI SD-LM-02C (mg/kg)	ESI SD-LM-03 (mg/kg)	ESI SD-LM-04 (mg/kg)
DDD, 4,4'-	0.0072 U	0.0042 U	0.0041 U	0.0043 U	0.0041 U	0.0045 U	0.0045 U	0.0048 U	0.0043 U	NR	0.0045 UJ	0.0048 UJ
DDE, 4,4'-	0.0077 U	0.042	0.0041 U	0.0068	0.0041 U	0.00051 J	0.0045 U	0.0048 U	0.0043 U	NR	0.0023 UJ	0.0048 UJ
DDT, 4,4'-	0.0056 U	0.0042 U	0.0041 U	0.03	0.0041 U	0.0045 U	0.0045 U	0.0048 U	0.0043 U	NR	0.0045 UJ	0.0048 UJ
Dibenzo(a,h)anthracene	0.34 J	0.15 J	0.41 U	0.43 U	0.41 U	0.44 U	0.049 J	0.48 U	0.43 U	0.079 J	0.45 U	0.47 U
Dibenzofuran	0.22 J	0.32 J	0.41 U	1.1 U	0.41 U	0.44 U	0.44 U	0.48 U	0.43 U	0.49 U	0.45 U	0.47 U
Dibromo-3-chloropropane, 1,2-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dichlorobenzene, 1,4-	0.57 U	0.42 U	0.41 U	0.43 U	0.41 U	0.44 U	0.44 U	1	0.43 U	0.49 U	0.45 U	0.47 U
Dichloroethane, 1,1-	0.017 U	NR	0.012 U	0.013 U	0.012 U	0.014 U	0.014 U	0.014 U	0.013 U	0.015 U	0.014 U	0.014 U
Dichloroethene, cis-1,2-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dichloroethene, trans-1,2-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dieldrin	0.0066 N	0.0042 U	0.0034 JN	0.055	0.0041 U	0.0024 J	0.0036 J	0.007 N	0.0043 U	NR	0.0006 JN	0.00051 JN
Dinitrotoluene, 2,4-	0.57 U	0.42 U	0.41 U	0.43 U	0.41 U	0.44 U	0.44 U	2	0.43 U	0.49 U	0.45 U	0.47 U
Endosulfan II	0.0072 U	0.03 U	0.059	0.0043 U	0.0041 U	0.0045 U	0.0045 U	0.0048 U	0.0043 U	NR	0.0045 UJ	0.0048 UJ
Endosulfan sulfate	0.0056 U	0.0042 U	0.0018 J	0.0043 U	0.00062 J	0.0045 U	0.0045 U	0.0048 U	0.0043 U	NR	0.0045 UJ	0.0048 UJ
Endrin	0.0072 U	0.0042 U	0.0041 U	0.033	0.00081 J	0.00052 J	0.0045 U	0.0048 U	0.00086 J	NR	0.00018 JN	0.0048 UJ
Endrin aldehyde	0.0011 J	0.0042 U	0.0041 U	0.0016 U	0.0041 U	0.0045 U	0.0045 U	0.0048 U	0.0043 U	NR	0.0045 UJ	0.0048 UJ
Endrin ketone	0.0056 U	0.0042 U	0.0041 U	0.0043 U	0.0041 U	0.0045 U	0.0045 U	0.0048 U	0.0043 U	NR	0.0045 UJ	0.0048 UJ
Ethylbenzene	0.017 U	0.013 U	0.012 U	0.013 U	0.012 U	0.014 U	0.014 U	0.014 U	0.013 U	0.015 U	0.014 U	0.014 U
Fluoranthene	6.3	2.9	0.06 J	0.32 J	0.19 J	1.2	2.6	0.34 J	0.94	3.7	0.45 U	0.47 U
Fluorene	1.6	0.96	0.41 U	0.43 U	0.41 U	0.063 J	0.1 J	0.48 U	0.067 J	0.14 J	0.45 U	0.47 U
Heptachlor	0.0029 U	0.0022 U	0.0021 U	0.015	0.0021 U	0.00056 J	0.0011 J	0.0025 U	0.00051 J	NR	0.0023 UJ	0.0024 UJ
Heptachlor epoxide	0.0029 U	0.0022 U	0.0021 U	0.0022 U	0.00015	0.0023 U	0.0023 U	0.0014 JN	0.0022 U	NR	0.0023 UJ	0.0048 UJ
Indeno(1,2,3-c,d)pyrene	1.2	0.41 J	0.043 J	0.054 J	0.41 U	0.1 J	0.15 J	0.48 U	0.11 J	0.24 J	0.45 U	0.47 U
Iron	14,000	2,000	310	460 J	2,300 J	820 J	1,100 J	1,000 J	420 J	1,200 J	200 J	180 J
Isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Isopropyltoluene, p-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lead	72	90	5.6	11 J	68 J	17 J	20 J	19 J	15 J	21 J	5.0 J	3.1 J
Magnesium	490	210	30 U	20 UJ	30 UJ	110 J	120 J	120 UJ	40 UJ	90 UJ	30 UJ	40 U
Manganese	47	9.2	1.6 J	2.3 J	7.4 J	3.4 J	3.4 J	5.8 J	1.9 J	4.8 J	1.3 J	1.3 J
Mercury	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.2 U	0.06 U	0.06 U	0.07 U	0.06 U	0.07 U
Methyl tert-butyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylnaphthalene, 1-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylnaphthalene, 2-	0.53 J	0.26 J	0.41 U	0.43 U	0.41 U	0.12 J	0.44 U	0.48 U	0.073 J	0.25 J	0.45 U	0.47 U
N-Nitrosodi-n-propylamine	0.57 U	0.42 U	0.41 U	0.43 U	0.41 U	0.44 U	0.44 U	1.3	0.43 U	0.49 U	0.45 U	0.47 U

NR Not reported.
I Value detected between MDL and PQL.
J Estimated value.
N Presumptive evidence.
U Material was analyzed for but not detected. The number is the minimum quantitation limit.

