FINAL
TIER 1 REMEDIAL INVESTIGATION WORK PLAN

DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
AGENCY INTEREST (AI) NO. 86800
EPA ID LAD981155872, SSID #06N1
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Prepared For:

Baton Rouge Disposal, LLC
Baton Rouge, Louisiana

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EXECUTIVE SUMMARY

Clean Harbors Environmental Services, Inc. (Clean Harbors), on behalf of Baton Rouge Disposal, LLC, hereby submits to the United States Environmental Protection Agency (EPA) the Final Tier 1 Remedial Investigation (RI) Work Plan (WP) for the Devil's Swamp Lake Site (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 06-04-10) located near Baton Rouge, Louisiana (Site). The Site consists of a man-made crescent-shaped lake and associated wetlands located on the Mississippi River east bank floodplain approximately ten miles north of Baton Rouge, Louisiana.

This Report was prepared in accordance with the requirements outlined in the Unilateral Administrative Order (UAO) for Remedial Investigation/Feasibility Study (RI/FS) for the Devil's Swamp Lake Site issued on December 3, 2009. The UAO was issued to Baton Rouge Disposal, LLC, by EPA Region 6 and became effective on December 18, 2009. This Report was prepared to meet the requirements of Task 1.1.1.6 of Appendix A of the UAO (Statement of Work [SOW]). In accordance with the general requirements of the UAO SOW, the RI/FS will include the investigation and evaluation of the horizontal and vertical extent of impact and feasible remedies for polychlorinated biphenyl (PCB) impact in the lake and adjoining portions of the swamp (UAO, Appendix A, Section 1.0.3.3).

This Final Tier 1 RI Work Plan outlines the proposed scope of work for the first phase of the RI to be completed in accordance with the requirements as defined in the UAO and in referenced EPA guidance. Subsequent tiers may follow Tier 1 as needed to meet the objectives of the UAO. The objective of this Work Plan is to present the methodology and procedures that will be used to obtain information regarding the nature and extent of potential impact at the Site. The RI for the Devil's Swamp Lake Site is being conducted in a tiered approach. The first tier (Tier 1) of the RI will include initial characterization of the nature and extent of PCBs at the Site; determination if a human health risk assessment (HHRA) is required by identification of constituents of potential concern (COPCs) and comparison of concentrations of the constituents at the Site with applicable screening criteria; and completion of an initial ecological effects evaluation through a screening level ecological risk assessment (SLERA). The Work Plan objective will be completed through Tier 1 RI activities including Site characterization, identification of COPCs for a potential HHRA (Tier 1 HHRA), and completion of a SLERA.

This Work Plan outlines the proposed scope of work for completion of the Tier 1 RI at the Site. The Work Plan includes a description of the proposed additional data collection and data evaluation procedures. Site-specific Data Quality Objectives (DQOs),

a Technical Sampling and Analysis Plan (TSAP), and a Health and Safety Plan (HASP) are included in the Work Plan. The Quality Assurance Project Plan (QAPP) is being submitted as a stand alone document.

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LIST OF ACRONYMS

ANSI	-	American National Standards Institute
AOC	-	Administrative Order on Consent
AOI	-	Area of Investigation
ARAR	-	Applicable or Relevant and Appropriate Requirement
ASQC	-	American Society for Quality Control
BERA	-	Baseline Ecological Risk Assessment
CAA	-	Clean Air Act
CCME	-	Canadian Council of the Ministers of the Environment
CERCLA	-	Comprehensive Environmental Response, Compensation, and Liability Act
CSF	-	Cancer Slope Factor
CLP	-	Contract Laboratory Program
COC	-	Constituents of Concern
COPCs	-	Constituents of Potential Concern
COPECs	-	Constituents of Potential Ecological Concern
CRA	-	Conestoga-Rovers & Associates
CSM	-	Conceptual Site Model
CWA	-	Clean Water Act
DMP	-	Data Management Plan
DQOs	-	Data Quality Objectives
DW	-	Dry Weight
EPA	-	U. S. Environmental Protection Agency
EPCs	-	Exposure Point Concentrations
ERA	-	Ecological Risk Assessment
ESVs	-	Ecological Screening Values
FSP	-	Field Sampling Plan
GPS	-	Global Positioning System
HASP	-	Site Health and Safety Plan
HCB	-	Hexachlorobenzene
HCBD	-	Hexachlorobutadiene
HEAST	-	Health Effects Assessment Summary Tables
HHRA	-	Human Health risk Assessment
HI	-	Hazard Index
HQ	-	Hazard Quotient
HRS	-	Hazard Ranking System
HpCB	-	Heptachlorinage Biphenyl

HxCB	-	Hexachlorinated Biphenyl
IDM	-	Investigation-Derived Material
IRIS	-	Integrated Risk Information System
LCV	-	Lowest Chronic Value
LDEQ	-	Louisiana Department of Environmental Quality
LDNR	-	Louisiana Department of Natural Resources
LDOTD	-	Louisiana Department of Transportation and Development
LEL	-	Lowest Effects Level
LHHC	-	Limiting Human Health Criteria
MDL		Method Detection Limit
MOC	-	Maximum Observed Concentration
MRLs	-	Minimal Risk Levels
MS/MSD	-	Matrix Spike/Matrix Spike Duplicate
NAAQS	-	National Ambient Air Quality Standards
NAD	-	North American Datum
NEPA	-	National Environmental Policy Act
NOAEL	-	No Observed Adverse Effects Level
NPDES	-	National Pollutant Discharge Elimination System
NPL	-	National Priorities List
OSHA	-	Occupational Safety and Health Administration
PCBs	-	Polychlorinated Biphenyls
PCMP	-	Pollution Control and Mitigation Plan
PeCB	-	Pentachlorinated Biphenyl
PMP	-	Project Management Plan
PPE		Personal Protective Equipment
PPI	-	Petro Processors of Louisiana, Inc.
PPRTVs	-	Provisional Peer-reviewed Toxicity Values
PVC	-	Polyvinyl Chloride
ORNL	-	Oak Ridge National Laboratory
QA	-	Quality Assurance
QA/QC	-	Quality Assurance/Quality Control
QAPP	-	Quality Assurance Project Plan
QC	-	Quality Control
RAGS	-	Risk Assessment Guidance for Superfund
RBC	-	Risk-Based Concentration
RCRA	-	Resource Conservation and Recovery Act
RFI	-	RCRA Facility Investigation

RI	-	Remedial Investigation
RI/FS	-	Remedial Investigation/Feasibility Study
RME	-	Reasonable Maximum Exposure
ROCs	-	Receptors of Concern
RSLs	-	Regional Screening Levels
SDWA	-	Safe Drinking Water Act
SLERA	-	Screening Level Ecological Risk Assessment
SMDP	-	Scientific Management Decision Point
SOPs	-	Standard Operating Procedures
SOW	-	Statement of Work
SQ	-	Screening Quotient
SQG	-	Sediment Quality Guideline
SW-846	-	"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA SW-846, 3rd Edition with Updates I through IV
TBC	-	To Be Considered
TCB	-	Tetrachlorinated Biphenyl
TEC	-	Threshold Effects Concentration
TEF	-	Toxicity Equivalence Factor
TOC	-	Total Organic Carbon
TRVs	-	Toxicity Reference Values
TSAP	-	Technical Sampling and Analysis Plan
TSCA	-	Toxic Substances Control Act
UAO	-	Unilateral Administrative Order
UCL	-	Upper Confidence Limit
VSP	-	Visual Sample Plan
WP	-	Work Plan
WW	-	Wet Weight

1.0 INTRODUCTION

Clean Harbors Environmental Services, Inc. (Clean Harbors), on behalf of Baton Rouge Disposal, LLC, hereby submits to the United States Environmental Protection Agency (EPA) the Final Tier 1 Remedial Investigation (RI) Work Plan (WP) for the Devil's Swamp Lake Site (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 06-04-10) located near Baton Rouge, Louisiana (Site). The Site consists of a man-made crescent-shaped lake and associated wetlands located on the Mississippi River east bank floodplain approximately ten miles north of Baton Rouge, Louisiana. The Site location is shown on the Site vicinity map included as Figure 1.

This Report was prepared in accordance with the requirements outlined in the Unilateral Administrative Order (UAO) for Remedial Investigation/Feasibility Study (RI/FS) for the Devil's Swamp Lake Site issued on December 3, 2009. The UAO was issued to Baton Rouge Disposal, LLC, by EPA Region 6 and became effective on December 18, 2009. This Report was prepared to meet the requirements of Task 1.1.1.6 of Appendix A of the UAO (Statement of Work [SOW]). In accordance with the general requirements of the UAO SOW, the RI/FS will include the investigation and evaluation of the horizontal and vertical extent of impact and feasible remedies for polychlorinated biphenyl (PCB) impact in the lake and adjoining portions of the swamp (UAO, Appendix A, Section 1.0.3.3).

The UAO specifies a date for submittal of the Draft Tier 1 RI WP of 90 days following EPA approval of the Preliminary Site Characterization Report. In a correspondence dated February 15, 2010, Clean Harbors requested a schedule extension for submittal of the Draft Preliminary Site Characterization Report on March 19, 2010. The February 15, 2010, schedule extension request included a proposed project schedule. The EPA approved the report submittal schedule extension request in a correspondence dated February 16, 2010. The Draft Preliminary Site Characterization Report was submitted on March 19, 2010. The EPA submitted review comments on April 23, 2010, and Clean Harbors submitted a table summarizing the review comment responses on May 19, 2010. In a Record of Communication dated May 19, 2010, the EPA acknowledged approval of the comment responses and requested submittal of the Draft Tier 1 RI WP by July 23, 2010. The Final Preliminary Site Characterization Report that incorporated the EPA review comment revisions was submitted on May 21, 2010. In addition, on June 3, 2010, Clean Harbors submitted two pages for replacement in the Final Preliminary Site Characterization Report.

The Draft Tier 1 RI Work Plan was submitted on July 23, 2010. The EPA and LDEQ submitted review comments on the Draft Tier 1 RI Work Plan on September 1, 2010, and

October 1, 2010, and Clean Harbors submitted tables summarizing the review comment responses on September 17, 2010, and November 4, 2010, respectively. Copies of the review comment response tables are included in Appendix A. In addition, the EPA provided review comments on the Quality Assurance Project Plan (QAPP), Appendix B of the Draft Tier 1 RI Work Plan, in a correspondence dated August 11, 2010. The correspondence included a review checklist and a request for the QAPP to be submitted as a stand alone document. Clean Harbors requested that submittal of the revised QAPP be contingent on agreement and approval of the Draft Tier 1 RI Work Plan. The QAPP will be submitted under separate cover and will include the requested revisions. The EPA approved the work plan review comment responses in a correspondence dated November 10, 2010. The approval letter included a request for submittal of the Final Tier 1 RI Work Plan and revised QAPP for review and approval. A copy of the approval letter is also included in Appendix A.

This Final Tier 1 RI WP outlines the proposed scope of work for the first phase of the RI to be completed in accordance with the requirements as defined in the UAO and in referenced EPA guidance. Subsequent tiers may follow Tier 1 as needed to meet the objectives of the UAO.

1.1 OBJECTIVE

The RI/FS process represents the methodology for characterization of the nature and extent of risks posed by potential constituents at a site and for evaluation of potential remedial options. Nine criteria are used in the RI/FS process during the evaluation of remedial alternatives. These criteria include:

- 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
- Cost
- State acceptance
- Community acceptance

The objective of this WP is to present the methodology and procedures that will be used to obtain information regarding the nature and extent of potential impact at the Site. The RI for the Devil's Swamp Lake Site is being conducted in a tiered approach. The outline of the tiered approach follows:

Tier 1:

- Initial characterization of the nature and extent of PCBs at the Site
- Determine if a human health risk assessment (HHRA) is required by identification of constituents of potential concern (COPCs) and comparison of concentrations of the constituents at the Site with applicable screening criteria
- Conduct an initial ecological effects evaluation through a screening level ecological risk assessment (SLERA)

Tier 2:

The Tier 2 RI will focus on supplementing the Tier 1 RI results by collection of additional data and completion of a more thorough evaluation of the pathways and receptors identified as potentially at risk. The Tier 2 RI may include more than one phase of field investigation. It is anticipated that the Tier 2 RI will include:

- Additional characterization of the nature and extent of PCBs at the Site
- Completion of the HHRA
- Refinement of the understanding of ecological effects through a Baseline Ecological Risk Assessment (BERA)

The methods and procedures contained in this work plan describe activities that will be conducted during Tier 1 of the RI.

1.2 TIER 1 REMEDIAL INVESTIGATION

The WP objective will be completed through Tier 1 RI activities including Site characterization, identification of COPCs for a potential HHRA (Tier 1 HHRA), and completion of a SLERA.

Site Characterization

The objective of Site characterization is to define the nature and extent of impact at the Site in sediment/soil and surface water such that informed decisions can be made

regarding the degree of potential risk presented by the Site and the alternative appropriate type(s) of remedial response. Preparation and completion of the Site characterization work will be consistent with, but not limited to, the following EPA guidance:

- *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites (USEPA, 2005)*
- *Interim Final, Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988)*

Tier 1 Human Health Risk Assessment (Tier 1 HHRA)

The objective of the Tier 1 HHRA is to identify COPCs based on comparison of sediment/soil and surface water sample analytical results with agency approved screening criteria. Completion of the Tier 1 HHRA will be consistent with applicable federal and state risk assessment guidelines provided in, but not limited to, the following guidance:

- *Risk Assessment Guidance for Superfund (RAGS), Human Health Evaluation Manual, Part A (USEPA, 1989); Part B (Development of Risk-based Preliminary Remediation Goals) (USEPA, 1991a); and Part C (Risk Evaluation of Remedial Alternatives) (USEPA, 1991b)*
- *Human Health Evaluation Manual Supplemental Guidance "Standard Default Exposure Factors (USEPA, 1991c)*
- *Guidance for Data Usability in Risk Assessment (Parts A and B), (USEPA, 1992a; USEPA, 1992b)*
- *Risk Assessment Guidance for Superfund: Volume 1, Human Health Evaluation Manual Supplemental Guidance. (Part E, Supplemental Guidance for Dermal Risk Assessment) Final (USEPA, 2004)*
- *Risk Assessment Guidance for Superfund: Volume 1, Human Health Evaluation Manual Supplemental Guidance. (Part E Supplemental Guidance for Inhalation Risk Assessment) Final (USEPA, 2009)*
- *Risk Evaluation/Corrective Action Program (RECAP), Louisiana Department of Environmental Quality (LDEQ, 2003)*

Screening-Level Ecological Risk Assessment (SLERA)

The objective of the SLERA is to use Site-specific data to assess risks to ecological receptors from exposure to Site constituents in sediment/soil and surface water. Completion of the SLERA will be consistent with, but not limited to, the following EPA guidance:

- *Guidelines for Ecological Risk Assessment (USEPA, 1998a)*

- *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessment, Interim Final (USEPA, 1997)*
- *Guidance for Data Usability in Risk Assessment (Parts A and B), (USEPA, 1992a,b)*
- *Data Collection for the Hazardous Waste Identification Rule. Section 13.0. Ecological Receptors and Habitats. Office of Solid Waste (USEPA, 1999a)*
- *Data Collection for the Hazardous Waste Identification Rule. Section 12.0. Ecological Exposure Factors. Office of Solid Waste (USEPA, 1999b)*
- *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Office of Solid Waste and Emergency Response. 530-D-99-001A (USEPA, 1999c)*

1.3 WORK PLAN ORGANIZATION

The methods and procedures contained in this WP describe activities that will be conducted during Tier 1 of the RI. The remainder of this WP is organized into seven sections and six appendices:

- **Section 2.0 – Background** – This section provides general background information about the Site including the Conceptual Site Model (CSM) and proposed areas of investigation (AOIs).
- **Section 3.0 – Remedial Investigation Data Requirements and Objectives -** This section identifies the Tier 1 RI data needs and outlines the seven step data quality objective (DQO) process and its application for the Tier 1 RI.
- **Section 4.0 – Human Health Risk Assessment (HHRA) -** This section describes methods and procedures that will be used to conduct the HHRA.
- **Section 5.0 –Ecological Risk Assessment (ERA) -** This section describes methods and procedures that will be used to conduct the SLERA**.**
- **Section 6.0 - Tier 1 RI Technical Sampling and Analysis Plan (TSAP) -** This section describes the sampling and analysis that will be completed during the Tier 1 RI including chemical and physical measurements and sample collection to be performed during field activities. An outline of field and laboratory procedures is presented in this section.
- **Section 7.0 - Schedule -** This section provides a brief overview of the anticipated project schedule.
- **Section 8.0 - References -** A list of all references is provided in this section.

- **Appendix A – Draft Tier 1 RI Work Plan Comment Response Tables –** The tables list the EPA and LDEQ review comments and responses on the Draft Tier 1 RI Work Plan and the location of the revision in the work plan text, if applicable.
- **Appendix B – Site Management Plan (SMP) –** The SMP provides details regarding Site access, security, and contingency procedures and the project management, technical, and support processes to be utilized during completion of the Tier 1 RI.
- **Appendix C – Technical Sampling and Analysis Plan Standard Operating Procedures (SOPs)** – SOPs will be developed and used during fieldwork as described in this WP. The SOPs provide the procedures to be used in collection of representative samples of environmental media and collection of other related data at the Site.
- **Appendix D – Data Management Plan (DMP) –** The DMP includes a description of the procedures that will be used to record and maintain data generated during completion of the Tier 1 RI.
- **Appendix E – Pollution Control and Mitigation Plan (PCMP) -** The PCMP provides procedures and detailed instruction on the disposition of investigation-derived material (IDM) related to the RI.
- **Appendix F – Site-Specific Health and Safety Plan (HASP) -** The health and safety plan satisfies health and safety requirements in accordance with standards of the Occupational Safety and Health Administration (OSHA) Section 190.120.

2.0 BACKGROUND

Devil's Swamp Lake is a man-made, crescent-shaped lake located on the Mississippi River east bank floodplain approximately ten miles north of Baton Rouge, Louisiana, as shown on the Site vicinity map included as Figure 1. The lake was excavated in 1973 and 1974 to provide a source of borrow material for levee construction to reinforce the levee along the north and west sides of the Port of Greater Baton Rouge Terminal (Baton Rouge Barge Harbor). The Devil's Swamp Lake Site boundaries are described in the UAO as follows:

> *The site is generally bordered by the north portions of Bayou Baton Rouge to the north, US Highway 61 – (Scenic Highway), the Ewell Swamp farm, Baton Rouge Disposal, LLC, (previously owned and operated by Safety-Kleen [Baton Rouge], Inc., formerly known as Laidlaw Environmental Services [Baton Rouge], formerly known as Rollins Environmental Services [LA], Inc. [Rollins]), the Baton Rouge barge harbor to the east and the Mississippi River to the south and west. The Site consists of contaminated sediments within the Lake, a portion of Devil's Swamp adjoining the Lake and associated wetlands.*

Baton Rouge Disposal, LLC, currently owns, and Clean Harbors Baton Rouge, LLC, currently operates, the former Rollins facility adjacent to the Site. Beginning in 1971, the former Rollins facility discharged treated process wastewater to Devil's Swamp Lake through National Pollutant Discharge Elimination System (NPDES) permitted Outfall 001 and stormwater runoff through Outfall 002. In 1993, the treated water discharge line (Outfall 001) was installed directly to the Mississippi River. Stormwater from Outfall 002 continues to discharge to Devil's Swamp Lake through the drainage ditch from the former Rollins facility. The current discharge locations for the outfalls and the approximate drainage paths are shown on Figure 2. The Site topographic map is attached as Figure 3.

The sediment/soil within the drainage ditch located east of Devil's Swamp Lake, specifically northeast of the Baton Rouge Barge Terminal railroad tracks, is being addressed separately under a December 3, 2003, Administrative Order on Consent (AOC) and a Hazardous Waste Permit (LAD010395127-OP-RN-1) for the former Rollins facility. Rollins completed a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Corrective Action Plan at the former Rollins facility, including that portion of the drainage ditch, in July 1991. Characterization in the portion of the drainage ditch northeast of the Baton Rouge Barge Terminal railroad tracks is being completed as part of the RFI under the jurisdiction of the LDEQ. Therefore, that portion of the drainage ditch will not be included as part of the Devil's Swamp Lake Site during completion of the RI/FS.

Previous risk assessments indicate reportedly unacceptable human health and ecological risks in the lake and portions of the wetlands surrounding the lake. PCBs have been identified by the EPA as the primary constituents of concern (COCs) in the sediment and in aquatic receptors in Devil's Swamp Lake. In March 2004, the EPA identified the commercial hazardous waste disposal facility formerly operated by Rollins as the apparent source of the Devil's Swamp Lake PCB impact. Using the Hazard Ranking System (HRS), the EPA assigned a score of 50 to the Devil's Swamp Lake Site. The EPA recommends that sites receiving a score of 28.5 or higher be placed on the National Priorities List (NPL). The Devil's Swamp Lake Site was proposed to be placed on the NPL on March 8, 2004. In accordance with the general requirements of the UAO SOW, the RI/FS will include the investigation and evaluation of the horizontal and vertical extent of impact and feasible remedies for PCB impact in the lake and adjoining portions of the swamp (UAO, Appendix A, Section 1.0.3.3).

2.1 DESCRIPTION OF INVESTIGATION AREA

The characterization and description of the investigation area including relevant information on Site conditions based on available data, including: land use, demographics, topography, drainage, geology, hydrogeology, surface water hydrology, ecological setting, Site history, and previous investigations are described in the EPA-approved Final Preliminary Site Characterization Report dated May 2010. These sections are not repeated herein due to the voluminous nature of the material. A copy of the May 2010 Final Preliminary Site Characterization Report is in the EPA project file.

2.2 CONCEPTUAL SITE MODEL

The CSM has been developed based on knowledge of the Site setting, a review of existing Site data, and a project stakeholder conference call on March 11, 2010. The CSM is presented on Figure 4. The purpose of the CSM is to identify Site-related constituent fate and transport mechanisms and the various potential human and ecological exposure pathways to constituents. The CSM includes the following components:

- Suspected source of impact
- Release and transport mechanisms
- Affected media
- Known and potential migration pathways
- Potential receptors

As shown on the CSM, the historical discharge from the former Rollins facility appears to be the primary source of potential impact at the Site. Constituents were discharged to surface water and sediment/soil, and subsequently to other areas and environmental media at the Site by various transport mechanisms including sediment resuspension and surface water transport. The duration and extent of inundation of the Site by the Mississippi River affects the evaluation of the CSM. The area is frequently flooded as the seasonal elevation of the Mississippi River rises in the early spring and summer months. Local precipitation and high water stages in Bayou Baton Rouge can also affect the water depth in Devil's Swamp and the surrounding area. The mobility of constituents appears to vary depending on water depth. A general discussion of the components of the CSM follows.

Surface Water

The primary source of impact to the surface water at the Site is from the historical discharge from the former Rollins facility. Resuspension of lake sediment and potential soil erosion are considered secondary sources of impact. Potential exposure pathways to impacted surface water for human receptors include dermal contact, incidental ingestion, and ingestion by fish/shellfish consumption. Potential exposure routes for ecological receptors include uptake by wetland plants and aquatic invertebrates and direct ingestion by receptors of concern (ROCs).

Drainage Ditch Sediment/Soil

Potentially impacted sediment/soil is present in the former Rollins facility drainage ditch. The ditch material is assumed to be native sediment/soil that may be dry during seasonal fluctuation of the water stage and/or during periods when there is no discharge from the former Rollins facility. The ditch samples may be evaluated as both sediment and soil. Human exposure pathways for the drainage ditch sediment/soil include potential incidental ingestion and dermal contact. Ecological exposure routes include potential uptake by plants and invertebrate dietary items and incidental ingestion by identified ROCs.

Devil's Swamp Lake Sediment

The historical discharge from the former Rollins facility is considered the primary source of impact to the sediment in Devil's Swamp Lake. Potential exposure pathways to impacted sediment for human receptors include incidental ingestion, dermal contact, and ingestion by fish/shellfish consumption. Potential exposure routes for ecological receptors include uptake by aquatic invertebrates and fish dietary items and direct and incidental ingestion by ROCs.

Wetland Sediment

Resuspension of sediment into surface water and deposition of the sediment in the areas surrounding the lake during elevated surface water stages is the primary route of transport to the wetland sediment surrounding Devil's Swamp Lake. The North-Central Devil's Swamp samples may be evaluated as both sediment and soil. Potential exposure pathways to wetland sediment for human receptors include dermal contact, incidental ingestion, and ingestion by fish/shellfish consumption. Potential exposure routes for ecological receptors include uptake by wetland plant and invertebrate dietary items and by indirect/direct ingestion by ROCs.

Biota

Potentially impacted soil, sediment, and surface water are considered the primary potential exposure pathways to biota. Biota includes wild game including deer, rabbits, and ducks that may utilize the Site. The potential exposure routes for both human and ecological receptors to impacted biota are by direct ingestion, which is considered potentially complete but not significant or quantifiable.

Groundwater

The potential for communication between groundwater and surface water at the Site is shown on the CSM. The ongoing investigation activities at the Petro Processors of Louisiana, Inc. (PPI) site and the former Rollins facility will determine if impacted groundwater represents a potential source of impairment to sediment and surface water at the Site. Human exposure to impacted groundwater at the Site via dermal contact and ingestion is considered incomplete. Ecological exposure routes include uptake by aquatic plants, invertebrates and fish dietary items, and direct ingestion by ROCs, which are considered potentially complete but not significant or quantifiable. Potential exposures from this pathway are being evaluated as part of the ongoing investigation activities at the PPI site and the former Rollins facility.

Air

Evaporation of volatile constituents from surface water and inhalation of particulates from erosion of drainage ditch sediment/soil are considered potential routes of exposure in the CSM. However, while potential exposure pathways for human and ecological receptors are considered potentially complete, these pathways are not considered significant or quantifiable. Because much of the impacted sediment/soil is covered by surface water, there is minimal potential for releases of dust and/or volatilization of constituents to the air. The soil/sediment would have to be uncovered for sufficient time to dry out and be substantially disturbed by human activities in order to generate sufficient volatilization and/or dust to represent a concern.

The CSM may be revised as additional evaluation is completed and additional information becomes available throughout the RI/FS process.

2.3 PROPOSED AREAS OF INVESTIGATION

In general, the AOIs as discussed in this Tier 1 RI WP are defined as those areas contiguous to and including potentially impacted media at the Site. Four AOIs are proposed for the Tier 1 RI including North-Central Devil's Swamp, Drainage Ditch, North Devil's Swamp Lake, and South Devil's Swamp Lake. The proposed AOI locations were identified and discussed during the April 2010 scoping meeting with the EPA and the project stakeholders. The Tier 1 RI sample analytical results will be used to determine the preliminary nature and extent of the impact at the Site and to delineate areas in these AOIs that require further evaluation. Evaluation of sample data collected for the HHRA and SLERA will be AOI-specific, i.e., each AOI will be evaluated as a separate exposure area. The proposed AOI boundaries are shown on Figure 5.

North-Central Devil's Swamp – AOI I

The North-Central Devil's Swamp AOI includes the length of the additional drainage feature (see Figure 3) located approximately 1,300 feet northwest of the Outfall 002 drainage ditch current discharge point and the surrounding wetlands area directly upstream of the northern portion of Devil' Swamp Lake. The additional drainage feature likely channeled stormwater runoff to Devil's Swamp from a former soil borrow pit area on the west side of the former Rollins facility. The additional drainage feature represents a naturally-occurring, open-water channel surrounded by wetlands.

The wetland area consists of low-lying land that can become saturated with water during severe rainfall/runoff events. Devil's Swamp receives surface water runoff primarily from the northern portion of Bayou Baton Rouge, from the Ewell farm, and from the former Rollins facility from the east. Surface water flow in the wetlands is generally from north to south, although seasonal flooding of the Mississippi River may cause water to inundate wetlands from the south and west.

Drainage Ditch – AOI II

The Drainage Ditch AOI includes the portion of the Outfall 002 drainage ditch southwest of the Baton Rouge Barge Terminal railroad tracks to its discharge location into the northern portion of Devil's Swamp Lake. The soil/sediment within the drainage ditch located northeast of the Baton Rouge Barge Terminal railroad tracks, is being addressed separately under a December 3, 2003, AOC and a Hazardous Waste Permit (LAD010395127-OP-RN-1) for the former Rollins facility. Therefore, that portion

of the drainage ditch will not be included as part of the Devil's Swamp Lake Site during completion of the RI/FS.

The drainage ditch, which is approximately 3,600 feet long, begins near the southwest corner of the former Rollins facility on the Pleistocene terrace and discharges into the northeastern portion of Devil's Swamp Lake. The elevation of the ditch is about 75 feet North American Datum (NAD) within the former Rollins facility, and decreases to an elevation of approximately 35 feet NAD at the outfall into Devil's Swamp Lake (see Figure 3). The ditch material is assumed to be native soil/sediment that may be dry during seasonal fluctuation of precipitation, the Mississippi River water stage, and/or during periods when there is no discharge from the former Rollins facility. The ditch samples may be evaluated as both soil and sediment.

North Devil's Swamp Lake – AOI III

The North Devil's Swamp Lake AOI includes approximately the northern half of Devil's Swamp Lake to the east and west of the current drainage ditch discharge location into the lake. Devil's Swamp Lake is a man-made, crescent-shaped lake that was excavated in 1973 and 1974 to provide a source of borrow material for levee construction to reinforce the levee along the north and west sides of the Baton Rouge Barge Harbor. The entire lake covers approximately 39 acres (see Figures 2 and 3), is approximately 0.8 mile long, and is 340 feet wide (at its widest point). The lake bottom is relatively flat with the exception of point bar deposits that form alternating emergent and open water areas. The dredged material from the lake that was placed along the eastern bank of the lake reaches an elevation of approximately 20 feet above the surrounding lowland. The centerline depth of the Devil's Swamp Lake has been measured between approximately 10 and 25 feet at low water stage. The lake stage has been observed to fluctuate 10 to 15 feet between high and low water stages.

South Devil's Swamp Lake – AOI IV

The South Devil's Swamp Lake AOI includes approximately the southern half of Devil's Swamp Lake. The physical characteristics and topography of the South Devil's Swamp Lake AOI are assumed to be similar to the North Devil's Swamp Lake AOI. Surface water flow from the northern portion of the swamp enters Devil's Swamp Lake and drains through the lake into the southern portions of Devil's Swamp Lake, Devil's Swamp, and Bayou Baton Rouge.

3.0 REMEDIAL INVESTIGATION DATA REQUIREMENTS AND OBJECTIVES

3.1 DATA REQUIREMENTS

Items outlined in this section were developed to meet the purpose and objectives of the Tier 1 RI, as described in Section 1. This section identifies the RI data needs and presents an approach for collection and evaluation of the data to satisfy these needs.

Site Characterization

It is necessary to determine the horizontal and vertical distribution of constituents at the Site to support fate and transport evaluations, assess risk, and evaluate potential remedial alternatives if unacceptable risks are identified. Sediment, surface water, and biological tissue sampling has been completed during previous investigations conducted at the Site and surrounding the Site. The results of the previous investigations provide a preliminary characterization of the nature and extent of constituent concentrations present in the various media. However, the existing results are not sufficient to adequately identify the horizontal and vertical extent of the constituent concentrations in some media and areas of the Site. Therefore, additional sampling will be conducted to obtain a more representative data set to achieve a more accurate characterization.

Human Health Risk Assessment

Sediment/soil and surface water sample data collected during the Tier 1 RI will be compared with the most stringent and applicable media-specific human health criteria, the Limiting Human Health Criteria (LHHC). If necessary, the potential for human health risk will be further evaluated in the Tier 2 RI by additional sampling of specific media in locations of the Site in which constituent concentrations exceed the LHHC. In addition, to further evaluate human health risks beyond a screening level, a baseline risk assessment will be conducted as part of the Tier 2 RI to characterize the evidence regarding the potential for certain constituents to cause adverse health effects and to estimate the type and magnitude of exposures to the constituents for the various potentially relevant exposure pathways identified. More information about these data requirements is provided in Section 4.0.

Baseline Ecological Risk Assessment

Sediment/soil and surface water sample data collected during the Tier 1 RI will be compared with the ecological screening values (ESVs). If necessary, the potential for ecological risk will be further evaluated in the Tier 2 RI by additional sampling of specific media in which constituent concentrations exceed the ecological screening values. For the ecological risk assessment, data may be needed to characterize constituent concentrations in receptors and dietary items of upper trophic level receptors. Additional sediment/soil, surface water, and biological tissue data may be

collected to complete the BERA with more Site-specific information including concentrations of constituents in prey items (i.e., tissues) and site utilization factors. More information about these data needs is provided in Section 5.0.

3.2 DATA QUALITY OBJECTIVES

The type and quality of data needed to satisfy the objectives of the Tier 1 RI is governed by the data quality objectives (DQOs). The DQO process is used to develop performance and acceptance criteria that clarify investigation objectives, define the appropriate type of data, and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support risk management decisions. DQOs are developed prior to data collection as part of the sampling design to develop a scientifically sound and resource-effective sampling. The DQO process consists of seven steps that are sequential and reiterative. The steps in the DQO process that are specific to the Site RI/FS are provided below.

1) State the Problem. This step defines the problem that necessitates the investigation. Members of the planning team and the primary decision-maker are identified and the available resources and deadlines for the investigation are specified.
2) Identify the Goal of the Investigation. This step consists of a statement of how environmental data will be used to meet project objectives and solve the problem, identification of decision problems, and definition of alternative outcomes.
3) Identify Information Inputs. This step focuses on identifying qualitative and quantitative data and information needed to meet the goals of the investigation.
4) Define the Boundaries of the Investigation. This step delineates the spatial and temporal boundaries that will be encompassed by the investigation and describes when and where data shall be obtained. This includes specifying characteristics of the (statistical) population of interest, defining the geographical extent of the area and timeframes to which decisions will apply, and identifying constraints on obtaining data.
5) Develop the Analytic Approach. This step defines the parameter of interest, specifies the type of inference, and develops the logic for drawing conclusions from findings.
6) Specify Performance or Acceptance Criteria. This step develops performance criteria for new data being collected or acceptable criteria for existing data being considered for use.

7) Develop the Plan for Obtaining Data. This step considers information obtained in the previous six steps to formulate a resource-effective sampling and analysis plan that meets the performance criteria.

Each step in the DQO process produces qualitative and quantitative statements that are then used to develop a scientifically-sound and resource-effective sampling design. The seven steps of this process are detailed below.

3.2.1 STEP 1: PROBLEM STATEMENT

Devil's Swamp Lake was used by the former Rollins facility for the permitted discharge of treated process wastewater since the 1970s, which has resulted in the deposition of potentially hazardous constituents in the sediment and surface water at the Site. Complete pathways were determined to exist by which both ecological and human receptors may be exposed to chemical constituents at the Site.

Previous risk assessments indicate reportedly unacceptable human health and ecological risks in the lake and portions of the wetlands surrounding the lake. Based on the 1999 EPA ERA, hexachlorobenzene (HCB), hexachlorobutadiene (HCBD), PCBs, cadmium, and lead were identified as the primary COCs in the sediment and in aquatic species at the Site and the area surrounding the Site. The 1999 EPA ERA identified cadmium and lead as COCs, but concluded that they did not pose significant risk to ecological receptors in Devil's Swamp Lake. Based on the 1999 EPA HHRA, HCB, HCBD, PCBs, and a few pesticides were identified as the primary COCs at the Site and the area surrounding the Site. As reported in the HHRA, the few occurrences of pesticides were believed to be representative of anthropogenic background concentrations. Impact associated with HCB and HCBD is under evaluation as part of the PPI site and will not be further evaluated as part of the Devil's Swamp Lake Site (UAO, Section IV, Paragraph 8).

PCBs have been identified by the EPA as the primary COCs in the sediment and in aquatic receptors at Devil's Swamp Lake. In March 2004, the EPA identified the commercial hazardous waste disposal facility formerly operated by Rollins as the apparent source of the Devil's Swamp Lake PCB impact. Therefore, as a result of evaluation of all the historic investigation data and as specified in the UAO, Appendix A, Section 1.0.3.3, and as presented in the approved May 2010 Final Preliminary Site Characterization Report, PCBs have been selected as COCs to be carried forward during completion of the RI/FS at the Site. The PCB COCs selected for evaluation during the Tier 1 RI include PCB aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260. In addition, as requested by the EPA and LDEQ, a portion of the sediment

samples collected during the Tier 1 RI will be submitted for analysis of the 12 World Health Organization (WHO) PCB congeners that have toxicity equivalency factors for humans, mammals, and birds including congeners 77, 81, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189. The Tier 1 RI COCs are listed in Table 1.

To assess the potential for risk to ecological and human receptors from exposure to PCBs by way of the various media, a SLERA and screening level HHRA will be completed using the data collected during the Tier 1 RI sampling activities. Constituent concentrations in sediment and surface water will be evaluated against ESVs and human health screening level standards for chemical constituents based on existing guidance documents. The screening level HHRA will also identify environmental media and/or locations in AOIs in which specific constituent concentrations exceed the human health screening level criteria. This information will be used to assist in designing the Tier 2 RI, if needed.

Resources, Constraints, And Deadlines

The Devil's Swamp Lake stage has been observed to fluctuate 10 to 15 feet between high and low water stages. The center portion of the bottom of the lake is deeper than the surrounding swamp so it holds water when others areas of the swamp and bayou are more susceptible to low water stages during summer and fall and thus serves as a refuge for fish and other aquatic life during these seasons. Average monthly stage records indicate that the Mississippi River experiences a seasonal low in fall (September) and a seasonal high in spring (April). River stage forecasting will be reviewed on a daily basis during the implementation of this WP to verify that work activities are not disrupted by the flooding of Devil's Swamp and Devil's Swamp Lake by the Mississippi River. The river stage is forecasted for up to twenty-eight days by the National Weather Service Lower Mississippi River Forecast Center (LMRFC). A more accurate five-day forecast is issued by the LMRFC on an hourly basis. In the event the Mississippi River stage is forecasted to flood, the Tier 1 RI work will be temporarily discontinued.

3.2.2 STEP 2: IDENTIFY THE GOAL OF THE INVESTIGATION

The decisions that will be made based on the results of the Tier 1 RI are reflected in the following principle investigation question:

Do concentrations of PCBs in sediment/soil and surface water samples collected from the Site AOIs pose an unacceptable risk to human and ecological receptors utilizing the Site?

Delineation of the nature and extent of PCB impact at the Site is an additional objective of the Tier 1 RI. A CSM of constituent fate and transport to human and ecological receptors is presented on Figure 4. Ecological and human health decision problems are listed below.

Ecological

1) If exposure of upper trophic level ROCs (shorebirds, waterfowl, mammals, reptiles, or amphibians) to the maximum observed concentration of total PCBs and/or sum of the PCB congeners weighted by the Toxicity Equivalence Factors (TEFs) for the individual congeners in sediment/soil and/or surface water results in a No Observed Adverse Effects Level (NOAEL) based Hazard Quotient (HQ)>1, then potential exposure risk to that ROC will be considered in an additional tier of the RI for this Site. Potential exposure of ROCs to COCs in sediment/soil and surface water will be evaluated for the North-Central Devil's Swamp, Drainage Ditch, North Devil's Swamp Lake, and South Devil's Swamp Lake AOIs.
2) If the maximum concentration of total PCBs in sediment/soil and/or surface water exceeds the ESV for total PCBs, then the maximum concentration of each individual aroclor will be compared to the ESV for each aroclor. Subsequently, if the individual aroclor maximum concentration exceeds the individual aroclor ESV and/or the sum of the PCB congeners weighted by the TEFs for the individual congeners, then potential risks to the ROC will be considered in an additional tier of the RI for this Site. The ESVs for total PCBs and the individual aroclors and the TEFs for individual congeners are listed in Table 3A and Table 3B, respectively, and are discussed in Sect. 5.2.1.7. This decision statement is applicable to sediment/soil and/or surface water within the North-Central Devil's Swamp, Drainage Ditch, North Devil's Swamp Lake, and South Devil's Swamp Lake AOIs.