Table 4-12
Sediment Analytical Results from the CAR and ESI
Sanford Gas Plant

ANALYTE	ESI SD-LM-05 (mg/kg)	ESI SD-LM-06 (mg/kg)	ESI SD-LM-07 (mg/kg)	ESI SD-LM-08 (mg/kg)	ESI SD-LM-09 (mg/kg)	ESI SD-LM-10 (mg/kg)	CAR CBT1A (2.1-2.5 ft) (mg/kg)	CAR CBT3C (0-1.5 ft) (mg/kg)	CAR CBT4C (2.55-3.15 ft) (mg/kg)	CAR UTT1A (1-1.5 ft) (mg/kg)	CAR UTT2A (1.2-3 ft) (mg/kg)	CAR UTT3B (1.5-2 ft) (mg/kg)
DDD, 4,4'-	0.0043 UJ	0.0043 UJ	0.0044 UJ	0.0043 UJ	0.0047 UJ	0.0045 UJ	NR	NR	NR	NR	NR	NR
DDE, 4,4'-	0.00083 JN	0.0011 J	0.0049 J	0.00097 J	0.0047 UJ	0.0011 J	NR	NR	NR	NR	NR	NR
DDT, 4,4'-	0.0043 UJ	0.0043 UJ	0.0044 UJ	0.0043 UJ	0.0047 UJ	0.0045 UJ	NR	NR	NR	NR	NR	NR
Dibenzo(a,h)anthracene	0.44 U	0.43 U	0.051 J	0.43 U	0.049 J	0.46 U	NR	NR	NR	NR	NR	NR
Dibenzofuran	0.44 U	0.43 U	0.44 U	0.43 U	0.47 UJ	0.46 U	NR	NR	NR	NR	NR	NR
Dibromo-3-chloropropane, 1,2-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dichlorobenzene, 1,4-	0.44 U	0.43 U	0.44 U	0.43 U	0.47 UJ	0.46 U	NR	NR	NR	NR	NR	NR
Dichloroethane, 1,1-	0.013 U	0.013 U	0.014 U	0.013 U	0.014 U	0.014 U	NR	NR	NR	NR	NR	NR
Dichloroethene, cis-1,2-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dichloroethene, trans-1,2-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dieldrin	0.00053 J	0.00082 JN	0.0023 UJ	0.0043 UJ	0.0012 JN	0.00049 J	NR	NR	NR	NR	NR	NR
Dinitrotoluene, 2,4-	0.44 U	0.43 U	1.1 U	0.43 U	0.47 UJ	0.46 U	NR	NR	NR	NR	NR	NR
Endosulfan II	0.0043 UJ	0.0043 UJ	0.0044 UJ	0.0043 UJ	0.0047 UJ	0.0045 UJ	NR	NR	NR	NR	NR	NR
Endosulfan sulfate	0.0043 UJ	0.0043 UJ	0.0044 UJ	0.0043 UJ	0.0047 UJ	0.0045 UJ	NR	NR	NR	NR	NR	NR
Endrin	0.0043 UJ	0.0043 UJ	0.0044 UJ	0.0043 UJ	0.00067 J	0.00015 J	NR	NR	NR	NR	NR	NR
Endrin aldehyde	0.0043 UJ	0.0043 UJ	0.0044 UJ	0.0043 UJ	0.0047 UJ	0.0045 UJ	NR	NR	NR	NR	NR	NR
Endrin ketone	0.0043 UJ	0.0043 UJ	0.0044 UJ	0.0043 UJ	0.0047 UJ	0.0045 UJ	NR	NR	NR	NR	NR	NR
Ethylbenzene	NR	0.013 U	0.014 U	0.013 U	0.014 U	0.014 U	8.3 J	1 U	320	1 U	190	460
Fluoranthene	0.44 U	0.14 J	0.37 J	0.047 J	0.37 J	0.074 J	120.0 J	25	340	200 U	910	2,200
Fluorene	0.44 U	0.43 U	0.44 U	0.43 U	0.47 UJ	0.46 U	150	10	660	55	1,300	2,900
Heptachlor	0.00084 J	0.0022 UJ	0.0023 UJ	0.0022 UJ	0.0024 UJ	0.0023 UJ	NR	NR	NR	NR	NR	NR
Heptachlor epoxide	0.0022 UJ	0.0022 UJ	0.0023 UJ	0.0022 UJ	0.0024 UJ	0.0023 UJ	NR	NR	NR	NR	NR	NR
Indeno(1,2,3-c,d)pyrene	0.44 U	0.077 J	0.17 J	0.43 U	0.18 J	0.46 U	19 U	5 J	160 U	24 J	305 U	344 U
Iron	NR	310 J	2,500 J	210 J	400 J	360 J	2,100	37,000	640	2,800	20,000	24,000
Isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Isopropyltoluene, p-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lead	NR	4.3 J	36 J	4 J	5.5 J	5 J	14	450	3.6	38	260	250
Magnesium	NR	50 UJ	220 J	40 UJ	40 UJ	60 UJ	NR	NR	NR	NR	NR	NR
Manganese	NR	2.5 J	18 J	0.97 J	2.6 J	2.3 J	7.1	220	2.5 U	7	41	48
Mercury	NR	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	NR	NR	NR	NR	NR	NR
Methyl tert-butyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylnaphthalene, 1-	NR	NR	NR	NR	NR	NR	290	3.8 U	470	19 U	3,000	4,700
Methylnaphthalene, 2-	0.44 U	0.43 U	0.44 U	0.43 U	0.47 UJ	0.46 U	350	3.8 U	1,800	19 U	3,700	5,300
N-Nitrosodi-n-propylamine	0.44 U	0.43 U	0.44 U	0.43 U	0.47 UJ	0.46 U	NR	NR	NR	NR	NR	NR

NR Not reported.
I Value detected between MDL and PQL.
J Estimated value.
N Presumptive evidence.
U Material was analyzed for but not detected. The number is the minimum quantitation limit.

Table 4-12
Sediment Analytical Results from the CAR and ESI
Sanford Gas Plant

ANALYTE	ESI SD-STRM-01 (mg/kg)	ESI SD-STRM-02 (mg/kg)	ESI SD-MC-01 (mg/kg)	ESI SD-MC-02 (mg/kg)	ESI SD-MC-03 (mg/kg)	ESI SD-CB-01 (mg/kg)	ESI SD-CB-02 (mg/kg)	ESI SD-CB-03 (mg/kg)	ESI SD-CB-04 (mg/kg)	ESI SD-CB-05 (mg/kg)	ESI SD-CB-06 (mg/kg)	ESI SD-CB-07 (mg/kg)
Naphthalene	NR	NR	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	0.13 J	0.55 U	0.52 U	0.42 U
Nickel	2.9 J	7 J	0.97 U	3.8 J	0.97 U	0.92 U	2.4 J	2.7 J	3.7 J	1.4 J	28	12
Nitroaniline, 2-	1.1 U	1.2	1.1 U	1 U	1 U	1.1 U	1.2 U	1.1 U	1 U	1.4 U	1.3 U	1 U
Nitrophenol, 4-	1.1 U	1.2 U	1.1 U	1 U	1 U	1.1 U	1.2 U	1.1 U	1 U	1.4 U	1.3 U	1 U
Pentachlorophenol	1.1 U	1.2 U	1.1 U	1 U	1 U	1.1 U	1.2 U	1.1 U	1 U	1.4 U	1.3 U	1 U
Phenanthrene	0.18 J	0.79	0.43 U	0.051 J	0.4 U	0.4 J	0.43 J	0.1 J	0.95	1.2	1.3	0.25 J
Phenol	0.43 U	0.47 U	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	0.42 U	0.55 U	0.52 U	0.42 U
Potassium	140	160	26	20 U	20 U	42	50	54	220	26	120	260
Propylbenzene, n-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Pyrene	0.3 J	1.3	0.43 U	0.11 J	0.072 J	0.56	0.55	0.16 J	1.2	2	2.8	1.7
Selenium	0.54 U	0.55 U	1 U	0.46 U	0.51 U	0.48 U	0.52 U	1U	0.50 U	0.49 U	2.8	1.4
Styrene	NR	NR	0.013 U	0.012 U	0.012 U	NR	NR	NR	0.013 U	0.017 U	NR	NR
Tetrachloroethene	NR	NR	0.013 U	0.012 U	0.012 U	NR	NR	NR	0.013 U	0.017 U	NR	NR
Toluene	0.006 J	0.015 U	0.013 U	0.012 U	0.012 U	0.013 U	0.014 U	NR	0.013 U	0.017 U	0.016 U	0.016 U
Trichlorobenzene, 1,2,3-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Trichlorobenzene, 1,2,4-	0.47 U	0.47 U	0.43 U	0.4 U	0.4 U	0.43 U	0.46 U	0.42 U	0.42 U	0.55 U	0.52 U	0.42 U
Trichloroethene	NR	NR	0.013 U	0.012 U	0.012 U	NR	NR	NR	0.013 U	0.017 U	NR	NR
Trichloropropane, 1,2,3-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Trimethylbenzene, 1,2,4-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Trimethylbenzene, 1,3,5-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Vanadium	4 J	3.5 J	0.67 U	0.60 J	0.37 J	1.2 J	4.7 J	3.3 J	6.6 J	1.6 J	6.9 J	10 J
Zinc	330	150	10 UJ	20 UJ	20 UJ	190 J	29 J	110	95	59 J	920 J	320 J
Miscellaneous												
Total Volatile Solids	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Percent Solids	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NR Not reported.
I Value detected between MDL and PQL.
J Estimated value.
N Presumptive evidence.
U Material was analyzed for but not detected. The number is the minimum quantitation limit.

Table 4-12
Sediment Analytical Results from the CAR and ESI
Sanford Gas Plant

ANALYTE	ESI SD-CB-08 (mg/kg)	ESI SD-CB-09 (mg/kg)	ESI SD-CB-10 (mg/kg)	ESI SD-CB-11 (mg/kg)	ESI SD-CB-12 (mg/kg)	ESI SD-LM-01A (mg/kg)	ESI SD-LM-01B (mg/kg)	ESI SD-LM-02A (mg/kg)	ESI SD-LM-02B (mg/kg)	ESI SD-LM-02C (mg/kg)	ESI SD-LM-03 (mg/kg)	ESI SD-LM-04 (mg/kg)
Naphthalene	0.21 J	0.47	0.41 U	0.43 U	0.41 U	0.061 J	0.12 J	0.48 U	0.43 U	0.1 J	0.45 U	0.47 U
Nickel	2.5 J	1.3 J	0.91 U	0.88 U	0.91 U	0.91 U	0.90 U	1.1 U	0.91 U	1.1 U	0.91 U	0.96 U
Nitroaniline, 2-	1.4 U	1.1 U	1 U	1.1 U	1 U	1.1 J	1.1 U	1.2	1.1 U	1.2 U	1.1 U	1.2 U
Nitrophenol, 4-	1.4 U	1.1 U	1 U	1.1 U	1 U	1.1 U	1.1 U	3.6	1.1 U	1.2 U	1.1 U	1.2 U
Pentachlorophenol	1.4 U	1.1 U	1 U	0.43 U	1 U	1.1 U	1.1 U	2.4	1.1 U	1.2 U	1.1 U	1.2 U
Phenanthrene	3.7	3.2	0.41 U	0.094 J	0.049 J	0.091 J	0.13 J	0.085 J	0.082 J	1.1	0.45 U	0.47 U
Phenol	0.57 U	0.42 U	0.41 U	0.43 U	0.41 U	0.44 U	0.44 U	1.7	0.43 U	0.49 U	0.45 U	0.47 U
Potassium	45	31	20U	30 U	30 U	30 U	30 U	30 U	30 U	30 U	30 U	33 J
Propylbenzene, n-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Pyrene	9.5	2.8	0.065 J	0.49	0.31 J	1.8	3.6	2.5	1.5	3.9	0.45 U	0.47 U
Selenium	1U	0.52 U	1 U	0.95 UJ	0.99 UJ	0.98 UJ	0.97 UJ	1.1 UJ	0.98 UJ	1.2 UJ	0.99 UJ	1 UJ
Styrene	0.017 U	NR	0.012 U	0.013 U	0.012 U	0.014 U	0.014 U	0.014 U	0.013 U	0.015 U	0.014 U	0.014 U
Tetrachloroethene	0.017 U	NR	0.012 U	0.013 U	0.012 U	0.014 U	0.014 U	0.014 U	0.013 U	0.015 U	0.014 U	0.014 U
Toluene	0.017 U	0.013 U	0.012 U	0.013 U	NR	0.014 U	0.014 U	0.014 U	0.013 U	0.015 U	0.014 U	0.014 U
Trichlorobenzene, 1,2,3-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Trichlorobenzene, 1,2,4-	0.57 U	0.42 U	0.41 U	0.43 U	0.41 U	0.44 U	0.44 U	1.1	0.43 U	0.49 U	0.45 U	0.47 U
Trichloroethene	0.017 U	NR	0.012 U	0.013 U	0.012 U	0.014 U	0.014 U	0.014 U	0.013 U	0.015 U	0.014 U	0.014 U
Trichloropropane, 1,2,3-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Trimethylbenzene, 1,2,4-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Trimethylbenzene, 1,3,5-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Vanadium	3.4 J	2 J	1 U	1 UJ	1 UJ	2 UJ	1 UJ	2 UJ	0.49 U	2 UJ	0.49 U	0.52 U
Zinc	110 J	91 J	20 UJ	20 UJ	30 UJ	30 UJ	36 J	40 UJ	20 UJ	40 UJ	9 UJ	8 UJ
Miscellaneous												
Total Volatile Solids	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Percent Solids	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NR Not reported.
I Value detected between MDL and PQL.
J Estimated value.
N Presumptive evidence.
U Material was analyzed for but not detected. The number is the minimum quantitation limit.