Human Health and Site Characterization

1) If the maximum concentration of a COC in wetland and/or lake sediment is above the Site-specific Sediment Quality Guideline (SQG), then risk to a human receptor will be considered in an additional tier of the RI for this Site. The SQGs are listed in Tables 2A and 2C and discussed in Sect. 4.1. This decision statement is applicable to sediment in the North-Central Devil's Swamp, North Devil's Swamp Lake, and South Devil's Swamp Lake AOIs.
2) If the maximum concentration of a COC in sediment/soil collected from the North-Central Devil's Swamp and the Drainage Ditch AOIs is above the sediment SQG, the soil Regional Screening Level (RSL), or the LDEQ RECAP Screening Option Screening Standard (SO SS) for industrial soil, then risk to a human receptor will be

considered in an additional tier of the RI for this Site. The RSLs, SO SS, and SQGs are listed in Tables 2A, 2C, 2D, and 2E and discussed in Sect. 4.1. This decision statement is applicable to sediment/soil collected from the North-Central Devil's Swamp and the Drainage Ditch AOIs.

3) If the maximum concentration of a COC in surface water is above either the surface water ingestion/dermal contact risk-based concentration (RBC) or the EPA National Recommended Water Quality Criterion (NRWQC) protective of fish/shellfish consumption, then risk to a human receptor will be considered in an additional tier of the RI for this Site. The RBCs and NRWQC are listed in Tables 2A and 2B and discussed in Sect. 4.1. This decision statement is applicable to surface water in the North-Central Devil's Swamp, Drainage Ditch, North Devil's Swamp Lake, and South Devil's Swamp Lake AOIs.

4) If the maximum concentration of a COC in sediment or surface water is above the SQG or NRWQC protective of human ingestion of fish/shellfish, then collection of fish/shellfish tissue samples will be considered in an additional tier of the RI for this Site. The SQGs and NRWQC are listed in Tables 2A, 2B, and 2C and discussed in Sect. 4.1. This decision statement is applicable to sediment and surface water in the North-Central Devil's Swamp, Drainage Ditch, North Devil's Swamp Lake, and South Devil's Swamp Lake AOIs.

The activities proposed in this Tier 1 RI WP are designed to provide sufficient information and data to address these decision statements.

3.2.3 STEP 3: IDENTIFICATION OF INFORMATION INPUTS

The following types of information will be collected to resolve the decision problems listed in Step 2 of the DQO process.

1) Analysis of sediment/soil and surface water samples for the identified COCs. The list of COCs to be analyzed in sediment/soil and surface water is provided in Table 1. Analytical chemistry data from sampled environmental media will be used for quantitative evaluation in the risk assessments for those exposure pathways that are complete.

2) Determination of relevant exposure point concentrations (EPCs) of COCs in sediment/soil and surface water for each complete ecological and human exposure pathway. Constituent concentrations in sediment/soil (0 to 6 inches) from the North-Central Devil's Swamp, Drainage Ditch, North Devil's Swamp Lake, and South Devil's Swamp Lake AOIs will be considered relevant to human health exposure. Constituent concentrations in sediment/soil (0 to 6 inches) throughout the

Site will be considered relevant to ecological exposure. The maximum concentration of each COC will be used as the EPC during the Tier 1 RI. The upper 95th confidence limit of the mean (95 percent UCL) of each COC in each AOI will be considered during the Tier 2 RI and the HHRA and BERA, if necessary. The EPA memorandum, "*Calculating the Concentration Term*" (USEPA, 1992), indicates that a minimum of 10 samples are required for the calculation of a representative value of the 95 percent UCL for use as an EPC. Calculation of the 95 percent UCL during the Tier 2 RI will be based on the most appropriate statistical distribution (e.g., normal, log-normal, etc.) that describes medium-specific sample concentrations of each COC.

3) Completion of an exposure assessment with the identification of human receptor groups (e.g., recreational users), Site use patterns, and associated exposure assumptions for populations engaged in activities that could potentially result in exposure to Site constituents. The exposure assessment will help in determination of the potential frequency of recreational fishing in Site water bodies and if fish/shellfish that meet minimum size requirements for harvesting are present in Site water bodies. The exposure assessment may be completed by Site surveys and observations. Previous regional and Site-specific studies and regulatory guidance will be used to determine values that quantify activities associated with complete exposure pathways. In some cases, professional judgment may be needed to identify non-standard exposure assumptions for the Site. Whenever possible, prior studies of the area will be used or referenced in the determination of these values.

4) Completion of a toxicity assessment with the use of published toxicity values and determination of applicable toxicity for COCs in sediment/soil and surface water.

5) Refinement of ecological exposure factors and potential receptors of concern as well as the refinement of the exposure models for upper trophic level receptors.

6) Use of historically relevant data and other information that are determined to be of sufficient quality to support risk characterization and risk management decision-making. A complete discussion of all the previous data collected at the Site and it's suitability for use in a risk assessment was included in the Preliminary Site Characterization Report dated May 2010. The use of historic data would be subject to regulatory review and approval.

7) Use of analytical laboratory indicators such as method detection limits, sample quantitation limits, and reporting limits as cited in the Quality Assurance Project Plan (QAPP) for constituents in sediment/soil and surface water that are below applicable ESVs and human health criteria. The QAPP is submitted under separate cover and dated November 2010.

8) Physicochemical measurements in sediment/soil and surface water from the investigation area. Physical measurements in sediment (particle size distribution and moisture content) and surface water (dissolved oxygen, salinity, and

temperature) will be used to evaluate some of the physical constraints as they may affect the presence or absence of ecological receptors in the investigation area.

9) Determination of habitat uses by selected ecological receptor populations and Site uses by selected human receptor populations.

10) Identification of Federal and State ARARs.

3.2.4 STEP 4: DEFINITION OF INVESTIGATION BOUNDARIES

3.2.4.1 SPATIAL BOUNDARIES

The Devil's Swamp Lake Site boundaries are described in the UAO as follows:

> *The site is generally bordered by the north portions of Bayou Baton Rouge to the north, US Highway 61 – (Scenic Highway), the Ewell Swamp farm, Baton Rouge Disposal, LLC, (previously owned and operated by Safety-Kleen [Baton Rouge], Inc., formerly known as Laidlaw Environmental Services [Baton Rouge], formerly known as Rollins Environmental Services [LA], Inc. [Rollins]), the Baton Rouge barge harbor to the east and the Mississippi River to the south and west. The Site consists of contaminated sediments within the Lake, a portion of Devil's Swamp adjoining the Lake and associated wetlands.*

Sediment/soil and surface water data used for Site characterization, the HHRA, and the SLERA will be collected from the four AOIs described in Section 3 and shown on Figure 5.

3.2.4.2 TEMPORAL BOUNDARIES

Sediment/soil and surface water samples will be collected concurrently. Proposed surface water samples in the North-Central Devil's Swamp AOI and the Drainage Ditch AOI are contingent on the presence of standing surface water at these locations during the Tier 1 RI sample collection activities. Additional surface water samples may be collected from locations with standing water, if needed. It is anticipated that Tier 1 RI samples will be collected in January 2011. The Tier 1 RI sample collection schedule will depend on the Mississippi River stage upon approval of the Tier 1 RI WP.

3.2.5 STEP 5: DEVELOPMENT OF THE ANALYTIC APPROACH AND/OR AN APPROPRIATE METHOD

Step 5 defines the statistical measures relevant to the investigation and specifies the conditions by which decision-makers will choose among alternative actions.

The population parameters that will summarize the critical source concentration characteristic of each of the constituent populations will be the maximum observed concentration (MOC). The MOC value will be used as the reasonable maximum exposure (RME) point concentration for all COCs in all exposure media in the HHRA. The HHRA MOCs will be evaluated per constituent per medium for each AOI. The SLERA will include an evaluation with the use of the MOC for each COC and the BERA evaluation will include a calculation of the 95 percent UCL for each specific habitat/AOI in which the receptors are known to exist.

For each COC, the designated DQO Action Level will be the acceptable cancer risk range (10^{-4} to 10^{-6}) and the regulatory standard (LHHC) for the HHRA. The LHHC are listed on Table 2A. The RBC calculations for surface water protective of incidental ingestion and dermal contact are shown on Table 2B. The SQG calculations for sediment protective of human ingestion of fish/shellfish are shown on Table 2C. The EPA RSL and LDEQ SO SS calculations for soil protective of dermal contact and ingestion for PCB congeners are shown on Table 2D and Table 2E, respectively. If the MOC exceeds the Action Level for the medium being evaluated, it will be concluded that the COC poses a potentially unacceptable risk to human health and/or the environment for that medium at the AOI being evaluated. If the MOC does not exceed the Action Level for the medium being evaluated, it will be concluded that the COC does not pose an unacceptable risk to human health and/or the environment for that medium at the AOI being evaluated and that COC will not be evaluated further.

DQO Action Levels for the SLERA will include ESVs (Table 3A). To evaluate potential risk to other ecological receptors for the SLERA the maximum concentration of a COC in surface water and sediment/soil will be compared to the appropriate ESV. Sample detections from both the entire Site and specific AOIs may be used to evaluate potential risk to ROCs based on habitat suitability and ROC mobility.

3.2.6 STEP 6: SPECIFICATION OF PERFORMANCE OR ACCEPTANCE CRITERIA

This step defines in statistical terms the acceptable limits on the decision errors of the Tier 1 RI, which are based on the consequence of making an incorrect decision. Step 6

sets performance or acceptance criteria that the data collected should achieve in order to minimize the possibility of either making a decision error or failing to keep uncertainty within acceptable levels. These criteria were based on a decision–making process, where the decision is attempting to determine if the MOC for samples collected from a particular medium at an AOI exceeds the regulatory standard or benchmark.

Two broadly defined possible errors are listed below:

1. Errors in deciding whether constituents qualify as COPCs. These errors potentially occur through the combination of sampling design error and analytical measurement error.
2. Errors in deciding whether exposure to COPCs poses acceptable or unacceptable risks to the environment. These errors are affected by an incorrect exposure pathway analysis and incorrectly specifying exposure point concentrations and other relevant exposure parameters, including toxicity reference values, reference doses, and slope factors.

The possibility of making a decision error based on the maximum observed concentration is unavoidable and is an inherent part of the process of evaluation. Such error does not suggest that the evaluation was done improperly, but is simply a deviation from the true condition at the Site. This error introduces uncertainty into the decision making process. Although error can never be completely eliminated, the planning, sampling, analysis, and data evaluation have been designed to minimize error. To the extent feasible, an attempt will be made to prevent the occurrence of false-positive claims (i.e., committing false rejection errors). This verifies that risks to human health and the environment are conservatively assessed and are reasonably accurate, so that the most appropriate risk management decisions can be made. The different environmental media will be sampled in a manner consistent with establishing an acceptable approximation to the true nature and extent of potential impairment, as detailed in the Field Sampling Plan. Reporting limits and/or other numerical laboratory indicators of analytical measurements will be evaluated to verify that they are at a minimum equal to the relevant screening-level benchmarks, when possible, as discussed in the QAPP to verify data are usable for risk management decision-making purposes. For the risk assessments, realistic and defensible exposure assumptions will be used, where available. When Site-specific exposure assumption information is not available, then default EPA/LDEQ-promulgated values will be used, as appropriate.

3.2.7 STEP 7: DEVELOP THE PLAN FOR OBTAINING DATA

This step considers information obtained in the previous six steps to formulate an optimal sampling design, including (if possible) estimates of the number of samples necessary to meet acceptable decision errors. Surface water and sediment/soil samples will be collected using methodology and rational outlined in the Technical Sampling and Analysis Plan (TSAP), Section 7.0. The following provides a general discussion of items that assist to result in resource-efficient sampling and analysis design for data collection.

Surface Water

Surface water samples will be obtained in areas that represent the overall quality of water in the wetlands, ditch, or lake segment. Surface water samples will be collected from mid-depth of the watercourse being sampled prior to the collection of sediment/soil samples to obtain a representative sample. Laboratory analysis will include both filtered and unfiltered surface water samples. The unfiltered surface water data will be used to evaluate the ingestion exposure pathway and the filtered surface water data will be used to evaluate the dissolved phase constituent concentrations for the dermal exposure pathway. The filtered surface water samples will be filtered by the laboratory to remove any suspended sediment particles in the sample, which would be representative of the sediment matrix which is being evaluated separately. Surface water samples will be evaluated for potential risks to ecological receptors via direct exposures and indirect exposures using screening quotients. Surface water samples will be collected to address ecological decision statements 1 and 2 and human health decision statement 3 (Section 3.2.2).

Sediment/Soil

Sediment/soil samples will be collected using a thin-walled aluminum or polyvinyl chloride (PVC) sleeve to enhance collection of representative undisturbed sediment/soil cores. Sediment/soil samples will be collected subsequent to any proximal surface water samples. Sediment/soil samples will be evaluated for potential risks to ecological receptors via direct and indirect exposure using screening quotients. Sediment/soil samples will be collected to address ecological decision statements 1 and 2 and human health decision statements 1, 2, and 4 (Section 3.2.2).

3.3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

The identification of potential state and federal ARARs will assist in the refinement of remedial action objectives and the initial identification of remedial alternatives and

ARARs associated with particular actions. During the RI/FS, information will be collected to assist in finalizing the evaluation of potential ARARs.

ARARs are any promulgated standard, requirement, criterion, or limitation under Federal or State environmental law that has been found to be applicable and relevant. ARARs consist of two sets of requirements, those that are applicable and those that are relevant and appropriate. Applicable requirements are those substantive standards that specifically address the situation at a CERCLA site. Relevant and appropriate requirements are those that address problems or situations sufficiently similar and appropriate to the circumstances at the site. Constituent-specific ARARs are usually risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of numerical values. ARARs will be one of the nine criteria that are used to evaluate remedial alternatives at the Site (see Section 1.1).

The ARARs that have been identified as being potentially applicable for the Devil's Swamp Lake Site RI/FS include, but are not limited to, RCRA, the Toxic Substances Control Act (TSCA), the Safe Drinking Water Act (SDWA), the Clean Air Act (CAA), the Clean Water Act (CWA), OSHA requirements, the LDEQ RECAP, the Louisiana Department of Natural Resources (LDNR) Office of Conservation, and the National Environmental Policy Act (NEPA).

RCRA

The Resource Conservation and Recovery Act (42 U.S.C. 6901, *et seq.,* implemented by regulations at 40 CFR parts 239-282) was an amendment to the Solid Waste Disposal Act of 1965 and was enacted to create a management system to control hazardous waste from the "cradle to the grave," including the generation, transportation, treatment, storage, and disposal of hazardous waste.

TSCA

The Toxic Substances Control Act (15 U.S.C. 2601-2692, implemented by regulations at 40 CFR 700-766) was enacted by Congress in 1976 to give the EPA the ability to track industrial chemicals currently produced or imported into the United States. The EPA repeatedly screens these chemicals and can require reporting or testing of those that may pose an environmental or human-health hazard and can ban the manufacture and import of those chemicals that pose an unreasonable risk. With respect to hazardous waste regulation, TSCA specifically focuses on the use, management, disposal, and cleanup of PCBs. Material with a concentration of PCBs in excess of 50 parts per million (ppm) is subject to specific requirements under TSCA.

SDWA

The Safe Drinking Water Act was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and groundwater wells. The SDWA authorizes the EPA to set national health-based standards for drinking water to protect against both naturally-occurring and man-made constituents that may be found in drinking water.

CAA

The Clean Air Act (42 U.S.C. 7401, *et seq.*) is the comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. The law authorizes the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. The 1990 amendments to the CAA in large part were intended to meet unaddressed or insufficiently addressed problems such as acid rain, ground-level ozone, stratospheric ozone depletion, and air toxics.

CWA

Section 404 was added to the 1972 Clean Water Act and the Section 404 (b)(1) Guidelines were drafted to prohibit the discharge of dredged or fill material into waters of the United States, including wetlands, that will violate water quality standards or jeopardize endangered or threatened species or critical habitat. Section 401 of the CWA ensures that actions permitted under Section 404 do not violate State water quality standards or degrade waters of the State.

OSHA

The Occupational Safety and Health Administration requirements (29 U.S.C. 651, *et seq.*, implemented by regulations at 29 CFR 1900, *et seq.*) are applicable to cleanup activities at all Superfund sites. All sites must establish a medical surveillance program, a site-specific health and safety plan, a minimum of 40 hours of health and safety training for all workers on site, and a decontamination plan for workers as they leave the site. In order to ensure the safety and health of all on-site personnel, all investigation, construction, and corrective action activities are performed in accordance with the applicable federal and state OSHA requirements.

LDEQ RECAP

The LDEQ developed the RECAP to address risks to human health and the environment posed by the release of chemical constituents in the environment. RECAP is the LDEQ's primary statutory mandate for remediation activities in Louisiana. RECAP uses risk evaluation to determine if corrective action is necessary for protection of human health

and the environment; and to identify constituent levels in impacted media that do not pose unacceptable risks (i.e., RECAP Standards).

LDNR Office of Conservation

The LDNR Office of Conservation requires notification prior to the commencement of drilling for all owners of non-domestic water supply wells to comply with the Louisiana Ground Water Protection Regulation, promulgated July 2003 by La. R.S. 38:3097. In accordance with a memorandum issued by the Louisiana Department of Transportation and Development (LDOTD) dated March 4, 2010, monitor wells must now also be registered with the LDNR following their installation.

NEPA

The National Environmental Policy Act requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. To meet NEPA requirements, federal agencies prepare a detailed statement known as an Environmental Impact Statement (EIS). The EPA reviews and comments on EISs prepared by other federal agencies, maintains a national filing system for all EISs, and assures that its own actions comply with NEPA.

In addition, other regulatory requirements or restrictions and To Be Considered (TBCs) related to Site characterization and/or the assessment of risk to human health and ecological receptors will be considered.

4.0 HUMAN HEALTH RISK ASSESSMENT

The purpose of this section is to present the methods and inputs that will be used to complete the HHRA at the Site. Analytical results from the collected samples will be compared with appropriate screening criteria to determine if there is a potential for risk to human health.

The steps that will be included in the HHRA are as follows:

Tier 1

- Data comparison to screening criteria
- Identification of COPCs

Tier 2

- Toxicity Assessment
- Exposure Assessment
- Risk Characterization

The screening level HHRA will be completed following the Tier 1 RI sampling event to determine if a baseline HHRA needs to be completed. If the screening-level HHRA indicates that analytical results from the Tier 1 RI sampling event are below screening criteria, additional Tier 2 RI sampling and completion of a baseline HHRA may not be required. A Draft Tier 2 RI Work Plan will be prepared for review and approval prior to initiation of the Tier 2 RI.

4.1 SCREENING LEVEL HUMAN HEALTH RISK ASSESSMENT

The screening level HHRA will include comparison of the sample data to the LHHC and the identification of COPCs. As part of the identification of COPCs, all of the constituents analyzed in sediment/soil and surface water during the RI will be initially evaluated using a screening process.

The following general criteria will be used in the development of the initial list of COPCs:

- Constituents that are detected or have laboratory reporting limits (RLs) at concentrations less than their LHHC will be eliminated from further evaluation.

- Constituents that are not detected at concentrations above the LHHC in sediment/soil or surface water will be eliminated from further evaluation, even if the laboratory RL is above the appropriate LHHC. The laboratory instrument detection limit, method detection limit, and reporting limit will be set below the LHHC, if possible. Analytical laboratories may not be able to obtain RLs at levels lower than the LHHC with the available analytical test methods (e.g., NRWQC). If constituents that are not detected at concentrations above the LHHC are eliminated from further evaluation, discussion and comparison of the values will be included in the uncertainty section of the HHRA.
- Constituents that are detected, at a minimum of one instance, at concentrations greater than the LHHC will be carried forward for further evaluation.

Tier 1 RI results will be compared to relevant screening standards (LHHC) listed below. Screening standards are chemical concentrations that correspond to fixed levels of risk (i.e., either a one-in-one million [10^{-6}] incremental cancer risk or a non-carcinogenic hazard quotient of one, whichever occurs at a lower concentration) in a given media. Screening standards are generally risk-based concentrations that have been calculated using default exposure parameters. The selected LHHC address the exposure pathways identified in the CSM, which was developed in conjunction with the project stakeholders. The lowest screening value is proposed for use as the LHHC; therefore, these criteria would be protective of other, less sensitive, exposure pathways.

Surface Water

The EPA NRWQC (USEPA, 2009) will be used to evaluate the concentration of individual aroclors in surface water at the Site. The EPA NRWQC are protective of human health with respect to the consumption of fish/shellfish. The analytical laboratory will likely not be able to obtain RLs as low or lower than the NRWQC. There are currently no EPA recommended default screening criteria for human exposure to potential constituents in surface water via dermal contact and incidental ingestion. As such, surface water RBCs were developed using standard exposure factors for recreational swimming in order to evaluate incidental ingestion and dermal contact. The RBC calculations are shown on Table 2B. The screening criteria for human consumption of fish/shellfish are expected to be the LHHC.

Sediment

SQGs were developed based on the EPA *Incidence and Severity of Sediment Contamination in Surface Waters of the United States, National Sediment Quality Survey: Second Edition* (USEPA-823-R-04-007, November 2004). These SQGs are based on protection of human health with respect to the consumption of fish/shellfish and were calculated using default input parameters from the EPA National Sediment Quality Survey and the EPA

Regional Screening Levels (RSLs) (USEPA, 2010). In addition, a Site-specific average total organic carbon (TOC) value from the 1997 EPA Site Investigation was included in the calculation. A summary of the SQG calculations for each COC is shown In Table 2C. There are currently no EPA recommended default screening criteria for human exposure to potential constituents in sediment via dermal contact and incidental ingestion. The screening criteria for human consumption of fish/shellfish are expected to be the LHHC.

Soil

The EPA RSLs (USEPA, 2010) and LDEQ RECAP SO SS (LDEQ, 2003) will be used to evaluate PCB concentrations in soil samples collected from the Site. The RSLs and SO SS are protective of human health for ingestion, dermal contact, and inhalation in the industrial/commercial exposure scenario. Calculation of the EPA RSLs for PCB congeners in soil is shown on Table 2D and calculation of the LDEQ RECAP SO SS for PCB congeners in soil is shown on Table 2E. The lowest of these values will be selected as the soil LHHC.

This screening sequence is designed to provide a conservative means of screening constituents detected in surface water and sediment/soil and to help reduce the likelihood of screening out a constituent that should be further evaluated. If the screening process indicates that COPCs are present at the Site at concentrations that would pose a risk to human health, a baseline HHRA will be performed.

4.2 BASELINE HUMAN HEALTH RISK ASSESSMENT

If the Tier 1 RI analytical results indicate that there are COPCs for human health at the Site, a Tier 2 RI will be required and a WP for the Tier 2 RI would then be prepared and submitted for agency approval. The following provides an overview of the Tier 2 HHRA process.

4.2.1 TOXICITY ASSESSMENT

A toxicity assessment will be conducted to characterize the evidence regarding the potential for COPCs to cause adverse health effects in exposed populations and, where possible, to estimate the relationship between the extent of exposure and extent of toxic injury or disease (dose-response evaluation). Qualitative and quantitative toxicity information for the COPCs would be acquired through examination of relevant scientific literature that relates exposure to response in humans. Useful data are those based on actual human exposures; although, most of the available information on the toxic effects of chemicals is based on experiments in animals.

The toxicity of the identified COPCs will be evaluated using EPA published toxicity reference values (TRVs) that relate chemical "dose" to potential health effects. Sources of TRVs in hierarchical order (USEPA, 2003c) include the following:

- Tier 1: EPA Integrated Risk Information System (IRIS)
- Tier 2: EPA Provisional Peer-reviewed Toxicity Values (PPRTVs)
- Tier 3:
  - Agency for Toxic Substance and Disease Registry Minimal Risk Levels (MRLs)
  - EPA Health Effects Assessment Summary Tables (HEAST)
  - California Environmental Protection Agency
  - LDEQ's RECAP

The toxicity factors are called "slope factors" for carcinogenic effects and "reference doses" for non-carcinogenic effects. The methodology by which these values are derived is explained in detail below. The toxicity values will be used in conjunction with the estimated constituent intakes, which will be developed during the exposure assessment, using Site-specific concentrations, to calculate media-specific carcinogenic and non-carcinogenic risks and hazards.

4.2.2 EXPOSURE ASSESSMENT

The objective of the exposure assessment is to estimate the type and magnitude of exposures to the COPCs that are present at or migrating from the Site (USEPA, 1989). The exposure assessment reviews the manner in which the COPCs are distributed in the environment and the estimated frequency of contact between potential receptors and the constituents. The quantitative assessment of exposure, based on the constituent concentrations present in the sediment/soil and surface water and the degree of absorption of each constituent, provides the basis for estimating constituent uptake (dose) and associated health risks.

An exposure assessment evaluates the potential for Site-specific receptor populations to be exposed to COPCs at the Site. The exposure assessment also addresses the magnitude of such exposures. The first step in an exposure assessment is to develop a CSM (see Figure 4). Exposure pathways identified by the CSM define the migration pathway that constituents would likely take from the constituent source area to the human receptor populations. The exposure pathway analysis identifies potential

receptor populations, release mechanisms, transport mechanisms, and exposure points for the Site.

An exposure pathway consists of four necessary elements:

- A source and mechanism of constituent release to the environment
- An environmental transport medium for the released constituent
- A point of potential human contact with the medium and the receptors located at these points
- A human uptake route (intake of media containing site-related constituents) at the point of exposure

All four elements must be present for an exposure pathway to be complete and for exposure to occur. If any one of the four elements is absent, the pathway is incomplete and no exposure can occur. During the risk assessment, all potential exposure pathways will be evaluated for each identified receptor to determine their significance. Only complete exposure pathways will be addressed quantitatively during the risk assessment. Incomplete exposure pathways do not result in actual human exposure and, therefore, will not be included in the quantitative risk assessment.

4.2.3 RISK CHARACTERIZATION

Risk characterization is the description of the nature and magnitude of potential human health risks, including attendant uncertainty. Risk characterization integrates the results of the exposure assessment and the toxicity assessment to characterize cumulative risks to the affected population. The risk characterization section will include quantitative estimates of potential carcinogenic and non-carcinogenic risks associated with exposure to Site-specific COPCs. Risks will be combined across all applicable pathways for a receptor group at a given exposure time for each COPC. Cumulative risks from all applicable COPCs and exposure pathways will be presented.

To characterize potential non-carcinogenic effects, comparisons will be made between projected doses and toxicity criteria. Potential non-carcinogenic effects will be assessed using a hazard index (HI) approach. The HI is equal to the sum of the hazard quotients (HQ) for each COPC. The HQ is the ratio of the exposure dose to an appropriate toxicity value (e.g., RfD or RfC) which represents an "acceptable level" of exposure. An HI greater than one typically indicates an increased potential for adverse health effects. Constituent- and route-specific HIs will be calculated for exposures to all

non-carcinogenic COPCs. As appropriate, HQs will be summed by target organ or critical effect to calculate an HI for a given health effect.

In order to characterize potential carcinogenic effects, probabilities that an individual will develop cancer over a lifetime of exposure will be estimated from projected intakes and constituent-specific toxicity information. Dose estimates for carcinogens will be multiplied by the constituent-specific Cancer Slope Factor (CSF) to produce estimates of incremental carcinogenic risks for each COPC and exposure route. Carcinogenic risks will be summed across constituents to produce medium-specific risk estimates for each scenario. When appropriate, medium-specific risks may be summed. These estimated carcinogenic and non-carcinogenic risks would be compared to standards of acceptable risk.

Regulatory agencies have documented the range of acceptable risks. EPA has concluded that sites posing a cumulative excess cancer risk of less than $1x10^{-4}$ may be acceptable and, therefore may not require remedial activities. Under most situations, excess carcinogenic risks in the range of $1x10^{-4}$ to $1x10^{-6}$ and a non-carcinogenic HI less than one are considered acceptable. Such EPA risk estimates will be used.

4.2.4 UNCERTAINTY ANALYSIS

A qualitative uncertainty analysis will be conducted, which will identify uncertainties associated with the Site-specific risk assessment. Major assumptions, scientific judgments, and to the extent possible, estimates of the uncertainties embodied in the assessment will be discussed. The analysis will be qualitative in nature and will describe general methodological and Site-specific uncertainties in the risk assessment, and if possible, provide an indication as to whether these sources of uncertainty have resulted in an over- or under-estimation of the risk.

5.0 ECOLOGICAL RISK ASSESSMENT

The purpose of this section is to present the methods and assumptions that will be used in the Tier 1 RI and screening assessment to evaluate the potential for risk to ecological receptors exposed to PCBs at the Site. The sampling and data collection program for the Tier 1 RI was developed specifically to evaluate risk to ecological receptors. The results of the screening assessment that will be conducted upon completion of the Tier 1 RI, hereafter referred to as the SLERA, will be used to determine if a BERA will be required to adequately evaluate risk to ecological receptors and make informed risk management decisions. A Draft Baseline Ecological Risk Assessment Problem Formulation Report and Work Plan will be prepared for approval prior to initiation of the Tier 2 RI.

5.1 8-STEP PROCESS

The SLERA and, if necessary, BERA will follow the 8-step process for ecological risk assessment recommended by the EPA (1996). Steps 1 and 2 constitute the SLERA. Steps 3 through 7 constitute the BERA. Step 8 is the risk management step. Figure 6 shows a flow diagram of the 8-step process. A brief description of each of the eight steps is presented below:

- ***Screening Level Problem Formulation (Step 1)***. This step includes a Site reconnaissance to document the ecological setting of the assessment area, identification of known or suspected sources of impact, discussion of the fate and transport of Site-related constituents, identification of potentially complete exposure pathways, development of a preliminary CSM, selection of assessment and measurement endpoints, and an ecological effects evaluation.
- ***Screening Level Exposure Estimate and Risk Calculation (Step 2)***. This step includes completion of preliminary exposure estimates and risk calculations. Constituents with concentrations in one or more media that potentially pose risk to ecological receptors are identified as constituents of potential ecological concern (COPECs).
- ***Problem Formulation (Step 3).*** This step includes evaluation of the assumptions used in the SLERA and, if appropriate, refinement of the list of COPECS, further characterization of the ecological effects of COPECs, revision of constituent fate and transport and exposure pathways, and refinement and assessment of endpoints and CSM.
- ***Study Design and Data Quality Objectives (Step 4).*** This step includes refinement of measurement endpoints, design of the baseline investigation, establishment of DQOs, development of statistical hypotheses and tests, and preparation of a work plan and sample collection and analysis plan.

- ***Field Verification of Sampling Design (Step 5).*** This step involves evaluation of the sample collection design.
- ***Site Investigation and Analysis (Step 6).*** This step involves execution of the study design, verification that all DQOs are satisfied, and revision of ecological exposures and effects. An important consideration in this step is verification of the nature and spatial extent of Site-related constituents through additional collection and analysis of environmental media.
- ***Risk Characterization (Step 7).*** This step includes re-calculation of risk to ecological ROCs carried-over from the SLERA and addition of any new receptors that are considered important, characterization of these risks, and completion of an uncertainty analysis.
- ***Risk Management (Step 8).*** The final step in the 8-step risk assessment process involves the balance of ecological risks identified in the BERA through remediation of constituents with adverse environmental impacts associated with remedial actions.

5.2 SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT

The SLERA will be conducted as Steps 1 and 2 of the eight-step process conducting ecological risk assessments (Figure 6). Following completion of the Tier 1 RI sample collection, there will be sufficient data and information to support an informed decision regarding the need for additional ecological risk assessment. The additional data collection, if necessary, will be conducted during the Tier 2 RI and may include completion of a BERA. The SLERA will be conducted in a manner that will provide conservative-based evidence whether the potential for risk to ecological receptors exists, and to what extent adverse consequences could be expected at the Site.

5.2.1 STEP 1: SCREENING LEVEL PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION

The initial step of an ERA is to decide which components of an ecosystem (the sum of all the living organisms, their interactions, and the physical factors in a particular area) should be protected, and therefore, which species and communities should be the focus of the BERA.

5.2.1.1 ENVIRONMENTAL SETTING

The first task in Step 1 will be characterization of the ecological setting for the Site. Qualified ecologists with experience in ERAs will conduct a Site reconnaissance to describe the habitats within the assessment area and identify ecological receptors that occur or are likely to occur within the assessment area. Major plant communities will be identified and mapped. The dominant species within each plant community will be identified. Wildlife associated with each plant community will be identified through direct observation during the Site reconnaissance and review of distribution maps and documented habitat associations. Historical aerial photographs will be reviewed to identify any current or historical activities within and adjacent to the assessment area that affect the distribution of receptors.

The Site reconnaissance will also identify complete and potentially complete exposure pathways within the assessment area and migration pathways from the assessment area to adjacent habitats. To supplement information collected through the Site reconnaissance, other documents and reports specific to the assessment area will be reviewed, including the 1999 EPA ERA Report.

5.2.1.2 SPECIES AND HABITATS OF CONCERN

At this time, insufficient data are available to develop a list of Site-specific receptors and identify ROCs. The Site reconnaissance and data review described in the previous section will provide a detailed description of the ecological setting and the receptors that occur, or are likely to occur, in the assessment area. Once this task has been completed, a list of Site-specific ROCs for each habitat type and AOI will be developed and submitted to the EPA for review and approval.

Table 4 identifies threatened and endangered species and habitats of concern known to be present in East Baton Rouge Parish, Louisiana. Threatened and endangered species are those species that have been given special legal and protective designations by federal or state government agencies. A federally endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A federally threatened species is one likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Each species of concern with a potential to be present in the Devil's Swamp Lake assessment area is briefly discussed below.

Amphibians

The four-toed salamander (*Hemidactylium scutatum*) is identified as rare for East Baton Rouge Parish with a state rank of S1. This salamander is associated with a diversity of aquatic and wetland habitats, including streams, ponds, permanently flooded marshes and forested wetlands. Sphagnum moss is a common feature of the preferred habitat for four-toed salamander. Adult salamanders are commonly found under deadfalls and moss. Breeding occurs in early spring. Eggs are typically deposited in moss or protected structures above or immediately adjacent to water. The four-toed salamander is aquatic in the larval stage and terrestrial as an adult.

Reptiles

The eastern glass lizard (*Ophisaurus ventralis*) is a legless lizard that inhabits wet meadows, grasslands, and pine flatwoods. This lizard is identified as rare in East Baton Rouge Parish with a state rank of S3. Their diet consists of insects, spiders, small mice, and eggs of birds and other reptiles. The preferred habitats for eastern glass lizards do not appear to be present within the Devils Swamp Lake assessment area.

The rainbow snake (*Farancia erytrogramma*) is a secretive species associated with wet habitats and is identified as rare in East Baton Rouge Parish with a state ranking of S2. This snake is a strong swimmer and spends much of its time in water or hiding in aquatic vegetation. The rainbow snake breeds in summer and produces clutches of 20-50 eggs. The diet of the rainbow snake consists primarily of eels, but also includes frogs, tadpoles, and salamanders.

Birds

The American swallow-tailed kite (*Elanoides forficatus*) is an inhabitant of lowland cypress swamps and tall riparian forests. This species is identified as rare in East Baton Rouge Parish with a state rank of S1S2B. Nests are constructed in tress, usually near water. Breeding occurs during March through May with females laying 2-4 eggs per clutch. The incubation period is approximately 28 days and young are fledged within 36-42 days of hatching. The diet of the American swallow-tailed kite includes insects, amphibians, reptiles and nestling birds.

The bald eagle (*Haliaeetus leucocephalus*) is piscivorous raptor typically associated with large rivers and other water bodies and is listed as endangered in East Baton Rouge Parish with a state rank of S2N and S3B. The bald eagle is also protected under the Bald and Golden Eagle Protection Act. This raptor inhabits a wide variety of habitats, but proximity to water is essential. The preferred nesting habitat is along rivers or lakeshores with large, tall trees that provide an unobstructed flight path to the nest. Nest sites are typically within one-half mile of water at the top of tall, established trees

or open cliffs near water. Preferred roosting sites include large old trees with large horizontal limbs and unobstructed visibility to the surrounding areas.

Mammals

The eastern harvest mouse (*Reithrodontomys humulis*) is an inhabitant of wet, open habitats and is identified as rare in East Baton Rouge Parish with a state rank of S3S4. This species is omnivorous with a diet consisting of seeds, plant tissue, and insects. Breeding of the eastern harvest mouse occurs in early spring and litter size is 2-4 young per litter. Predators of the eastern harvest mouse include snakes, owls, and fox. The habitat of the eastern harvest mouse does not appear to be present within the Devil's Swamp Lake assessment area.

The long-tailed weasel (*Mustela frenata*) occurs in a diversity of habitats, including small wooded areas and is identified as rare in East Baton Rouge Parish with a state rank of S2S4. The long-tailed weasel burrows and nests in hollow logs. Breeding occurs in mid-summer, and birth occurs in the following April-May. The primary diet of long-tailed weasels is small mammals, but also includes reptiles, birds, and fruits and berries. Long-tailed weasels are accomplished swimmers. Owls and large snakes may prey on young weasels.

The manatee (*Trichechus manatus*) is an aquatic mammal that inhabits open water and rivers and is listed as endangered at both the state and federal level. The state rank is SZN. Preferred habitat features for manatee include dense beds of submerged or floating vegetation. Preferred water depth is 4 to 7 feet and reproduction occurs throughout the year. The N state rank indicates that Manatee do not breed in East Baton Rouge Parish. Manatee is herbivorous, with a diet consisting of a diversity of aquatic plants.

The southeastern shrew (*Sorex longirostris*) occurs in a variety of habitats, with early successional series and disturbed habitats being preferred. This shrew is identified as rare in East Baton Rouge Parish with a state rank of S2S3. The southeastern shrew constructs nests of leaves and other plant material in deadfalls and cavities beneath the bark of fallen trees. Breeding of the southeastern shrew occurs April through September. Litter size ranges from one to six young per litter. The diet of the southeastern shrew consists of spiders, lepidoptera, beetles, and centipedes. Predators of southeastern shrew include raptors, snakes, weasels, and fox.

Fish

The Alabama shad (*Alosa alabamae*) is an anadromous fish that spawns in medium to large rivers and is listed as rare in East Baton Rouge Parish with a state rank of S1.

Temperature is an important factor in habitat preference as Alabama shad is thought to be sensitive to thermal stress. Adults spawn in freshwater in spring or early summer and eggs are typically deposited in course sand or gravel substrates in rivers with moderate currents and water temperatures of 18-23 C°. Juveniles remain in freshwater for 6-8 weeks and may return to their home water to spawn as adults. The diet of Alabama shad consists of small fish and invertebrates.

The pallid sturgeon (*Scaphirrhynchus albus*) is a long-lived species known to be present in the lower Mississippi River basin. This species is listed as endangered at both the state and federal levels. The state rank for pallid sturgeon is S1. Pallid sturgeon occurs in streams and rivers with moderate to swift flow and water depths ranging from 3 to 25 feet. Pallid sturgeon is often found where the river substrate is sandy or rocky. This species is a bottom feeder with a diet that includes insects and small fish. Females take up to 15 years to reach sexual maturity and individual females spawn every 3 to 10 years.

Freshwater Mussels

The inflated heelspliter (*Potamilus inflatus*) is a freshwater mussel that inhabits stable substrates of streams and rivers with slow to moderate currents. This mussel is listed as threatened at both the state level and federal level. The state rank for inflated heelspliter is S1. Preferred substrates include sand, mud, silt, and sandy-gravel. The life history of the inflated heelspliter is poorly understood. Mature larvae are released into the water column where they attach to the gills of host fish to complete development. Known fish hosts for mature larvae include freshwater drum.

The rayed creekshell (*Anodontoides radiatus*) is a freshwater mussel that inhabits small to medium rivers and streams with moderate flow. This mussel is identified as rare in East Baton Rouge Parish with a state rank of S2. Adult mussels typically inhabit sand, mud, or gravel substrates.