Table 4-12
Sediment Analytical Results from the CAR and ESI
Sanford Gas Plant

ANALYTE	ESI SD-LM-05 (mg/kg)	ESI SD-LM-06 (mg/kg)	ESI SD-LM-07 (mg/kg)	ESI SD-LM-08 (mg/kg)	ESI SD-LM-09 (mg/kg)	ESI SD-LM-10 (mg/kg)	CAR CBT1A (2.1-2.5 ft) (mg/kg)	CAR CBT3C (0-1.5 ft) (mg/kg)	CAR CBT4C (2.55-3.15 ft) (mg/kg)	CAR UTT1A (1-1.5 ft) (mg/kg)	CAR UTT2A (1.2-3 ft) (mg/kg)	CAR UTT3B (1.5-2 ft) (mg/kg)
Naphthalene	0.44 U	0.43 U	0.44 U	0.43 U	0.47 UJ	0.46 U	NR	3.8 U	NR	NR	NR	NR
Nickel	NR	0.93 U	0.94 U	0.87 U	0.91 U	0.95 U	NR	NR	NR	NR	NR	NR
Nitroaniline, 2-	1.1 U	1.1 U	1.1 U	1.1 U	1.2 UJ	1.1 U	NR	NR	NR	NR	NR	NR
Nitrophenol, 4-	1.1 U	1.1 U	1.1 U	1.1 U	1.2 UJ	1.1 U	NR	NR	NR	NR	NR	NR
Pentachlorophenol	1.1 U	1.1 U	1.1 U	1.1 U	1.2 UJ	1.1 U	NR	NR	NR	NR	NR	NR
Phenanthrene	0.44 U	0.058 J	0.16 J	0.43 U	0.049 J	0.46 U	310	11	1,100	19 U	2,800	6,000
Phenol	0.44 U	0.43 U	0.44 U	0.43 U	0.47 UJ	0.46 U	NR	NR	NR	NR	NR	NR
Potassium	NR	30 U	45 J	30 U	30 U	27 J	NR	NR	NR	NR	NR	NR
Propylbenzene, n-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Pyrene	0.44 U	0.22 J	0.5	0.11 J	0.57 J	0.1 J	160	36	520	220	1,400	3,200
Selenium	NR	1 UJ	1 UJ	0.94 UJ	0.98 UJ	1 UJ	0.25 U	0.25 U	0.25 U	0.25 U	0.8	2.3
Styrene	0.013 U	0.013 U	0.014 U	0.013 U	0.014 U	0.014 U	NR	NR	NR	NR	NR	NR
Tetrachloroethene	0.013 U	0.013 U	0.014 U	0.013 U	0.014 U	0.014 U	NR	NR	NR	NR	NR	NR
Toluene	0.013 U	0.013 U	0.014 U	0.013 U	0.014 U	0.014 U	NR	NR	NR	NR	NR	NR
Trichlorobenzene, 1,2,3-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Trichlorobenzene, 1,2,4-	0.44 U	0.43 U	0.44 U	0.43 U	0.47 UJ	0.46 U	NR	NR	NR	NR	NR	NR
Trichloroethene	0.013 U	NR	0.014 U	0.013 U	0.014 U	0.014 U	NR	NR	NR	NR	NR	NR
Trichloropropane, 1,2,3-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Trimethylbenzene, 1,2,4-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Trimethylbenzene, 1,3,5-	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Vanadium	NR	0.50 U	4 U	0.47 U	0.49 U	0.51 U	NR	NR	NR	NR	NR	NR
Zinc	NR	10 UJ	83 J	6 UJ	20 UJ	8 UJ	NR	NR	NR	NR	NR	NR
Miscellaneous												
Total Volatile Solids	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Percent Solids	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NR Not reported.
I Value detected between MDL and PQL.
J Estimated value.
N Presumptive evidence.
U Material was analyzed for but not detected. The number is the minimum quantitation limit.

Table 4-13
Sediment Analytical Results from the RI/FS

Parameter	SD-1	SD-2	SD-3	SD-4	SD-5
Volatile Organic Compounds (µg/Kg)					
Chloromethane	1 U	1 U	1 U	1 U	1 U
Acetone	68 U	130 U	71 U	67 U	63 U
t-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
Methyl tert-butyl ether	8 U	8 U	8 U	8 U	8 U
1,1-Dichloroethane	1 U	1 U	1 UJ1	1 U	1 U
c-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
2-Butanone	34 U	32 U	36 U	33 U	32-U
Benzene	19 J8	5	1 U	1.6 UJ1,8	2.3
Trichloroethene	1 U	1 U	1 U	1 U	1 U
Toluene	4.8	4.7	3	1 U	2 UJ1
Tetrachloroethene	10 UJ1	10	21	12	13
Ethylbenzene	2.2 UJ1	1.5 UJ1	1 U	1 U	1 U
Styrene	3 UJ1	1 U	1 U	1 U	1 U
Isopropylbenzene	63 J8	3.7 UJ1	6	1 UJ8	3.9 UJ1
1,2,3-Trichloropropane	6.4 J8	5.8	7.4	8.7 J8	5.9
n-Propylbenzene	27 J8	1 U	1 U	1 UJ8	1.5
1,3,5-Trimethylbenzene	2.9	1 U	1.6	1 U	1 U
1,2,4-Trimethylbenzene	8.4 J8	1.8 UJ1	4	1 U	1.5 UJ1
s-Butylbenzene	2 UJ1	1.5 UJ1	1 U	1 U	1 U
p-Isopropyltoluene	8.8 J8	1.6 UJ1	2 UJ1	1 UJ8	1.6 UJ1
n-Butylbenzene	20 J8	12	4.6	1 U	1 U
1,2-Dibromo-3-chloropropane	11 J8	1 U	1 U	1 U	1 U
Naphthalene	22	46	27	3.2 J8	14
1,2,3-Trichloropropane	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds (µg/Kg)					
Acenaphthene	22000	22000	1400	1500	2100 U
Acenaphthylene	2300 U	2100 U	240 U	230 UJ1	2100 U
Anthracene	7000	9600	360 UJ1	430 UJ1	2100 U
Benz(a)anthracene	16000	14000	1000	1600	2100 U
Benzo(b)fluoranthene	12000	6200	600	1000	2100 U
Benzo(k)fluoranthene	13000	7000	700	1100	2100 U
Benzo(g,h,i)perylene	6600	4900 UJ1	330 UJ1	430 UJ1	2100 U
Benzo(a)pyrene	16000	12000	1000	1300	2100 U
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA
Chrysene	16000	12000	900	1300	2100 U
Dibenz(a,h)anthracene	2700 UJ1	2100 U	240 U	220 U	2100 U
Fluoranthene	29000	30000	1800	3100	2300 UJ1
Fluorene	8400 J8	11000	410 UJ1	640 UJ1	2100 U

Table 4-13 (continued)
Sediment Analytical Results from the RI/FS

Parameter	SD-1	SD-2	SD-3	SD-4	SD-5
Indeno(1,2,3-cd)pyrene	***6300***	***3500***	***310 IJ1***	***410***	2100 U
1-Methylnaphthalene	***22000 J8***	***3800***	***290 IJ1***	220 U	2100 U
2-Methylnaphthalene	***3000 IJ1***	2100 U	240 U	220 U	2100 U
Phenanthrene	***25000***	***29000***	***1600***	***1700 J8***	***2800 IJ1***
Pyrene	***49000***	***47000***	***2600***	***3600***	***4000 IJ1***
Metals (mg/Kg)					
Arsenic	***0.8 IJ1***	***5.9***	0.7 U	***0.9 IJ1***	***1.1 IJ1***
Barium	27 U	***43***	28 U	27 U	25 U
Cadmium	1 U	***6.8***	1 U	1 U	1 U
Chromium	***3 J8***	***7.2 J8***	***4 J8***	***3.6 J8***	***5 J8***
Copper	***22 J8***	***43 J8***	***7 J8***	***76 J8***	***16 J8***
Iron	***9000 J4,8***	***63000 J4,8***	***3600 J4,8***	***5500 J4,8***	***8100 J4,8***
Lead	***110 J8***	***250 J8***	***26 J8***	***61 J8***	***86 J8***
Manganese	***32 J8***	***140 J8***	***8 J8***	***20 J8***	***38 J8***
Mercury	***0.023***	***0.034***	***0.016 I***	0.01 U	***0.04***
Zinc	***120 J8***	***280 J8***	***28 J8***	***120 J8***	***100 J8***
Miscellaneous (mg/Kg)					
Total Volatile Solids	***16000***	***22000***	***16000***	***12000***	***12000***
Percent Solids	***73***	***79***	***70***	***75***	***79***

Table 4-13 (continued) Sediment Analytical Results from the RI/FS					
Parameter	**SD-6**	**SD-7**	**SD-8**	**SD-9**	**SD-10**
Volatile Organic Compounds (µg/Kg)					
Chloromethane	1 U	1 U	1 U	3 UJ2	1 U
Acetone	64 U	66 U	63 U	160 UJ2	66 U
t-1,2-Dichloroethene	1 U	1 U	1 U	3 UJ2	1 U
Methyl tert-butyl ether	8 U	8 U	***11 IJ1***	19 UJ2	8 U
1,1-Dichloroethane	***1.7 IJ1***	1 U	1 U	3 UJ2	***2.1***
c-1,2-Dichloroethene	1 U	1 U	1 UJ8	3 UJ2	1 U
2-Butanone	32 U	33 U	25 U	81 UJ2	33 U
Benzene	1 U	1 U	1 U	3 UJ2	1 U
Trichloroethene	1 U	1 U	1 U	3 UJ2	1 U
Toluene	***2 IJ1***	1 U	1 U	3 UJ2	1 U
Tetrachloroethene	***23***	4 U	4 U	10 UJ2	4 U
Ethylbenzene	1 U	1 U	1 U	3 UJ2	1 U
Styrene	1 U	1 U	1 U	3 UJ2	1 U
Isopropylbenzene	1 U	1 U	1 U	3 UJ2	1 U
1,2,3-Trichloropropane	***3.6 IJ1***	1 U	1 U	3 UJ2	1 U
n-Propylbenzene	1 U	1 U	1 U	3 UJ2	1 U
1,3,5-Trimethylbenzene	1 U	1 U	1 U	3 UJ2	1 U
1,2,4-Trimethylbenzene	1 U	1 U	1 U	3 UJ2	1 U
s-Butylbenzene	1 U	1 U	1 U	3 UJ2	1 U
p-Isopropyltoluene	1 U	1 U	1 U	3 UJ2	1 U
n-Butylbenzene	1 U	1 U	1 U	3 UJ2	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	3 UJ2	1 U
Naphthalene	***4.4***	1 U	1 U	3 UJ2	1 U
1,2,3-Trichloropropane	1 U	1 U	1 U	3 UJ2	1 U
Semivolatile Organic Compounds (µg/Kg)					
Acenaphthene	210 U	220 U	***300 IJ1***	540 UJ2	220 U
Acenaphthylene	210 U	220 U	210 U	540 UJ2	220 U
Anthracene	210 U	220 U	210 U	540 UJ2	220 U
Benz(a)anthracene	210 U	***530***	***390***	***710 IJ1,2***	220 U
Benzo(b)fluoranthene	210 U	***280 IJ1***	***300 IJ1***	***610 IJ1,2***	220 U
Benzo(k)fluoranthene	210 U	***300 IJ1***	***350***	***680 UJ2***	220 U
Benzo(g,h,i)perylene	210 U	220 U	210 U	***610 IJ1,2***	220 U
Benzo(a)pyrene	210 U	***410***	***320 IJ1***	***840 IJ1,2***	220 U
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA
Chrysene	210 U	***410 IJ1***	***350 IJ1***	***740 IJ1,2***	220 U
Dibenz(a,h)anthracene	210 U	220 U	170 U	540 UJ2	220 U
Fluoranthene	210 U	***780***	***570***	***870 IJ1,2***	***300 IJ2***
Fluorene	210 U	220 U	210 U	540 UJ2	220 U

Table 4-13 (continued)
Sediment Analytical Results from the RI/FS

Parameter	SD-6	SD-7	SD-8	SD-9	SD-10
Indeno(1,2,3-cd)pyrene	210 U	220 U	210 U	540 UJ2	220 U
1-Methylnaphthalene	210 U	220 U	210 U	540 UJ2	220 U
2-Methylnaphthalene	210 U	220 U	210 U	540 UJ2	220 U
Phenanthrene	210 U	220 U	***300 IJ1***	540 UJ2	220 U
Pyrene	***260 IJ1***	***1200***	***770***	***1200 IJ1,2***	***900***
Metals (mg/Kg)					
Arsenic	0.6 U	0.6 U	0.6 U	1.6 UJ2	0.6 U
Barium	26 U	26 U	25 U	64 UJ2	26 U
Cadmium	1 U	1 U	1 U	3 UJ2	1 U
Chromium	1 U	1 U	***1.5 J8***	***8.7 J2,8***	1 U
Copper	6 U	***12 J8***	6 U	***29 J2,8***	***9.9 J8***
Iron	***850 J4,8***	***550 J4,8***	***600 J4,8***	***2800 J2,4,8***	***210 J4,8***
Lead	***24 J8***	***14 J8***	***7.8 J8***	***64 J2,8***	***25 J8***
Manganese	***3.1 J8***	***4.5 J8***	***28 J8***	***9.4 J2,8***	1 U
Mercury	0.01 U	0.01 U	0.01 U	***0.1 J2***	0.01 U
Zinc	***47 J8***	***17 J8***	***29 J8***	***84 J2,8***	***8.8 J8***
Miscellaneous (mg/Kg)					
Total Volatile Solids	***2000***	***7000***	***3200***	***310000 J2***	***3300***
Percent Solids	***78***	***76***	***79***	***31***	***76***