The southern hickorynut (*Obovaria jacksoniana*) is a freshwater mussel that inhabits slow to moderate currents of small streams to large streams and is identified as rare in East Baton Rouge Parish with a state rank of S1S2. On March 23, 2010, the U.S. Fish and Wildlife Service published a Notice of 90-day Petition of Finding to list southern hickorynut as federally threatened or endangered. Preferred substrates for this mussel are stable sands and gravels. Host fish for development of larvae are unknown.

Southern pocketbook (*Lampsilis ornata*) is a freshwater mussel that inhabits shallow water margins of large rivers and streams with moderate flow and is identified as rare in East Baton Rouge Parish with a state rank of S3. Mature larvae are released in late

spring through early summer. Largemouth bass appear to be the preferred host for mature larvae to complete development.

Plants

Dixie wood-fern (*Dryopteris x australis*) is a naturally occurring hybrid of *Dryopteris celsa* and *Dryopteris*. *Ludoviciana* and is identified as rare in East Baton Rouge Parish with a state rank of SH, which indicates that is occurrence is historical with no recent records in the past 20 years. This species of wood-fern prefers moist habitats.

Dwarf filmy-fern (*Trichomanes petersii*) is a mat-forming fern that occurs in moist, humid habitats and is identified as rare in East Baton Rouge Parish with a state rank of S2. Dwarf filmy-fern occurs on rocks and tree bark. Trees associated with dwarf filmy-fern include southern magnolia, American beech, and evergreens in forests near streams.

Elliott sida (*Sida elliottii*) is an inhabitant of pinelands and is identified as rare in East Baton Rouge Parish with a state rank of SH, which indicates that is occurrence is historical with no recent records in the past 20 years. It occurs in moist, well-drained sandy and limestone soils that lack humus. Suitable habitat for Elliott sida does not appear to be present within Devil's Swamp Lake assessment area.

Low erythrodes (*Platyhelys querceticola*) is member of the orchid family. In the United States, this orchid occurs only in Louisiana, Mississippi, and Florida. Low erythrodes is identified as rare in East Baton Rouge Parish with a state rank of S1. Habitats for this low growing orchid include the humus of forested wetlands and hardwood forests. Flowering occurs between September and early March.

Powdery thalia (*Thalia dealbata*) is an obligate wetland plant that occurs along stream banks and is identified as rare in East Baton Rouge Parish with a state rank of S2S3. Preferred habitat for powdery thalia includes wet soil, shallow water, and full sun. Flowering occurs May through September.

Silky camellia (*Stewartia malacodendrom*) is a small understory tree that occurs along the bluffs and ravine slopes of riverbanks. This species is identified as rare in East Baton Rouge Parish with a state rank of S2S3. The preferred habitat for silky camellia includes shade and moist, but well-drained soils. Flowering occurs in April.

Southern shield wood-fern (*Dryopteris ludoviciana*) is a shade tolerant inhabitant of bottomland hardwood forests and forest seeps. This member of the wood-fern family is identified as rare in East Baton Rouge Parish with a state rank of S2. Sporulation occurs spring through fall. The major threats to this species include alteration of hydrology.

Square-stemmed monkey flower (*Mimulus ringens*) is an obligate wetland plant that typically occurs along stream banks, lake margins, and wet meadows. It is frequently found partially submerged in water. This species is identified as rare in East Baton Rouge Parish with a state rank of S2. Flowering occurs June through September.

Wolf spikerush (*Eleocharis wolfii*) is an obligate wetland plant that typically occurs in small shallow depressions in saline prairies and in depressions in wet intermediate terrace flatwoods. This spikerush is identified as rare in East Baton Rouge Parish with a state rank of S3. Light requirements are full sun to partial shade. Given its habitat requirements, Wolf spikerush is not likely to be present within the Devil's Swamp Lake assessment area.

The Site reconnaissance and characterization of the ecological setting will identify those species and habitats of concern identified in Table 4 that are actually present or have the potential to be present in the assessment area.

5.2.1.3 KNOWN AND SUSPECTED CONSTITUENTS

PCBs are the primary constituent known to be associated with the Site. Therefore, the Tier 1 RI and SLERA will focus on PCBs and the potential for risk to ecological receptors to PCBs within the assessment area. The SLERA will provide a detailed discussion of the historical handling of PCBs and factors that potentially affect ecotoxicity of PCBs (e.g., weathering).

5.2.1.4 CONSTITUENT FATE AND TRANSPORT

The Devil's Swamp Lake assessment area is a complex system with numerous factors that may affect the fate and transport of PCBs. These factors include suspension and re-deposition of sediment throughout the assessment area and flooding from the adjacent Mississippi River. These fate and transport processes can affect the aerial extent and magnitude of exposure of ecological receptors to PCBs. The SLERA will include a detailed discussion of the fate and transport process within the assessment area and how these processes affect exposure and ecotoxicity.

5.2.1.5 POTENTIALLY COMPLETE EXPOSURE PATHWAYS

Figure 4 presents a CSM, which identifies potentially complete exposure pathways for the Devil's Swamp Lake assessment area. The project stakeholders have reviewed and offered comments on the CSM. The Site reconnaissance and characterization of the ecological setting conducted as part of the SLERA will provide a mechanism for verifying the potentially complete exposure pathways identified in the CSM. The SLERA will modify the CSM, if appropriate. The rationale for any changes to the CSM will be presented in the SLERA.

5.2.1.6 ASSESSMENT AND MEASUREMENT ENDPOINTS

Assessment endpoints for the SLERA will be identified after the ecological setting has been characterized. It is anticipated that the assessment endpoints are likely to consist of the following:

Surface Water

- diversity of aquatic life (aquatic invertebrates and fish) inhabiting the water column
- relative and absolute densities of avian and mammalian piscivores

Sediment

- species richness and productivity of the benthic macroinvertebrate and aquatic plant communities
- relative and absolute densities of avian and mammalian piscivores

Soil

- species richness and productivity of the terrestrial plant and soil invertebrate communities
- relative and absolute densities of avian and mammalian insectivores, herbivores, and carnivores

The selected assessment endpoints are intentionally broad. Once the final COPECs are identified (Step 3 of the 8-step process), Site-specific assessment endpoints will be developed for specific receptor groups and evaluated in the BERA.

For the SLERA, the maximum concentrations of total PCBs and the individual aroclors and sum of the PCB congeners, weighted by the TEFs for the individual congeners, detected in sediment/soil and surface water will be used as the measurement endpoints for receptors directly exposed to environmental media (e.g., benthic invertebrates,

plants). For upper trophic level receptors, maximum concentrations will be used to calculate conservative rates of ingestion for representative upper trophic level receptors.

5.2.1.7 ECOLOGICAL SCREENING VALUES AND TOXICITY EQUIVALENCE FACTORS

Identification and documentation of ESVs for screening concentrations of PCBs in surface water and sediment/soil is an essential aspect of the RI process. The ESVs that will be used in the SLERA are listed below and presented in Table 3A. Toxicity Equivalence Factors for the individual PCB congeners, which are available for mammals, birds, and fish, are listed in Table 3B. Some of the substrate samples will be collected in areas that are intermittently submerged (i.e., North-Central Devil's Swamp and Drainage Ditch AOIs) and, as such, may support aquatic receptors and terrestrial receptors during different portions of the year. Accordingly, these samples may be evaluated as both sediment (aquatic receptors) and soil (terrestrial receptors).

- ***Surface Water.*** The SLERA will consider benchmarks specific to aquatic invertebrates, fish, and aquatic plants. The Ecological Benchmark Tool, developed and maintained by Oak Ridge National Laboratory (ORNL), and Suter and Tsao (1996), a publication of ORNL, were consulted to identify appropriate ESVs for the SLERA. For aquatic invertebrates, the lowest chronic value (LCV) of 0.0008 milligrams per liter (mg/L) for non-daphnids (total PCBs) will be used as the ESV. For fish, the LCV of 0.0002 mg/L will be used as the ESV. For aquatic plants, the LCV of 0.000144 mg/L will be used as the ESV. USEPA (2008) identifies TEFs for individual PCB congeners for fish. The benchmark for the sum of the congeners, weighted by the TEFs for the individual congeners, is unity.
- ***Sediment.*** The SLERA will consider benchmarks for total PCBs and individual aroclors. The so-called consensus threshold effects concentration (TEC) of 0.0598 milligrams per kilogram (mg/kg) will be used as the ESV for total PCBs. The lowest effects level (LEL) identified by Persaud et al. (1993), which has been adopted by the Canadian Council of the Ministers of the Environment (CCME), will be used as the ESVs for Aroclor 1016 (0.007 mg/kg), Aroclor 1248 (0.03 mg/kg), Aroclor 1254 (0.06 mg/kg), and Aroclor 1260 (0.005 mg/kg). Sediment benchmarks specific to Aroclor 1221, Aroclor 1232, and Aroclor 1242 are not available. The sediment ESVs for total PCBs and the individual aroclors are based on benthic macorinvertebrates.
- ***Soil.*** The SLERA will consider benchmarks specific to soil invertebrates, plants, and wildlife. The ESVs for invertebrates and plants will be 2.51 mg/kg and 10 mg/kg, respectively. The USEPA (1999c) identifies these values as benchmarks for

Aroclor 1016 and Aroclor 1254. These benchmarks will be used as benchmarks for total PCBs.

- ***Wildlife.*** The SLERA will evaluate the risk to upper trophic level receptors that ingest prey exposed to surface water, sediment, and soil. The benchmark of 0.65 mg/kg identified by the Washington State Department of Ecology will be used as the ESV for total PCBs in soil. Benchmarks for total PCBs and the individual aroclors specific to upper trophic level receptors are not available for surface water or sediment. USEPA (2008, referencing van den Berg et al., 1998, 2006)) identifies TEFs for 12 PCB congeners for mammals and birds. Risk to upper trophic level receptors that forage on prey exposed to surface water and sediment will be evaluated using food chain models. The food chain models will consider ingestion of prey, surface water, and sediment (i.e., multi-media sources of exposure). The SLERA will consider multi-media exposure, but will be based on conservative bioaccumulation factors and utilization factors (UFs). The Tier 2 RI samples and the BERA may include tissue analysis for prey items. Sample et al. (1996) identify toxicity reference values (TRVs) for a variety of species of birds and mammals for several of the individual aroclors. TRVs are also available from other sources. As the TRVs are specific to individual receptors, the TRVs cannot be identified until the ROCs for the food chain models are selected. The TEFs for mammals and birds identified by USEPA (2008) will be used to evaluate risk for the PCB congeners. The benchmark for the sum of the congeners, weighted by the TEFs for the individual congeners, is unity.

The analytical laboratory that will analyze the Tier 1 RI samples has been provided with the ESVs for surface water and sediment/soil. The laboratory reporting limits will be at least equal to, if not below, the ESVs for total PCBs and the individual aroclors, if possible.

5.3 STEP 2: SCREENING LEVEL EXPOSURE ESTIMATE AND RISK CALCULATION

Step 2 of the 8-step process includes estimation of exposure of Site constituents to the identified ROCs and completion of preliminary risk calculations. The risk calculations are completed by comparison of maximum observed constituent concentrations to screening values, which results in a Screening Quotient (SQ). The following sections provide details about the proposed scope of work for completion of Step 2.

5.3.1 EXPOSURE ESTIMATES

Exposure estimates for all species will be based on the maximum concentration of total PCBs and the individual aroclors and congeners in each media. Each of the AOIs will be evaluated as an independent portion of the assessment area. For ecological receptors exposed to surface water and sediment/soil, the maximum concentration will be compared to the ESVs identified for specific receptor groups.

For the food chain models that will be used to assess risk to upper trophic level receptors, the maximum concentration in surface water and sediment/soil within an AOI will be used to calculate the total rate of ingestion of PCBs. Conservative uptake factors and bioaccumulation factors will be used to estimate the concentrations of PCBs in invertebrates, plants, fish, small mammals, and plants consumed by upper trophic level receptors. An area use factor of 100 percent will be assumed (i.e., all prey and water ingested by the selected indicator species will be from the AOI evaluated). Bioavailability of 100 percent will also be assumed.

Ingestion of PCBs by upper trophic level receptors will be calculated using the general equation:

$$IR_{total} = IR_{food} \times Conc_{food} + IR_{water} \times Conc_{water} + IR_{soil/sediment} \times Conc_{soil/sediment} \qquad \text{Equation 1}$$

Where:

IR_{total}	=	total ingestion rate (IR) of PCBs (milligrams per kilogram body weight [BW] per day [mg/kg-day]);
IR_{food}	=	rate of food ingestion (mg WW/kg-day);
IR_{water}	=	rate of water ingestion (L/kg-day);
$IR_{soil/sediment}$	=	rate of soil/sediment ingestion (mg DW/kg-day);
$Conc_{food}$	=	concentration of PCBs in food (mg/kg WW);
$Conc_{water}$	=	concentration of PCBs in surface water (mg/L); and
$Conc_{soil/sediment}$	=	concentration of PCBs in soil/sediment (mg/kg DW).

Ingestion of food and water is expressed on a wet weight (WW) basis. The rate of soils/sediment ingestion ($IR_{soil/sediment}$) is expressed on a dry weight (DW) basis.

5.3.2 RISK CALCULATION

Screening for potential risk to surface water invertebrates, fish, aquatic plants, benthic invertebrates, soil invertebrates, terrestrial plants, and terrestrial wildlife will be a two-phase process. For each media, the first phase will be comparison of the maximum concentration of total PCBs in each AOI to the ESV for total PCBs. If the maximum concentration is below the ESV, risk due to exposure to total PCBs and all aroclors will be considered below the threshold of concern for that receptor group (e.g., fish) in that AOI, and no further evaluation of risk will be conducted. If the maximum concentration of total PCBs exceeds the ESV for total PCBs, the evaluation will advance to the second phase. In the second phase, the maximum concentrations of the individual aroclors in each AOI will be compared to the ESVs for the individual aroclors, if an ESV is available. The effects of PCBs on ecological receptors are cumulative. The purpose of screening the individual aroclors is to identify those aroclors contributing to the cumulative risk. Individual aroclors with maximum concentrations that exceed their ESVs, if available, will be identified as a COPEC. If the maximum concentrations of all aroclors with an AOI are below their ESVs, risk will be considered below the threshold of concern and no further evaluation will be completed.

For fish, USEPA identifies TEFs for 12 PCB congeners. For the screening phase, the concentrations of the 12 congeners, weighted by the TEFs for the individual congeners, will be summed. For each AOI, the sample with the maximum sum of the congeners exceeds unity, PCBs will be identified as the sum of the PCB congeners exceeding unity.

Food chain models will be used to evaluate risk to upper trophic level receptors. As identified in Equation 1, the food chain models will consider multiple routes of ingestion (i.e., food, water, and sediment/soil). Food chain models will evaluate risk for both PCB aroclors and congeners.

Food chain models for the upper trophic level receptors will have a degree of conservatism commensurate with a screening-level assessment. Exposure will be based on the maximum concentrations of the media evaluated and area use and bioavailability will be assumed to be 100 percent. In addition, indicator species for each trophic guild evaluated (e.g., piscivorous birds) will have documented sensitivity to PCBs. Risk to upper trophic receptors will be considered to be below the threshold of concern if the estimated rate of total ingestion of PCB aroclors is below the TRV, which will be based on no observed adverse effects levels (NOAELs), or the ingestion of PCB congeners, weighted by the TEFs for the individual congeners, is below unity.

5.4 UNCERTAINTY ANALYSIS

A qualitative uncertainty analysis will be conducted to identify and discuss uncertainties associated with the SLERA. Major assumptions and uncertainty estimates will also be determined. The analysis will be qualitative in nature and will describe general methodological uncertainties and, if possible, provide an indication as to whether these sources of uncertainty have resulted in an over-estimation or under-estimation of risk.

5.5 SCIENTIFIC MANAGEMENT DECISION POINT

The SLERA (Steps 1 and 2) concludes with a scientific management decision point (SMDP) as shown on Figure 6. The SMDP will evaluate three potential outcomes of the SLERA as follows:

1. Sufficient data and information exist to conclude that risk to all ecological receptors in all AOIs are below the threshold of concern and there is no need for further ecological risk assessment.
2. Sufficient data and information exist to suggest the potential for risk to ecological receptors for one or more exposure pathways and AOI is above the threshold for concern. This finding will trigger the BERA.
3. Data and information are sufficient to suggest that the potential for risk to ecological receptors is significantly above the threshold for concern that additional data collection will not reduce that potential below the threshold for concern. This finding, if realized, will likely to apply to specific AOIs or sub areas of some of the AOIs. For these areas, the risk assessment will proceed directly to the risk management step.

If the SLERA indicates a potential for risk to ecological receptors above the threshold for concern (SQ > 1) for one or more AOI, additional data will be collected during the Tier 2 RI. The SLERA will identify those exposure pathways that can be eliminated from further evaluation because they are unlikely to pose a significant potential for risk. Following completion of the SLERA, the decision will be documented in the Draft Screening Level Ecological Risk Assessment Report.

5.6 STEPS 3 – 8: BASELINE ECOLOGICAL RISK ASSESSMENT

Following completion of the SLERA, a BERA will be completed, if necessary. The BERA will follow steps 3-8 of the eight step ecological risk assessment process as shown in Figure 6. A Draft Baseline Ecological Risk Assessment Problem Formulation Report and Work Plan will be prepared for approval prior to initiation of the Tier 2 RI.

6.0 TIER 1 RI TECHNICAL SAMPLING AND ANALYSIS PLAN

6.1 INTRODUCTION

The TSAP documents the design of sample collection methods for field activities for the Tier 1 RI. The TSAP is supported by a Field Sampling Plan (FSP) (Section 6.3), a QAPP, and the SOPs. The QAPP is submitted under separate cover and dated November 2010. The SOPs (Appendix C) provide detailed procedures for activities cited in the FSP and include:

- Water quality monitoring and deployment of multi-probe water quality monitoring instrument (SOP 001)
- Surface water sampling (SOP 002)
- Sediment/soil sampling (SOP 003)
- Containers, preservation, handling and tracking of environmental samples (SOP 004)
- Decontamination procedures for field activities (SOP 005)

6.2 DATA COLLECTION APPROACH

The data collection program will be conducted in accordance with applicable EPA Guidance as referenced herein including the Guidance on Choosing a Sampling Design for Environmental Data Collection (USEPA 2002), where applicable. The data collection program will be completed in accordance with the QAPP and the FSP. The TSAP development process considered the discussion during the April 2010 scoping meeting, the Site history, existing available Site data, the CSM, Visual Sample Plan (VSP) output, and the UAO.

6.2.1 SAMPLING DESIGN

The sampling design is a fundamental part of data collection for scientifically based decision making. A well-developed sampling design plays a critical role in ensuring that data are sufficient to draw the conclusions needed. To generate accurate information regarding the constituents at the Site, the following were considered:

- The appropriateness and accuracy of the sample collection and handling method
- The effect of measurement error
- The quality and appropriateness of the laboratory analysis

- The representativeness of the data with respect to the objective of the investigation

Of these, representativeness is addressed through the sampling design. Representativeness may be considered as the measure of the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition (American National Standards Institute/American Society for Quality Control [ANSI/ASQC] 1994).

A complete sampling design indicates the number of samples and identifies the particular samples (for example, the geographic positions where these samples will be collected or the time points when samples will be collected). Along with this information, a complete sampling design will also include an explanation and justification for the number and the positions/timings of the samples (USEPA 2002).

6.3 FIELD SAMPLING PLAN

The FSP defines in detail the methods used to implement the field investigation to obtain the data to address the project objectives. It provides the operational plan for execution of the sample design and identifies the procedures for collection of samples consistent with the sample design (USEPA 1993a). The FSP is supplemented by the QAPP to verify that the data will be usable to meet the project objectives. This FSP describes methods to be used during the field investigations.

6.3.1 BACKGROUND INFORMATION

The Site background information and physical characteristics of the Site including land use, demographics, topography, drainage, geology, hydrogeology, surface water hydrology, ecological setting, Site history, and previous investigations are described in the EPA-approved Final Preliminary Site Characterization Report. These topics are not repeated herein due to the voluminous nature of the material. The Tier 1 RI WP will rely on and reference the previously submitted documents.

6.3.2 SAMPLE TYPE, LOCATION, AND FREQUENCY

The type, location, and frequency of environmental media samples collected is dependent on the use of the data in a risk assessment. The determination of the appropriate number of samples to be collected is made with a number of considerations including the number of AOIs that will be sampled, planned statistical methods, statistical performance, and practical considerations of logistics and cost (USEPA, 1989).

The proposed sample locations in each AOI across the Site are shown on Figure 7. The sample type and proposed locations for the Tier 1 RI are shown on Figure 8 for North-Central Devil's Swamp AOI I, Figure 9 for the Drainage Ditch AOI II, Figure 10 for the North Devil's Swamp Lake AOI III, and Figure 11 for the South Devil's Swamp Lake AOI IV. Details concerning sampling locations and sample collection methods are described herein. In summary, the following samples will be collected:

Surface Water - A total of approximately 52 surface water samples will be collected for the HHRA and SLERA from open water areas in the North-Central Devil's Swamp, Drainage Ditch, North Devil's Swamp Lake, and South Devil's Swamp Lake AOIs at the Site. Collection of surface water samples at each proposed sample location will depend upon the availability of standing water at the time of sample collection. Additional surface water samples will be collected at locations with standing water, if needed.

Sediment/Soil – A total of 156 (3 depth intervals at 52 locations) sediment/soil samples will be collected for the HHRA and SLERA from the North-Central Devil's Swamp, Drainage Ditch, North Devil's Swamp Lake, and South Devil's Swamp Lake AOIs at the Site. Sediment/soil samples will be collected from the 0 to 6, 6 to 12, and 12 to 18 inch depth intervals. Solid samples collected from the North-Central Devil's Swamp and Drainage Ditch AOIs may be evaluated as both sediment and soil.

6.3.3 SAMPLE COLLECTION OBJECTIVE AND LOCATION RATIONALE

Samples will be collected at the Site to determine constituent concentrations in the sediment/soil and surface water and to determine constituent fate and transport mechanisms, such that informed decisions can be made regarding the degree of potential risk presented by the Site and the potential alternative appropriate type(s) of remedial response. The sample locations were determined to provide data that will support the HHRA, including adequate characterization of each of the four AOIs; to support the SLERA; and to aid in the evaluation of potential remedial areas. A discussion of the AOI breakdown is provided in Section 2.3.

The sample point configuration was developed using the following criteria:

- Surface water samples are obtained in areas that represent the overall quality of water in the wetlands, ditch, or lake segments
- 0 to 6 inch surface sediment/soil samples are obtained in areas that may have accumulated re-suspended sediment and/or erosion materials, but represent a less dynamic erosion/sedimentation system

- 6 to 12, and 12 to 18 inch sediment/soil samples are obtained where significant inflows and a more dynamic erosion/sedimentation system have the potential to bring in large volumes of water possibly laden with sediment where historical surface sediment sample results detected concentrations of constituents

6.3.4 SURFACE WATER SAMPLING

Constituent concentrations in surface water will be used to determine exposure point concentrations for use in the HHRA and SLERA. The Mississippi River stage will be monitored throughout the collection of surface water sample activities. Samples will be collected at mid-depth within the wetlands, ditch, and lake prior to collection of any corresponding sediment samples. Samples will be collected using procedures as outlined in the following section and the SOPs (Appendix C), and shipped to TestAmerica, Inc., located in Pittsburgh, Pennsylvania (TestAmerica). Samples will be analyzed for PCB aroclors as listed on Table 1 using procedures as outlined in the QAPP.

6.3.4.1 SURFACE WATER SAMPLE LOCATIONS

A total of 52 surface water samples will be collected from the North-Central Devil's Swamp, Drainage Ditch, North Devil's Swamp Lake, and South Devil's Swamp Lake AOIs at the Site, as shown on Figure 8, Figure 9, Figure 10, and Figure 11, respectively. Details regarding the number and type of surface water samples to be collected in each AOI are shown on Table 5, and are listed below.

North-Central Devil's Swamp

Fifteen surface water samples will be collected from North-Central Devil's Swamp as shown on Figure 8. The proposed surface water samples in the North-Central Devil's Swamp AOI are contingent on the presence of standing water at each location during the Tier 1 RI sample collection activities. Additional surface water samples will be collected at locations with standing water, if needed. The proposed sample locations are also subject to change based on the location of the drainage feature.

Drainage Ditch

Twelve surface water samples will be collected from the Drainage Ditch as shown on Figure 9. The proposed surface water samples in the Drainage Ditch AOI are contingent on the presence of standing water at each location during the Tier 1 RI sample collection activities.

North Devil's Swamp Lake
A total of fifteen surface water samples will be collected from North Devil's Swamp Lake as shown on Figure 10.

South Devil's Swamp Lake
A total of ten surface water samples will be collected from South Devil's Swamp Lake as shown on Figure 11.

6.3.4.2 SURFACE WATER SAMPLE COLLECTION PROCEDURE

Prior to collection of the surface water samples, the sampling craft will be moved into position over the sampling station and anchored. Sample station coordinates (longitude and latitude) will be recorded with the use of a sub-meter global positioning system (GPS). Direct-read field meters will be deployed to measure water quality parameters at each sample location. Measurements will be recorded at mid-depth, mid-channel. The direct read instruments will be calibrated at least daily for each parameter measured during the investigation. Field personnel will measure and record the following parameters at each sampling location:

- Water depth (m)
- Temperature (°C)
- Dissolved oxygen (mg/L)
- Conductivity (micromhos per centimeter, µmhos/cm)
- Salinity (parts per thousand, ppt)
- pH (s.u.)

Surface water samples will be collected using either a pre-cleaned commercially available messenger-activated sampler (e.g., Kemmerer®), by submerging the sample container (in shallow water depths), or with a low-flow peristaltic pump with clean plastic tubing. The messenger-activated sampler will be slowly lowered through the water column to the correct sample depth, the sampler tripped, and retrieved to the surface. The messenger-activated sampler will be equipped with a low-flow device to allow for minimal agitation of the surface water sample while filling the appropriate sample container, minimizing aeration of the sample. Surface water samples at water depths of only a few inches may be collected by submerging the sample container. This method is advantageous when the sample might be significantly altered during transfer from a collection vessel into another container. The low-flow peristaltic pump may be used in sample locations where the water depth is not adequate for use of the

messenger-activated sampler. Clean plastic tubing will be placed at mid-depth during sample collection.

Sample containers will be sealed, labeled, and placed on ice in an insulated ice chest for subsequent delivery to the laboratory. Appropriate chain of custody documentation will accompany the samples as required by the QAPP. Laboratory analysis will include both filtered and unfiltered surface water samples. The filtered surface water samples will be filtered by the laboratory to remove any suspended sediment particles in the sample, which would be representative of the sediment matrix which is being evaluated separately. Specific sample volumes, sample containers, preservatives, and replication of samples are detailed in the QAPP. The messenger-activated sampler will be thoroughly decontaminated between each sample location. In addition, new clean plastic tubing will be used on each sample location sampled with the low-flow peristaltic pump.

6.3.5 SEDIMENT SAMPLING

Sediment/soil samples will be collected using an aluminum or PVC sample sleeve and are anticipated to yield sediment/soil cores of approximately 0 to 18 inches in length. The sediment/soil core will be divided into equal 6-inch sections representing the sample. The upper 6-inch sample will be identified as the surface sediment/soil.

If the aluminum or PVC sample sleeve is unable to obtain a sample core of 12 to 18 inches in length during sample collection activities, additional sample collection attempts to obtain an 12 to 18 inch core will be made directly adjacent to the first attempt. If three attempts each result in a sample core less than 18 inches in length, then the top 6 inches will be collected and the remaining sediment/soil, if any, will be equally divided into two segments for sample collection. In addition, any samples collected from a sample core less than 18 inches in length will be documented in the field record. An alternate collection method may be implemented for collection of sediment/soil samples depending on Site conditions at the time of sample collection. Any modification of field sample collection methods will be documented in the field log book.

All sediment/soil samples will be analyzed by TestAmerica for PCB aroclors listed on Table 1. In addition, approximately 25 percent of the 0 to 6 inch sediment/soil samples and approximately 10 percent of the 6 to 12 inch and 12 to 18 inch sediment/soil samples will be submitted to TestAmerica for analysis of the 12 WHO toxic PCB congeners listed in Table1. The sediment/soil samples will be analyzed using procedures outlined in the QAPP. The sediment/soil sample locations proposed for the additional PCB congener analysis are shown on Figures 7 through 11.

6.3.5.1 SEDIMENT SAMPLE LOCATIONS

The proposed sediment sample locations were selected based on spatial distribution in each AOI and based on historical data collected at the Site. The proposed sediment sample locations were strategically placed in locations that previously had detected concentrations of PCBs. As requested by the EPA, several proposed sample locations were selected in deeper, depositional areas along the centerline of Devil's Swamp Lake. Details regarding the number and type of sediment samples to be collected in each AOI shown on Figure 8, Figure 9, Figure 10, and Figure 11, on Table 5, and are listed below.

North-Central Devil's Swamp
Fifteen sediment/soil samples will be collected from North-Central Devil's Swamp as shown on Figure 8. The sediment samples will consist of 0 to 6, 6 to 12, and 12 to 18 inch depths. The proposed sample locations are subject to change based on the location of the drainage feature. Drainage features were identified in historic aerial photographs, but flooding events and depositional and erosional changes in the swamp can change the location of these features. Sample locations may be modified to match the best current locations of the drainage features as they are identified at the time of sample collection.

Drainage Ditch
Twelve sediment/soil samples will be collected from the Drainage Ditch as shown on Figure 9. The sediment/soil samples will consist of 0 to 6, 6 to 12, and 12 to 18 inch depths.

North Devil's Swamp Lake
A total of fifteen sediment samples will be collected from North Devil's Swamp Lake as shown on Figure 10. The sediment samples will consist of 0 to 6, 6 to 12, and 12 to 18 inch depths.

South Devil's Swamp Lake
A total of ten sediment samples will be collected from South Devil's Swamp Lake as shown on Figure 11. The sediment samples will consist of 0 to 6, 6 to 12, and 12 to 18 inch depths.

6.3.5.2 SEDIMENT SAMPLE COLLECTION PROCEDURE

Prior to initiation of sediment/soil sampling activities the approximate flow direction within the waterbody will be determined. Sediment/soil samples will be collected

starting at the lowest downstream location and always working upstream. This method verifies that any impacts on other sampling locations due to sampling disturbance is minimized. To initiate the sediment sampling the sampling craft will be navigated to the approximate sampling location using GPS technology. Due to potential physical restrictions in accessing sampling locations (i.e., thickness of vegetation and distance from water), an airboat or marsh buggy may be used in the wetlands area. These vehicles will allow relatively easy access to most locations. Sediment/soil samples collected from areas without standing water may be accessed by foot. Once positioned in the general area, the sediment/soil samples will be collected. After sampling, the craft will be navigated using GPS technology to the next location. At each location, the craft will be anchored or stabilized at the sample location, and sediment samples will be collected. When one area (i.e., North-Central Devil's Swamp) is completed, this procedure will be repeated in the other areas (i.e., Drainage Ditch, North Devil's Swamp Lake, South Devil's Swamp Lake). Sample location coordinates (longitude and latitude) will be recorded along with other pertinent information including water depth and time.

A three-inch diameter aluminum or PVC sample sleeve will be used for collection of sediment/soil samples. The sample craft will be positioned over the sampling location and the sample core will then be pushed by hand through the sediment/soil to a depth of 18 inches or until refusal is met. The core sample will then be hoisted to the surface and the sediment/soil samples will be collected for analyses. An alternate collection method may be implemented for collection of soil samples depending on Site conditions at the time of sample collection. Any modification of field sample collection methods will be documented in the field log book. Samples will be removed from the sleeves in the field and placed in pre-labeled sampling containers. Sample containers will then be delivered to TestAmerica for analyses. A new clean sample sleeve will be used for each sediment sample location.

6.4 ANALYTICAL PROGRAM

Sediment/soil and surface water samples will be analyzed by LDEQ accredited laboratories using EPA approved methods. All surface water and sediment/soil samples will be submitted to TestAmerica for analysis of PCB aroclors listed on Table 1 using EPA SW-846 Method 8082. In addition, approximately 25 percent of the 0 to 6 inch sediment/soil samples and approximately 10 percent of the 6 to 12 inch and 12 to 18 inch sediment/soil samples will be submitted to TestAmerica for analysis of the 12 WHO toxic PCB congeners listed in Table 1 using EPA Method 1668. Total organic carbon (TOC) and grain size analysis will be completed on only the 0 to 6 inch sediment/soil samples. The sample media, number of samples, and analytical analyses are listed in Table 5. The sampling and analytical testing program is detailed in the

QAPP. The purpose of the QAPP is to describe the policy, organization (analytical laboratory), functional activities, and quality assurance and quality control protocols necessary to achieve the DQOs dictated by the intended use of the data. In addition, the Data Management Plan (DMP) includes a description of the procedures that will be used to record and maintain data generated during completion of the Tier 1 RI activities. The DMP is attached as Appendix D.

6.5 INVESTIGATION-DERIVED MATERIAL

The IDM generated during the Tier 1 RI will be handled in accordance with the Pollution Control and Mitigation Plan (PCMP) included in Appendix E and may include sediment sample cuttings, personal protective equipment (PPE), decontamination fluids, and disposable sampling equipment.

6.6 HEALTH AND SAFETY

Each contractor at the Site will be responsible for development of a Site-specific HASP to protect the safety of their employees following procedures consistent with the Site safety requirements. The HASP for the Tier 1 RI fieldwork is attached in Appendix F. At the beginning of each day of fieldwork, a brief joint safety meeting will be held. During this meeting, the field team will describe the activities to be implemented that day, identify the safety hazards, remind employees of important safety procedures, and comment on safety issues identified the previous day.

7.0 SCHEDULE

The proposed project schedule is shown in Exhibit 1.

SIGNATURE PAGE

All of Which is Respectfully Submitted,

Pressley L. Campbell, PhD, PE
Conestoga-Rovers & Associates

John C. Arbuthnot, PE
Clean Harbors Environmental Services, Inc.

8.0 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 1991a. Toxicological Profile for Selected PCBs (Aroclor -1260, -1254, -1248, -1242, -1232, -1221, and -1016). (Draft). U.S. Public Health Service, Washington, D.C.

ANSI/ASQC. 1994. Specification and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs.

Di Toro D.M., C.S. Zarba, D.J Hansen, W.J. Berry, R.C. Swartz, C.E. Cowan, S.P. Pavlou, H.E. Allen, N.A. Thomas, and P.R. Paquin. 1991. Technical basis for establishing sediment quality criteria for nonionic organic chemicals by using equilibrium partitioning. *Environmental Toxicology and Chemistry* 10:1541-1583.

MacDonald, D. D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Environ. Contam. Toxicol. 39:20-31.

Persaud, D., Jaagumagi, R., and Hayton, A. 1993. Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario. ISBN 0-7729-9248-7. Ontario Ministry of the Environment, Ottawa, Ontario. 23 pp.

Suter, G.W. II, and C.L. Tsao. 1996. Toxicological Benchmarks for Screening of Potential Contaminants of Concern for Effects on Aquatic Biota on Oak Ridge Reservation: 1996 Revision. Oak Ridge National Laboratory, Oak Ridge, TN. 104 pp. ES/ER/TM-96/R2.

The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, National Sediment Quality Survey: Second Edition. EPA-823-R-04-007. November 2004

U.S. Environmental Protection Agency (USEPA). 1987a. Data Quality Objectives for Remedial Response Activities. Office of Emergency and Remedial Response and Office of Waste Programs Enforce. EPA/540/G-87/003. OSWER Directive No. 9335.0-7b. March 1987.

USEPA. 1987b. Interim Guidance on Compliance with Applicable or Relevant and Appropriate 'Requirements. Office of Emergency and Remedial Response. OSWER Directive No. 9234.0-05. July 9, 1987.

USEPA. 1988a. CERCLA Compliance with Other Laws Manual. Office of Emergency and Remedial Response. OSWER Directive No. 9234.1-01. August 1988.

USEPA. 1988b. Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. Office of Emergency and Remedial Response. EPA/540/G-89/004. OSWER Directive No. 9355.3-01. October 1988.

USEPA. 1989a. CERCLA Compliance with Other Laws Manual: Part II. Clean Air Act and Other Environmental Statutes and State Requirements. Office of Emergency and Remedial Response. OSWER Directive No. 9234.1-02. August 1989.

USEPA. 1989b. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002. OSWER Directive No. 9285.7-01A. December 1989.

USEPA. 1991a. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Emergency and Remedial Response. OSWER Directive No. 9235.6-03. March 1991.

USEPA. 1991b. Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part B), Development of Risk-Based Preliminary Remediating Goals. Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-01B. December 1991.

USEPA. 1991c. Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part C), Risk Evaluation of Remedial Alternatives. Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-01C. 1991.

USEPA. 1992. Guide to Management of Investigation – Derived Wastes. Office of Emergency and Remedial Response. OSWER Directive No. 9345.3-03FS. January 1992.

USEPA. 1992a. Guidance for Data Usability in Risk Assessment (Part A), Final. Office of Solid Waste and Emergency Response. Publication 9285.7-09A/FS. May.

USEPA. 1992b. Supplemental Guidance to RAGS: Calculating the Concentration Term. Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-081. May 1992.

USEPA. 1992b. Guidance for Data Usability (Part B). Office of Solid Waste and Emergency Response. Publication 9285.7-09B, PB92-963362. May.

USEPA. 1993a. Data Quality Objectives Process for Superfund. Interim Final Guidance. EPA540-R-93-071, September 1993, OSWER, Washington, DC.

USEPA. 1993b. Wildlife Exposure Factors Handbook: Volume I of II. EPA600-R-93-178a, December, ORD, Washington, DC.

USEPA. Region 5, Pelka, Amy, Bioaccumulation Models and Applications: Setting Sediment Cleanup Goals in the Great Lakes, National Sediment Bioaccumulation Conference, 1996. Web site: http://www.epa.gov/waterscience/cs/pelka.pdf

USEPA. 1997. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessment, Interim Final. EPA 540-R-97-006. Office of Solid Waste and Emergency Response. June 5, 1997.

USEPA. 1998a. Risk Assessment Guidance for Superfund, Volume 1 - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund risk Assessments). Interim. Process for Designing and Conducting Ecological Risk Assessments. Office of Solid Waste and Emergency Response. EPA/540-R-97-033. January 1998.

USEPA. 1998a. Guidelines for Ecological Risk Assessment. EPA/630/R-95/002F. Office of Research and Development. April.

USEPA. 1998b. EPA Guidance for Quality Assurance Project Plans. Office of Research and Development. EPA QA/G-5. EPA/600/R-98/018. February 1998.

USEPA. 1999a. Data Collection for the Hazardous Waste Identification Rule. Section 13.0. Ecological Receptors and Habitats. Office of Solid Waste. October 1999.

USEPA. 1999b. Data Collection for the Hazardous Waste Identification Rule. Section 12.0. Ecological Exposure Factors. Office of Solid Waste. October 1999.

USEPA. 1999c. Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Office of Solid Waste and Emergency Response. EPA530-D-99-001A.

USEPA. 2000. Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment Bulletins. EPA Region 4, originally published November 1995, Website version last updated May 2000: http://www.epa.gov/region4/waste/ots/healtbul.htm.

USEPA. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories Volume 1. Office of Water. EPA 823-B-00-007. November 2000.

USEPA. 2000a. Guidance for the Data Quality Objectives Process. EPA/600/R-96/055. Office of Environmental Information. August, 2000.

USEPA. 2000b. Data Quality Objectives Process for Hazardous Waste Site Investigations. EPA/600/R-00/007. Office of Environmental Information. January, 2000.

USEPA. 2000c. Equilibrium Partitioning Sediment Guidelines (ESGs) for the Protection of Benthic Organisms: PAH Mixtures. Office of Science and Technology and Office of Research and Development, April 2000.

USEPA. 2000d. Ecological Soil Screening Level Guidance. Office of Emergency and Remedial Response. July 10, 2000. Draft.

USEPA. 2001. EPA Requirements for Quality Assurance Project Plans. Office of Environmental Information. EPA/QA/R-5. EPA/240/B-01/003. March 2001.