Table 4-13 (continued)
Sediment Analytical Results from the RI/FS

Parameter	SD-11	SD-12	SD-13	SD-14	SD-15
Volatile Organic Compounds (µg/Kg)					
Chloromethane	***1.6 UJ2***	1 U	1 U	1 U	2 U
Acetone	67 U	64 U	***530***	140 U	83 U
t-1,2-Dichloroethene	1 U	1 U	1 U	1 U	2 U
Methyl tert-butyl ether	8 U	8 U	8 U	8 U	10 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	2 U
c-1,2-Dichloroethene	1 U	1 U	1 U	1 U	2 U
2-Butanone	33 U	32 U	34 U	34 U	42 U
Benzene	1 U	***1.4 UJ1***	1 U	1 U	2 U
Trichloroethene	1 U	1 U	1 U	1 U	2 U
Toluene	***1.7 UJ2***	***1 J***	***1.8 UJ2***	***3 UJ1***	2 U
Tetrachloroethene	4 U	4 U	4 U	4 U	5 U
Ethylbenzene	1 U	1 U	1 U	1 U	2 U
Styrene	1 U	1 U	1 U	1 U	2 U
Isopropylbenzene	1 U	1 U	***6.1***	***9.7***	2 U
1,2,3-Trichloropropane	1 U	***4 J***	1 U	1 U	2 U
n-Propylbenzene	1 U	1 U	1 U	***3***	2 U
1,3,5-Trimethylbenzene	1 U	1 U	1 U	1 U	2 U
1,2,4-Trimethylbenzene	1 U	1 U	1 U	1 U	2 U
s-Butylbenzene	1 U	1 U	1 U	1 U	2 U
p-Isopropyltoluene	1 U	1 U	1 U	1 U	2 U
n-Butylbenzene	1 U	1 U	1 U	1 U	2 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	2 U
Naphthalene	1 U	***1.4***	***8***	***2.8***	***2***
1,2,3-Trichloropropane	1 U	1 U	1 U	1 U	2 U
Semivolatile Organic Compounds (µg/Kg)					
Acenaphthene	2200 U	210 U	***2800 UJ1***	***580***	2800 U
Acenaphthylene	2200 U	210 U	2200 U	230 U	2800 U
Anthracene	2200 U	210 U	2200 U	230 U	2800 U
Benz(a)anthracene	2200 U	***260 UJ1***	***2600 UJ1***	230 U	2800 U
Benzo(b)fluoranthene	2200 U	210 U	2200 U	230 U	2800 U
Benzo(k)fluoranthene	2200 U	210 U	2200 U	230 U	2800 U
Benzo(g,h,i)perylene	2200 U	210 U	2200 U	230 U	2800 U
Benzo(a)pyrene	2200 U	***260 UJ1***	***2600 UJ1***	***240 UJ1***	2800 U
Bis(2-ethylhexyl)phthalate	NA	NA	NA	***NA***	NA
Chrysene	2200 U	***230 UJ1***	***2300 UJ1***	230 U	2800 U
Dibenz(a,h)anthracene	2200 U	210 U	2200 U	230 U	2800 U
Fluoranthene	2200 U	***300 UJ1***	***5000 UJ1***	***350 UJ1***	2800 U
Fluorene	2200 U	210 U	2200 U	230 U	2800 U

Table 4-13 (continued)
Sediment Analytical Results from the RI/FS

Parameter	SD-11	SD-12	SD-13	SD-14	SD-15
Indeno(1,2,3-cd)pyrene	2200 U	210 U	2200 U	230 U	2800 U
1-Methylnaphthalene	2200 U	210 U	2200 U	230 U	2800 U
2-Methylnaphthalene	2200 U	210 U	2200 U	230 U	2800 U
Phenanthrene	2200 U	210 U	2200 U	*270 IJ1*	2800 U
Pyrene	2200 U	*400 IJ1*	*6900*	*430 IJ1*	*3000 IJ1*
Metals (mg/Kg)					
Arsenic	0.7 U	0.6 U	0.7 U	0.7 U	0.8 U
Barium	27 U	26 U	27 U	27 U	33 U
Cadmium	1 U	1 U	1 U	1 U	2 U
Chromium	1 U	1 U	*2.3 J8*	1 U	*3 J8*
Copper	*11 J8*	6 U	*16 J8*	*12 J8*	*12 J8*
Iron	*250 J4,8*	*470 J4,8*	*880 J4,8*	*320 J4,8*	*2200 J4,8*
Lead	*7.2 J8*	*14 J8*	*15 J8*	*12 J8*	*48 J8*
Manganese	*2.5 J8*	*1.9 J8*	*3.2 J8*	1 U	*6.8 J8*
Mercury	0.01 U	0.01 U	*0.031*	0.01 U	*0.03*
Zinc	*12 J8*	*13 J8*	*18 J8*	*18 J8*	*57 J8*
Miscellaneous (mg/Kg)					
Total Volatile Solids	*8400*	*1900*	*16000*	*2700*	*60000*
Percent Solids	*75*	*78*	*74*	*74*	*60*

Table 4-13 (continued)
Sediment Analytical Results from the RI/FS

Parameter	SD-16	SD-17	SD-18	SD-19	SD-20
Volatile Organic Compounds (µg/Kg)					
Chloromethane	1 U	1 U	1 U	2 U	1 U
Acetone	130 U	63 U	***240***	76 U	65 U
t-1,2-Dichloroethene	***2.9 IJ1***	1 U	1 U	2 U	1 U
Methyl tert-butyl ether	8 U	8 U	8 U	9 U	8 U
1,1-Dichloroethane	1 U	1 U	1 U	2 U	1 U
c-1,2-Dichloroethene	***28***	1 U	1 U	2 U	1 U
2-Butanone	33 U	32 U	35 U	38 U	32 U
Benzene	1 U	1 U	1 U	2 U	1 U
Trichloroethene	***1 IJ1***	1 U	1 U	2 U	1 U
Toluene	***1.5 IJ1***	1 U	1 U	2 U	1 U
Tetrachloroethene	***8 IJ1***	4 U	4 U	***14***	***14***
Ethylbenzene	1 U	1 U	1 U	2 U	1 U
Styrene	1 U	1 U	1 U	2 U	1 U
Isopropylbenzene	1 U	1 U	1 U	2 U	1 U
1,2,3-Trichloropropane	1 U	1 U	1 U	***5 IJ1***	1 U
n-Propylbenzene	1 U	1 U	1 U	2 U	1 U
1,3,5-Trimethylbenzene	1 U	1 U	1 U	2 U	1 U
1,2,4-Trimethylbenzene	1 U	1 U	1 U	2 U	***1 IJ1***
s-Butylbenzene	1 U	1 U	1 U	2 U	1 U
p-Isopropyltoluene	1 U	1 U	1 U	2 U	1 U
n-Butylbenzene	1 U	1 U	1 U	2 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	2 U	1 U
Naphthalene	***1.9***	1 U	1 U	2 U	***2.7***
1,2,3-Trichloropropane	1 U	1 U	1 U	2 U	1 U
Semivolatile Organic Compounds (µg/Kg)					
Acenaphthene	220 U	210 U	240 U	250 U	220 U
Acenaphthylene	220 U	210 U	240 U	250 U	220 U
Anthracene	220 U	210 U	240 U	250 U	220 U
Benz(a)anthracene	220 U	210 U	240 U	250 U	***270 IJ1***
Benzo(b)fluoranthene	220 U	210 U	240 U	250 U	220 U
Benzo(k)fluoranthene	220 U	210 U	240 U	250 U	***260 IJ1***
Benzo(g,h,i)perylene	220 U	210 U	240 U	250 U	220 U
Benzo(a)pyrene	220 U	210 U	240 U	250 U	***250 IJ1***
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA
Chrysene	220 U	210 U	240 U	250 U	220 U
Dibenz(a,h)anthracene	220 U	210 U	240 U	250 U	220 U
Fluoranthene	***250 IJ1***	210 U	240 U	250 U	***430 IJ1***
Fluorene	220 U	210 U	240 U	250 U	220 U

Table 4-13 (continued)
Sediment Analytical Results from the RI/FS

Parameter	SD-16	SD-17	SD-18	SD-19	SD-20
Indeno(1,2,3-cd)pyrene	220 U	210 U	240 U	250 U	220 U
1-Methylnaphthalene	220 U	210 U	240 U	250 U	220 U
2-Methylnaphthalene	220 U	210 U	240 U	250 U	220 U
Phenanthrene	220 U	210 U	240 U	250 U	220 U
Pyrene	220 U	210 U	240 U	250 U	***530***
Metals (mg/Kg)					
Arsenic	0.7 U	0.6 U	0.7 U	0.8 U	0.6 U
Barium	27 U	25 U	28 U	30 U	26 U
Cadmium	1 U	1 U	1 U	2 U	1 U
Chromium	***1.7 J8***	1 U	1 U	2 U	1 U
Copper	***16 J8***	***9.9 J8***	***7.3 J8***	8 U	6 U
Iron	***450 J4,8***	***280 J4,8***	***110 J4,8***	***1500 J4,8***	***360 J4,8***
Lead	***24 J8***	***4.7 J8***	1 U	2 U	***4.9 J8***
Manganese	***6.8 J8***	***8.5 J8***	1 U	***9.2 J8***	***2.3 J8***
Mercury	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Zinc	***16 J8***	6 U	7 U	8 U	***12 J8***
Miscellaneous (mg/Kg)					
Total Volatile Solids	***13000***	***5100***	***4500***	***32000***	***5100***
Percent Solids	***75***	***79***	***71***	***66***	***77***

Table 4-13 (continued)
Sediment Analytical Results from the RI/FS

Parameter	SD-21	SD-22	SD-23	SD-24	SD-25
Volatile Organic Compounds (µg/Kg)					
Chloromethane	1 U	3 UJ2	1 U	1 U	1 U
Acetone	130 U	***530 J2***	71 U	130 U	130 U
t-1,2-Dichloroethene	1 U	3 UJ2	1 U	1 U	1 U
Methyl tert-butyl ether	8 U	17 UJ2	8 U	8 U	8 U
1,1-Dichloroethane	1 U	3 UJ2	1 U	1 U	1 U
c-1,2-Dichloroethene	1 U	3 UJ2	1 U	1 U	1 U
2-Butanone	33 U	***78 J2***	36 U	33 U	33 U
Benzene	1 U	3 UJ2	***2 IJ1***	1 U	1 U
Trichloroethene	1 U	3 UJ2	1 U	1 U	1 U
Toluene	***2.8***	***3.6 IJ1,2***	***2.3 IJ1***	***4***	1 U
Tetrachloroethene	***6 IJ1***	***14 IJ1***	4 U	4 U	4 U
Ethylbenzene	1 U	3 UJ2	1 U	1 U	1 U
Styrene	1 U	3 UJ2	1 U	1 U	1 U
Isopropylbenzene	1 U	3 UJ2	***2.6 IJ1***	1 U	1 U
1,2,3-Trichloropropane	***6***	***5 IJ1,2***	***3.8 IJ1***	***6.8***	1 U
n-Propylbenzene	1 U	3 UJ2	1 U	1 U	1 U
1,3,5-Trimethylbenzene	1 U	3 UJ2	1 U	1 U	1 U
1,2,4-Trimethylbenzene	1 U	3 UJ2	1 U	1 U	1 U
s-Butylbenzene	1 U	3 UJ2	1 U	1 U	1 U
p-Isopropyltoluene	1 U	3 UJ2	1 U	1 U	1 U
n-Butylbenzene	1 U	3 UJ2	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	3 UJ2	1 U	1 U	1 U
Naphthalene	***1.8***	***6.4 J2***	***4***	1 U	1 U
1,2,3-Trichloropropane	1 U	***4.2 J2***	1 U	1 U	1 U
Semivolatile Organic Compounds (µg/Kg)					
Acenaphthene	220 U	4600 UJ2	***5700***	2200 U	2200 U
Acenaphthylene	220 U	4600 UJ2	***430 IJ1***	2200 U	2200 U
Anthracene	220 U	4600 UJ2	***730***	2200 U	2200 U
Benz(a)anthracene	220 U	4600 UJ2	***2000***	2200 U	2200 U
Benzo(b)fluoranthene	220 U	4600 UJ2	***2400***	2200 U	2200 U
Benzo(k)fluoranthene	220 U	4600 UJ2	***2400***	2200 U	2200 U
Benzo(g,h,i)perylene	220 U	4600 UJ2	***570***	2200 U	2200 U
Benzo(a)pyrene	220 U	4600 UJ2	***1800***	2200 U	2200 U
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA
Chrysene	220 U	4600 UJ2	***1200***	2200 U	2200 U
Dibenz(a,h)anthracene	220 U	4600 UJ2	240 U	2200 U	2200 U
Fluoranthene	220 U	***6700 IJ1,2***	***2800***	2200 U	2200 U
Fluorene	220 U	4600 U	***2000***	2200 U	2200 U

Table 4-13 (continued)
Sediment Analytical Results from the RI/FS

Parameter	SD-21	SD-22	SD-23	SD-24	SD-25
Indeno(1,2,3-cd)pyrene	220 U	4600 U	***530***	2200 U	2200 U
1-Methylnaphthalene	220 U	4600 U	***3300***	2200 U	2200 U
2-Methylnaphthalene	220 U	4600 U	240 U	2200 U	2200 U
Phenanthrene	220 U	4600 U	***4100***	2200 U	2200 U
Pyrene	220 U	***9400 IJ1,2***	***3400***	2200 U	2200 U
Metals (mg/Kg)					
Arsenic	0.6 U	***2.5 IJ1,2***	***0.8 IJ1***	0.6 U	0.7 U
Barium	26 U	56 UJ2	28 U	26 U	27 U
Cadmium	1 U	3 UJ2	1 U	1 U	1 U
Chromium	***3.6 J8***	***14 J2,8***	***2.6 J8***	1 U	1 U
Copper	***10 J8***	***72 J2,8***	***24 J8***	***8.4 J8***	***8.5 J8***
Iron	***260 J4,8***	***5000 J2,4,8***	***970 J4,8***	***280 J4,8***	***750 J4,8***
Lead	***17 J8***	***58 J2,8***	***18 J8***	***5.5 J8***	***4 J8***
Manganese	***2.1 J8***	***23 J2,8***	***5.1 J8***	***3.2 J8***	***2.4 J8***
Mercury	0.01 U	***0.25 J2***	***0.051***	***0.01 IJ1***	0.01 U
Zinc	***11 J8***	***180 J2,8***	***51 J8***	***22 J8***	***8.9 J8***
Miscellaneous (mg/Kg)					
Total Volatile Solids	***3900***	***100000***	***20000***	***1600***	***7700***
Percent Solids	***76***	***36***	***70***	***76***	***75***