USEPA. 2002. Guidance on Choosing a Sampling Design for Environmental Data Collection. Office of Environmental Information. Final. EPA-QA/G-5S. December.

USEPA. 2002a. National Recommended Water Quality Criteria: 2002. EPA-822-R-02 047. Office of Water. November.

USEPA. 2003. Guidance for Developing Ecological Soil Screening Values. OSWER Directive 9285.7-55. Office of Solid Waste and Emergency Response. Washington D.C., November. http://www.epa.gov/superfund/programs/risk/ecorisk/ecossl.pdf.

USEPA. 2003. *Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures*, EPA-600-R-02-013, Office of Research and Development, Washington, DC.

USEPA. 2003a. *Technical Basis for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Non-Ionic Organics*, EPA-600-R-02-014, Office of Research and Development, Washington, DC (draft).

USEPA. 2003c. *Human Health Toxicity Values in Superfund Risk Assessments.* Memorandum from Michael B. Cook, Director. Office of Superfund Remediation and Technology Innovation. Washington, D.C. OSWER Directive 9285.7-53. December 5, 2003.

USEPA. 2004. Risk Assessment Guidance for Superfund: Volume 1, Human Health Evaluation Manual Supplemental Guidance. (Part E, Supplemental Guidance for Dermal Risk Assessment). Final: EPA/540/R/99/005. Office of Superfund Remediation and Technology Innovation, Washington, D.C. July 2004.

USEPA. 2005. Memorandum: Response to Ecological Risk Assessment Forum, Request for Information on the Benefits of PCB Congener-Specific Analyses. Office of Research and Development, National Center of Environmental Assessment, NCEA-C-1315, ERASC-002F. March 2005.

USEPA. 2006. Guidance on Systematic Planning Using the Data Quality Objectives Process. Office of Environmental Information. Final. EPA-QA/G-4. February.

USEPA. 2006. Guidance on Systematic Planning Using the Data Quality Objectives Process. EPA/240/B-06/001. Office of Environmental Information. February 2006.

USEPA. 2007. ProUCL Version 4.0 Technical Guide, April 2007.

USEPA. 2008. Framework for Application of Toxicity Equivalence Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment. Office of the Science Advisor. EPA/100/R-08/004.

USEPA. 2009a. Risk Assessment Guidance for Superfund: Volume 1, Human Health Evaluation Manual Supplemental Guidance. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final: EPA-540-R-070-002. Office of Superfund Remediation and Technology Innovation, Washington D.C. January 2009.

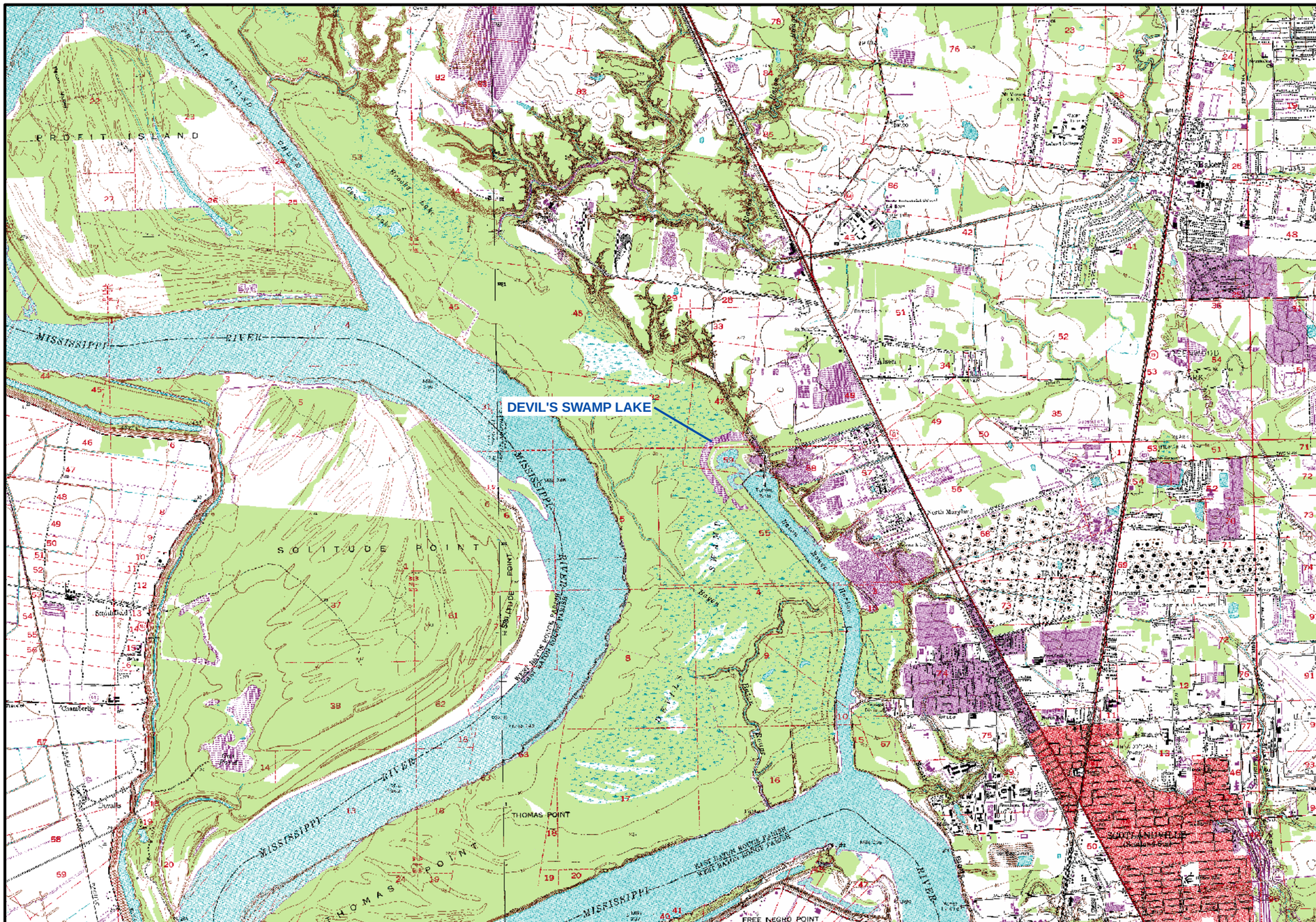
USEPA. 2009b. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance, Office of Resource Conservation and Recovery, Program Implementation and Information Division, March 2009.

Van den Berg, M; Birnbaum, L; Bosveld, ATC; Brunstrom, B; Cook, P; Feeley, M; Giesy, JP; Hanberg, A; Hasegawa, R; Kennedy, SW; Kubiak, T; Larsen, JC; van Leeuwen, FX; Liem, AK; Nolt, C; Peterson, RE;Poellinger, L; Safe, S; Schrenk, D; Tillitt, D; Tysklind, M; Younes, M; Waern, F; Zacharewski, T. 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ Health Perspect.* 106(12):775-792.

Van den Berg, M; Birnbaum, LS; Denison, M, DeVito, M, Farland, W, Feeley, M; Fiedler, H; Hakansson, H; Hanberg, A; Haws, L; Rose, M; Safe, S; Schrenk, D; Tohyama, C; Tritscher, A; Tuomisto, J; Tysklind, M; Walker, N; Peterson, RE. 2006. The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds. *Toxicol Sci* 93:223-241.

Wildlife Exposure Factors Handbook (Vol. I), EPA, 1993b.

FIGURES



LOUISIANA

N

0 2,000 4,000 Feet

RE: USGS 7□5 Minute Topographic Maps, Walls, La and Scotlandville, La
dated 1□63, photorevised 1□70 and 1□80□

Figure 1
VICINITY MAP
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

55364-00(007)PR-BR007 JUN 11/2010

RE: Aerial Photograph by AE□ dated May 15, 2006□

Figure 2
SITE PLAN
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

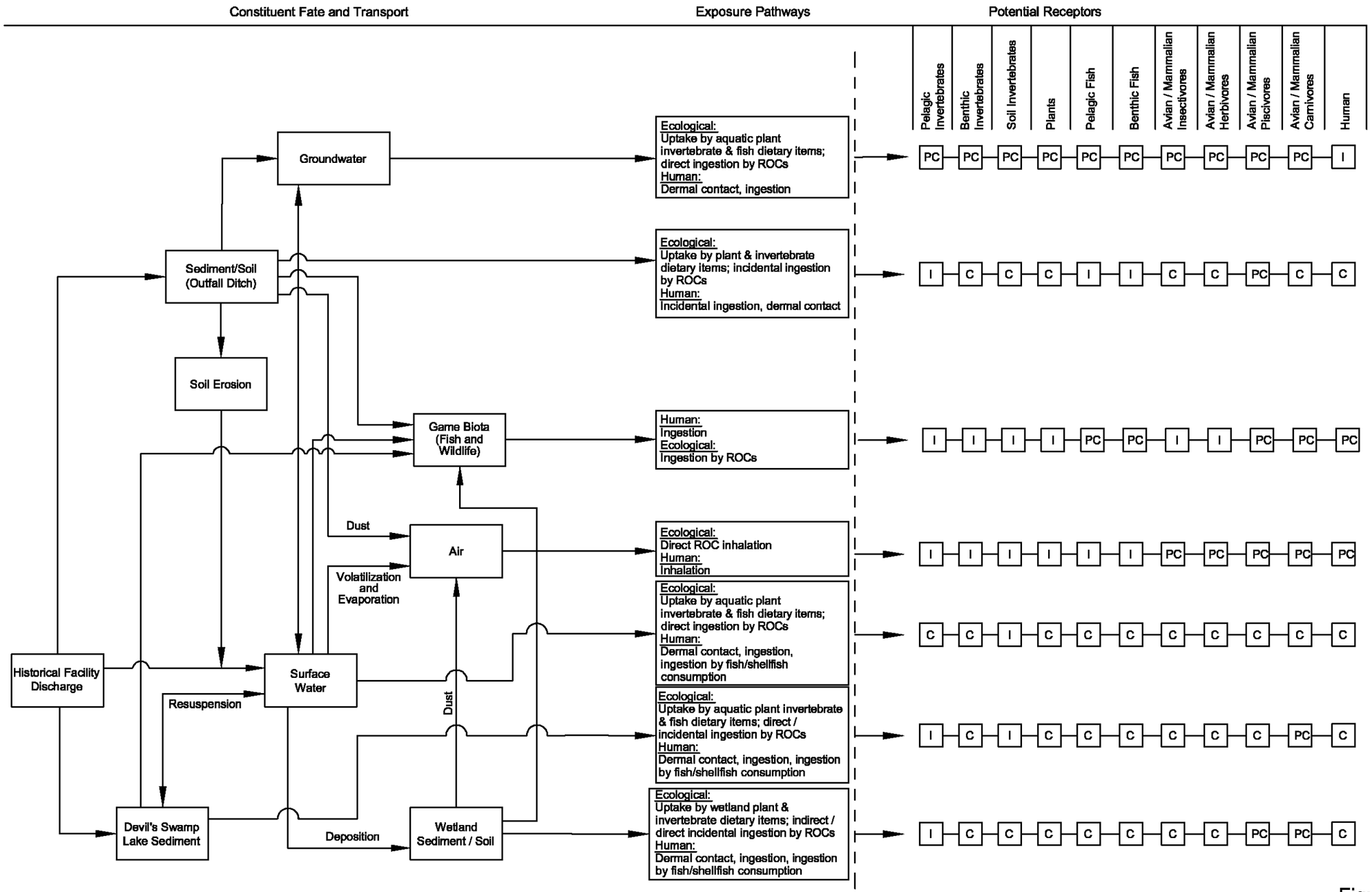
055364-00(008)PR-BR002 SEPT 3/2010

RE: Aerial Photograph by AE□ dated May 15, 2006□

LIDAR (Louisiana) Light Detection And Ranging data U□S□Army Corps of Engineers, Saint Louis District, 2001, Elevation Contours, Hori□ontal Datum Name: North American Datum of 1□83□

Figure 3
TOPOGRAPHIC MAP
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

55364-00(007)PR-BR00□ JUN 11/2010



Notes:
1) Potentially complete exposure pathways may be considered complete but not significant or quantifiable, therefore will not be evaluated.
2) A more thorough evaluation of exposure pathways will be completed during the Tier 2 RI, if necessary.

Figure 4

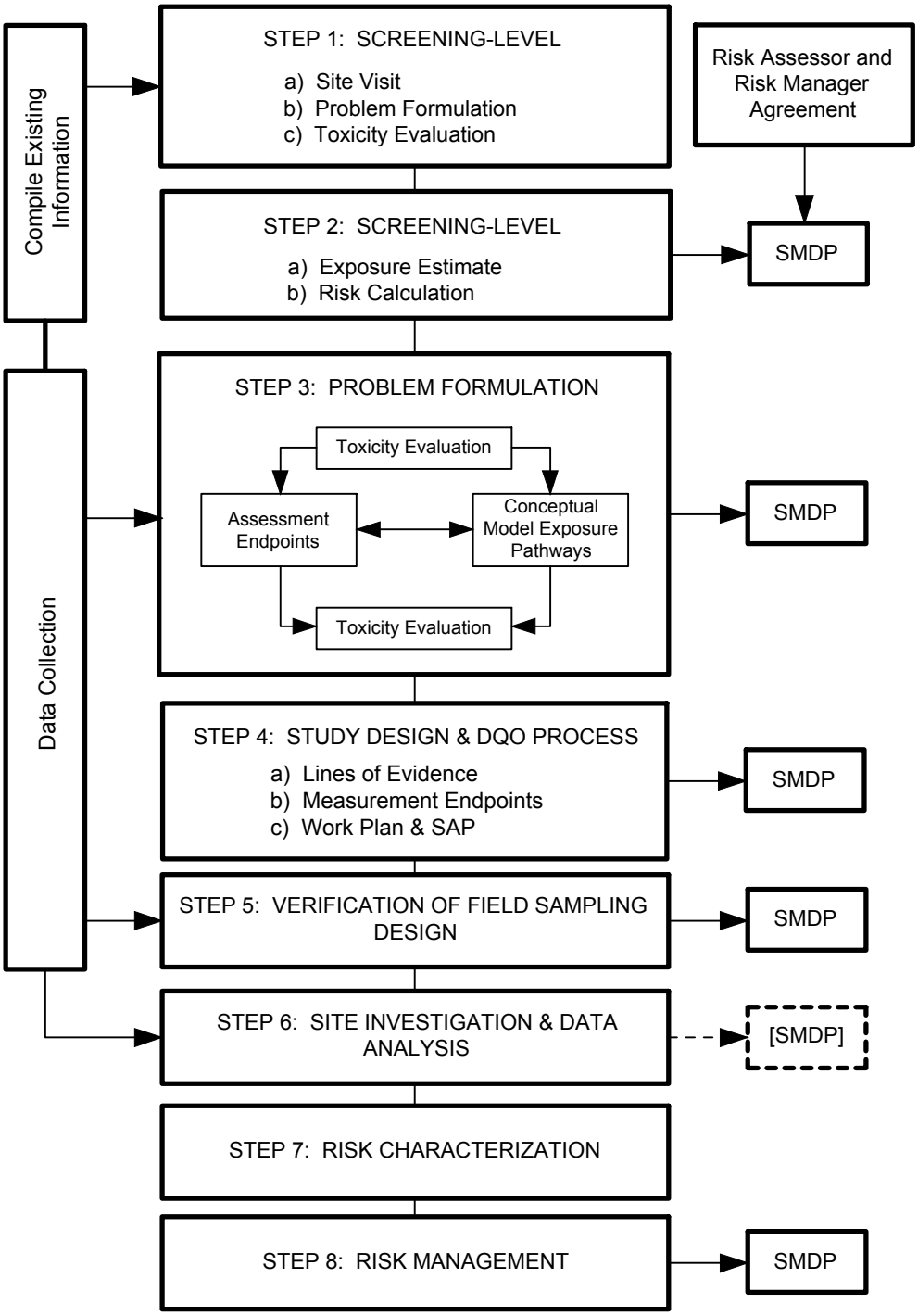
CONCEPTUAL SITE MODEL
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

055364-00(009)GN-BR001 NOV 24/2010

RE: USGS Aerial Photograph dated 2008

Figure 5
PROPOSED AREAS OF INVESTIGATION - TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

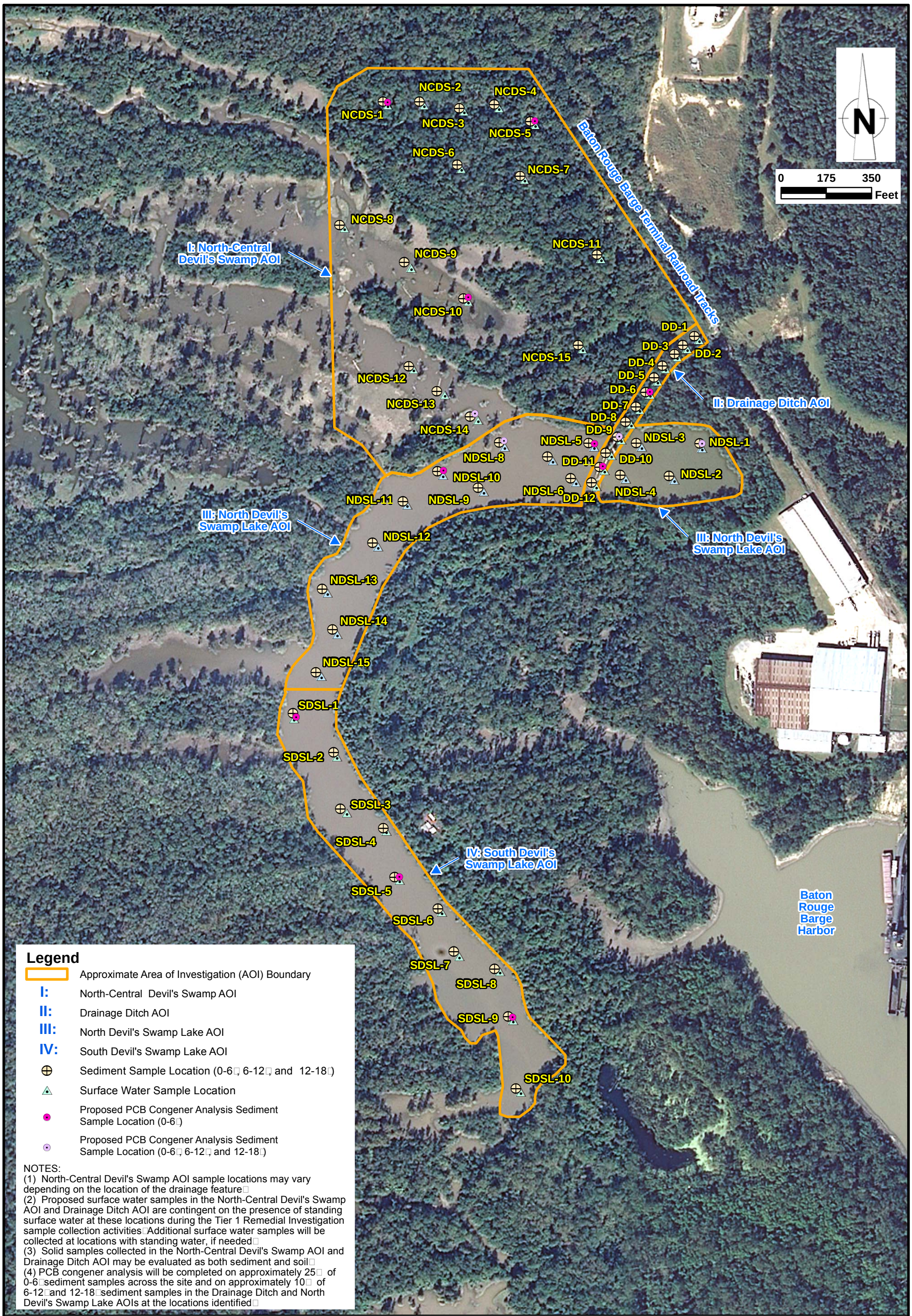
55364-00(007)PR-BR001 July 16/2010



SMDP - SCIENTIFIC MANAGEMENT DECISION POINT

Figure 6

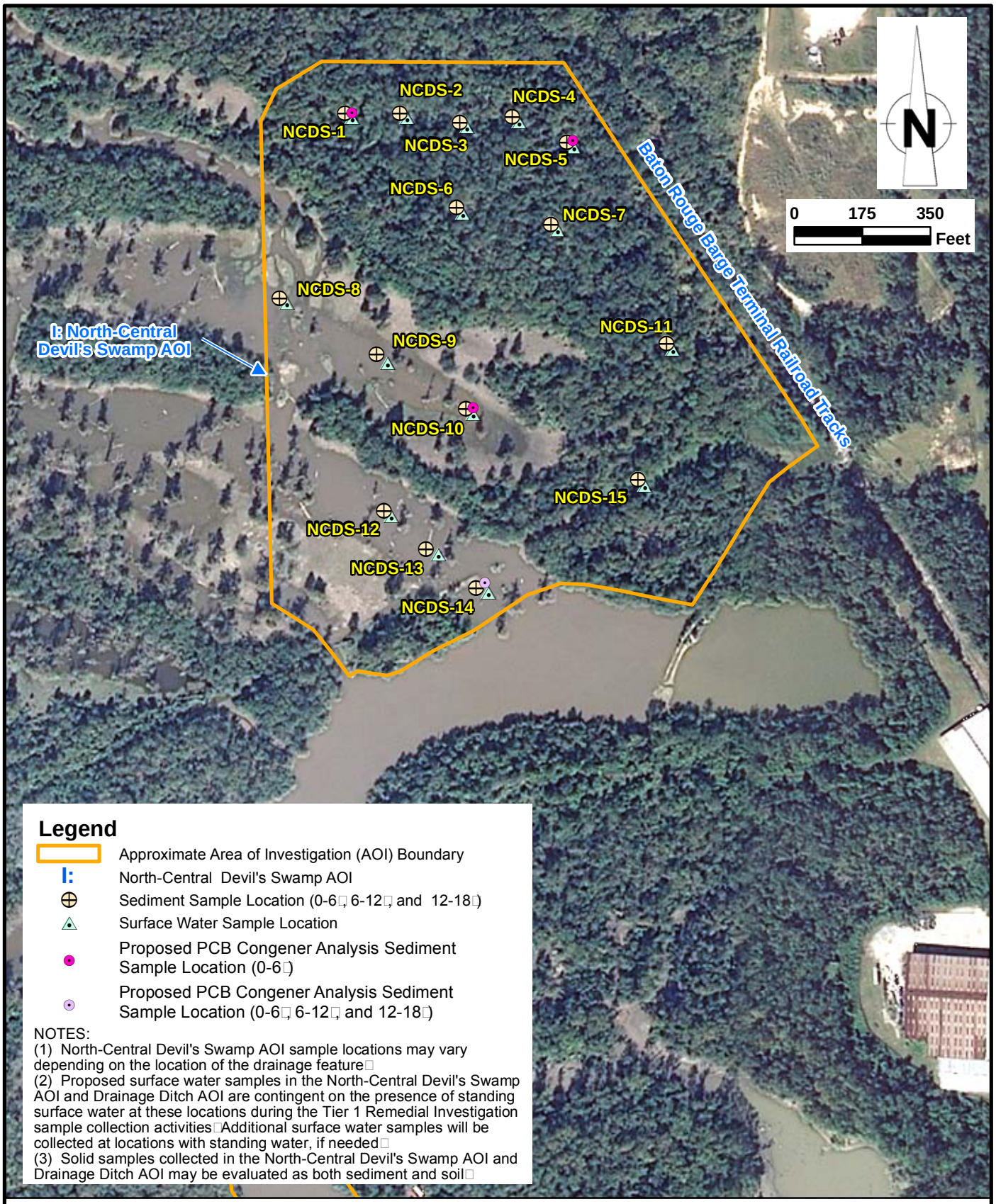
EPA ECOLOGICAL RISK ASSESSMENT EIGHT-STEP PROCESS
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana



RE: USGS Aerial Photograph dated 2008□

Figure 7
PROPOSED SAMPLE LOCATIONS - TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

55364-00(00□)PR-BR001 Nov 22/2010



RE: USGS Aerial Photograph dated 2008□

Figure 8

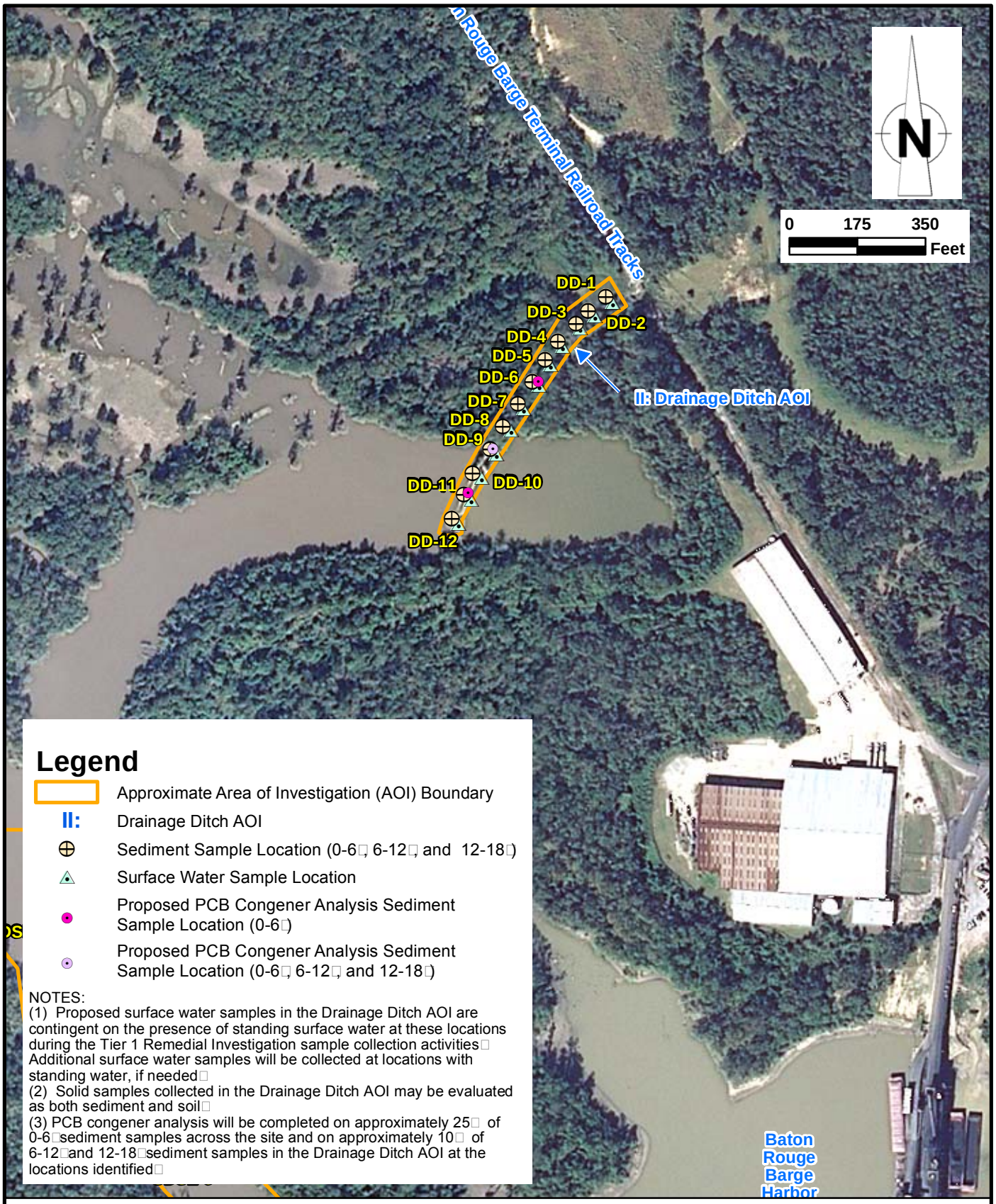
NORTH-CENTRAL DEVIL'S SWAMP LAKE AOI □1 SAMPLE LOCATIONS

DEVIL'S SWAMP LAKE SITE

EAST BATON ROUGE PARISH, LOUISIANA

Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

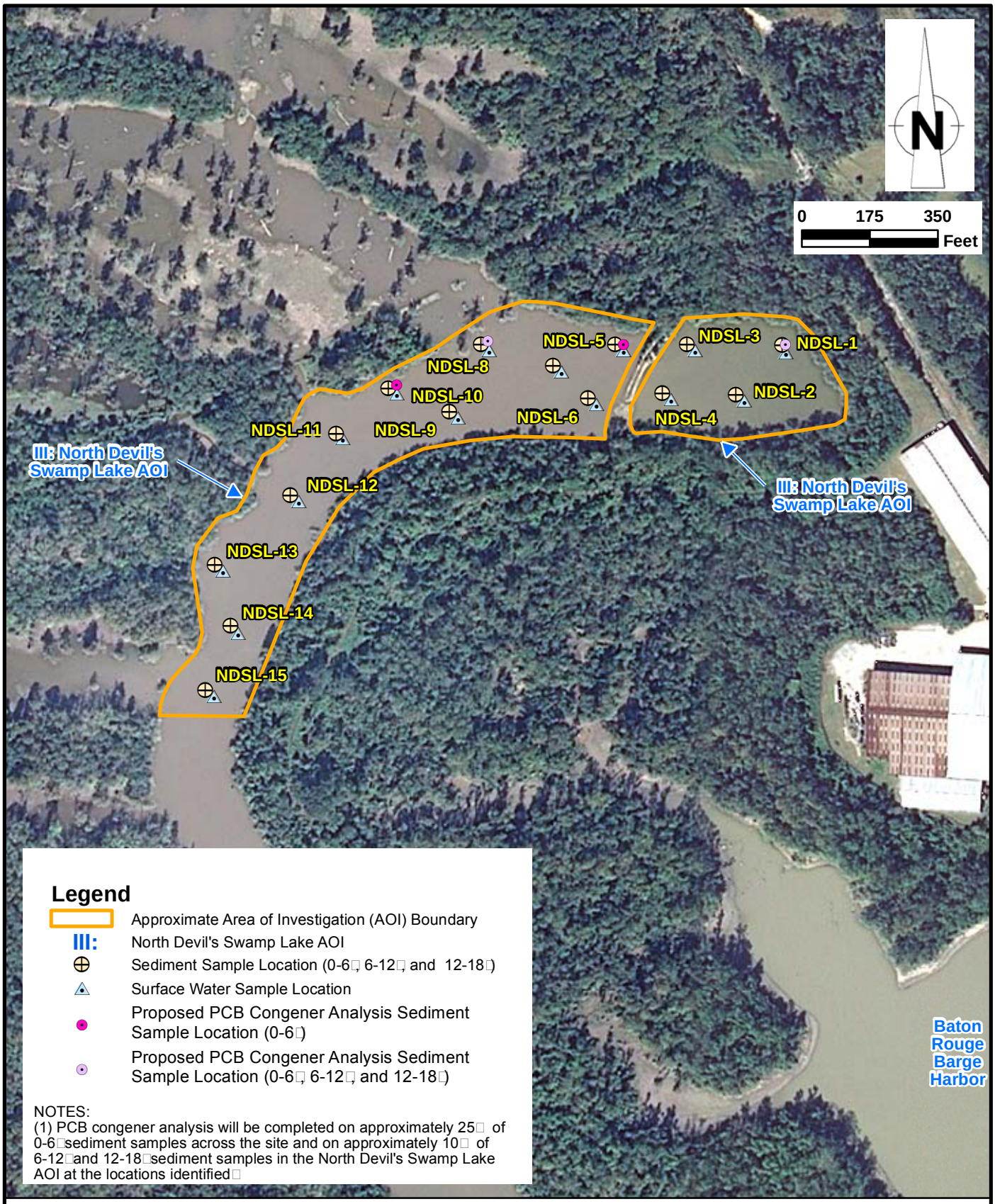
55364-00(00□)PR-BR002 Nov 22/2010



RE: USGS Aerial Photograph dated 2008□

Figure □
DRAINAGE DITCH AOI □II SAMPLE LOCATIONS
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

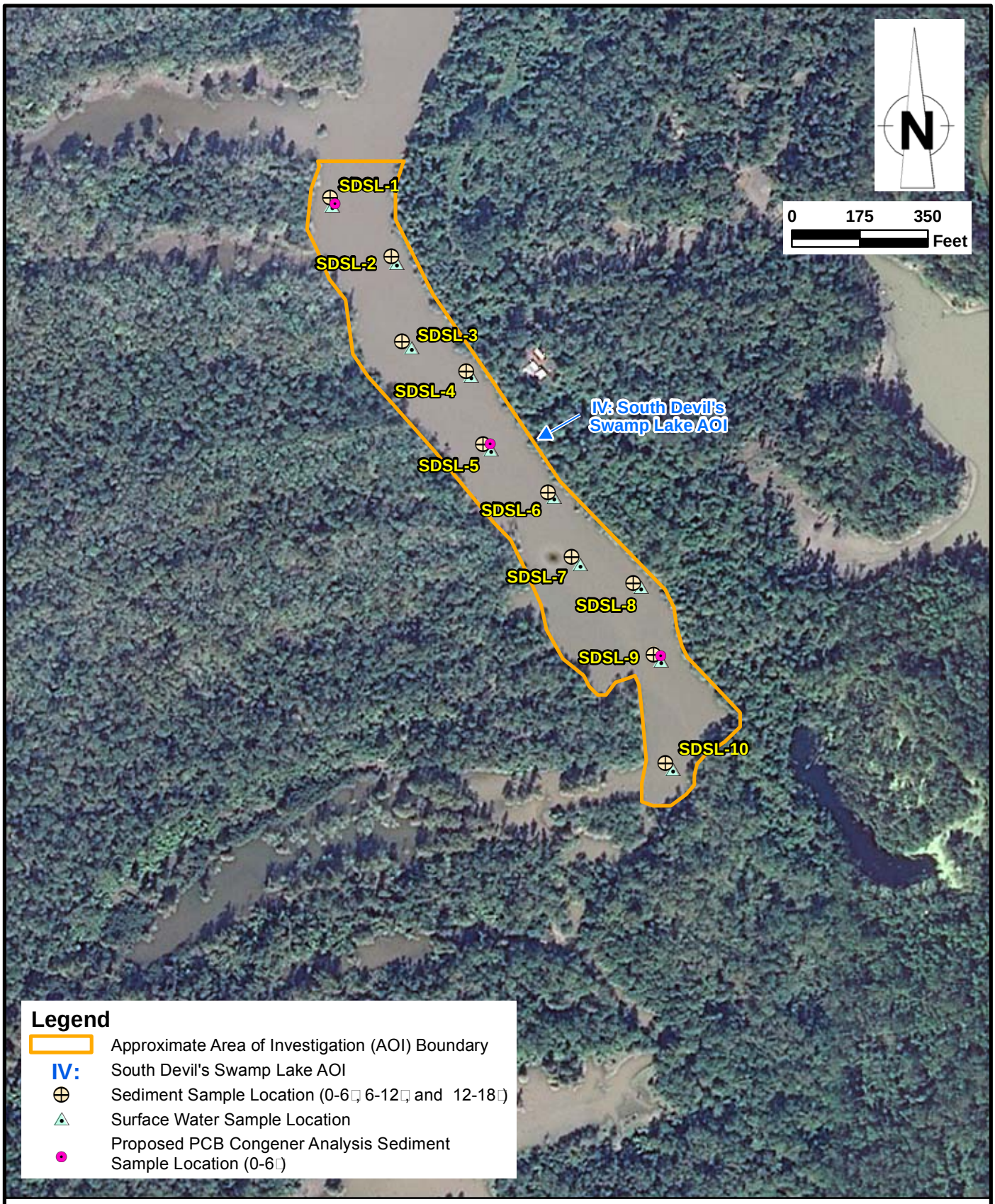
55364-00(00□)PR-BR003 Nov 22/2010



RE: USGS Aerial Photograph dated 2008□

Figure 10
NORTH DEVIL'S SWAMP LAKE AOI □III SAMPLE LOCATIONS
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

55364-00(00□)PR-BR004 Nov 22/2010



RE: USGS Aerial Photograph dated 2008□

Figure 11
SOUTH DEVIL'S SWAMP LAKE AOI □IV SAMPLE LOCATIONS
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

55364-00(00□)PR-BR005 Nov 22/2010

TABLES

TABLE 1

CONSTITUENTS OF CONCERN
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA

PCB Aroclors [1]	*PCB Congeners* [2]	*Other*
Aroclor 1016	3,3',4,4'-Tetrachlorobiphenyl (PCB-77)	Total Organic Carbon[3]
Aroclor 1221	3,4,4',5-Tetrachlorobiphenyl (PCB-81)	Grain Size[3]
Aroclor 1232	3,3',4,4',5-Pentachlorobiphenyl (PCB-126)	
Aroclor 1242	3,3',4,4',5,5'-Hexachlorobiphenyl (PCB-169)	
Aroclor 1248	2,3,3',4,4'-Pentachlorobiphenyl (PCB-105)	
Aroclor 1254	2,3,4,4',5-Pentachlorobiphenyl (PCB-114)	
Aroclor 1260	2,3',4,4',5-Pentachlorobiphenyl (PCB-118)	
Total PCBs	2,3',4,4',5-Pentachlorobiphenyl (PCB-123)	
	2,3,3',4,4',5-Hexachlorobiphenyl (PCB-156)	
	2,3,3',4,4',5'-Hexachlorobiphenyl (PCB-157)	
	2,3',4,4',5,5'-Hexachlorobiphenyl (PCB-167)	
	2,3,3',4,4',5,5'-Heptachlorobiphenyl (PCB-189)	

Notes:

[1]All surface water and sediment/soil samples will be submitted for analysis of PCB aroclors by EPA Method 8082.

[2]Approximately 25 percent of the surface (0-6 inch) sediment samples and approximately 10 percent of the deeper (6 to 12 and 12 to 18 inch) sediment samples will be submitted for analysis of PCB congeners by EPA Method 1668.

[3]Surface (0-6 inch) sediment samples will be submitted for analysis of total organic carbon (TOC) by the Walkley Black method and grain size by ASTM D6913.