Table 4-13 (continued) Sediment Analytical Results from the RI/FS				
Parameter	**SD-BG-1**	**SD-BG-2**	**SD-BG-3**	**SD-BG-4**
Volatile Organic Compounds (µg/Kg)				
Chloromethane	1 U	1 U	1 U	1 U
Acetone	67 U	62 U	61 U	64 U
t-1,2-Dichloroethene	1 U	1 U	1 U	1 U
Methyl tert-butyl ether	8 U	8 U	7 U	8 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U
c-1,2-Dichloroethene	1 U	1 U	1 U	1 U
2-Butanone	33 U	31 U	24 U	32 U
Benzene	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U
Tetrachloroethene	***8 IJ1***	***5 IJ1***	***5 IJ1***	***6 IJ1***
Ethylbenzene	1 U	1 U	1 U	1 U
Styrene	1 U	1 U	1 U	1 U
Isopropylbenzene	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	1 U	***5.2***	1 U	1 U
n-Propylbenzene	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	1 U	1 U	1 U	1 U
s-Butylbenzene	1 U	***1.9 IJ1***	1 U	1 U
p-Isopropyltoluene	1 U	1 U	1 U	1 U
n-Butylbenzene	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U
Naphthalene	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds (µg/Kg)				
Acenaphthene	2200 U	2100 U	2000 U	2100 U
Acenaphthylene	2200 U	2100 U	2000 U	2100 U
Anthracene	2200 U	2100 U	2000 U	2100 U
Benz(a)anthracene	2200 U	2100 U	2000 U	2100 U
Benzo(b)fluoranthene	2200 U	2100 U	2000 U	2100 U
Benzo(k)fluoranthene	2200 U	2100 U	2000 U	2100 U
Benzo(g,h,i)perylene	2200 U	2100 U	2000 U	2100 U
Benzo(a)pyrene	2200 U	2100 U	2000 U	2100 U
Bis(2-ethylhexyl)phthalate	***4900***	2100 U	***92000***	2100 U
Chrysene	2200 U	2100 U	2000 U	2100 U
Dibenz(a,h)anthracene	2200 U	2100 U	2000 U	2100 U
Fluoranthene	2200 U	***4000 IJ1***	2000 U	2100 U
Fluorene	2200 U	2100 U	2000 U	2100 U

Table 4-13 (continued)
Sediment Analytical Results from the RI/FS

Parameter	SD-BG-1	SD-BG-2	SD-BG-3	SD-BG-4
Indeno(1,2,3-cd)pyrene	2200 U	2100 U	2000 U	2100 U
1-Methylnaphthalene	2200 U	2100 U	2000 U	2100 U
2-Methylnaphthalene	2200 U	2100 U	2000 U	2100 U
Phenanthrene	2200 U	2100 U	2000 U	2100 U
Pyrene	2200 U	2100 UJ1	2000 U	2100 U
Metals (mg/Kg)				
Arsenic	0.7 U	0.6 U	3.4 UJ1	0.6 U
Barium	27 U	25 U	24 U	26 U
Cadmium	1 U	1 U	1 U	1 U
Chromium	2.1	8.2	9.6	1.9
Copper	7 U	8	6 U	6 U
Iron	830 J4	2000 J4	10000 J4	2000 J4
Lead	53	20	20	33
Manganese	6.4	15	5.7	8
Mercury	0.024 J6	0.01 U	0.01 UJ1,6	0.01 U
Zinc	45 J4	50 J4	82 J4	37 J4
Miscellaneous (mg/Kg)				
Total Volatile Solids	24000	12000	50000	3800
Percent Solids	75	80	82	78

Table 4-13 (continued) Sediment Analytical Results from the RI/FS				
Parameter	**SD-BG-5**	**SD-DUP1** *SD-8'*	**SD-DUP2** *SD-4'*	**SD-DUP3** *SD-1'*
Volatile Organic Compounds (µg/Kg)				
Chloromethane	1 U	1 U	1 U	1 U
Acetone	64 U	66 U	68 U	146 U
t-1,2-Dichloroethene	1 U	***1.7 IJ1***	1 U	1 U
Methyl tert-butyl ether	8 U	8 U	8 U	9 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U
c-1,2-Dichloroethene	1 U	***12 J8***	1 U	1 U
2-Butanone	32 U	33 U	34 U	36 U
Benzene	1 U	1 U	***7.8 J8***	***75 J8***
Trichloroethene	1 U	1 U	1 U	1 U
Toluene	1 U	***1 IJ1***	1 U	***6***
Tetrachloroethene	***8 IJ1***	***6 IJ1***	***9 IJ1***	***9 IJ1***
Ethylbenzene	1 U	1 U	1 U	***2.8***
Styrene	1 U	1 U	***1.6 IJ1***	1 U
Isopropylbenzene	1 U	1 U	***43 J8***	***3.2 IJ1,8***
1,2,3-Trichloropropane	1 U	***3.2 IJ1***	***1 UJ8***	***1 UJ8***
n-Propylbenzene	1 U	1 U	***18 J8***	***1 UJ8***
1,3,5-Trimethylbenzene	1 U	1 U	***1.8***	1 U
1,2,4-Trimethylbenzene	1 U	1 U	***4.7***	***1 IJ1,8***
s-Butylbenzene	1 U	1 U	***1 IJ1***	1 U
p-Isopropyltoluene	1 U	1 U	***9.7 J8***	***1 UJ8***
n-Butylbenzene	1 U	1 U	***2 IJ1***	***1 UJ8***
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	***1 UJ8***
Naphthalene	1 U	***2.4***	***16 J8***	***19***
1,2,3-Trichloropropane	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds (µg/Kg)				
Acenaphthene	2100 U	***450 IJ1***	***1200***	2400 U
Acenaphthylene	2100 U	220 U	230 U	2400 U
Anthracene	2100 U	220 U	***260 IJ1***	***11000***
Benz(a)anthracene	2100 U	360 U	***930 U***	***20000***
Benzo(b)fluoranthene	2100 U	***220 IJ1***	***570 IJ1***	***14000***
Benzo(k)fluoranthene	2100 U	***250 IJ1***	***640 IJ1***	***14000***
Benzo(g,h,i)perylene	2100 U	220 U	230 U	***7700***
Benzo(a)pyrene	2100 U	***300 IJ1***	***820 IJ1***	***20000***
Bis(2-ethylhexyl)phthalate	2100 U	NA	NA	NA
Chrysene	2100 U	***300 IJ1***	***820***	***20000***
Dibenz(a,h)anthracene	2100 U	***220 UJ2***	230 U	2400 U
Fluoranthene	2100 U	***590***	***2000***	***35000***
Fluorene	2100 U	220 U	***380 IJ1***	***14000 J8***