PCB - Polychlorinated Biphenyl

TABLE 2A

LIMITING HUMAN HEALTH CRITERIA
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA

Constituent of Concern	*Surface Water - Fish Ingestion [a] (mg/L)*	*Surface Water - Recreational Swimming [b] (mg/L)*	*Surface Water - LHHC [c] (mg/L)*	*Sediment - Fish Ingestion [d] (mg/kg)*	*Sediment - LHHC [e] (mg/kg)*	*Soil - Industrial/ Commercial [f] (mg/kg)*	*Soil - Industrial [g] (mg/kg)*	*Soil - LHHC [h] (mg/kg)*
Aroclor 1016	N/A	3.2E-05	3.2E-05	2.7E-02	2.7E-02	2.1E+01	N/A	2.1E+01
Aroclor 1221	N/A	3.2E-01	3.2E-01	9.4E-04	9.4E-04	5.4E-01	N/A	5.4E-01
Aroclor 1232	N/A	1.1E-01	1.1E-01	9.4E-04	9.4E-04	5.4E-01	N/A	5.4E-01
Aroclor 1242	N/A	3.2E-04	3.2E-04	9.4E-04	9.4E-04	7.4E-01	N/A	7.4E-01
Aroclor 1248	N/A	1.1E-03	1.1E-03	9.4E-04	9.4E-04	7.4E-01	N/A	7.4E-01
Aroclor 1254	N/A	1.1E+00	1.1E+00	9.4E-04	9.4E-04	7.4E-01	N/A	7.4E-01
Aroclor 1260	N/A	1.1E+00	1.1E+00	9.4E-04	9.4E-04	7.4E-01	N/A	7.4E-01
Total PCBs	6.4E-08	N/A	6.4E-08	N/A	N/A	N/A	9.0E-01	9.0E-01
PCB-77	NE	NE	NE	1.1E-02	1.1E-02	1.8E-01	3.2E-01	1.8E-01
PCB-81	NE	NE	NE	3.6E-03	3.6E-03	6.0E-02	1.1E-01	6.0E-02
PCB-126	NE	NE	NE	1.1E-05	1.1E-05	1.8E-04	3.2E-04	1.8E-04
PCB-169	NE	NE	NE	3.6E-05	3.6E-05	6.0E-04	1.1E-03	6.0E-04
PCB-105	NE	NE	NE	3.6E-02	3.6E-02	6.0E-01	1.1E+00	6.0E-01
PCB-114	NE	NE	NE	3.6E-02	3.6E-02	6.0E-01	1.1E+00	6.0E-01
PCB-118	NE	NE	NE	3.6E-02	3.6E-02	6.0E-01	1.1E+00	6.0E-01
PCB-123	NE	NE	NE	3.6E-02	3.6E-02	6.0E-01	1.1E+00	6.0E-01
PCB-156	NE	NE	NE	3.6E-02	3.6E-02	6.0E-01	1.1E+00	6.0E-01
PCB-157	NE	NE	NE	3.6E-02	3.6E-02	6.0E-01	1.1E+00	6.0E-01
PCB-167	NE	NE	NE	3.6E-02	3.6E-02	6.0E-01	1.1E+00	6.0E-01
PCB-189	NE	NE	NE	3.6E-02	3.6E-02	6.0E-01	1.1E+00	6.0E-01

Notes:

a - EPA National Recommended Water Quality Criteria

b - Surface water protective of recreational swimming (dermal contact and incidental ingestion); calculation shown on Table 2B based on EPA Risk Based Concentrations (RBCs)

c - Surface Water Limiting Human Health Criteria (LHHC) is the lowest of the available surface water screening criteria

d - Sediment protective of ingestion of fish; calculation shown on Table 2C based on EPA *The Incidence and Severity of Sediment Contamination in Surface Waters of the U.S., National Sediment Quality Survey*

e - Sediment LHHC is equal to the only available sediment screening criteria

f - EPA Regional Screening Levels (RSLs) for industrial/commercial soil exposure

g - LDEQ Risk Evaluation/Corrective Action Program (RECAP) Screening Standard for Industrial Soil (Soil_SSi)

h - Soil LHHC is equal to the lowest of the available soil screening criteria

mg/L - Milligrams per liter

mg/kg - Milligrams per kilogram

N/A - Not Applicable, Not Available

NE - Not Evaluated; PCB congeners only analyzed/evaluated in sediment/soil only

PCB - Polychlorinated Biphenyl

TABLE 2B

SURFACE WATER RISK-BASED CONCENTRATIONS FOR RECREATIONAL SWIMMING CALCULATIONS
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA

Constituents of Concern	*CASRN*	*CSF*		*RfD*		*NonCancer*			*Cancer*			*Final*	
		oral	*dermal*	*oral*	*dermal*	RBC_{Ing}	RBC_{Derm}	RBC_{comb}	RBC_{Ing}	RBC_{Derm}	RBC_{comb}	RBC_{final}	
		1/(mg/kg-d)	*1/(mg/kg-d)*	*(mg/kg-d)*	*(mg/kg-d)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(µg/L)*
Aroclor 1016	12674-11-2	7.00E-02	7.00E-02	7.00E-05	7.00E-05	9.83E-02	8.96E-04	8.88E-04	2.18E-01	7.30E-04	7.28E-04	**7.28E-04**	**7.28E-01**
Aroclor 1221	11104-28-2	2.00E+00	2.00E+00	--	--	NV	NV	NV	7.64E-03	8.68E-05	8.58E-05	**8.58E-05**	**8.58E-02**
Aroclor 1232	11141-16-5	2.00E+00	2.00E+00	--	--	NV	NV	NV	7.64E-03	8.68E-05	8.58E-05	**8.58E-05**	**8.58E-02**
Aroclor 1242	53469-21-9	2.00E+00	2.00E+00	--	--	NV	NV	NV	7.64E-03	1.15E-05	1.14E-05	**1.14E-05**	**1.14E-02**
Aroclor 1248	12672-29-6	2.00E+00	2.00E+00	--	--	NV	NV	NV	7.64E-03	1.06E-05	1.06E-05	**1.06E-05**	**1.06E-02**
Aroclor 1254	11097-69-1	2.00E+00	2.00E+00	2.00E-05	2.00E-05	2.81E-02	6.68E-05	6.66E-05	7.64E-03	6.67E-06	6.66E-06	**6.66E-06**	**6.66E-03**
Aroclor 1260	11096-82-5	2.00E+00	2.00E+00	--	--	NV	NV	NV	7.64E-03	1.08E-06	1.08E-06	**1.08E-06**	**1.08E-03**

Exposure Factors

Target Risk Level (unitless)	TR	1.0E-06	
Target Hazard Level (unitless)	THQ	1	
Cancer Slope Factor (per mg/kg-day)	CSF	chemical-specific	
Reference Dose Factor (mg/kg-day)	RfD	chemical-specific	
Ingestion Rate (L/h)	IR	0.05	USEPA, 1989
Surface Area Exposed (cm^2/day) - Child	SAc	6,600	USEPA, 2004a
Surface Area Exposed (cm^2/day) - Adult	SAa	18,000	USEPA, 2004a
Exposure Time (hrs/day)	ET	3	USEPA, 1997, 2004b
Exposure Events (/day)	EV	1	USEPA, 1997
Exposure Frequency (days/year)	EF	26	Professional Judgement[1]
Exposure Duration (years) - Child	EDc	6	USEPA, 2004a
Exposure Duration (years) - Adult	EDa	30	USEPA, 2004a
Body Weight (kg) - Child	BWc	15	USEPA, 2004a
Body Weight (kg) - Adult	BWa	70	USEPA, 2004a
Averaging Time - carc. (years)	AT_c	70	USEPA, 2004a
Averaging Time - noncarc. (years)	ATnc	6	USEPA, 2004a
Correction Factor (cm^3/L)	CF	1,000	

Exposure Equations

Ingestion:

Non-Carcinogenic Endpoints:

$$RBC_{Ing} = \frac{RfD \times THQ \times BWc \times ATnc \times 365\ (d/yr)}{IR \times EV \times ET \times EF \times EDc}$$

Carcinogenic Endpoints:

$$RBC_{Ing} = \frac{TR \times BWa \times ATc \times 365\ (d/yr)}{SF \times IR \times EV \times ET \times EF \times EDa}$$

Dermal:

Non-Carcinogenic Endpoints:

$$RBC_{Derm} = \frac{RfD \times THQ \times BWc \times ATnc \times 365\ (d/yr) \times CF}{SAc \times DAevent^* \times EF \times EDc \times CF}$$

Carcinogenic Endpoints:

$$RBC_{Derm} = \frac{TR \times BWa \times ATc \times 365\ (d/yr) \times CF}{SF \times SAa \times DAevent^* \times EF \times EDa \times CF}$$

Combined Ingestion-Dermal RBEL

$$RBC_{comb} = \frac{1}{(1/RBC_{Ing}) + (1/BRC_{Derm})}$$

Final $^{Tot}RBEL_{comb}$ RBC_{final} = Lower of carcinogenic and noncarcinogenic RBC_{comb}

Notes:

[1]Exposure frequency = 1 day/week for 6 months (26 weeks) or 26 days/year. USEPA (1997) recommends an exposure frequency of 1 event/month (Table 1-2 and 15-176). This would equate to 6 days/year. As such, the exposure frequency of 26 days/year used to derive surface water

NV = No Value
mg/kg-d = Milligrams per kilogram per day
mg/L = Milligrams per liter
L/h = Liters per hour
cm^2/day = Square centimeters per day
kg = Kilograms

References:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A OERR. EPA/540-1-89-002.
USEPA, 1997. Exposure Factors Handbook.(Tables 1-2, 15-67 and 15-18) August 1997.
USEPA, 2004a Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005. July 2004.
USEPA, 2004b Example Exposure Scenarios. National Center for Environmental Assessment, Washington, DC; EPA/600/R-03/036. April 2004. http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=85843

TABLE 2B

SURFACE WATER RISK-BASED CONCENTRATIONS FOR RECREATIONAL SWIMMING CALCULATIONS
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA

ABSORBED DOSE PER EVENT

Constituents of Concern	*CASRN*	*PC*	*Ref*	*FA*	*Ref*	*MW*	*LogKow*	*τ (tau)*	*D_{sc}*	*b*	*c*	*t**	*tevent*	*B*	*DA event**
Aroclor 1016	12674-11-2	0.31	Calc.	1	USEPA, 2004	258	5.62	2.907	5.72E-08	3.30	1.999457667	11.81	3	1.88	2.491265429
Aroclor 1221	11104-28-2	0.14	Calc.	1	USEPA, 2004	189	4.53	1.196	1.39E-07	1.00	0.932217947	4.63	3	0.74	0.734049958
Aroclor 1232	11141-16-5	0.14	Calc.	1	USEPA, 2004	189	4.53	1.196	1.39E-07	1.00	0.932217947	4.63	3	0.74	0.734049958
Aroclor 1242	53469-21-9	0.55	Calc.	1	USEPA, 2004	292	6.29	4.532	3.67E-08	9.72	3.656223291	19.45	3	3.58	5.557181284
Aroclor 1248	12672-29-6	0.59	Calc.	1	USEPA, 2004	292	**6.34**	4.532	3.67E-08	11.15	3.936914383	19.56	3	3.87	5.999069446
Aroclor 1254	11097-69-1	0.75	Calc.	1	USEPA, 2004	326	6.79	7.067	2.35E-08	19.34	5.271460165	31.10	3	5.22	9.556113612
Aroclor 1260	11096-82-5	2.97	Calc.	1	USEPA, 2004	395	**8.27**	17.181	9.69E-09	334.92	22.71590051	79.62	3	22.70	58.90666318

Shaded values from USEPA EPIwin v3.20 program. This is the same program used for regional RBCs, which do not present Kow values
Shaded and bold values are estimated EPIwin values. Others are database values.
DAevent* = DAevent (Absorbed dose per event (mg/cm-event) from USEPA, 2004 Eq 3.2 and 3.3) divided by Cw (mg/cm³)

References:
USEPA, 2004 Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005. July 2004.

TOXICITY REFERENCE VALUE

Constituents of Concern	*CASRN*	*RfD (mg/kg-d)*	*Source*	*SF $(mg/kg\text{-}d)^{-1}$*	*Source*
Aroclor 1016	12674-11-2	0.00007	USEPA, 2010	0.07	USEPA, 2010
Aroclor 1221	11104-28-2	--	--	2	--
Aroclor 1232	11141-16-5	--	--	2	--
Aroclor 1242	53469-21-9	--	--	2	USEPA, 2010
Aroclor 1248	12672-29-6	--	--	2	--
Aroclor 1254	11097-69-1	0.00002	USEPA, 2010	2	USEPA, 2010
Aroclor 1260	11096-82-5	--	--	2	USEPA, 2010

References:
USEPA, 2010. Integrated Risk Information System. http://www.epa.gov/iris/

TABLE 2C

SEDIMENT QUALITY GUIDELINES FOR PROTECTION OF FISH CONSUMPTION CALCULATIONS
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA

Constituent	*Toxicity Equivalency Factor (TEF)*	*SFo* [1] *(mg/kg-d)* $^{-1}$	*RfDo* [1] *(mg/kg-d)*	*BSAF* [2] *(unitless)*	*SQG carcinogens (mg/kg)*	*SQG noncarcinogens (mg/kg)*	*Limiting SQG (mg/kg)*
Aroclor 1016	-	0.07	7.0E-05	1.85	2.7E-02	1.31E-01	2.7E-02
Aroclor 1221	-	2	N/A	1.85	9.4E-04	N/A	9.4E-04
Aroclor 1232	-	2	N/A	1.85	9.4E-04	N/A	9.4E-04
Aroclor 1242	-	2	N/A	1.85	9.4E-04	N/A	9.4E-04
Aroclor 1248	-	2	N/A	1.85	9.4E-04	N/A	9.4E-04
Aroclor 1254	-	2	2.0E-05	1.85	9.4E-04	3.75E-02	9.4E-04
Aroclor 1260	-	2	N/A	1.85	9.4E-04	N/A	9.4E-04
PCB-77	0.0001	N/A	N/A	N/A	1.1E-02	N/A	1.1E-02
PCB-81	0.0003	N/A	N/A	N/A	3.6E-03	N/A	3.6E-03
PCB-126	0.1	N/A	N/A	N/A	1.1E-05	N/A	1.1E-05
PCB-169	0.03	N/A	N/A	N/A	3.6E-05	N/A	3.6E-05
PCB-105	0.00003	N/A	N/A	N/A	3.6E-02	N/A	3.6E-02
PCB-114	0.00003	N/A	N/A	N/A	3.6E-02	N/A	3.6E-02
PCB-118	0.00003	N/A	N/A	N/A	3.6E-02	N/A	3.6E-02
PCB-123	0.00003	N/A	N/A	N/A	3.6E-02	N/A	3.6E-02
PCB-156	0.00003	N/A	N/A	N/A	3.6E-02	N/A	3.6E-02
PCB-157	0.00003	N/A	N/A	N/A	3.6E-02	N/A	3.6E-02
PCB-167	0.00003	N/A	N/A	N/A	3.6E-02	N/A	3.6E-02
PCB-189	0.00003	N/A	N/A	N/A	3.6E-02	N/A	3.6E-02

N/A - Not Applicable, Not Available
SF - Slope factor
RfD - Reference Dose
BSAF - Biota-sediment accumulation factor
mg/kg-d - Milligrams per kilogram per day
mg/kg - Milligrams per kilogram

USEPA SQG INPUTS [3]

Factor	Value	Units
Target Risk Level (TR)	1.00E-06	unitless
Body Weight (BW)	70	kilogram
Averaging Time (AT)	70	year
Exposure Frequency (EF)	365	days/year
Exposure Duration (ED)	70	year
Ingestion Rate (IR)	0.0175	kilograms/day
Lipid fraction (f_{Lipid})	0.03	unitless
Organic carbon fraction (f_{oc})[4]	0.026	unitless

USEPA ALGORITHMS

Fish Concentration

C_{fish}(carc)

$$C_{fish} = \frac{TR \times BW \times AT \times CF}{SF \times IR \times EF \times ED}$$

C_{fish}(noncarc)

$$C_{fish} = \frac{RfD \times BW \times AT \times CF}{IR \times EF \times ED}$$

Sediment Quality Guideline SQG

$$C_{sediment} = C_{fish} \times \frac{f_{oc}}{BSAF \times f_{lipid}}$$

Notes:

Calculation of screening criteria for PCB congeners was based on the calculated screening value for 2,3,7,8-TCDD and the congener-specific TEF, i.e., $SQG_{Ccongener} = SQG_{TCDD}/TEF$. The calculated SQG for 2,3,7,8-TCDD (1.1E-06 mg/kg) was based on a TEF of 1, an oral slope factor of 1.3E+05 mg/kg-d $^{-1}$, and a BSAF of 0.025.

References:

[1]Toxicity reference values from USEPA Regional Screening Table (May 2010 Update) (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm) and/or USEPA Integrated Risk Information System (IRIS) (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm)

[2]BSAF values are for polychlorinated biphenyls (CASRN 1336-36-3) and were from USEPA's *The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, National Sediment Quality Survey: Second Edition. EPA-823-R-04-007. November 2004*

[3]Inputs from USEPA's *The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, National Sediment Quality Survey: Second Edition. EPA-823-R-04-007. November 2004*

[4]Site-specific value that represents the average TOC from the 1997 USEPA investigation, i.e., 26,025 mg/kg

TABLE 2D

SOIL REGIONAL SCREENING LEVEL PCB CONGENER CALCULATIONS
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA

Constituent	*Toxicity Equivalency Factor (TEF)*	*Regional Screening Level (mg/kg)*
PCB-77	0.0001	1.8E-01
PCB-81	0.0003	6.0E-02
PCB-126	0.1	1.8E-04
PCB-169	0.03	6.0E-04
PCB-105	0.00003	6.0E-01
PCB-114	0.00003	6.0E-01
PCB-118	0.00003	6.0E-01
PCB-123	0.00003	6.0E-01
PCB-156	0.00003	6.0E-01
PCB-157	0.00003	6.0E-01
PCB-167	0.00003	6.0E-01
PCB-189	0.00003	6.0E-01

mg/kg = Milligrams per kilogram

Notes:
Calculation of RSL for PCB congeners was based on the RSL for 2,3,7,8-TCDD (1.8E-05 mg/kg) and the congener-specific TEF, i.e., $RSL_{congener} = RSL_{TCDD}/TEF$

References:
TCDD RSL from USEPA Regional Screening Table (May 2010 Update)

TABLE 2E

SOIL SCREENING OPTION SCREENING STANDARD
PCB CONGENER CALCULATIONS
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA

Constituents of Concern	*Toxicity Equivalency Factor (TEF)*	*Soil_SSi (mg/kg)*
PCB-77	0.0001	3.2E-01
PCB-81	0.0003	1.1E-01
PCB-126	0.1	3.2E-04
PCB-169	0.03	1.1E-03
PCB-105	0.00003	1.1E+00
PCB-114	0.00003	1.1E+00
PCB-118	0.00003	1.1E+00
PCB-123	0.00003	1.1E+00
PCB-156	0.00003	1.1E+00
PCB-157	0.00003	1.1E+00
PCB-167	0.00003	1.1E+00
PCB-189	0.00003	1.1E+00

Exposure Factors (LDEQ default values except SFo)

Target Risk Level (unitless)	TR	1.0E-06
2,3,7,8-TCDD Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	SFo	1.3E+05
Body Weight (kg) - Adult	BWa	70
Averaging Time - carc. (years)	ATc	70
Exposure Frequency - Industrial (days/year)	EFi	250
Exposure Duration - Industrial (years)	EDi	25
Soil Ingestion Rate - Industrial (mg/day)	IRSi	50
Skin Surface Area - Industrial Worker (cm^2/day)	SAi	3300
Soil-to-Skin Adherence Factor - Industrial (mg/cm^2)	AFi	0.2
Dermal Absorption Factor (unitless)	ABS	0.03

Exposure Equation

Ingestion and Dermal:

$$\textit{2,3,7,8-TCDD Soil_SSi (mg/kg)} = \frac{TR \times BWa \times ATc \times 365\ (d/yr)}{EFi \times EDi\ [(SFo \times 10\text{-}6 \times IRSi) + (SFo \times SAi \times AFi \times ABS \times 10\text{-}6)}$$

$$\textit{2,3,7,8-TCDD Soil_SSi (mg/kg)} = 3.2E\text{-}05$$

$(mg/kg\text{-}day)^{-1}$ = Inverse milligrams per kilogram per day
kg = Kilograms
mg/day = Milligrams per day
cm^2/day= Square centimeters per day
mg/cm^2 = Milligrams per square centimeter

Notes:
Calculation of Soil_SSi for PCB congeners was based on the calculated Soil_SSi for 2,3,7,8-TCDD (3.2E-05 mg/kg) and the congener-specific TEF, i.e., $Soil_SSi_{congener} = Soil_SSi_{TCDD}/TEF$

References:
2,3,7,8-TCDD oral slope factor is from USEPA Regional Screening Table (May 2010 Update)
2,3,7,8-TCDD Soil_SSi calculated based on LDEQ 2003 RECAP Appendix H, Equation 16
Dermal adsorption factor for 2,3,7,8-TCDD is from LDEQ 2003 RECAP Table H-6

TABLE 3A

ECOLOGICAL SCREENING VALUES (ESVs)
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA

Constituent of Concern	*Ecological Screening Values*													
	Surface Water - Invertebrates (mg/L)		*Surface Water - Fish (mg/L)*		*Surface Water - Aquatic Plants (mg/L)*		*Sediment - Invertebrates (mg/kg)*		*Soil - Invertebrates (mg/kg)*		*Soil - Plants (mg/kg*		*Soil - Wildlife (mg/kg)*	
Aroclor	*ESV*	*Reference*	*ESV*	*Reference*	*ESV*	*Reference*	*ESV*	*Reference*	*ESV*	*Reference*	*ESV*	*Reference*	*ESV*	*Reference*
Aroclor 1016	N/A	---	N/A	---	N/A	---	0.007	d	N/A	---	N/A	---	N/A	---
Aroclor 1221	N/A	---	N/A	---	N/A	---	N/A	---	N/A	---	N/A	---	N/A	---
Aroclor 1232	N/A	---	N/A	---	N/A	---	N/A	---	N/A	---	N/A	---	N/A	---
Aroclor 1242	N/A	---	N/A	---	N/A	---	N/A	---	N/A	---	N/A	---	N/A	---
Aroclor 1248	N/A	---	N/A	---	N/A	---	0.03	d	N/A	---	N/A	---	N/A	---
Aroclor 1254	N/A	---	N/A	---	N/A	---	0.06	d	N/A	---	N/A	---	N/A	---
Aroclor 1260	N/A	---	N/A	---	N/A	---	0.005	d	N/A	---	N/A	---	N/A	---
Total PCBs	0.0008	a	0.0002	b	0.000144	c	0.0598	e	2.51	f	10	g	0.65	h

References:
- a - Lowest Chronic Value (LCV) for non-daphnids (Suter and Tsao, 1996)
- b - Lowest Chronic Value (LCV) for fish (Suter and Tsao, 1996)
- c - Lowest Chronic Value (LCV) for aquatic Plants (Suter and Tsao, 1996)
- d - Ontario Lowest Effects Level (LEL) (Persaud et al., 1993) and sediment Total PCB ESV is the
- e - Threshold Effects Concentration (TEC) (McDonald et al., 2000)
- f - Sceening value for soil invertebrates for combustion facilities (USEPA, 1999c)
- g - Sceening value for soil terrestial plants for combustion facilities (USEPA, 1999c)
- h -Ecological Indicator Soil Concentration from Table 749-3 of Washington State Department of Ecology, Toxics Clean-Up Program (undated)

Notes:
- mg/L - Milligrams per liter
- mg/kg - Milligrams per kilogram
- N/A - Not Applicable, Not Available
- PCBs - Polychlorinated Biphenyls

TABLE 3B

TOXICITY EQUIVALENCE FACTORS (TEFs)
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA

PCB Congeners	*Toxicity Equivalence Factors*					
	Mammals		*Birds*		*Fish*	
	TEF	*Reference*	*TEF*	*Reference*	*TEF*	*Reference*
3,3',4,4'-TCB (PCB-77)	0.001	a	0.05	b	0.0001	b
3,4,4',5-TCB (PCB-81)	0.003	a	0.1	b	0.0005	b
3,3',4,4',5-PeCB (PCB-126)	0.1	a	0.1	b	.005	b
3,3',4,4',5,5'-HxCB (PCB-169)	0.03	a	0.001	b	.00005	b
2,3,3',4,4'-PeCB (PCB-105)	0.00003	a	0.0001	b	<0.000005	b
2,3,4,4',5-PeCB (PCB-114)	0.00003	a	0.0001	b	<0.000005	b
2,3',4,4',5-PeCB (PCB-118)	0.00003	a	0.00001	b	<0.000005	b
2',3,4,4',5-PeCB (PCB-123)	0.00003	a	0.00001	b	<0.000005	b
2,3,3',4,4',5-HxCB (PCB-156)	0.00003	a	0.0001	b	<0.000005	b
2,3,3',4,4',5'-HxCB (PCB-157)	0.00003	a	0.0001	b	<0.000005	b
2,3',4,4',5,5'-HxCB (PCB-167)	0.00003	a	0.00001	b	<0.000005	b
2,3,3',4,4',5,5'-HpCB (PCB-189)	0.00003	a	0.00001	b	<0.000005	b

References:
a - van den Berg et al., 2006
b - van den Berg et al., 1998

Notes:
mg/L - Milligrams per liter
mg/kg - Milligrams per kilogram
N/A - Not Applicable, Not Available
PCBs - Polychlorinated Biphenyls
TCB - Tetrachlorinated Biphenyl
PeCB - Pentachlorinated Biphenyl
HxCB - Hexachlorinated Biphenyl
HpCB - Heptachlorinated Biphenyl

TABLE 4

RARE, THREATENED, AND ENDANGERED SPECIES AND NATURAL COMMUNITIES OF CONCERN IN EAST BATON ROUGE PARISH
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA

Common Name	*Scientific Name*	*State Rank*	*State Status*	*Federal Status*
Amphibians				
Four-Toed Salamander	*Hemidactylium scutatum*	S1	Rare	
Reptiles				
Eastern Glass Lizard	*Ophisaurus ventralis*	S3	Rare	
Rainbow Snake	*Farancia erytrogramma*	S2	Rare	
Birds				
American Swallow-Tailed Kite	*Elanoides forficatus*	S1S2B	Rare	
Bald Eagle	*Haliaeetus leucocephalus*	S2N,S3B	Endangered	Delisted
Mammals				
Eastern Harvest Mouse	*Reithrodontomys humulis*	S3S4	Rare	
Long-Tailed Weasel	*Mustela frenata*	S2S4	Rare	
Manatee	*Trichechus manatus*	SZN	Endangered	Endangered
Southeastern Shrew	*Sorex longirostris*	S2S3		
Fish				
Alabama Shad	*Alosa alabamae*	S1	Rare	
Pallid Sturgeon	*Scaphirrhynchus albus*	S1	Endangered	Endangered
Freshwater Mussels				
Inflated Heelsplitter	*Potamilus inflatus*	S1	Threatened	Threatened
Rayed Creekshell	*Anodontoides radiatus*	S2	Rare	
Southern Hickorynut	*Obovaria jacksoniana*	S1S2	Rare	
Southern Pocketbook	*Lampsilis ornata*	S3	Rare	
Plants				
Dixie Wood-Fern	*Dryopteris x australis*	SH	Rare	
Dwarf Filmy-Fern	*Trichomanes petersii*	S2	Rare	
Elliott Sida	*Sida elliottii*	SH	Rare	
Low Erythrodes	*Platyhelys querceticola*	S1	Rare	
Powdery Thalia	*Thalia dealbata*	S2S3	Rare	
Silky Camellia	*Stewartia malacodendrom*	S2S3	Rare	
Southern Shield Wood-Fern	*Dryopteris ludoviciana*	S2	Rare	
Square-Stemmed Monkey Flower	*Mimulus ringens*	S2	Rare	
Wolf Spikerush	*Eleocharis wolfii*	S3	Rare	
Natural Communities				
Bottomland Hardwood Forest		S4		
Cypress Tupelo Swamp		S4		
Hackberry-American Elm-Green Ash Bottomland Forest		S4		
Prairie Terrace Loess Forest		S2		
Spruce-Pine Hardwood Mesic Flatwoods		S2		
Sweet Gum-Water Oak Bottomland Forest		S4		

Source: Louisiana Wildlife and Fisheries (April 2008)

Notes:
S1 - critically imperiled because of extreme rarity (5 or fewer known populations) or some factor(s) making it especially vulnerable to extirpation
S2 - imperiled because of rarity (6-20 known populations) or some factor(s) making it very vulnerable to extirpation
S3 - rare and local throughout state or found locally in restricted regions or because of factor(s) making it vulnerable to extirpation (21-100 known populations)
S4 - apparently secure with many occurrences (100-1,000 known populations)
SH - historic occurrence, but no records in past 20 years
SZ - transient species with no identifiable consistent area of occurrence
B - breeding
N- nonbreeding

TABLE 5

SEDIMENT/SOIL AND SURFACE WATER INVESTIGATION
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA

Matrix	*Area of Investigation*	*Number of Proposed Sample Locations*	*Proposed Sample Intervals (Inches)* [1]	*No. of Proposed Samples (No. of Locations x No. of Sample Intervals)*	*Proposed Analyses* [2]
Sediment/Soil	North-Central Devil's Swamp	15	0 - 6 6 - 12 12 - 18	45	PCB Aroclors[3] PCB Congeners[4] TOC[5] Grain Size[5] (see Table 1)
	Drainage Ditch	12	0 - 6 6 - 12 12 - 18	36	
	North Devil's Swamp Lake	15	0 - 6 6 - 12 12 - 18	45	
	South Devil's Swamp Lake	10	0 - 6 6 - 12 12 - 18	30	
TOTAL				156	
Surface Water	North-Central Devil's Swamp	15	-	15	PCB Aroclors[3] (see Table 1)
	Drainage Ditch	12	-	12	
	North Devil's Swamp Lake	15	-	15	
	South Devil's Swamp Lake	10	-	10	
TOTAL				52	

Notes:

[1] Proposed sampling intervals presented on this table are estimated for planning purposes only. Actual sampling intervals may vary depending on site conditions.

[2] Table 1 shows a detailed list of COCs.

[3] All surface water and sediment/soil samples will be submitted for analysis of PCB aroclors by EPA Method 8082.

[4] Approximately 25 percent of the surface (0-6 inch) sediment samples and approximately 10 percent of the deeper (6 to 12 and 12 to 18 inch) sediment samples will be submitted for analysis of PCB congeners by EPA Method 1668.

[5] Surface (0-6 inch) sediment samples will be submitted for analysis of total organic carbon (TOC) by the Walkley Black method and grain size by ASTM D6913.

- Not Applicable

APPENDIX A

EPA AND LDEQ REVIEW COMMENTS ON THE DRAFT TIER 1 REMEDIAL INVESTIGATION WORK PLAN

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EPA AND LDEQ COMMENTS ON THE DRAFT TIER 1 REMEDIAL INVESTIGATION WORK PLAN
COMMENTS CONTAINED IN A LETTER TO PRESS CAMPBELL FROM BARTOLOME' J. CANELLAS, DATED SEPTEMBER 1, 2010
DEVIL'S SWAMP LAKE SITE
CERCLA DOCKET NO. 06-04-10
EAST BATON ROUGE PARISH, LOUISIANA
SEPTEMBER 2010

Item No.	*Reference*	*Comment made by*	*Comment*	*Response*	*A revision is included in the Final Tier 1 RI Work Plan in the location cited below*
EPA COMMENTS: ENCLOSURE 1					
1	Figure 4, Conceptual Site Model	EPA	Figure 4 lists a number of pathways as incomplete or potentially complete that are complete and potentially significant. Some of these pathways are already being evaluated in the document, and some may require further evaluation beyond that currently planned. These pathways include exposures of benthic fish to polychlorinated biphenyls (PCBs) in sediment; piscivores to PCBs in fish; carnivores to PCBs in game; humans to PCBs in fish and game; carnivores and piscivores to PCBs in wetland soil and surface water; and carnivores to PCBs in surface water. RPM note: The Tier 1 RI WP is presenting a phase one for screening, if the site fails screening, additional risk assessments will be conducted in the second phase that will include this. CH/CRA may include note in Figure 4 that as a result of the first phase of the investigation a more thorough evaluation of the pathways and receptors identified as potentially at risk will take place.	A note will be added to Figure 4 regarding the tiered approach and further evaluation of exposure pathways during the Tier 2 RI, if necessary.	Figure 4
2	Figure 4 and Section 2.2; page 10, third paragraph	EPA	The document indicates that human health exposure to ground water is an incomplete exposure pathway; however, the document also states that "Potential exposures from this pathway are being evaluated as part of the ongoing investigation activities at the PPI site and the former Rollins facility." Is there an institutional control precluding the use of ground water? Is the ground water non-potable? In the absence of an acceptable rationale, ground water should be evaluated to ensure that the remedy is protective of current and likely future exposure scenarios. RPM note: From PPI investigation it is known GW is shallow and moves toward the Mississippi River, deeper GW used for drinking is drawn upstream of the site and is separated from the shallow and surface water. CH/CRA does no need to include further discussions.	Potential exposure pathways to groundwater will not be evaluated during the RI/FS at the Site.	None
3	Section 3.2.2; page 16	EPA	The goal of the investigation should include delineation of the nature and extent of PCBs. RPM note: Nature and extent is one objective. CH/CRA include in Section 2.2.2; page 16, "the goal of delineation of the nature and extent of PCBs".	The suggested revision will be included in Sect. 3.2.2.	Section 3.2.2
4	Section 3.2.2; page 17	EPA	Sections describing comparison values should reference the tables in which they are listed and Sections 4.1 and 5.2.1.7, which discuss their derivation. CH/CRA include reference to the table with the ESV values to be compared.	The suggested references will be included in Sect. 3.2.2.	Section 3.2.2
5	Section 3.2.2	EPA	Aroclor analysis is a cost-effective means to evaluate the contamination source, nature and extent of contamination, and associated migration pathways. However, Aroclor mixtures often contain many individual congeners with toxicity values ranging in orders of magnitude, and may not include all congeners that could contribute to toxicity. Because it is not possible to accurately assign one toxicity value to the PCBs in any given Aroclor mixture, Aroclors are a poor measure for evaluating risk to human health. It is recommended that the study design consider the approach endorsed by "PCBs: Cancer Dose-Response Assessment and Application to Environmental Mixtures" (EPA 1996), which focuses on the composition of the weathered PCB congener mixture, rather than the historical commercial Aroclor release. This approach could be adopted by collecting a subset of duplicate samples from the most impacted areas and analyzing for individual PCB congeners to evaluate the toxicity and potential health risks associated with exposure. Use of screening levels for Aroclor mixtures only is not necessarily protective of human health and ecology. Aroclors contain many, but not all, PCB congeners. Therefore, employing screening levels that only consider a subset of the PCB congeners does not provide an evaluation of the potential cumulative risk associated with exposure to the range of potentially present PCB congeners. This will lead to an underestimation of the potential risk to human health and may lead to a remedial decision that is not protective of human health. CH/CRA see comment from LDEQ. Is our understanding from the scoping meeting that congener analysis will be done, either under Tier 1 RI WP or Tier 2 RI WP.	The Tier 1 RI will include sediment and surface water sample collection and analysis for PCB aroclors. Consistent with the use of media specific screening values, the target risk level for the Tier 1 RI screening evaluation will be 1x10-6 and the maximum concentration of each aroclor will be compared to the screening criteria in each media. Following the screening evaluation, PCB congener analysis will be considered during the Tier 2 RI at sample locations and in sample matrices that require further evaluation.	Section 3.2.1 and Section 4.1 (See October 2010 comment responses)

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Item No.	*Reference*	*Comment made by*	*Comment*	*Response*	*A revision is included in the Final Tier 1 RI Work Plan in the location cited below*
6	Section 3.2.2	EPA	The screening of each media separately may underestimate the overall potential for risk for humans and wildlife that may contact multiple media. The risk assessment should estimate the cumulative risk to human health and wildlife using multi-media dose-based calculations, rather than back-calculated single-media screening levels. Cumulative risk assessment should include simultaneous exposure to all media (i.e., sediment, surface water, etc.) and chemicals to ensure that the remedial decision is protective of a receptor that may be exposed to PCBs via more than one media. This cumulative risk estimate can then be evaluated in conjunction with the EPA's risk management range of 10-4 to 10-6. CH/CRA should consider using screening values of 1x10E-06 and not 1x10E-05. This is a key comment, EPA uses 1x10E-06 for screening.	The limiting human health criteria (LHHC) provided in the Draft Tier 1 RI Work Plan (WP) address the exposure pathways identified in the Conceptual Site Model (CSM), which was developed in conjunction with USEPA and LDEQ. The lowest screening value was proposed as the LHHC; therefore, these criteria will be protective of other, less sensitive, exposure pathways. The WP was developed consistent with USEPA risk assessment guidance in that impacts below screening levels would generally require no further evaluation. The Tier 1 RI screening program was designed to develop information needed to identify areas that may require further characterization and those that would not likely warrant further evaluation. The target risk level for screening purposes will be 1x10-6. Sect. 4.1 will be revised to reflect this change.	Section 4.1
7	Section 3.2.2; page 17, second paragraph	EPA	While different PCB Aroclors demonstrate different toxicities, they share common modes of toxicities. Therefore, it is appropriate to evaluate combined risk from total PCB concentrations either by summing concentrations or using a toxicity-weighted summation. Please provide a rationale for performing comparisons based on individual Aroclors or limit comparisons to those based on estimates of total PCB concentrations. Alternatively, please incorporate recommendations in the comments above regarding the use of congener-specific analyses in conjunction with Aroclor-based analyses. CH/CRA due to the limited sources of information to establish ESV for total PCBs and the individual aroclors, the maximum concentration of total PCBs, and the maximum concentration of each individual aroclor should be compared to their specific ESV, if one is available. If there is an exceedance at this screening stage, the potential risk should be considered in an additional tier of the investigation. E.g. Tier 2 RI WP where additional information is collected to complete a Human Health Risk Assessment (HHRA) and/or Baseline Ecological Risk Assessment (BERA).	The maximum concentration of total PCBs, and the maximum concentration of each individual aroclor will be compared to their specific ESV, if one is available. If there is an exceedance at this screening stage, the potential risk will be considered in an additional tier of the investigation. Toxicity weighting is addressed at the Tier 1 RI screening stage by the comparison to individual aroclor ESVs, as available, and total PCBs. Risk weighting techniques will be further considered during the Tier 2 RI with consideration of more comprehensive approaches to calculation of the exposure point concentration, as appropriate. This issue will be clarified in Sect. 3.2.2.	Section 3.2.2 (See October 2010 comment responses)
8	Section 3.2.3; page 17, third, fourth, and fifth paragraphs	EPA	These paragraphs discuss the use of the 95-percent upper confidence limit (UCL) mean for initial human health screening. As discussed above, use of single-media screening values is not recommended. However, if single-media screening values are used, per EPA guidance and standard practice, the maximum detected concentration is used for initial screening. Please use the maximum detected concentration for initial screening. Also, as indicated in the comment above, evaluation of risk by screening individual Aroclor concentrations may underestimate risks. Aroclor results may not fully represent the range of congeners present, and this methodology is not protective of the cumulative risk posed by components of multiple Aroclors. Please consider methods available to evaluate cumulative impacts of components of multiple congeners; alternatively, please incorporate recommendations in the comments above regarding the use of congener-specific analyses in conjunction with Aroclor-based analyses. CH/CRA should compare to the maximum concentration during a Tier 1 screening investigation and go the 95 percent upper confidence limit (URL) during a Tier 2 investigation. This is a key comment, EPA uses maximum concentration for screening.	As noted previously, the lowest screening value from pathways identified in the CSM was selected as the LHHC. These LHHCs would therefore be protective of other, less sensitive exposure pathways. The approach outlined in the Work Plan is consistent with media-specific screening level evaluations developed by USEPA for CERCLA sites. The target risk level for screening purposes will be 1x10-6. Sect. 3.2.2 will be revised to reflect the comparison of the maximum concentration during the Tier 1 RI screening evaluation and use of the 95% UCL during the Tier 2 RI risk assessments.	Section 3.2.2 (See October 2010 comment responses)
9	Section 3.2.3; page 18, fifth paragraph	EPA	Please reference Section 3.2.5, which provides a more in-depth discussion of the statistical calculation of the 95-percent UCL. CH/CRA should clarify that for Tier 1 screening the maximum detected concentrations are used, if the investigation moves to a Tier 2, then the 95 percent UCL is applied using the ProUCL 4.0. This statistical software package includes methods to evaluate data sets with nondetect (ND) and without ND observations.	Section 3.2.3 will be revised to reflect the comparison of maximum concentrations during the Tier 1 RI screening evaluation.	Section 3.2.3

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10	Section 3.2.3; page 19, third full paragraph	EPA	This paragraph discusses the use of historic data in the risk characterization and risk management. The document should include a discussion regarding its potential uses and the data quality standards that would need to be achieved for its incorporation into the remedial investigation. The document should also indicate that use of historic data would be subject to regulatory review and approval. CH/CRA include the above statement about regulatory review and approval.	A complete discussion of all the previous data collected at the Site and it's suitability for use in a risk assessment was included in the Preliminary Site Characterization Report. A summary of that discussion and the suggested language will be included in Sect. 3.2.3.	Section 3.2.3
11	Table 3	EPA	Please provide parenthetic references to the literature sources of benchmarks used in Table 3. CH/CRA please provide.	The suggested references will be included in Table 3.	Table 3
12	Section 3.2.7; page 24, second paragraph	EPA	The paragraph states that surface water will be filtered prior to analysis. Analysis of filtered samples provides valuable information regarding dissolved concentrations of chemicals that is important to evaluation of fate and transport, as well as aquatic organism exposures. However, water ingested by humans or wildlife would be unfiltered and would include sediment. Please provide rationale for how comparison values and risk assessment will account for this factor, or consider additional analysis of unfiltered samples. CH/CRA please note, this is a similar comment to one provided by the State. Samples should not be filtered. This is a key comment, EPA Region 6 never filters samples.	Laboratory analysis will include both filtered and unfiltered surface water samples. The unfiltered surface water data data will be used to evaluate the ingestion exposure pathway and the filtered surface water sample data will be used to evaluate the dissolved phase constituent concentrations for the dermal exposure pathway. Sect. 3.2.7 will be revised to reflect this change.	Section 3.2.7
13	Section 4.1, page 29.	EPA	As discussed above, media-specific screening values may underestimate risks. Risk assessment should be based on cumulative exposure modeling. The use of screening values is potentially premature because these values assume selection of representative receptors and exposure scenarios that have not been specifically identified in the conceptual site model. CH/CRA for the above reason, the screening levels should be set at least at 1x10E-06, the point of departure for CERCLA site investigations. If these screening levels are exceeded, a more thorough and site specific risk assessment should be conducted under Tier 2 and will consider 95 percent UCL and site specific characteristics. During the evaluation of the full HHRA further evaluation will consider the risk management range of 1x10E-04 to 1x10E-06 for carcinogenic risks.	Consistent with the use of media specific screening values, the target risk level for the Tier 1 RI screening evaluation will be $1x10^{-6}$. Sect. 4.1 will be revised to reflect this change.	Section 4.1
14	Section 4.1; page 28, last paragraph	EPA	The text states, "Constituents that are not detected at concentrations above the LHHC in sediment/soil or surface water will be eliminated from further evaluation, even if the laboratory RL is above the appropriate LHHC." While these constituents may be eliminated from consideration, a discussion and comparison of reporting limits to limiting human health criteria (LHHC) should be included in the uncertainty section of the risk assessment for such cases. CH/CRA please note. The LHHC is the Limiting Human Health Criteria that is being considered for comparison during Tier 1. The laboratory Reporting Limit (RL) needs to be set below the LHHC if it could be attained. Please note there is an instrument detection limit, a method detection limit, a laboratory reporting limit and in some cases a contract required reporting limit. They need to be below the screening values if possible.	The laboratory instrument detection limit, method detection limit, and reporting limit will be set below the LHHC, if possible. If constituents that are not detected at concentrations above the LHHC are eliminated from further evaluation, discussion and comparison of the values will be included in the uncertainty section of the HHRA. Sect. 4.1 will be revised to include the suggested language.	Section 4.1

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15	Section 4.1; page 29, second full paragraph	EPA	The text discusses the potential for surface water analytical reporting limits (RLs) higher than the EPA National Recommended Water Quality Criteria (NRWQC). The text should note the anticipated method detection limits and the NRWQC for cases where this is expected. This applies to discussion of such cases in other media. CH/CRA please note, following previous comments, screening levels need to be set at 1x10E-06 and reporting limits need to be below the screening criteria. NRWQC for total PCBs is set at 0.000064 ug/L for a carcinogenicity of 1x10E-06 for Water and Organism and Organisms Only. The 65FR31682 shows a Human Health Criterion (HHC) value of 0.00017 ug/L. For fresh water the chronic value is set at 0.014 ug/L. CH/CRA please elaborate in planned reporting limits and alternate risk levels.	The laboratory instrument detection limit, method detection limit, and reporting limit will be set below the LHHC, if possible. If constituents that are not detected at concentrations above the LHHC are eliminated from further evaluation, discussion and comparison of the values will be included in the uncertainty section of the HHRA. The target risk level for screening purposes will be $1x10^{-6}$. Sect. 4.1 will be revised to include the suggested language.	Section 4.1
16	Section 4.1	EPA	The text states that screening levels are set at "one-in-one hundred thousand [10-5] incremental cancer risks or a non-carcinogenic hazard quotient of one." Based on the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), which presents EPA's regulations for the evaluation of risk at Superfund sites, the cancer risk range are from 10-4 to 10-6 excess risk of developing cancer. Utilizing a target risk level of 10-5 in a screening step employs a risk management decision without the input of stakeholders (including EPA). Theoretically, exposure point concentrations for multiple analytes could be slightly less than the 10-5 screening level and thus not be considered in the Tier 2 evaluation; however, exposure to these multiple analytes could have a cumulative risk greater than 10-5 or even 10-4. The Tier 1 screening step is, therefore, inappropriate because it is likely that analytes with cancer risks within the risk management range will be screened out and cumulative risk within the risk management range will be underestimated. Typically the lower bound of the acceptable risk level, 10-6 incremental cancer risk, is used for initial site screening to ensure cumulative effects from multiple analytes (i.e., different Aroclors) are taken into account. Similarly, a hazard index (HI) of 0.1 is typically used for screening rather than a HI of 1. Please adjust the screening values accordingly. As discussed above, there are also concerns associated with the screening of risks from each media separately, which could also underestimate risks. CH/CRA please note, as previously mentioned, screening values should be at 1x10E-06 and HI of 1, using maximum detected concentrations.	The target risk level for screening purposes will be $1x10^{-6}$ and a Hazard Index of 1.0. Sect. 4.1 will be revised to reflect this change.	Section 4.1
17	Section 4.1; page 29, last paragraph	EPA	The text states soil concentrations will be screened using an industrial /commercial scenario. Screening values for other media are established using recreational/residential assumptions. Recreational use of the area for hunting and fishing has been established as a current land use. Therefore, use of a residential scenario, in addition to the industrial/commercial, for screening would be consistent with other screening assumptions and more protective of potential human health receptors. Given established land use, the document should also evaluate whether a soil screening value is needed to account for consumption of PCBs that have bioaccumulated in game. In other words, explain how game, residential, swimming are not applicable or appropriate at this time RPM note: The nature of the site as a swamp that gets flooded does not allow for a reasonable residential scenario. Due to low concentrations previously reported consumption of PCBs bioaccumulated in game at this time is not anticipated to be more significant than risk from consumption of fish and crawfish in the area.	A residential exposure scenario is not appropriate for the Site and will not be evaluated in the RI/FS.	None
18	Section 5.2.1.2; page 37, last paragraph	EPA	Please include text stating that bald eagles are also protected under the Bald and Golden Eagle Protection Act. CH/CRA please include.	The suggested language will be included in Sect. 5.2.1.2.	Section 5.2.1.2

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19	Section 5.2.1.3	EPA	As discussed above, use of single-media screening values is not recommended for wildlife, which may contact chemicals in multiple media. Multimedia exposure modeling is recommended instead. CH/CRA, explain why not. RPM note: From EPA previous investigations, PCBs have been identified as the primary driver for unacceptable risks in the Devil's Swamp Lake. For that reason the Order issued for the RI/FS is directed toward PCBs.	The LHHC provided in the Draft Tier 1 RI Work Plan address the exposure pathways identified in the CSM, which was developed in conjunction with USEPA and LDEQ. The lowest screening value was proposed as the LHHC; therefore, these criteria would be protective of other, less sensitive, exposure pathways.	Section 4.1 and Section 5.2.1.7
20	Section 5.2.1.7; page 43, fifth full paragraph	EPA	As discussed above risk assessment for wildlife should be based on multimedia exposure models rather than media-specific screening. If screening benchmarks are utilized, please provide a literature citation for the Washington State Department of Ecology sediment benchmark. For purposes of comment, it is assumed that the value is the Sediment Impact Zone Maximum Level/Sediment Cleanup Screening Level/Minimum Cleanup Level listed in state regulations (Washington Administrative Code [WAC] 173-204-420 and WAC 173-204-520). It is unclear whether these values take into account bioaccumulation through the food chain. Moreover, the values are intended for use normalized to carbon content. Also, it is more appropriate to use the more precautionary Sediment Quality Standard from Washington State Department of Ecology provided in WAC 173-204-320(a) in a screening-level evaluation. Based on these comments, it is recommended that the benchmark be reevaluated and that a more precautionary soil benchmark that includes potential evaluation of effects through the food chain be utilized. CH/CRA please note. The fifth paragraph is unclear. Add reference to location of ESVs (table 3), add a complete reference to the benchmarks planned to be used and add rationale for the selection. The Sediment Quality Standards WAC 173-204-320 (a) is 12 ug/Kg dry weight for a "no effects level", the Sediment Impact Zone Maximum Level, WAS 173-204-420 (a) is 65 ug/Kg dry weight for PCBs. EPA Ecological Screening Levels are based in NOAELs (chronic or subchronic exposures), whenever possible, and when not, LOAELs are adjusted to establish an appropriate screening level. Based in uncertainty, usually one tenths of the NOAEL to extrapolate. Point in question, should use 12 as the SQS and may cite the 65 as a cleanup screening level and minimum cleanup level used by the State of Washington.	The Washington State ecological screening value (ESV) is proposed for soil, not sediment. Therefore, the comments regarding the Washington State ESVs for sediment are not applicable at this time. The proposed ESVs for sediment are the Consensus Threshold Effects Concentrations (TEC) for total PCBs and the Canadian Council of the Ministers of the Environment (CCME) Lowest Effects Levels (LELs) for individual aroclors, if concentrations exceed the TEC for total PCBs. Sediment ESVs are based on benthic invertebrates, and are not applicable to upper trophic level receptors. As discussed in Section 5.3.1, food chain models will be used to evaluate risk to upper trophic level receptors. Equation 1 on Page 45 identifies the inputs to calculation of total ingestion, which include prey, water, and incidental ingestion of sediment. Toxicity reference values (TRVs) will be used as ecological benchmarks. TRVs are receptor-specific, and will be provided once rerpresentative indicator species are identified. For the SLERA, only No Observed Adverse Effects Levels (NOAELs) will be considered. References will be provided in Table 3 for all ESVs and discussion will be added to provide rationale for selection of ESVs.	Section 5.2.1.7 and Section 5.3.1
21	Section 5.2.1.7; page 43, fifth full paragraph	EPA	The paragraph states that sediment and surface water benchmarks for protection of wildlife are unavailable. Data are available to support multi-media exposure modeling, which is recommended over use of media-specific screening values. If screening values are maintained, it is possible to back-calculate protective soil, sediment, and surface water concentrations using exposure models analogous to those used in this document for human health. Given the bioaccumulative potential of PCBs, this method should be adopted to provide screening values appropriate for protection of wildlife. CH/CRA please add clarification to note the Tier 1 RI WP is focusing in screening while a Tier 2 RI WP will focus in a more through assessment considering multi-medial exposure modeling.	Food chain models will be used to evaluate risk to upper trophic level receptors. The food chain models will consider ingestion of prey, surface water, and sediment (i.e., multi-media sources of exposure). The SLERA will consider multi-media exposure, but will be based on conservative bioccumulation factors and Utilization Factors (UFs). The Tier 2 RI samples and the BERA may include tissue analyis for prey items.	Section 5.2.1.7
Not Numbered	Section 5.3.2; page 45	EPA	As discussed above, use of Aroclor-specific comparison concentrations is inappropriate for evaluation of cumulative risks from PCBs, which have similar modes of toxicity. Please limit comparisons to those using total PCBs as a summation or toxicity-weighted summation. CH/CRA please note, risk screening and risk calculations should be a two phase process: Screening for total PCBs if an ecological screening value (ESV) is available and screening for individual aroclors if an ESV is available. The different ESVs come from different sources. Cumulative risks from PCBs should be based on Total PCBs.	The screening of PCBs for the SLERA will be a 2-phase process. The first phase will be a screen for total PCBs. For those assessment areas where the maximum concentration of total PCBs exceeds the ESV, the maximum concentrations of the individual aroclors will be screened (phase 2). CH/CRA recognizes that the effects of PCBs on ecological receptors are cumulative. The purpose of screening the individual aroclors is to identify those aroclors contributing to the cumulative risk.	Section 3.2.2 and Section 5.3.2

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22	Sections 5.0 and 6.0	EPA	These sections discuss overall approaches for conducting further risk assessment for Devil's Swamp Lake. However, they do not address specific components that would be needed for such risk assessment efforts, such as procedures for selecting, collecting, and analyzing biota; development of sediment and water to biota uptake factors for use in ingestion modeling; and identification of representative receptors/receptor species. If additional risk assessment is identified as necessary, additional documentation in the form of a work plan or work plan addendum that has been reviewed and approved by the stakeholders will likely be required. CH/CRA add note/discussion to indicate a separate Tier 2 RI WP or work plan addendum will be required and submitted to stakeholders for review and approval.	The proposed scope of work for additional investigation and/or risk assessment activities will be included in a Draft Tier 2 RI Work Plan following submittal and approval of the Tier 1 RI Report. The requested revision will be included in the Work Plan text.	Section 4.0 and Section 5.0
23	Section 6.3.5.1; page 54	EPA	The maps show samples in the South Devil's Swamp Lake Area of Interest (AOI) as located along the shoreline. The known source of PCBs is upstream, and the lake is a low-flow environment. The sample design rationale should include consideration of deeper depositional areas along the center line of the lake. CH/CRA add description of rationale or procedure used to establish these sample locations. If CH/CRA decides to add a few more samples to reduce the risk of data gaps, See Enclosure 2, LDEQ comment no. 7, the extra samples may be in the deeper parts of the lake and swamp. As a reminder, the sample number is influenced by statistics and the confidence/variability among samples.	Direct human contact with deep water sediment is not usually considered a complete pathway. Potential partitioning of sediment constituents to fish tissue would likely represent sediment that fish have contacted over a wider area that would include the lake centerline. No additional samples will be collected during the Tier 1 RI. The Tier 1 RI sample location selection rationale will be included in Sect. 6.3.5.1.	Section 6.3.5.1
24	Section 6.3.5.1; page 54, first paragraph	EPA	The text states, "The proposed sample locations are subject to change based on the location of the drainage feature." Please add text to describe the rationale that will be used to adjust sample locations. CH/CRA add text to describe that drainage features were identified from old aerial photographs, but flooding events in the swamp, depositional and erosional changes in the swamp could change the actual location of these features. Samples will be changed to match the best current location of the drainage features as they are uncovered at the time of the field activities.	The requested revision will be included in Sect. 6.3.5.1.	Section 6.3.5.1
25	Appendix A, Site Management Plan	EPA	No comments	No response necessary.	None
26	Appendix B, Quality Assurance Project Plan (QAPP)	EPA	In numerous locations, the text incorrectly refers to Section 2.8.2.	The QAPP will be revised to refer to the correct section numbers. The revised QAPP will be submitted upon approval of the Tier 1 RI Work Plan.	QAPP
27	Appendix B, QAPP	EPA	Part of the review of Appendix B, QAPP, included using EPA's QA/R-5 checklist (EPA 2001), a completed version was previously provided. The most notable result of this review is that the QAPP does not include standard operating procedures (SOPs) or method performance criteria for analytical methods, which should be added. Additional comments were included in the checklist. Also note LDEQ comment, they would like to sign on the approval page.	The QAPP will be revised to include SOPs, include LDEQ signature, and address all comments included on the checklist. The revised QAPP will be submitted upon approval of the Tier 1 RI Work Plan.	QAPP
28	Appendix C, Technical Sampling and Analysis Plan (TSAP) SOPs	EPA	No comments	No response necessary.	None
29	Appendix D, Data Management Plan	EPA	No comments	No response necessary.	None

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COMMENTS CONTAINED IN A LETTER TO PRESS CAMPBELL FROM BARTOLOME' J. CANELLAS, DATED SEPTEMBER 1, 2010
DEVIL'S SWAMP LAKE SITE
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30	Appendix E, Pollution Control and Mitigation Plan, Section 4.0 Appendix F, Health and Safety Plan, Section 3.1	EPA	No comments	No response necessary.	None
LDEQ COMMENTS: ENCLOSURE 2 - GENERAL COMMENTS APPLICABLE TO ASSESSMENT OF HUMAN AND ECOLOGICAL RISK					
1	General Comments Applicable to Assessment of Human Risk	LDEQ	The comparison of sediment data – 95 percent upper confidence limit on the arithmetic mean (95%UCL-AM) with generic/screening sediment quality goals is not a technically defensible approach for characterizing potential health risks associated with fish and crawfish ingestion in Devil's Lake/Swamp. The EPA Baseline Human Health Risk Assessment (1999) concluded that the health risk associated with exposure to PCBs via the ingestion of fish and crawfish obtained from Devil Swamp Lake was unacceptable. In addition, Devil Lake is under a fish consumption advisory that was issued by LDHH, LDEQ, LDWF, and LDAF in 1993. Based on the persistence of PCBs in sediment, it is reasonable to assume that the environmental conditions in Devil's Lake have not changed significantly over time and that fish and crawfish tissue PCB concentrations are still present at unacceptable levels. EPA concurs with the State recommendation and the work plan should further clarify that the generic screening under Tier 1 RI WP will be used to identify areas of concern for further evaluation under a Tier 2 RI WP and not characterizing potential risk. This is covered under Section 3.1; CH/CRA should consider adding further clarification.	As noted previously, the lowest screening value from pathways identified in the CSM was selected as the LHHC. These LHHCs would therefore be protective of other, less sensitve exposure pathways. The approach outlined in the Work Plan is consistent with media-specific screening level evaluations developed by USEPA for Superfund. Sect. 3.2.3 will be revised to reflect the comparison of the maximum concentration during the Tier 1 RI screening evaluation and use of the 95% UCL during the Tier 2 RI risk assessments.	Section 3.2.3
2	General Comments Applicable to Assessment of Human and Ecological Risk	LDEQ	Bioaccumulation is a complex process that is highly dependent on a variety of site-specific factors; edible portions of recreationally-relevant species should be analyzed for the presence of PCB congeners. The use of congener data is preferable to use of aroclor data for the characterization of PCB constituents in biological tissues. Due to environmental weathering processes and the selective biological uptake, metabolism and elimination of individual PCB congeners, the pattern of PCB congeners in biological tissues is unlikely to match commercial aroclor mixtures thus placing significant limitations on the analytical identification and quantitation of these constituents. The use of Aroclor data has been shown to underestimate the risk associated with the consumption of PCB contaminated fish and shellfish. The PPG biomonitoring plan for the Calcasieu estuary uses EPA Method 1668 – It can determine all 209 PCB congeners or any subset of the 209 congeners for water, soil, sediment or tissue (or other media) by gas chromatography/high-resolution mass spectrometry/selective ion monitoring (GC/HRMS/SIM). There are 12 PCB congeners that have toxicity equivalent factors for humans and wildlife (mammals and avian) – these are the 12 we would include in the analyte list for the risk assessment. Table 1 Twelve PCB Congeners that Pose the Most Ecological and Human Health Risks Congener IUPAC# Congener IUPAC# 3,4,4',5-TeCB PCB 77 3,3',4,4'-TeCB PCB 81 2',3,4,4',5-PeCB PCB 105 2,3',4,4',5-PeCB PCB 114 2,3,4,4',5-PeCB PCB 118 2,3,3',4,4'-PeCB PCB 123 3,3',4,4',5-PeCB PCB 126 2,3,3',4,4',5'-HxCB PCB 156 2,3',4,4',5,5'-HxCB PCB 157 2,3,3',4,4',5-HxCB PCB 167 3,3',4,4',5,5'-HxCB PCB 169 2,3,3',4,4',5,5'-HpCB PCB 189 EPA concurs with the State recommendation and the work plan should further clarify that these congener analyses will be included during the Tier 2 RI work plan at areas of concern for further evaluation.	Fish and shellfish tissue samples will not be collected for analysis during the Tier 1 RI. Following a screening evaluation, PCB congener analysis will be considered during the Tier 2 RI at sample locations and in sample matrices that require further evaluation.	Section 3.2.1, Section 6.3.5, and Section 6.4 (See October 2010 comment responses)

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3	General Comments Applicable to Assessment of Human and Ecological Risk	LDEQ	Chlorinated furans are impurities in aroclor mixtures. EPA Method 1613 identifies and quantifies the 17 toxicologically significant. Table 2 below is the list from RECAP. Table 2. Seventeen Chlorinated Dioxin and Furans Congener Congener Congener Congener 2,3,7,8 TCDF 2,3,7,8 TCDD 1,2,3,7,8 PeCDF 2,3,4,7,8 PeCDF 1,2,3,7,8 PeCDD 1,2,3,4,7,8 HxCDF 1,2,3,6,7,8 HxCDF 2,3,4,6,7,8 HxCDF 1,2,3,7,8,9 HxCDF 1,2,3,4,7,8 HxCDD 1,2,3,6,7,8 HxCDD 1,2,3,7,8,9 HxCDD 1,2,3,4,6,7,8 HpCDF 1,2,3,4,7,8,9 HpCDF 1,2,3,4,6,7,8 HpCDD OCDF OCDD EPA concurs with the State recommendation and the work plan should further clarify that these Dioxin and Furans analyses will be included during the Tier 2 RI work plan at areas of concern for further evaluation.	Following a screening evaluation, PCB congener analysis will be considered during the Tier 2 RI at sample locations and in sample matrices that require further evaluation.	None (See October 2010 comment responses)
4	Screening Level Human Health Risk Assessment Page 21, Refers to Table 2A	LDEQ	This table does not include RECAP Screening Standards (RECAP SS). The SS for Industrial Soil (SSi) is 0.9 mg/kg Total PCB. This is lower than the table Aroclor concentration for 1016, 21 mg/kg. The RECAP SS is also much lower than the sum of the Aroclor concentrations in the table, 25.04 mg/kg. EPA Method Number 1668 will provide speciation of PCB congeners which, must be done to produce a verifiable assessment of risks posed by weathered PCB. The relative abundances of congeners in weathered PCB mixtures, "Aroclors" bear little resemblance to the original composition. CH/CRA please include RECAP Screening Standards.	Table 2A will be revised to include applicable soil RECAP Screening Standards for an industrial exposure scenario.	Table 2A (See October 2010 comment responses)
5	Screening Level Human Health Risk Assessment	LDEQ	Filtering water column samples is not acceptable. Particulate mater that is suspended in the water column will be taken up by many aquatic species and terrestrial and avian species that also enter the water. EPA concurs with the State recommendation and has included a similar comment.	Laboratory analysis will include both filtered and unfiltered surface water samples. The unfiltered surface water data data will be used to evaluate the ingestion exposure pathway and the filtered surface water sample data will be used to evaluate the dissolved phase constituent concentrations for the dermal exposure pathway. Sect. 3.2.7 will be revised to reflect this change.	Section 3.2.7
6	Screening Level Human Health Risk Assessment	LDEQ	95%UCL-AM concentrations should be calculated using EPA's ProUCL 4.0 and the recommended UCL should be used as the concentration for risk evaluation. EPA concurs with the State recommendation and has included a similar comment.	Maximum observed concentrations will be used for both the human health and ecological screening evaluations in the Tier 1 RI. ProUCL 4.0, or other statistically similar and appropriate methods, will be used to calculate 95% UCLs for use in the HHRA and BERA in the Tier 2 RI. The Work Plan will be revised to reflect this change.	Section 3.2.2
7	Screening Level Human Health Risk Assessment	LDEQ	The 95%UCL-AM concentration should be representative of the COC concentrations present throughout the boundaries of the area of impact (AOI). Human health and ecological risks cannot be adequately characterized by a minimum data set (such as the minimum 10 samples proposed). CH/CRA please note. Although the document presents a minimum of ten, it is our recollection from the scoping meeting that 15 to 20 samples were to be collected from all parts of the site, except at the south half of the lake. Currently the plan presents more than ten samples in those areas. CH/CRA need to keep in mind that if fewer samples are collected, there will be a higher risk of data gaps that will have to be addressed in the Tier 2 RI WP. In other words, a couple of extra samples could save having to go back to collect more data.	Maximum observed concentrations will be used for both the human health and ecological screening evaluations in the Tier 1 RI. ProUCL 4.0, or other statistically similar and appropriate methods, will be used to calculate 95% UCLs for use in the HHRA and BERA in the Tier 2 RI. The Tier 2 RI sampling program will consider data needs for the HHRA and the BERA based on the results of the Tier 1 RI screening level human health risk assessment and the SLERA. The Work Plan will be revised to reflect this change.	Section 3.2.2

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8	Screening Level Human Health Risk Assessment	LDEQ	It is important to note that, depending on site conditions, other measures of sediment COC concentrations may correlate better with tissue COC concentrations (such as the surface weighted average) than the 95%UCL on the arithmetic mean concentration.	Following the evaluation of the Tier 1 RI sample results, additional site characterization will be completed in specific areas, if needed. The Tier 2 RI will likely include collection of fish tissue samples, and these data would be used in the subsequent HHRA to evaluate potential risks to humans who consume locally caught fish. In this case, correlation between sediment and biota concentrations would likely be unnecessary. The use of weighted average approaches will be considered, as appropriate, during the Tier 2 RI.	None
9	Screening Level Human Health Risk Assessment	LDEQ	It is generally recommended that when evaluating health risks associated with the fish / shellfish ingestion pathway at sites under investigation/remediation (and under a fish consumption advisory), that the exposure assumptions be consistent with those used by the State for determining the need for (or for rescinding) a fish consumption advisory. EPA concurs with the State recommendation; CH/CRA should consider exposure assumptions used by the State for the consumption advisory and exposure assumptions used by the EPA in previous risk assessments conducted for this site.	The human health risk methodology to determine the need for remedial measures to protect for consumption of fish is generally incompatible with the methodology used to determine the need for fish advisories. For example, a cumulative target risk level of $1x10^{-4}$ is used in HHRAs to determine the need for remedial measures while fish advisories are typically based on a target risk level of $1x10^{-4}$ for individual constituents. The USEPA fish advisory method involves use of variable intake rates to determine warnings related to different consumption rates, and includes factors to address constituent loss during preparation (cooking). Fish advisories are developed on a species-specific basis, and are typically determined by the number of analytical composite test results that fall into categories defined by the various intake rates, i.e., risk-based concentration for 1 meal per week, 2 meals per month, etc. The draft LDEQ method, while using a single default ingestion rate, still involves species-specific evaluations and also stipulates use of average concentration rather than the 95% UCL concentration. For these reasons, use of fish advisory methodology is regarded as inappropriate for the Devil's Swamp HHRA and inconsistent with USEPA RAGS approaches.	None
LDEQ COMMENTS: ENCLOSURE 2 - FOR FUTURE REFERENCE					
1	Screening Level Human Health Risk Assessment - For Future Reference	LDEQ	The maximum detected concentration not the 95% Pro UCL 4.0 on the arithmetic mean is used for screening purposes. EPA concurs with the State recommendation and has included a similar comment.	Maximum observed concentrations will be used for both the human health and ecological screening evaluations in the Tier 1 RI. ProUCL 4.0, or other statistically similar and appropriate methods, will be used to calculate 95% UCLs for use in the HHRA and BERA in the Tier 2 RI. The Work Plan will be revised to reflect this change.	Section 3.2.2
2	Screening Level Human Health Risk Assessment - For Future Reference	LDEQ	Screening standards are generally based a 10-6 point of departure for cancer risk, not 10-5. Furthermore, a higher target cancer risk is not justified for screening purposes based on the likely presence of other carcinogenic compounds that are not being addressed in this assessment. EPA concurs with the State recommendation and has included a similar comment.	The target risk level for screening purposes will be $1x10^{-6}$. Sect. 4.1 will be revised to reflect this change.	Section 4.1
3	Screening Level Human Health Risk Assessment - For Future Reference	LDEQ	Sediment quality goals developed using generic BSAF are not appropriate for determining if health risks are acceptable or unacceptable. The use of the BSAF approach is most effective when the BSAF are developed using site-specific data and when applied in closed water bodies. BSAF-based sediment criteria are most useful in delineating areas potentially requiring remediation and for predicting the potential decrease in tissue COC concentrations associated with remedial alternatives during the feasibility study. The BSAF used in the development of the proposed SQG is not referenced with regard to the aroclor or PCB congener nor fish/shellfish species represented by the BSAF. In general, it is unclear if this BSAF is appropriate for the evaluation of site conditions and/or recreationally relevant species present at Devil's lake. EPA concurs with the State that this comment needs to be clarified. CH/CRA please clarify.	The methodology and input values to derive SQGs, including bioaccumulation factors, are consistent with those used by USEPA to develop sediment guideline values. These SQGs are proposed for use in the Tier 1 RI to help identify areas of the site that have been impacted by PCBs and that may be subject to further site characterization in the Tier 2 RI. As noted in responses to other comments, the Tier 2 RI will likely include collection of fish tissue samples, and these data would be used in the subsequent HHRA to evaluate potential risks to humans who consume locally caught fish. In this case, correlation between sediment and biota concentrations would likely be unnecessary.	None
4	Screening Level Human Health Risk Assessment - For Future Reference, Soil. Page 29-30	LDEQ	RECAP has standards for "Total PCB". They should be included this discussion. CH/CRA please include.	Table 2A will be revised to include applicable soil RECAP Screening Standards for an industrial exposure scenario.	Table 2A

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5	Ecological Risk Assessment	LDEQ	The comparison of media-specific data with generic ecological screening values for PCBs is not a technically defensible approach for characterizing/ruling out potential risks to ecological receptors for the following reasons: 1) the EPA Baseline Ecological Risk Assessment (1999) concluded that the COC present in Devil Lake sediment pose significant risks to ecological receptors; 2) the likelihood that environmental conditions of the lake have not changed significantly since 1999; and 3) generic ecological screening standards/ecotox thresholds may not be adequately protective for upper trophic wildlife for chemicals that bioaccumulate; bioaccumulation is species-specific and highly dependent on site-specific conditions.	The SLERA will evaluate the potential for risk to receptors in all media (surface water, sediment, soil, prey items). Because the mechanisms of fate and transport and the receptors exposed to the various media are different, each media should be evaluated independently. Risk to invertebrates and fish that inhabit the water column will be evaluated for surface water. Risk to benthic invertebrates and bottom dwelling fish will be evaluated for sediment. Risk to plants and soil invertebrates will be evaluated for soil. Risk to upper trophic level receptors (piscivores, insectivores, herbivores, carnivores) will be evaluated using food chain models. As indicated in Equation 1 on Page 45, the food chain models will consider ingestion of prey, surface water, and incidental ingestion of sediment/soil (i.e., multi-media exposure routes). The SLERA will be based on sampling of sediment/soil and surface water and conservative assumptions regarding exposure and bioaccumulation. The Tier 2 RI sampling and the BERA may include analysis of PCB concentrations in prey consumed by site-specific receptors.	Section 5.3.1
6	Ecological Risk Assessment	LDEQ	The maximum detected concentration not the 95% Pro UCL 4.0 on the arithmetic mean is used for screening purposes.	Maximum observed concentrations will be used for both the human health and ecological screening evaluations in the Tier 1 RI. ProUCL 4.0, or other statistically similar and appropriate methods, will be used to calculate 95% UCLs for use in the HHRA and BERA in the Tier 2 RI. The Work Plan will be revised to reflect this change.	Section 3.2.2
7	Ecological Risk Assessment	LDEQ	Sediment toxicity testing would provide a more accurate evaluation of the toxicity of the sediments to benthic organisms in Devil Lake than screening against generic screening standards for a single COC. CH/CRA, please note. Toxicity testing may be required as an additional line of evidence during Tier 2 RI WP and should be further discussed at that time.	Toxicity testing will be considered in the Tier 2 RI program if the SLERA identifies the potential for risk to aquatic organisms.	None
8	Ecological Risk Assessment	LDEQ	For the evaluation of risk to terrestrial receptors due to the bioaccumulation/ biomagnification of PCBs in the tissues of prey (e.g., fish), it is recommended that the whole body PCB content of the prey species be characterized. Typically, of the terrestrial receptors, piscivorous mammals and birds are the most susceptible to PCB exposure/toxicity.	The SLERA will evaluate risk to upper trophic level receptors, including avian and mammalian pisicivores, using food chain models and conservative bioaccumulation factors from sediment and surface water to prey items	Section 5.2.1.7
9	Ecological Risk Assessment	LDEQ	As stated above, there are analytical limitations on the identification and quantitation of weathered aroclor mixtures. Therefore, where ecotoxicity data is available, it is preferable that risk be estimated on a congener basis. TEFs (WHO 2005) are available for PCB congeners with dioxin-like activity for wildlife mammalian and avian species. CH/CRA EPA concurs with the State recommendation. Values are available from the World Health Organization (WHO) and EPA has made a policy to use them.	The SLERA will evaluate risk to avian and mammalian receptors using food chain and conservative assumptions based on PCB aroclors. Congener data will be considered in the Tier 2 RI. If the SLERA identifies the need for further evaluation of risk to avian and mammalian receptors, benchmarks for PCB congeners will be used.	Section 3.2.1, Section 6.3.5, and Section 6.4 (See October 2010 comment responses)
10	Ecological Risk Assessment - Table 1	LDEQ	Analysis of PCB congeners should be added to this table.	PCB congeners will be considered in the Tier 2 RI. Table 1 applies only to the Tier 1 RI sampling program.	Table 1 (See October 2010 comment responses)
11	Ecological Risk Assessment - Table 2	LDEQ	Analysis of PCB congeners should be added to this table.	PCB congeners will be considered in the Tier 2 RI. Table 1 applies only to the Tier 1 RI sampling program.	Table 2A (See October 2010 comment responses)

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12	Ecological Risk Assessment - Table 3	LDEQ	The "Total PCB" concentration in this table, 2.51 mg/kg exceeds the RECAP SS, 0.9 mg/kg Total PCB. Analyses of PCB congeners should be added to this table.	PCB congeners will be considered in the Tier 2 RI. Table 3 applies only to the Tier 1 RI sampling program. The SLERA will evaluate risk to various groups of ecological receptors at various trophic levels. The value of 2.51 mg/kg is a conservative screening value based on a specific group of ecological receptors (soil invertebrates). As demonstrated in Table 3, different groups of receptors have different sensitivities to PCBs. Further analysis of risk will be completed in the Tier 2 RI for all groups of receptors that the SLERA identified as potentially at risk. It is our understanding that the RECAP screening value is based on human receptors, not ecological receptors. The HHRA will consider screening values specific to human receptors.	Table 3A and Table 3B (See October 2010 comment responses)
13	6.0 Regulatory Agency Notification and Reporting Requirements - 6.1 NOTIFICATIONS	LDEQ	The LDEQ-RSD should be notified as well. The contacts are thomas.stafford@la.gov and 225-219-3222, vicki.hadwin@la.gov and (225)219-3225, gary.fulton@la.gov and 225 219-3207.	The requested notifications will be added to the project submittals.	None
14	Quality Assurance Project Plan	LDEQ	LDEQ signed the Quality Management Plan. We should sign this as well.	The Quality Assurance Project Plan will be revised to include LDEQ signature.	QAPP

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EPA Comments					
1	---	EPA	Federal and State reviewers have provided comments presenting a strong concern that the use of Aroclor data is likely to underestimate total PCBs and does not address the toxicity of dioxin-like congeners. They requested that congener analysis be conducted at this time under Tier 1 (RI) work since it would be more cost effective at the end.	Clean Harbors proposes to test (laboratory) a percentage of sediment samples to be submitted for laboratory analysis of the World Health Organization (WHO) 12 PCB congeners that have toxicity equivalent factors for humans, mammals, and birds. The proposed list is included as Table 1. The sediment samples proposed for congener analyses will include approximately 25% of sediment samples collected from the depth interval of 0 to 6 inches below the water/sediment interface across the Site and approximately 10% of sediment samples collected from the 6-12" and 12-18" depth interval in the drainage ditch and north Devil's Swamp Lake AOIs. The surface sediment, within the top six inches, is considered the bioavailable zone in which human health and ecological receptors may be exposed to potential constituents in the sediment. Potential direct contact by human receptors and uptake by ecological receptors may occur within the surface sediment. Therefore, PCB congener data collected from the 0-6" sediment samples would be most appropriate for use in a risk assessment. The results will be evaluated to determine whether there is a statistically significant correlation between total aroclor concentrations and corresponding congener concentrations, as aroclor data will be collected from all of the deeper sediment sample intervals. The PCB congener data collected from the 6-12" and 12-18" depth interval will be used for site characterization and determination of nature and extent of potential PCB impact. The sediment sample locations proposed for PCB congener analysis are shown on attached Revised Figure 7. The proposed locations for PCB congener analysis were selected based on historical data collected at the Site.	Section 3.2.1, Section 6.3.5, and Section 6.4
2	---	EPA	A review of literature references and Internet articles report on the advantages of congener data over Aroclor data for environmental risk analysis. Using this type of data is reported more accurate for estimating individual Aroclors. Composition of weathered, degraded, and metabolized PCBs mixtures can be measured and interpreted easier. This type of data also quantitates World Health Organization (WHO) dioxin-like PCBs for dioxin cancer risks.	The Tier 1 RI Work Plan will be revised to include analysis of approximately 25% of the proposed 0-6" and approximately 10% of the 6-12" and 12-18" soil/sediment samples for the 12 WHO PCB congeners (listed in attached Table 1) by EPA Method 1668B in the drainage ditch and north Devil's Swamp Lake AOIs.	Section 6.3.5
3	---	EPA	In addition to PCBs, polychlorinated dibenzofurans (CDFs) should always be analyzed where aroclors have been released. As contaminants in the original Aroclor mixture, they will be released along with other PCBs and will partition similarly to the highly chlorinated PCB congeners of concern.	Potential analysis for CDFs will be addressed during the development of the Tier 2 RI Work Plan.	None
4	---	EPA	Please provide response on how to address this comment that represents a growing issue of interest in the field of risk assessment. Collecting a number of samples for congener analysis could be used to determine whether a statistically significant correlation exists between the total PCB concentrations and the "group of PCB congeners of interest," which typically includes the dioxin-like PCB congeners.	Analyses for PCB aroclors will be completed in accordance with EPA SW-846 Method 8082. The Tier 1 RI Work Plan will be revised to include analysis of approximately 25 percent of the proposed (0-6") and approximately 10% of the 6-12" and 12-18" soil/sediment samples for the 12 WHO PCB congeners (listed in attached Table 1) by EPA Method 1668B in the drainage ditch and north Devil's Swamp Lake AOIs. The results will be evaluated to determine whether there is a statistically significant correlation between total aroclor concentrations and corresponding "PCB congeners of interest."	Section 3.2.1, Section 6.3.5, and Section 6.4
LDEQ RSD's Responses to CH/CRA' Responses to EPA Comments					
5	Comment 5 and 7	LDEQ, RSD Division	Aroclor data will provide limited characterization of the types and quantities of PCBs present in the lake system. Aroclor analysis is not a measurement of individual congeners but simply an estimate of aroclor pattern recognition. As such, the analysis of highly weathered aroclor mixtures are unlikely to be recognized analytically as aroclor mixtures and thus the characterization of PCBs present in environmental and/or biological media will be limited. In addition, aroclor data does not allow for a congener-specific assessment of toxicity for the assessment of health and ecological risks and may result in the under- or over-estimation of risk. It is also important to note that the origin/source of the PCBs in Devil's Lake is not known – the PCBs present may or may not have originated from commercial aroclor mixtures.	The Tier 1 RI Work Plan will be revised to include analysis of approximately 25% of the proposed 0-6" and approximately 10% of the 6-12" and 12-18" soil/sediment samples for the 12 WHO PCB congeners (listed in attached Table 1) by EPA Method 1668B in the drainage ditch and north Devil's Swamp Lake AOIs.	Section 3.2.1, Section 6.3.5, and Section 6.4
6	Comment 6	LDEQ, RSD Division	The response states that impacts below the screening levels would generally require no further evaluation. Bioaccumulation pathways are complex and highly site-specific and species-specific. Therefore the development/application of a generic screening standard cannot, with adequate certainty, rule out areas of sediment contributing to the bioaccumulative pathway and the associated health and ecological risks. The EPA site-specific baseline risk assessments indicated that there are unacceptable risk to human health and ecological receptors associated with the bioaccumulation of PCBs in Devil's Lake. Therefore, it is unclear why a screening level analysis is being performed when a more sophisticated, detailed, site-specific assessment of risks has already been conducted.	As outlined in the EPA-approved Preliminary Site Characterization Report, the data collected in the previous investigations in the area of the Site do not meet the current data usability requirements outlined in EPA guidance due to multiple quality assurance (QA) issues. Therefore, a screening-level evaluation will be performed to identify the areas and constituents at the Site that may require further investigation.	Section 3.2.3

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Item No.	*Reference*	*Comment made by*	*Comment*	*Response*	*A revision is included in the Final Tier 1 RI Work Plan in the location cited below*
7	Comment 19	LDEQ, RSD Division	Response does not address the concern given in the comment. EPA's comment references wildlife, the response references screening standards for human health.	Risk to upper trophic level receptors (piscivores, insectivores, herbivores, carnivores) will be evaluated using food chain models. The food chain models will consider ingestion of prey, surface water, and incidental ingestion of sediment/soil (i.e., multi-media exposure routes).	Section 5.2.1.7
8	Comment 23	LDEQ, RSD Division	The pathway of greatest concern at Devil's Lake is not direct human contact but rather bioaccumulation. Therefore, it is critical that the distribution of PCB concentrations in the lake sediment be adequately characterized particularly the depositional areas along the center line of the lake. Biota are mobile and are likely to be exposed to sediments throughout the lake.	The proposed sediment sample locations will be revised to include the depositional areas along the approximate midline of Devil's Swamp Lake. The proposed sample locations are shown on attached Revised Figure 7.	Figure 7 and Section 6.3.5.1
LDEQ RSD's Responses to CH/CRA' Responses to RSD's Comments					
9	Comment 1	LDEQ, RSD Division	Please clarify why a screening level risk analysis is being performed when more sophisticated, detailed, site-specific assessments of human health and ecological risks have already been conducted. It would seem that the objective of the work plan at this point should be to further characterize the nature and extent of PCBs in the sediment and biota to allow for revisions of the risk assessments and aid in the identification of areas requiring remediation.	As outlined in the EPA-approved Preliminary Site Characterization Report, the data collected in the previous investigations in the area of the Site do not meet the current data usability requirements outlined in EPA guidance due to multiple quality assurance (QA) issues. Therefore, a screening-level evaluation will be performed to identify the areas and constituents at the Site that may require further investigation.	Section 3.2.3
10	Comment 2	LDEQ, RSD Division	The collection of Aroclor data during Tier 1 of the site assessment: 1) may lead to misidentification of areas requiring further assessment and/or action under Tier 2; 2) result in a less robust dataset since aroclor and congener datasets (collected during Tier 2) cannot be combined; and 3) may generate aroclor and congener data sets that yield different conclusions and/or support different management decisions resulting in the need to collect additional data.	The Tier 1 RI Work Plan will be revised to include analysis of approximately 25% of the proposed 0-6" and approximately 10% of the 6-12" and 12-18" soil/sediment samples for the 12 WHO PCB congeners (listed in attached Table 1) by EPA Method 1668B in the drainage ditch and north Devil's Swamp Lake AOIs.	Section 3.2.1, Section 6.3.5, and Section 6.4
11	Comment 3	LDEQ, RSD Division	RSD's concern is that depending on analyses of Aroclors in a "Screening Risk Assessment" will allow significant concentrations of individual congeners to "screen out". This will cause many areas that should be considered to be ignored. Additionally, the response does not address the potential presence of chlorinated dioxins and furans which are known contaminants of PCB mixtures. These constituents should be identified as COC.	The Tier 1 RI Work Plan will be revised to include analysis of approximately 25% of the proposed 0-6" and approximately 10% of the 6-12" and 12-18" soil/sediment samples for the 12 WHO PCB congeners (listed in attached Table 1) by EPA Method 1668B in the drainage ditch and north Devil's Swamp Lake AOIs. Potential analysis for CDFs will be addressed during the development of the Tier 2 RI Work Plan.	Section 3.2.1, Section 6.3.5, and Section 6.4
12	Comment 4	LDEQ, RSD Division	DEQ note: It is "total PCBs" not "Aroclors" in RECAP.	Table 2A will be revised to include the RECAP Screening Standard for total PCBs in soil for an industrial exposure scenario.	Table 2A
13	Comment 5	LDEQ, RSD Division	EPA's Baseline Ecological Risk Assessment (1999) was based solely on analyses of Aroclors. Congener analyses or total PCB analyses may detect substantially different PCB concentrations. The results of a risk assessment based on congener analyses may be remarkably different (as much as 20 to 30 times) than risk assessment results based on aroclor data	The Tier 1 RI Work Plan will be revised to include analysis of approximately 25% of the proposed 0-6" and approximately 10% of the 6-12" and 12-18" soil/sediment samples for the 12 WHO PCB congeners (listed in attached Table 1) by EPA Method 1668B in the drainage ditch and north Devil's Swamp Lake AOIs.	Section 3.2.1, Section 6.3.5, and Section 6.4
14	Comment 7	LDEQ, RSD Division	Only if congener analyses are used to identify the risks.	The Tier 1 RI Work Plan will be revised to include analysis of approximately 25% of the proposed 0-6" and approximately 10% of the 6-12" and 12-18" soil/sediment samples for the 12 WHO PCB congeners (listed in attached Table 1) by EPA Method 1668B in the drainage ditch and north Devil's Swamp Lake AOIs.	Section 3.2.1, Section 6.3.5, and Section 6.4

APPENDIX A
EPA, LDEQ, AND EA ENGINEERING COMMENTS ON THE DRAFT TIER 1 REMEDIAL INVESTIGATION WORK PLAN
COMMENTS CONTAINED IN A LETTER TO PRESS CAMPBELL FROM BARTOLOME' J. CANELLAS, DATED OCTOBER 1, 2010
DEVIL'S SWAMP LAKE SITE
CERCLA DOCKET NO. 06-04-10
EAST BATON ROUGE PARISH, LOUISIANA
OCTOBER 2010

Item No.	*Reference*	*Comment made by*	*Comment*	*Response*	*A revision is included in the Final Tier 1 RI Work Plan in the location cited below*
15	Comment 8	LDEQ, RSD Division	It is stated that correlation between sediment and biota concentrations will likely be unnecessary. Based on the outcomes of the EPA human health and ecological baseline risk assessments, the pathway of concern at Devil's Lake is the bioaccumulation pathway. Therefore, the correlation between sediment and biota concentrations will likely drive the site investigation, risk assessments, and remedial efforts. Using models to quantify risks posed by bio-accumulation and bio-concentration of PCB's in soil, sediment, and surface water in "prey items" is unacceptable. The "prey items" must be sampled to assess the threat to higher trophic level species.	The SLERA, as proposed, will have an adequate level of conservatism to ensure that a potential for risk is not incorrectly dismissed. Maximum concentrations within each sampling area will be used. Conservative bioaccumulation factors and uptake factors will be used. The use of bioaccumulation and uptake factors usually overestimate concentrations of COPECs actually detected in biological tissues when compared to concentrations based on tissue analysis. Sampling and analysis of biological tissues provides the most appropriate data on the concentrations of constituents in prey consumed by humans and upper trophic level ecological receptors. However, collection of samples for tissue analysis is premature at this time. The Screening-Level Ecological Risk Assessment (SLERA) will include a detailed characterization of the ecological receptors within the assessment area. As directed by the Tier I, those receptors most critical to bioconcentration and bioaccumulation of constituents in the Devils Swamp Lake food web will be identified and their tissues sampled and analyzed in Tier 2. Step 5 of USEPA's 8-step Ecological Risk Assessment process includes field verification to verify that the proposed sampling program for the Baseline Ecological Risk Assessment (BERA) can be successfully completed. Such a sampling program in Tier 1, without adequate characterization of the ecological receptors present in the assessment area, is unlikely to produce an optimal dataset for evaluation of risk to either human or ecological receptors.	None
16	Comment 8 and 9	LDEQ, RSD Division	It is preferable that the PCB content of prey species be characterized through biota collection and sampling.	Potential analysis of biological tissue samples will be addressed during Tier 2, following completion of the SLERA.	None
17	Comment 9	LDEQ, RSD Division	The assumptions and methods set forth in Louisiana's *Protocol for Issuing Public Health Advisories for Chemical Contaminants in Recreationally-Caught Fish and Shellfish* are consistent with EPA guidance. Again, it is recommended that these assumptions and methods be used during the assessment and remedial planning portions of this project. It is expected at the completion of this project, that the resulting biota tissue concentrations will meet the requirements of the protocol so that the seafood consumption advisory can be lifted.	Potential collection and analysis of biological tissues considered during Tier 2 will be consistent with the referenced protocols and methods.	None
18	Comment 10	LDEQ, RSD Division	PCB and dioxin – furan congener analyses must occur during the Tier 1 Assessment	Potential analysis for dioxins and furans will be addressed during the development of the Tier 2 RI Work Plan.	None
19	Comment 11	LDEQ, RSD Division	PCB and dioxin – furan congener analyses must occur during the Tier 1 Assessment	Potential analysis for dioxins and furans will be addressed during the development of the Tier 2 RI Work Plan.	None
20	Comment 12	LDEQ, RSD Division	EPA's Baseline Ecological Risk Assessment (1999) was based on Aroclors analyses. Congener analyses or total PCB analyses may detect substantially different concentrations than aroclor analysis. The results of a risk assessment based on congener analyses may be remarkably different than the results of a risk assessment based on aroclor data. Therefore, in order to more accurately characterize the nature and extent of PCB/dioxin/furan and thus more accurately estimate potential ecological risks, PCB and dioxin /furan congener analyses should be conducted during the Tier 1 Assessment.	The Tier 1 RI Work Plan will be revised to include analysis of approximately 25% of the proposed 0-6" and approximately 10% of the 6-12" and 12-18" soil/sediment samples for the 12 WHO PCB congeners (listed in attached Table 1) by EPA Method 1668B in the drainage ditch and north Devil's Swamp Lake AOIs. Potential analysis for CDFs will be addressed during the development of the Tier 2 RI Work Plan.	Section 3.2.1, Section 6.3.5, and Section 6.4
EA Engineering, Science, and Technology, Inc., Response to CRA Response to EPA Comments					
21		EA Engineering, Science, Technology, Inc.	One comment that was not incorporated was the recommendation to consider moving some samples to the center-line of the lake. The rationale against center-line sampling provided by the PRP was that direct human contact with these sediments is unlikely. While this may be the case, deeper portions of the lake may act as accumulation points for polychlorinated biphenyls (PCBs), which may then bioaccumulate in biota consumed by humans. The current plan to sample closer to the shoreline is acceptable, assuming that bathymetry, patterns of PCB distribution in sediment, and other lines of evidence do not indicate any data gaps. Such a data gap could be examined during the Tier 2 investigation, as needed.	The proposed sediment sample locations will be revised to include the depositional areas along the approximate midline of Devil's Swamp Lake. The proposed sample locations are shown on attached Revised Figure 7.	Figure 7 and Section 6.3.5.1

APPENDIX A
EPA, LDEQ, AND EA ENGINEERING COMMENTS ON THE DRAFT TIER 1 REMEDIAL INVESTIGATION WORK PLAN
COMMENTS CONTAINED IN A LETTER TO PRESS CAMPBELL FROM BARTOLOME' J. CANELLAS, DATED OCTOBER 1, 2010
DEVIL'S SWAMP LAKE SITE
CERCLA DOCKET NO. 06-04-10
EAST BATON ROUGE PARISH, LOUISIANA
OCTOBER 2010

Item No.	*Reference*	*Comment made by*	*Comment*	*Response*	*A revision is included in the Final Tier 1 RI Work Plan in the location cited below*
22		EA Engineering, Science, Technology, Inc.	Another comment that was not incorporated was the LDEQ recommendation to analyze a subset of samples collected during the Tier 1 investigation for PCB congeners. Given the timeframe over which PCBs were released to Devil's Swamp Lake, it is expected that the ratios of congeners in sediments may differ from the original ratios resulting from release of Aroclors. As such, results reported in terms of Aroclors may not account for the total concentration of PCBs in sediment. One of the following approaches could be used to address these concerns: - Additional sediment from a subset of sample locations collected during the Tier 1 investigation could be submitted for PCB congener analyses. - Additional sediment volume (approximately 8 to 16 ounces) could be collected, extracted, and archived for later analysis for PCB congeners based on the results of the Tier 1 evaluation; the holding time for this analysis is typically 7 days to extraction, and 40 days to analysis; however, the analytical holding time may not be provide sufficient time for evaluation of aroclor analytical data.	The Tier 1 RI Work Plan will be revised to include analysis of approximately 25% of the proposed 0-6" and approximately 10% of the 6-12" and 12-18" soil/sediment samples for the 12 WHO PCB congeners (listed in attached Table 1) by EPA Method 1668B in the drainage ditch and north Devil's Swamp Lake AOIs.	Section 3.2.1, Section 6.3.5, and Section 6.4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

November 10, 2010

Mr. Press Campbell
Conestoga-Rovers & Associates (CRA)
4875 South Sherwood Forest,
Baton Rouge, LA, 70816,
Tel (225) 292-9007

Reference: Devil's Swamp Lake Superfund Site, AI#86800,
East Baton Rouge Parish, LA, EPA Id #LAD981155872,
Remedial Investigation/Feasibility Study
Responses to Tier 1 Remedial Investigation (RI) Work Plan Comments and "Additional Response to comments on draft work plan by USEPA, LDED, and others" (Document submitted on November 3, 2010).

Dear Mr. Campbell:

The present is to inform you that the EPA and the representatives from the Louisiana Department of Environmental Quality (LDEQ) have reviewed the above responses and found them acceptable. Responses are approved.

Please proceed to revise and incorporate these responses into the Tier 1 RI Work Plan to produce the final work plan. This final work plan should be submitted and distributed as previously specified. Also, please proceed to submit the revised Quality Assurance Project Plan (QAPP) for review and approval, and please note that the LDEQ has previously requested to participate of the approval process.

Any unresolved concerns with biota sampling will be addressed under the Tier 2 RI Work Plan.

If you have any question, please contact me at your earliest convenience at (214) 665-6662, or Mr. Thomas Stafford (LDEQ Project Manager – (225) 219-3222).

Sincerely,

Bartolomé J Cañellas

Bartolomé J Cañellas, P.E. (6SF-RL)
EPA Region 6, Remedial Project Manager

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cc:
LDEQ Agency Interest #86800
Thomas Stafford, LDEQ.
Louisiana Department of Environmental Quality
Remediation Services Division
P. O. Box 4314
Baton Rouge, LA 70821-4314

Mr. John C. Arbuthnot, P.E.
Senior Remediation Manager
Clean Harbors Environmental Services, Inc.
13351 Scenic Highway
Baton Rouge, LA 70807-1021
(Tel) (225) 778-3596

EPA Site File LAD981155872

Philip Turner, EPA R6.

APPENDIX B

SITE MANAGEMENT PLAN

SITE MANAGEMENT PLAN
TIER 1 REMEDIAL INVESTIGATION WORK PLAN

DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
AGENCY INTEREST (AI) NO. 86800
EPA ID LAD981155872, SSID #06N1
CERCLA DOCKET NO. 06-04-10

Prepared For:

Baton Rouge Disposal, LLC
Baton Rouge, Louisiana

NOVEMBER 2010
REF. NO. 055364-00 (9) APP B

APPENDIX B

SITE MANAGEMENT PLAN

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1.0 INTRODUCTION

This Site Management Plan (SMP) was prepared to outline the project management, technical, and support processes to be utilized during completion of the Tier 1 Remedial Investigation/Feasibility Study (RI/FS) activities at the Devil's Swamp Lake Site in East Baton Rouge Parish, Louisiana (Site). The SMP also outlines the access, security, and contingency procedures to be implemented during the Tier 1 RI activities. The SMP is intended to supplement the Tier 1 RI Work Plan (WP) as a supporting document to be referenced during the Tier 1 RI activities. The objective of this Site Management Plan is to identify the organizational structure of the project management team and define each member's role and responsibilities during completion of the RI/FS activities at the Site and to provide written understanding of the Site access, security, and contingency procedures.

This SMP was prepared in accordance with the requirements outlined in the Unilateral Administrative Order (UAO) for Remedial Investigation/Feasibility Study (RI/FS) for the Devil's Swamp Lake Site issued on December 3, 2009. The UAO was issued to Baton Rouge Disposal, LLC, by EPA Region 6 and became effective on December 18, 2009. This Report was prepared to meet the requirements of Task 1.1.2.1 of Appendix A of the UAO (Statement of Work [SOW]).

In addition, the Quality Management Plan (QMP) was submitted to the U.S. Environmental Protection Agency (EPA) on February 18, 2010. The purpose of the QMP is to establish program consistency in the application of Quality Assurance (QA) practices for all Site activities conducted during this project. The QMP contains additional information that describes the project management roles and responsibilities.

1.1 SITE HISTORY

Baton Rouge Disposal, LLC, currently owns and Clean Harbors Baton Rouge, LLC, currently operates the former Rollins facility adjacent to the Devil's Swamp Lake Site. Beginning in 1971, the Rollins facility discharged treated process wastewater to Devil's Swamp Lake through National Pollutant Discharge Elimination System (NPDES) permitted Outfall 001 and stormwater runoff through Outfall 002. In 1993, the treated water discharge line (Outfall 001) was installed directly to the Mississippi River. Stormwater from Outfall 002 continues to discharge to Devil's Swamp Lake through the drainage ditch from the former Rollins facility.

Previous risk assessments indicate reportedly unacceptable human health and ecological risks in the lake and portions of the swamp surrounding the lake. Polychlorinated biphenols (PCBs) have been identified by the EPA as the primary constituent of concern (COC) in the sediment and in aquatic receptors at Devil's Swamp Lake. In March 2004, the EPA identified the commercial hazardous waste disposal facility formerly operated by Rollins as the apparent source of the Devil's Swamp Lake PCB impact.

1.2 SITE LOCATION

Devil's Swamp Lake is a man-made, crescent-shaped lake located on the Mississippi River east bank floodplain approximately ten miles north of Baton Rouge, Louisiana. The lake was excavated in 1973 and 1974 by the United States Army Corps of Engineers New Orleans District to provide a source of borrow material for levee construction to reinforce the levee along the north and west sides of the Port of Greater Baton Rouge Terminal (Baton Rouge Barge Harbor). The approximate coordinates at the Clean Harbors (former Rollins) facility Main Gate are 30° 34′ 45″ north latitude and 91° 12′ 26″ west longitude. A vicinity map that shows the location of the Site is presented as Figure 1 in the Tier 1 RI Work Plan.

The Site staging area will be determined upon initiation of Tier 1 RI sampling activities based on Site conditions at the time of the field work. The Site staging area will likely be accessed by Barge Terminal Road, adjacent to the Clean Harbors facility, following check-in at the Clean Harbors facility Main Gate. The Site staging area will likely be located near the bank of Devil's Swamp Lake.

2.0 CURRENT SECURITY SAFEGUARDS AND CONTROLS

Physical and behavioral measures will be maintained to manage the passage of personnel and vehicles into, out of, and within the Site. The Clean Harbors (former Rollins) facility is fenced around the perimeter; however, the Devil's Swamp Lake Site currently does not have a fence surrounding the perimeter. Access to the Site will be controlled through the Clean Harbors facility Main Gate. The primary means of ingress and egress at the Clean Harbors facility is through the facility Main Gate located on Scenic Highway. The Main Gate security guard office is staffed 24 hours per day, 7 days per week. Contact information for on-Site personnel authorized to grant Site access will be provided to the security guard at the Main Gate. All visitors who enter and exit the Site, including contractors, government agency representatives, Conestoga-Rovers & Associates (CRA) employees and subcontractors, and Clean Harbors employees, must

sign in and out at the Main Gate. The Site staging area may be accessed through the facility access gate(s). All employees, visitors, and contractors are required to have photo identification at all times while on Site. The Site staging area will likely be accessed by Barge Terminal Road, adjacent to the Clean Harbors facility, following check-in at the Clean Harbors facility Main Gate. Access agreements with the current property owners and/or leasees will be executed prior to initiation of the field activities at the Site.

3.0 PREVENTATIVE SECURITY PROCEDURES

Procedures will be utilized daily to ensure the safety of Site personnel and the security of information and property. Normal working hours at the Clean Harbors facility are between 7:00 AM and 5:00 PM, Monday through Friday. Working hours at the Devil's Swamp Lake Site may vary depending upon the Site conditions and the sampling activities to be completed. Visitors will not be permitted to access the Site after normal working hours.

3.1 ARRIVAL PROCEDURES

Upon arrival but prior to entry to the Site, Site personnel will check in at the Clean Harbors facility Main Gate and inspect the access gate(s) and Site staging area for any unauthorized trespassers that may be present. If any unusual items are noted during the pre-arrival inspection, Site personnel are to re-locate to a safe location and immediately notify the CRA Site Supervisor and Clean Harbors Project Coordinator.

3.2 DEPARTURE PROCEDURES

Prior to departing the Site, the following procedures will be completed by Site personnel to ensure Site security:

- Shutdown and store in a secure area electronic devices such as laptops and cameras that may be easily stolen
- Visually inspect the Site to verify equipment and materials have not been tampered with throughout the day
- Inspect the perimeter of the Site for suspicious activity
- Exit the Site, lock all access gate(s), and check out at the Clean Harbors facility Main Gate

3.3 VISITOR/CONTRACTOR/EMPLOYEE SIGN-IN AND INSPECTION

All visitor, contractor, and employee vehicles are subject to search and inspection prior to entering the Clean Harbors facility and the Site. Access may be denied to any person if they are unwilling to provide proper photo identification or unwilling to wear proper personal protective equipment (PPE). Access may also be denied at any time based on the discretion of Clean Harbors. Property owner/lessee access will be coordinated through Clean Harbors, if needed.

Upon authorization to access the Site, all visitors will sign in at the Clean Harbors facility Main Gate. The following information should be provided by all Site visitors:

- Name
- Company
- Telephone number
- Date
- Time of entrance and exit
- Purpose of visit

4.0 EMERGENCY RESPONSE PROCEDURES

In the event of an emergency, on-Site personnel will notify local emergency authorities. Phone numbers for the local police department, fire department, nearest hospital, and other pertinent Site contact information are listed in the Site-specific Health and Safety Plan, attached to the Tier 1 RI Work Plan as Appendix F. In the event of an emergency, Site personnel are responsible for the following:

- All visitors and traffic will be prevented from entering the Site except for authorized emergency personnel
- Be prepared to meet, direct and/or escort external emergency response services and government agency representatives, as applicable, onto and within the Site, as necessary
- Initiate, maintain, and control communication between CRA and Clean Harbors

5.0 PROJECT ORGANIZATION

The project management team for completion of the RI/FS activities at the Devil's Swamp Lake Site includes the Respondent (Clean Harbors Environmental Services, Inc. [Clean Harbors] on behalf of Baton Rouge Disposal, LLC), the regulatory agency (EPA) and agency contractors, Respondent contractor (CRA), and other project stakeholders including the Louisiana Department of Environmental Quality (LDEQ), the Louisiana Department of Health and Hospitals (LDHH), and the US Fish and Wildlife Service (USFWS). The project organization chart is included as Attachment 1.

5.1 RESPONDENT

Baton Rouge Disposal, LLC, and Clean Harbors, Inc., are listed as the Respondents in the UAO. The Respondents are responsible for implementation of the RI/FS at the Site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERLA) regulatory framework within the jurisdiction of the EPA Region 6.

5.1.1 RESPONDENT PROJECT COORDINATOR

Clean Harbors has designated John Arbuthnot as the Respondent's Project Coordinator (PC) for completion of the RI/FS at the Site. The PC is responsible for implementation of the RI/FS in accordance with the UAO and for commitment of adequate resources to support the project.

5.2 REGULATORY AGENCY

The UAO was issued to the Respondents by EPA Region 6. RI/FS documentation and reporting will be submitted to the EPA for review and comment. The EPA will oversee the Respondents and its contractor(s) during the RI/FS process to ensure that all activities are being conducted in accordance with regulatory and guidance documents.

The CERCLA framework requires that for remedial actions, states be involved, including cost sharing. The LDEQ is the state agency that will share remedial action responsibilities with EPA.

5.2.1 REMEDIAL PROJECT MANAGER

The EPA has designated Bartolome J. Cañellas as the Remedial Project Manager (RPM) for completion of the RI/FS at the Site. The EPA RPM is responsible for overseeing the implementation of the requirements of the UAO. The EPA RPM shall have the authority lawfully vested in a Remedial Project Manager and On-Scene Coordinator by the National Oil and Hazardous Substances Pollution Contingency Plan. In addition, the EPA RPM shall have authority to stop any work required by the UAO and to take any necessary response action when he determines that conditions at the Site may present an immediate endangerment to public health or welfare or the environment.

5.3 RESPONDENT CONTRACTOR

Clean Harbors has retained CRA to act as the Supervising Contractor on behalf of Clean Harbors. CRA will be responsible for preparation and implementation of the environmental work plans, data collection activities, remediation plans, and remedial actions in accordance with the UAO. All project personnel will meet the following training and certification requirements:

- Site personnel will have Occupational Safety and Health Administration (OSHA) 40-hour health and safety and emergency response training.
- Site personnel performing Department of Transportation (DOT) functions (including selecting, packaging, marking, labeling, preparing shipping papers, and loading) will be trained in accordance with the requirements of Title 49 Code of Federal Regulations (CFR), Subpart H, Docket HM-126F. Subcontractors performing DOT functions must provide proof of training.
- All project personnel performing waste management will be trained in accordance with Title 40 CFR, Section (§) 265.16.
- All project personnel will attend a meeting on Site hazards. The meeting will address what Site hazards may be encountered and the procedures to follow if encountered.
- Subcontractor training records will be verified prior to the start of project activities.

5.3.1 CONTRACTOR PROJECT MANAGER

CRA has selected Pressley Campbell as the Project Manager (PM) for the Site. The CRA PM is responsible for overseeing the implementation of the UAO and shall coordinate

communications with Clean Harbors and the EPA RPM. The PM shall also coordinate the activities of the groups, subcontractors, and/or teams working on the project.

The PM also has the following specific responsibilities:

- Complete work activities in accordance with contract specifications and approved planning documents
- Ensure that work is conducted in a safe and environmentally sound manner
- Immediately notify the stakeholders of problems with work activities or safety and health procedures
- Ensure that Site personnel follow the approved procedures presented in the Site-specific project plans

The PM has the authority to stop work on any part of the job if it is found to be noncompliant with contract specifications or project plans. Further, the PM is authorized to institute corrective actions, as necessary, and to implement these changes, with Clean Harbors' approval, in accordance with the provisions of the contract.

5.3.2 ASSISTANT PROJECT MANAGER

CRA has selected Katie Menard as the Assistant PM for the Site. The Assistant PM will directly assist the CRA PM in overseeing project implementation and coordination of all work activities. The Assistant PM shall coordinate communications with Project Task Managers and other project personnel. In addition, the Assistant PM will coordinate and assist with the definition of applicable issues, data collection, and constraints for the project.

The Assistant PM has the authority to stop work on any part of the job if it is found to be noncompliant with contract specifications or project plans, and also has the authority to recommend corrective actions to the PM.

5.3.3 REGIONAL SAFETY AND HEALTH MANAGER

Mr. Ronald Bell is CRA's Regional Safety and Health Manager (SHM). The SHM shall be responsible for the review of the site-specific Health and Safety Plan (HASP) to ensure compliance with Title 40 CFR § 300.150 and Title 29 CFR § § 1910.120 1(1) and (1)(2), providing additional safety and health direction, and auditing as needed to ensure that the project meets contract requirements and the appropriate regulations.

The Regional SHM also has the following specific responsibilities:

- Ensure that work is conducted in a safe manner
- Evaluate each feature of work for safety and health risks
- Ensure that Site personnel follow the approved procedures presented in the Site-specific project plans
- Interpret sampling data required to determine appropriate upgrade or downgrade of personal protective measures
- Ensure compliance with specified safety and health requirements, federal, state, and OSHA regulations, as well as pertinent aspects of the HASP
- Immediately notify the stakeholders of problems with work activities or safety and health procedures
- Recommend corrective actions in coordination with the CRA PM for identified deficiencies and oversee the corrective actions

The Regional SHM is authorized to stop work if unacceptable safety and health conditions exist and to take appropriate measures to re-establish and maintain safe working conditions. The Regional Safety and Health Manager may not change the HASP or protocols without acceptance by Clean Harbors, if appropriate.

5.3.4 PROJECT QUALITY ASSURANCE OFFICER

CRA has selected Trace Chadwick as the Quality Assurance (QA) Officer for the project. The Project QA Officer is responsible for independently confirming the project quality implementation. Confirmation includes inspecting and reviewing work documentation to assess how effectively the Quality Assurance Project Plan (QAPP) is being implemented. The Project QA Officer is the single point of contact responsible for ensuring compliance with the requirements identified in the contract and the QAPP.

The Project QA Officer has the authority to stop work if it is found to be noncompliant with contract specifications or project plans, and also has the authority to recommend corrective actions to the PC and to require that a schedule for corrective action implementation be established. The Project QA Officer may delegate specific QA responsibilities to the Project Task Managers, as appropriate.

The Project QA Officer has quality management as a principal duty, but may be assigned other duties when the level of quality management activities does not warrant

full-time dedicated service and the other assigned duties do not conflict with the quality management duties.

5.3.5 PROJECT TASK MANAGERS

CRA has identified key Project Task Managers in technical areas required to complete the project. The Project Task Managers shall coordinate communications with the Assistant PM. The Project Task Managers have significant experience and a strong support team of qualified personnel to assist in the provision of the different components of the project. CRA has several Project Task Managers selected for this project, including expert personnel in wetlands evaluation and permitting, sediment management, risk assessment, hydrology, data validation, and innovative technology and treatability studies.

The Project Task Managers have the authority to stop work on any part of the task if it is found to be noncompliant with contract specifications or project plans, and also have the authority to recommend corrective actions to the PC.

5.4 SUBCONTRACTORS

CRA has an Approved Vendor List, in which each of these subcontractors has been pre-approved to work on CRA projects. The approved subcontractors have been evaluated on their safety and health programs, procedures, and ratings. If a specific subcontractor is required for a project, which is not already on the Approved Vendor List, the subcontractor will also need to be evaluated and approved based on safety and health requirements, prior to starting work at a CRA project site or property.

It is CRA's practice (and often a requirement of a Client contract) that subcontractors carry specific types of insurance coverage and limits. As a minimum, CRA's standard Terms and Conditions require the subcontractor to add CRA and the client as additional insured on certain of the subcontractor's liability insurance policies. Certificates of Insurance must be received, reviewed, and approved by the CRA PM before the subcontractor starts any work at the project Site or on the client's premises.

Under workers' compensation laws, some form of which exists in all states and provinces, employers must compensate their employees for employment-related injuries, regardless of fault. If a subcontractor does not maintain Workers'

Compensation Insurance, the subcontractor must complete a CRA Release and Indemnification Form before starting work at the project Site or property.

In addition, for required laboratory services, a CRA Chemist shall coordinate such services. CRA Chemists are trained for purchasing environmental laboratory services. If waste services are required, a member of the CRA Waste Services Group shall coordinate such services. CRA Waste Services Group personnel are specifically trained in that area of service.

6.0 REGULATORY AGENCY NOTIFICATION AND REPORTING REQUIREMENTS

6.1 NOTIFICATIONS

The EPA RPM and LDEQ-Remediation Services Division (RSD) shall be given at least 14 days advance notice of all field activities to be performed pursuant to the UAO.

Upon the occurrence of any event during performance of the work activities required under the UAO which requires reporting to the National Response Center, the EPA RPM and LDEQ-RSD shall immediately be notified. Within 14 days of the onset of such an event, the EPA RPM and LDEQ-RSD shall also be provided a written report detailing the events which occurred and the measures taken to mitigate the situation. Also, in the event of any action or occurrence during the performance of the requirements of the UAO which causes or threatens to cause a release of a hazardous substance or which may present an immediate threat to public health or welfare or the environment, appropriate actions shall be taken to prevent, abate, or minimize the threat. The EPA RPM and LDEQ-RSD shall also be immediately notified.

All reasonable measures to avoid or minimize delays will be taken. However, the EPA RPM and LDEQ-RSD shall be notified of any delay or anticipated delay in performing any requirements of the UAO within 48 hours of identification. Within five business days following EPA RPM and LDEQ-RSD notification, written notification fully describing the nature of the delay, any justification for the delay, the measures planned and taken to minimize the delay, and a schedule for implementing the measures that have been taken or will be taken to mitigate the effect of the delay.

All other warranted notifications will be communicated to the EPA RPM and LDEQ-RSD on an as-needed basis.

6.2 PROGRESS REPORTS

Weekly project status updates will be submitted to the EPA RPM as required by the UAO. These weekly updates will be communicated by meetings, telephone, or email and will include a summary of significant project activities for the previous week. In addition, a monthly progress report shall be submitted to the EPA RPM on or before the 15th day of the following month. The monthly progress reports will include: (1) descriptions of the work activities performed during the reporting period to meet the requirements of the UAO; (2) results of all sampling, tests, modeling, and all other data (including raw data) received or generated during the reporting period in the implementation of the work activities required by the UAO; (3) all actions, data, and plans scheduled for the next two months; and (4) the percentage of completion, all delays encountered or anticipated which may affect the schedule for completion of future work, and efforts to mitigate those delays or anticipated delays.

7.0 PROJECT MILESTONES

The project milestones will be completed in accordance with the requirements outlined in the UAO. The project deliverables and meetings will be completed as listed in the UAO Statement of Work (SOW) Attachment 1. The proposed project schedule is included as Exhibit 1 in the Tier 1 RI Work Plan.

8.0 PROJECT CLOSE-OUT

Following completion of all work activities required by the UAO and approval by the appropriate regulatory agencies (and any stakeholders), CRA will initiate project close-out activities. Project close-out shall include the archiving of project materials, holding a project retrospective meeting with all project stakeholders, and preparation of a summary to be submitted to Clean Harbors identifying lessons learned. CRA will solicit Clean Harbors feedback on how the project was performed. Project documents and records shall be archived for a minimum period of 10 years following completion of construction of any remedial action which is selected following the completion of the RI/FS process. These records will be maintained electronically on-Site or hard copy off-Site. After this ten year period, the EPA shall be notified at least 90 days in advance of documents and records destruction. Should the EPA request that the documents be retained longer, the documents and records shall be delivered to the EPA.

ATTACHMENT 1

PROJECT ORGANIZATION CHART

ATTACHMENT 1

PROJECT ORGANIZATION CHART

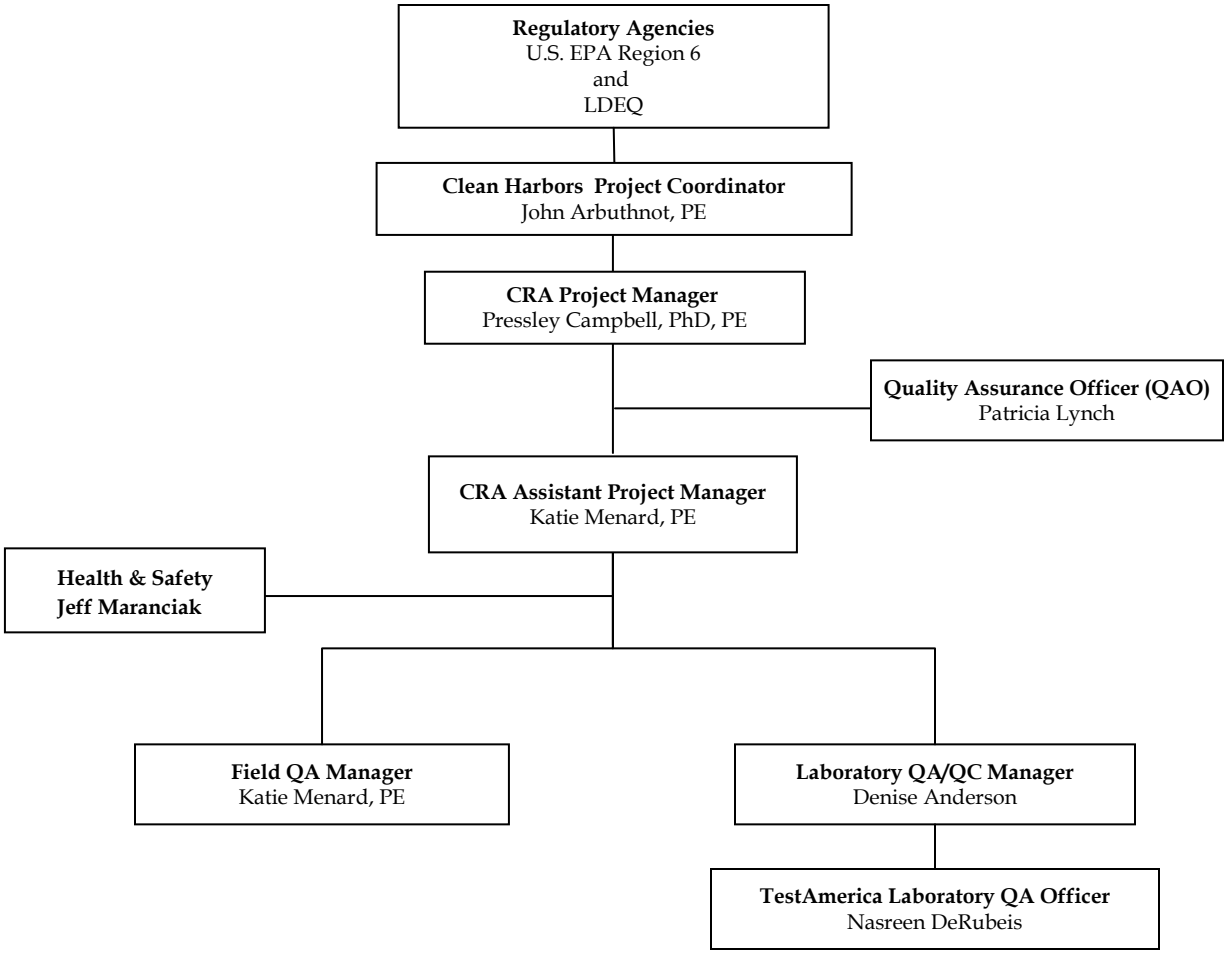
APPENDIX B – SITE MANAGEMENT PLAN

TIER 1 REMEDIAL INVESTIGATION WORK PLAN

DEVIL'S SWAMP LAKE SITE

EAST BATON ROUGE PARISH, LOUISIANA

CERCLA DOCKET No. 06-04-10



APPENDIX C

TECHNICAL SAMPLING AND ANALYSIS PLAN
STANDARD OPERATING PROCEDURES

TECHNICAL SAMPLING AND ANALYSIS PLAN
STANDARD OPERATING PROCEDURES
TIER 1 REMEDIAL INVESTIGATION WORK PLAN

DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
AGENCY INTEREST (AI) NO. 86800
EPA ID LAD981155872, SSID #06N1
CERCLA DOCKET NO. 06-04-10

Prepared For:
Baton Rouge Disposal, LLC
Baton Rouge, Louisiana

NOVEMBER 2010
REF. NO. 055364-00 (9) APP C

APPENDIX C

TECHNICAL SAMPLING AND ANALYSIS PLAN
STANDARD OPERATING PROCEDURES

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STANDARD OPERATING PROCEDURES FOR WATER QUALITY MONITORING AND DEPLOYMENT OF MULTI-PROBE WATER QUALITY MONITORING INSTRUMENT (SOP 001)

1.0 SCOPE AND APPLICABILITY

The purpose of this Standard Operating Procedure (SOP) is to detail the scope and schedule of activities to be performed. The objective of this SOP is to measure and record common water quality parameters using a Hydrolab® or similar water quality monitoring instrument.

2.0 EQUIPMENT AND SUPPLIES

The equipment to be used during the deployment of a Hydrolab® or similar instrument may include, but is not limited to the following:

- One boat or sampling barge
- Direct-read and properly calibrated water quality sampling instruments capable of recording temperature, DO, pH, conductivity, and salinity
- Flow/velocity meters
- 4L commercially obtained water sampler
- Field data sheets, indelible markers, and related materials
- Items needed to document data collection activities and to label sample jars for shipment, including: camera, field notebook, pens, sample labels, custody seals
- Personal protective equipment (PPE) as specified in the Health and Safety Plan (HASP)
- Decontamination equipment, including Alconox and deionized water

3.0 PROCEDURE

The following sections describe the methods to be used for the collection of water quality data. The general sampling approach will be to collect real-time water quality measurements that represent conditions present during sampling activities. Water parameters will be measured with direct read instruments. The direct read instruments will be properly calibrated for each parameter measured during the investigation. Field personnel will measure and record the following parameters:

- Water depth (meters)
- Salinity (parts per thousand)
- Dissolved oxygen (milligrams per liter)

- Temperature (degrees Celsius)
- Conductivity (microSiemens per centimeter)
- pH (standard units)

Water stage observations will include determination of whether or not sampling is occurring during high or low water stage. Ambient weather conditions will include air temperature, wind direction and approximate speed, and note any precipitation if occurring.

Readouts from the direct read meter will be recorded at each sampling location by a designated field team member assigned to record data. Data sheets will be completed in the field and compiled at the completion of each day's sampling activities.

Before beginning field activities, a 5/8-inch cotton or nylon rope may be attached to the water quality monitoring instrument electrical cable using duct tape, if needed. The purpose of the rope is to absorb the strain of deploying and retrieving the instrument. A 10 pound weight may be attached to the line used for deploying the instrument, if needed, so that the weight extends 18 inches below the instrument.

When transporting the instrument, care should be taken not to drop or bump the instrument. Pre and post-sampling and during transport of the instrument the cup must be full of water and attached to the bottom of the instrument covering and protecting the electrodes. This provides a moist environment and protects the sensitive electrodes. The D.O. membrane is to be kept moist. If the membrane is not kept moist the possibility of the membrane drying, cracking and wrinkling increases significantly. The D.O. electrolyte may also evaporate (the D.O. membrane is a semipermeable membrane). Either or both of these occurrences could affect subsequent D.O. readings, affecting their accuracy. The pH glass electrode must also be kept moist to function properly. The water used can be either brackish or freshwater.

The instrument should be inspected before use. Inspect all lines for worn areas. Inspect all knots for slippage. Attach the 10 pound weight to the rope used for deploying the instrument. The other end of the line should be tied to the vessel to prevent loss of the instrument.

Before deploying the instrument at the first station, remove the cup protecting the sensor electrodes and replace with the calibration cup (bottomless cup). Carefully place the instrument in a 5-gallon bucket with fresh water before beginning sampling.
The actual deployment and retrieval of the instrument involves four steps:

1. Remove the instrument from the 5-gallon bucket and remove the calibration cup. Lower the instrument in the water holding it so that it is fully submerged just below the water surface. Deployment of the instrument requires that the instrument be held submerged at the surface of the water to allow all sensors (electrodes) to equilibrate to the water. Turn on the display unit. The instrument should be held in this position until the dissolved oxygen (D.O.) display reading is stable (approximately 30 seconds).
2. After the equilibration time, slowly begin the descent of the instrument. Water quality data will be collected at mid-depth of the watercourse. Be careful not to allow the sensors on the bottom of the instrument to come in contact with sediment.
3. Record the sensor readings from the display unit when readings have stabilized (approximately 15 seconds).
4. Upon retrieving the instrument from the water, it should be decontaminated by washing the electrodes and body of the instrument with Alconox detergent and rinsing three times with de-ionized water. To decontaminate the electrodes, place the protective cup, filled ¾ full with Liquinox detergent, over the electrodes and gently swirl the instrument to dislodge any foreign particles and clean the electrodes. Remove the cup and discard the detergent solution in a container used for collecting decontamination products. Decontaminate the body of the instrument by using a brush saturated with Liquinox and gently scrubbing the casing. Rinse the body and electrodes three times with de-ionized water using a squeeze bottle while holding the instrument over the 5-gallon bucket used for collecting decontamination products. Visually inspect the electrodes to ensure they are not fouled or damaged. Re-install the calibration cup (bottomless cup) over the sensors and carefully place the instrument in the 5-gallon bucket of clean fresh water.

This four step procedure should be followed before and after each station deployment. After the last station has been monitored, decontaminate the instrument and place the filled protective cup over the sensors and prepare the instrument for transport. Properly dispose of the collected waste.

4.0 FIELD DATA SHEETS

Field data sheets will be completed at each surface water sampling location.

5.0 WATER QUALITY MONITORING

The following parameters will be completed using the multi-probe instrument:

- Water Depth - Record the water depth, in meters, from the display unit (meters)
- Dissolved Oxygen - Record the dissolved oxygen reading from the display unit (milligrams per liter)
- Specific Conductance - Record the specific conductance (conductivity) reading from the display unit (microSiemens per centimeter)
- PH - Record the pH reading from the display unit
- Salinity - Record the salinity reading from the display unit (parts per thousand)
- Water Temperature - Record the water temperature from the reading display unit (degrees celsius)

5.1 MULTI-PROBE MONITORING INSTRUMENT PRE- AND POST-SAMPLING CALIBRATION

5.1.1 FIELD INSTRUMENT CALIBRATION

The multi-probe monitoring instrument to be used in field sampling will be examined to certify that it is in operating condition. This includes checking the manufacturer's operating manual and the instructions for the instrument to ensure that maintenance requirements are being observed. Field notes from previous sampling trips will be reviewed so that the notation on any prior equipment problems are not overlooked and all necessary repairs to equipment have been performed.

The multi-probe instrument includes a temperature probe, specific conductivity sensor, D.O. sensor, pH sensor, and depth sensor. The instrument will be calibrated according to manufacturers' specifications. If the instrument fails to meet calibration/check-out procedures, it will be repaired and/or returned to the manufacturer for service.

The multi-probe instrument shall have a dedicated log book to record all calibrations, maintenance/repair work, and usage in a standard format which includes the calibrator's name, standard(s) used, date/time of calibration, corrective actions taken (when needed), instrument name/model, temperature, weather conditions, and results of calibration (raw data and summary). Entries to the instrument log books shall be made at least daily whenever the instrument is in use.

All personnel performing calibrations for an instrument shall be trained in its operation and calibrating procedures.

5.1.2 PRE- AND POST- SAMPLING CALIBRATION

Perform a pre- and post-sampling calibration of the multi-probe instrument to ensure performance and the accuracy of the data. Before using the instrument in the field calibrate the sensors of the instrument as per the manufacturers requirements. To calibrate the instrument, follow the manufacturers' calibration instructions.

After sampling ends each day, perform a post-sampling calibration. A post-sampling calibration will ensure the accuracy of the data and, if necessary, provide parameter correction factors for sensors which do not meet the post-sampling calibration ranges (manufacturers specified accuracy range for each specific sensor).

To conduct a post-sampling calibration, place standard solutions in the calibration cup and read the display reading for that parameter. If the display reading is within the manufacturers specified accuracy range then no correction factor is required for that parameter. However, if the display reading is outside of the manufacturers specified accuracy range a correction factor is needed for the field data collected that day. To calculate a correction factor use the formula:

CF = standard value/display reading

where:

CF = Correction Factor

Standard value = the manufacturer's value of the standard being read

Display reading = the value read off of the display unit for the standard

Then multiply the calculated correction factor (CF) by each of the field data points for that parameter to obtain the corrected field data points.

5.2 PRE- AND POST- SAMPLING FORMS

Complete pre- or post-calibration data sheets when a pre- or post-sampling calibration is conducted. Record the following parameters on the calibration data sheet.

- **Project No.** - Record the specific project number.
- **Date** - Record the date (MM/DD/YY).
- **Time** -Record the time of day, time should be recorded in military time.
- **Technician** - Record all persons conducting calibration/check.
- **Calibration pH** - Record the pH standard solution value (7 or 10) during pH calibration. Calibrate using both pH standard solution 7 and pH standard solution 10.
- **Post-sampling pH display reading** - Record the pH display reading of the standard pH solution during post-sampling calibration. Record for both pH buffer solutions, 7 and 10.
- **pH Correction Factor** - Calculate the correction factor for pH if necessary using the formula:

  CF = standard value/display reading

  where:

  CF = Correction Factor Standard value = the value of the standard Display reading = the value read off of the display unit for the standard

- **Calibration dissolved oxygen** - Record the dissolved oxygen saturation concentration during calibration (obtained from tables supplied from the manufacturer).
- **Post-sampling dissolved oxygen display reading** - Record the dissolved oxygen reading of the dissolved oxygen saturated water during post-sampling calibration.
- **Dissolved oxygen Correction Factor** - Calculate the correction factor for dissolved oxygen if necessary using the previously described formula.
- **Calibration Conductivity** - Record the conductivity standard solution value.
- **Post-sampling Conductivity display reading** - Record the conductivity display reading of the standard conductivity solution during post-sampling calibration.
- **Conductivity Correction Factor** - Calculate the correction factor for conductivity if necessary using the previously described formula.
- **Calibration depth** - Record the depth during depth calibration (should be 0.0).
- **Post-sampling depth display reading** - Record the depth display reading during post-sampling calibration.

- **Depth Correction Factor -** Calculate the correction factor for depth if necessary using the previously described formula.
- **Comments -** Record any unusual observations or comments.

6.0 EQUIPMENT DECONTAMINATION PROCEDURES

Decontamination of water quality field meters must be performed between each sampling event and location in accordance with the "Decontamination Procedures for Field Activities" SOP 005.

7.0 DATA AND RECORDS MANAGEMENT

The Field Team Leader or designee will complete field logs on a daily basis detailing personnel, stations sampled, sampling period, unusual field observations, samples collected, problems encountered, calibrations, significant telephone conversations, etc. Daily field logs should be kept in water resistant field notebooks labeled with the project description, project number, dates, and name.

Field data reporting shall be conducted principally through the transmission of report sheets containing tabulated results of all measurements made in the field and documentation of all field calibration activities. Field log books and preprinted field data forms will serve as the primary record of field investigation activities.

Field log books will be bound, uniquely numbered, and have numbered, water resistant pages. All pertinent information regarding the site and sampling procedures will be documented, with notations made in log book fashion, noting the time, date, and initials of the individual making each entry. Information recorded in this notebook will include, but not be limited to the following:

- Identity of project
- GPS coordinates (preferred) or visual location of the sampling location under investigation or interest
- Date and time of arrival and departures
- Weather conditions
- Name of person keeping log book
- Names of all field personnel on site

STANDARD OPERATING PROCEDURES FOR SURFACE WATER SAMPLING (SOP 002)

1.0 SCOPE AND APPLICABILITY

The purpose of this Standard Operating Procedure (SOP) is to provide details for the collection of surface water. This SOP details the equipment and devices required to collect surface water samples and the specific procedures that will be followed.

Surface water sampling requires a variety of procedures and instruments. The choice of procedure should be determined by site-specific conditions, such as the type of surface water body, the sampling depth, and the sample location's distance from shore. Samples can be collected from shallow depths by submerging the sample container. An intermediary disposable collection container or one constructed of a non-reactive material, messenger-activated sampler, or a peristaltic pump may be used depending on Site-specific conditions. Surface water samples will be filtered by the laboratory to remove any suspended sediment particles in the sample that may affect the sample results.

2.0 EQUIPMENT AND SUPPLIES

Equipment and supplies needed may include, but are not limited to the following:

- One boat or sampling barge for the purpose of collecting *in situ* parameters and surface water samples
- Direct-read and properly calibrated water quality sampling instruments capable of recording temperature, DO, pH, conductivity, and salinity
- Flow/velocity meters
- Van Dorn, Kemmerer, Niskin or similar messenger-activated water sampler
- Peristaltic pump
- Sample containers and coolers with wet ice for sample storage
- Field data sheets, COC forms, and related materials
- Silicone tubing
- Heavy-wall Teflon® tubing
- Point-source bailer
- Dipper
- Items needed to document data collection activities and to label sample jars for shipment, including: camera, film, waterproof field notebook, pens, sample labels, custody seals

- Personal Protective Equipment (PPE) as specified in the site Health and Safety Plan (HASP)
- Decontamination equipment, as specified in Section 4.0

3.0 PROCEDURE

3.1 WATER SAMPLE COLLECTION

Before collecting surface water samples, direct-read field meters will be deployed to measure the water quality parameters at each sample station. The direct read instruments will be calibrated twice each day for each parameter measured.

Suggested parameters targeted for measurement at each sampling station may include but are not limited to:

- Water depth (m)
- Temperature (°C)
- Dissolved oxygen (mg/L)
- Conductivity (S/cm)
- Salinity (^{o}/oo)
- pH (s.u.)
- flow/velocity (cm/sec)

Refer to the "Water Quality Monitoring and Deployment of Multi-Probed Water Quality Instrument" SOP 001 for the proper method for equipment calibration and meter methods.

3.2 SAMPLING PROCEDURE FOR SUBMERGING SAMPLE CONTAINER

Samples from depths of a only few inches or so may be collected by submerging the sample container. This method is advantageous when the sample might be significantly altered during transfer from a collection vessel into another container. All sampling containers should be made of inert and non-reactive materials.

3.2.1 PROCEDURE

1. Move to the sampling station and anchor to avoid drifting, if needed. Allow any disturbed sediment to settle prior to sample collection, especially at sample locations with shallow water depth.
2. Affix a completed sample container label to an appropriate sample container.
3. Before collecting the sample, measure the temperature, pH, and specific conductivity of the water body, as listed above. Record this information on the field sheet or in the log book.
4. For stream sampling, sample the location farthest downstream first. If sampling on foot, orient the mouth of the sample container upstream of your feet so as not to stir up any sediment that would impact the sample.
5. For a larger body of surface water, such as a lake, collect samples near the shore, unless boats are feasible and permitted. Collect samples from shallow depths by submerging the sample container. Collect samples from deeper depths using a transfer device.
6. Collect surface water samples at each location before collecting sediment samples to avoid impacting the water samples with excess suspended particles generated during sediment sampling.
7. Continue delivery of the sample until the container is almost full. Leave adequate space to allow for expansion. If sampling for volatile organics analysis, however, the container must be filled leaving no headspace.
8. Ensure that a Teflon® liner is present in the cap of the sample container, if required. Secure the cap tightly. Preserve the sample according to requirements in "Containers, Preservation, Handling, and Tracking of Environmental Samples."
9. Record the information in the field log book and complete chain-of-custody documents.
10. Decontaminate all sampling equipment before and after use and in between sampling locations in accordance with the "Decontamination Procedures for Field Activities" SOP 005.

3.3 SAMPLING PROCEDURE FOR MESSENGER-ACTIVATED SAMPLERS

Water samples collected using this method are to be taken with water bottle samplers (e.g., Kemmerer). These samplers are fairly simple devices that are made

up of a tube with stoppers at each end and a closing device that is tripped by the user. The device samples a predetermined amount of water at a designated depth described in the Work Plan. Several samplers can be used at once, each of them at their own set depth to speed up the process. Water bottle samplers that are commonly used include Van Dorn, Kemmerer, Niskin, Nansen, and the procedures outlined below apply to all of these sampling devices.

3.3.1 PROCEDURE

1. Move into position over the sampling station and anchor to avoid drifting.
2. After warm-up and calibration of the field meters, measure and record water quality parameters.
3. Check the appropriate sampler to ensure that the ends are open so that water is not trapped in the device.
4. Slowly lower the sampler through the water column to the correct sampling depth, trip the sampler messenger, and pull sampler to the water surface.
5. A messenger will activate the device in order to close the ends.
6. Once the water sampler is brought to the surface, the stoppers should be checked immediately for a complete seal. If the seal is not complete then re-sample.
7. Slowly fill the appropriate sample container to minimize aeration of the sample.
8. Seal sample containers with the appropriate caps, label, and placed on wet ice in an insulated container or cooler.
9. Appropriate COC documentation will accompany the samples as required by the project-specific QAPP.
10. Specific sample volumes, sample containers, preservatives, and replication of samples are detailed in the project-specific QAPP.
11. Decontaminate all sampling equipment before and after use and in between sampling locations in accordance with "Decontamination Procedures for Field Activities" SOP 005.

3.4 SAMPLING PROCEDURE FOR SAMPLING USING A PERISTALTIC PUMP

To extend reach in sampling efforts, a small peristaltic pump can be used. A peristaltic pump draws the sample through heavy-wall Teflon® tubing and pumps it directly into the sample container. Use of a peristaltic pump allows the operator to extend into a water body to sample at depth or to sweep the width of a narrow stream.

Medical-grade silicon tubing is appropriate for use in peristaltic pumps, as it is suitable for sampling almost any parameter, including most organics. However, some volatile stripping may occur, and even though the pump may have a high flow rate, some sample material may be lost on the tubing. The pump requires electricity to operate so a battery-operated pump is preferable because it eliminates the need for a direct current generator or alternating current inverter. All sampling equipment should be made of inert and non-reactive materials.

3.4.1 PROCEDURE

1. Move into position over the sampling station and anchor to avoid drifting.
2. Affix a completed sample container label to an appropriate sample container.
3. Before collecting the sample, measure the temperature, pH, and specific conductivity of the water body as listed above. Record this information on the field sheet or in the log book.
4. Install clean, medical-grade silicon tubing in the pump according to the manufacturer's instructions. Allow enough tubing on the discharge side to facilitate delivery of liquid into the sample container. Allow only enough tubing on the suction end for attachment to the intake line. This will minimize sample contact with the tubing.
5. Select the length of suction intake tubing needed to reach the required sample location. Attach it to the intake side of the pump tubing. Heavy-wall Teflon® tubing of a diameter equal to that of the required pump tubing suits most applications. A heavier wall will allow slightly greater lateral reach.
6. If possible, allow several liters of surface water to pass through the pump before collecting the sample. Collect the purge volume. Return it to the source after the samples have been withdrawn.
7. Fill the sample container by allowing the pump discharge to flow gently down the inside of the bottle with minimal entry turbulence.

8. Continue delivery of the sample until the container is almost full. Leave adequate space to allow for expansion. If sampling for volatile organics analysis, however, the container must be filled leaving no headspace.
9. Ensure that a Teflon® liner is present in the cap of the sample container, if required. Secure the cap tightly. Preserve the sample according to requirements in "Containers, Preservation, Handling, and Tracking of Environmental Samples".
10. Record the information in the field log book and complete chain-of-custody documents.
11. Allow the pump to drain, and then disassemble it. Decontaminate the tubing before reuse or dispose of it.

4.0 EQUIPMENT DECONTAMINATION PROCEDURES

Decontamination of water sampling equipment will be performed between each sampling station and in accordance with the "Decontamination Procedures for Field Activities" SOP 005.

5.0 DATA AND RECORDS MANAGEMENT

The Field Team Leader or designee will complete field logs on a daily basis detailing personnel, stations sampled, sampling period, unusual field observations, samples collected, problems encountered, calibrations, significant telephone conversations, etc. Daily field logs should be kept in water resistant field notebooks labeled with the project description, project number, dates, and name.

Field data reporting shall be conducted principally through the transmission of report sheets containing tabulated results of all measurements made in the field and documentation of all field calibration activities. Field log books and preprinted field data forms will serve as the primary record of field investigation activities.

Field log books will be bound, uniquely numbered, and have numbered, water resistant pages. All pertinent information regarding the site and sampling procedures will be documented, with notations made in log book fashion, noting the time, date, and initials of the individual making each entry. Information recorded in this notebook will include, but not be limited to the following:

- Identity of project
- GPS Coordinates (preferred) or visual location of the sampling location under investigation or interest
- Date and time of arrival and departures
- Name of person keeping log book
- Names of all field personnel on site
- Observations of water color and odor

STANDARD OPERATING PROCEDURES FOR SEDIMENT/SOIL SAMPLING (SOP 003)

1.0 SCOPE AND APPLICABILITY

The purpose of this Standard Operating Procedure (SOP) is to provide details for the collection of surface and subsurface sediment/soil samples. This SOP details the equipment required to collect sediment/soil using various devices designed for this purpose, and the specific procedures that will be followed.

2.0 EQUIPMENT AND SUPPLIES

Equipment and supplies needed may include, but are not limited to the following:

- Three-inch diameter aluminum or PVC sample sleeves
- Small barge or stable boat
- Nitrile gloves
- Cutting device (e.g., knife)
- Plastic caps
- Sample containers and coolers with wet ice for sample storage
- Field data sheets (water quality/chemistry, general data sheets)
- Chain-of-custody forms
- Items needed to document data collection activities and to label sample containers for shipment, including: digital camera, GPS unit, waterproof field notebook, pens (Rite in the Rain and Sharpie), sample labels, custody seals
- Personal protective equipment (PPE) as specified in the Site-Specific Health and Safety Plan (HASP)
- Decontamination equipment

3.0 DIRECT PUSH METHOD

The direct push method can be used to sample most types of sediment and soft soil material. The penetration depth is dependent on the depth in which refusal is encountered. This method will be used to collect all 0 to 6, 6 to 12, and 12 to 18-inch depth sediment/soil samples.

3.1 PROCEDURE

1. Obtain the sample location information from the Work Plan. This may be in the form of a GPS coordinate or a description of the general sampling location.
2. Position the sampling barge or boat over the selected sample location for sediment, or walk to the proper location for soil. When sampling sediment, the field crew should always work from the most downstream location to the most upstream location unless otherwise directed in the design section of the Work Plan.
3. When sampling sediment in deep water, attempt to set the barge in place with either a two to three point tie down (e.g., spud poles). This will provide some stability for the platform and ensure that the platform does not drift during sample collection.
4. Once you arrive at the proper location measure and record depth of water and sample location identification as identified on the sampling log. For soil, water depth may or may not be an issue.
5. Make sure that all data sheets correspond to the correct sample location.
6. Measure the sampling location using the best available technology (e.g., global positioning satellite system) and record sample coordinates on the sampling log.
7. Insert a clean three-inch diameter aluminum or PVC sleeve into the sample location.
8. Push the sample sleeve directly into the sediment/soil by hand to the appropriate depth or until refusal.
9. Carefully lift the sample sleeve to the surface and cap both ends of the sleeve.
10. Ensure sleeve is sealed and labeled and then place on a clean horizontal surface.
11. Cut open sleeve using a clean cutting tool such as a knife.
12. Divide the sediment/soil core into the needed portions (0-6, 6-12, 12-18 inches) using a clean cutting tool such as a sample knife.
13. Record observations of sediment/soil core sample in field book.
14. Samples should then be collected using the appropriate sample methods cited in the QAPP.
15. Collect the appropriate QA/QC samples as outlined in the QAPP attached to the project specific Work Plan.
16. Complete the chain-of-custody form.
17. Place all samples in the proper sample shipping/storage container, which should be sealed, labeled, and packed in sufficient wet ice to keep the samples at a temperature of 4°C until receipt by the laboratory.

18. Use decontamination equipment on cutting device in between collection of each sample to avoid cross-contamination.
19. Discard of investigation derived material (IDM) in accordance with the Pollution Control and Mitigation Plan (PCMP), Appendix E of the Tier 1 RI Work Plan.

An alternate collection method may be implemented for collection of soil samples depending on Site conditions at the time of sample collection. Any modification of field sample collection methods will be documented in the field log book.

STANDARD OPERATING PROCEDURES FOR CONTAINERS, PRESERVATION, HANDLING, AND TRACKING OF ENVIRONMENTAL SAMPLES (SOP 004)

1.0 SCOPE AND APPLICABILITY

This Standard Operating Procedure (SOP) defines the procedures to be followed for preserving, handling, and shipping environmental samples. Samples may be defined as water, sediment, or soil samples collected for laboratory analysis. This procedure describes equipment, field procedures, sample handling, and documentation procedures necessary to properly handle and ship samples for laboratory analysis. Specific information regarding sample collection and analysis is found in the Tier 1 RI Work Plan and in the Quality Assurance Project Plan (QAPP).

2.0 EQUIPMENT AND SUPPLIES

Equipment to be used during the collection may include, but is not limited to the following:

- Inert packing material such as bubble wrap
- Sample containers
- Sample labels
- Chain-of-Custody forms
- Analytical Request forms
- Insulated coolers
- Custody seals
- Marking pens
- Shipping tape
- Sealable plastic bags
- Waterproof field log book
- Ice (wet or dry)

3.0 SAMPLE HANDLING PROCEDURE

The following sections describe the methods to be used for the collection of samples.

3.1 SAMPLE IDENTIFICATION AND LABELING

The method of sample identification used depends on the type of sample collected and the sample container type. The field analysis and sample identity information are recorded in bound field log books or recorded on data sheets while in the custody of the sampling team.

A sample label will be completed and attached to each sample container for every sample collected. Labels consist of a waterproof material backed with a water-resistant adhesive. Labels are to be filled out using waterproof ink, and are to contain at least the following information:

- Sample collection date and time
- Sample identification number
- Investigation location
- Preservatives (if any)
- Sampler's initials
- Analyses to be conducted
- Sample matrix or matrix identifier

Each analytical sample will be assigned a unique sample identification number consisting of an alphanumeric code that identifies the investigative area, media type (sediment, water, tissue) the specific sampling location, phase of work, and depths (for soil, sediment and water samples). These numbers will be tracked electronically, from collection through laboratory analysis and into the final reports.

3.2 SAMPLE CONTAINERS AND PRESERVATION

3.2.1 SAMPLE CONTAINERS

Samples collected will be placed in certified, precleaned containers as supplied by commercial suppliers or laboratories. The QAPP summarizes container types that will be provided for the samples collected.

3.2.2 SAMPLE PRESERVATION

The preservation methods for samples for chemical analysis to be used are summarized in the QAPP. Aqueous and field QC samples will have preservatives added (if necessary) for each chemical analysis performed. Samples will be placed on wet ice immediately after collection, and shipping containers will be packed with additional wet ice, if needed, before shipping via overnight courier to the laboratory for analysis.

3.3 SAMPLING HANDLING AND SHIPPING

The following procedures will be performed as they relate to sample handling and shipping.

- Sample packaging and shipping will be done in accordance with applicable regulations.
- After filling, securely seal sample bottle caps or Ziploc® bags seals and complete the sample labels.
- If refrigeration is necessary, place samples on wet ice or similar chilling source immediately after collection.
- Decontaminate the outside of the sample containers by wiping them off with a cloth.
- Wrap each sample container with bubble wrap or a sealable bubble wrap bag. The bag will be used to cushion the samples, minimize potential breakage, and retain the sample in the event of breakage.
- Transfer the samples to a plastic-lined ice chest that will be used as a shipping container.
- Shipping coolers will contain crushed ice sufficient to maintain 4°C inside coolers during transport to the laboratory.
- Sample tracking documentation will be completed as described in Section 3.4 of this SOP. Documents will be placed in a sealable plastic bag inside the ice chest taped to the inside lid. Before sealing for shipment, the list of samples will be checked against the container contents to verify the presence of each sample listed on the chain-of-custody.
- Before shipping samples to off-site laboratories, secure chest top and seal the top and the drain spout (if present) with shipping tape. The entire seal area should be covered by tape. Affix custody seals over the taped seal.

- Transport the shipping container directly to the laboratory or to the overnight courier for overnight delivery. Samples will be shipped to the laboratories within 24 to 48 hours of collection.

3.4 SAMPLE TRACKING

The following procedures will be performed as they relate to sample tracking.

1. Samples collected for analysis will be continuously tracked, in the field and in transit to the laboratory by use of the following procedures:
   a. Individual sample bottles will be properly labeled and securely sealed before being placed in the container for shipment to the laboratory.
   b. All pertinent information (see requirements below) will be entered on the chain-of-custody form in the appropriate field. Assignment of field QC samples (e.g., matrix spike/matrix spike duplicate [MS/MSD]) and the analyses requested for each sample will be made on the chain-of-custody form.
2. Chain-of-custody forms must include the following, as required by guidance in SW-846, Test Methods for Evaluating Solid Waste (USEPA, Third Edition, including Promulgated Update I, 1993, Chapter One): (1) the project name; (2) signatures of samplers; (3) the sample number, date and time of collection (for sediment/soil, surface water, or tissue samples), grab or composite sample designation; (4) signatures of individuals involved in sample transfer; and (5) if applicable, the air bill or other shipping number.
3. The completed chain-of-custody form will be signed, dated, enclosed in a sealable plastic bag and placed in the container before shipping. Field personnel will retain a copy of the chain-of-custody form to be kept in project files.
4. Samples will be considered in the sampler's custody while in sight, or locked in a secure area prior to shipment. If the person packing the container and verifying the sample list is different than the sampler, both the sampler and the packer will sign the chain-of-custody form.
5. Upon receipt at the laboratory, the designated laboratory sample custodian shall sign the chain-of-custody form indicating receipt of the incoming field samples. The samples shall be checked against the chain-of-custody form upon arrival at the laboratory. The receiving personnel will enter all arriving samples into a laboratory log book and note any problems or discrepancies between the sample

and chain-of-custody forms and sample container and seal conditions and report them immediately to the field sampling coordinator.

6. A copy of the chain-of-custody form shall be returned from the laboratory to the QA/QC officer or designee.

4.0 DATA AND RECORDS MANAGEMENT

The Field Team Leader or designee will complete field logs on a daily basis detailing personnel, stations sampled, sampling period, unusual field observations, samples collected, problems encountered, calibrations, significant telephone conversations, etc. Daily field logs should be kept in water resistant field notebooks labeled with the project description, project number, dates, and name.

Field data reporting shall be conducted principally through the transmission of report sheets containing tabulated results of all measurements made in the field and documentation of all field calibration activities. Field log books and preprinted field data forms will serve as the primary record of field investigation activities.

Field log books will be bound, uniquely numbered, and have numbered, water resistant pages. All pertinent information regarding the site and sampling procedures will be documented, with notations made in log book fashion, noting the time, date, and initials of the individual making each entry. Information recorded in this notebook will include, but not be limited to the following:

- Identity of project
- GPS coordinates (preferred) or visual location of the sampling location under investigation or interest
- Date and time of arrival and departures
- Name of person keeping log book
- Names of all field personnel on site

STANDARD OPERATING PROCEDURES FOR DECONTAMINATION PROCEDURES FOR FIELD ACTIVITIES (SOP 005)

1.0 SCOPE AND APPLICABILITY

This Standard Operating Procedure (SOP) describes equipment, field procedures, and documentation procedures necessary to properly decontaminate equipment and instruments used during field activities for a given project. Decontamination is the process of neutralizing, washing, and rinsing exposed surfaces of equipment to minimize the potential for constituent migration and/or cross-contamination. This procedure does not apply to personnel decontamination, which is described in the Site-Specific Health and Safety Plan (HASP), Appendix F of the Tier 1 RI Work Plan.

2.0 METHOD OF SUMMARIES

The overall objective of multimedia sampling programs is to obtain samples, which accurately depict the current ambient conditions at the site. Extraneous impacted materials can be brought to a sampling location and/or introduced into the medium of interest during the sampling program with equipment previously used at another sampling site. Trace quantities of these materials can be introduced into other samples and lead to false positive analytical results and, ultimately, to an incorrect assessment of the conditions associated with a site. Decontamination of sampling equipment (e.g., water and sediment samplers, containers, and other equipment) and field support equipment (e.g., sampling vessel) is required so that sampling cross-contamination is prevented, and on-site constituents are not transferred outside the study area.

3.0 EQUIPMENT AND SUPPLIES

The following equipment list contains materials that may be needed in conducting the procedures contained in this SOP. Not all materials on the equipment list may be required for each sampling investigation conducted under the site specific Work Plan.

- Bristle brushes
- Wash/rinse tubs
- Low phosphate detergent (e.g., Alconox, Liquinox)
- 10 percent nitric acid, ultrapure
- Acetone or methanol plus hexane (pesticide grade or better in separate Teflon bottles)
- Distilled/de-ionized (analyte-free) water
- Stainless steel bowl

- Tap water (from any treated municipal water supply)
- High-pressure/steam cleaner
- Appropriate health and safety equipment (as required by HASP)
- Sample container(s) for rinsate blank, if collected
- Field log book

4.0 PROCEDURE

Decontamination of sampling equipment and field instruments is described separately.

4.1 SAMPLING EQUIPMENT DECONTAMINATION

Sampling equipment that comes into contact with sample matrices will be decontaminated before use to minimize cross-contamination. While performing the decontamination procedure, phthalate-free gloves, such as nitrile or butyl rubber, must be used in order to prevent phthalate contamination. Sampling equipment will be decontaminated in the area designated for decontamination.

The decontamination procedure is summarized below:

- Tap water/distilled water rinse
- Wash and scrub with low phosphate detergent (Alconox)
- Tap water/distilled water rinse
- Methanol rinse (solvents must be pesticide grade or better)
- Thorough de-ionized (analyte-free) water rinse (if available, otherwise use distilled water), air dry
- Wrap in aluminum foil, shiny side out, for transport

If samples are collected only for geotechnical laboratory testing, (e.g., grain size) the sampling equipment will only be rinsed with tap or distilled water after washing with low-phosphate detergent solution.

Solvents used during decontamination activities (e.g., iso-octane) will be collected and handled in accordance with the procedures outlined in the QAPP, Appendix B of the Tier 1 RI Work Plan.

The following steps will be used to decontaminate boat anchors, lines, ropes, submersible pump and hose, and other similar field equipment:

- Personnel will dress in suitable personal protection equipment to reduce personal exposure (see HASP)
- Equipment will be rinsed with site water
- Rinse water will not be contained

4.2 FIELD INSTRUMENTS AND EQUIPMENT

Instrumentation should be cleaned as per manufacturer's instructions. Probes such as those used in dissolved oxygen, temperature, pH, salinity, and conductivity meters will be carefully wiped clean using a sponge and detergent water and rinsed with deionized water. Care will be taken to prevent damage to equipment. When possible, instruments that are difficult to decontaminate, such as cameras and logging instruments, may be protectively wrapped to reduce or eliminate the need for decontamination.

4.3 RINSATE BLANKS

Rinsate blanks are a type of QA/QC sample collected to assess the adequacy of decontamination procedures. Rinsate blanks are collected by pouring deionized analyte-free water or solvent, whichever appropriate to the constituents of interest, (i.e., solvent used in equipment decontamination process) over the sampling equipment (e.g., sampler, knife, bowl, pan or blender) after it has been decontaminated in the field. The rinsate is collected directly into the sample bottles for analysis with other samples. Rinsate blanks will be collected at the frequency specified in the QAPP.

5.0 DATA RECORDS AND MANAGEMENT

The field personnel are responsible for documenting decontamination activities occurring in the field. Observations and data will be recorded with ink in a field log book with consecutively numbered pages. The information in the field log book will include the following as a minimum:

- Responsible person's name

- Date and time of activity
- Information concerning items decontaminated and the procedure utilized
- Information related to the taking of rinsate blank samples

APPENDIX D

DATA MANAGEMENT PLAN

DATA MANAGEMENT PLAN
TIER 1 REMEDIAL INVESTIGATION WORK PLAN

DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
AGENCY INTEREST (AI) NO. 86800
EPA ID LAD981155872, SSID #06N1
CERCLA DOCKET NO. 06-04-10

Prepared For:
Baton Rouge Disposal, LLC
Baton Rouge, Louisiana

NOVEMBER 2010
REF. NO. 055364-00 (9) APP D

APPENDIX D

DATA MANAGEMENT PLAN

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1.0 INTRODUCTION

This Data Management Plan (DMP) was prepared to describe the procedures that will be used to record and maintain data generated during completion of the Remedial Investigation/Feasibility Study (RI/FS) activities at the Devil's Swamp Lake Site in East Baton Rouge Parish, Louisiana (Site). The DMP is intended to supplement the Tier 1 RI Work Plan (WP) as a supporting document to be referenced during implementation of the Tier 1 RI activities. The DMP will address field activities, sample management and tracking, document control procedures, and data management during implementation of the Tier 1 RI.

2.0 PROJECT OVERVIEW

Devil's Swamp Lake is a man-made, crescent-shaped lake located on the Mississippi River east bank floodplain approximately ten miles north of Baton Rouge, Louisiana. The lake was excavated in 1973 and 1974 by the United States Army Corps of Engineers to provide a source of borrow material for levee construction to reinforce the levee along the north and west sides of the Port of Greater Baton Rouge Terminal (Baton Rouge Barge Harbor).

Baton Rouge Disposal, LLC, currently owns and Clean Harbors Baton Rouge, LLC, currently operates the former Rollins facility adjacent to the Devil's Swamp Lake Site. Beginning in 1971, the Rollins facility discharged treated process wastewater to Devil's Swamp Lake through National Pollutant Discharge Elimination System (NPDES) permitted Outfall 001 and stormwater runoff through Outfall 002. In 1993, the treated water discharge line (Outfall 001) was installed directly to the Mississippi River. Stormwater from Outfall 002 continues to discharge to Devil's Swamp Lake through the drainage ditch from the former Rollins facility.

Previous risk assessments indicate reportedly unacceptable human health and ecological risks in the lake and portions of the swamp surrounding the lake. Polychlorinated biphenyls (PCBs) have been identified by the EPA as the primary constituent of concern (COC) in the sediment and in aquatic receptors at Devil's Swamp Lake. In March 2004, the EPA identified the commercial hazardous waste disposal facility, formerly operated by Rollins, as the apparent source of the Devil's Swamp Lake PCB impact.

This DMP was prepared in accordance with the requirements outlined in the Unilateral Administrative Order (UAO) for RI/FS for the Devil's Swamp Lake Site issued on December 3, 2009. The UAO was issued to Baton Rouge Disposal, LLC, by EPA

Region 6 and became effective on December 18, 2009. This Report was prepared to meet the requirements of Task 1.1.2.1 of Appendix A of the UAO (Statement of Work [SOW]).

3.0 ANALYTICAL SCOPE

The analytical scope for the Tier 1 RI sample collection activities will be documented on the Simplified Scope of Work (SSOW). The SSOW will include the sample event information including required analyses, analytical methods, action or reporting limits, estimated sample quantities, reporting and data deliverables requirements, contact information, and analysis turnaround expectations.

The SSOW will be uniquely numbered. The number is created by listing the project number plus hyphen plus incremental number. The SSOW number should appear on sample documentation and follow through to the data repository.

The project team will submit the SSOW to the laboratory for procurement and review of the analytical scope. The laboratory will retain a copy of the SSOW to assist with sample login and to ensure the proper analyses are assigned and properly reported.

4.0 FIELD ACTIVITIES

Field activities for the RI/FS include sediment and surface water sampling and may include biological tissue sampling based on an evaluation of the results of the Tier 1 RI activities. The field personnel will be responsible for documenting activities that occur in the field. All information pertinent to sampling will be recorded in field log books or activity specific related forms. Each day's log book entry shall include the following:

- Name, initials, and title of author, date and time of entry, and weather and environmental conditions during the field activity
- Location of sampling activity
- Name, initials, and title of field crew
- Name, initials, and title of site visitors
- Sample medium (e.g., surface sediment)
- Sample collection method (e.g., corer)
- Number of samples collected

When activity-specific data forms are used, they will also include:

- Project name and number
- Sampler's initials

The sample identification number shall be unique in order to ensure a seamless flow to the data repository without human intervention. An example of a numbering system is as follows:

e.g., 55364-123110-T1-SED-NDSL-1 (0-6)

where:	55364	-	CRA project number
	123110	-	date of collection in "mmddyy" format
	T1	-	Tier 1 RI
	SED	-	sample matrix
	NDSL-1	-	Area of Investigation name and sample number
	(0-6)	-	sample depth interval (inches)

e.g., 55364-123110-T1-TB-01 [or insert EB (equipment blank) or FB (field blank) in place of TB]

where:	55364	-	CRA project number
	123110	-	date of collection in "mmddyy" format
	T1	-	Tier 1 RI
	Tripblank	-	name of the sample
	01	-	incremented number

The following information will be recorded either in the log book or on the activity-specific data forms:

- Volume of surface water or sediment/soil samples collected
- Date and time of collection
- Sample depth

- Sample identification number(s)
- Sample destination (i.e., laboratory)
- Water level measurement data
- Field observations
- Field measurements (e.g., pH, temperature, and conductivity)
- Sample handling (preservation)

All original data recorded in field log books, field data forms, sample labels, and chain-of-custody (COC) forms must be written with waterproof, indelible ink. None of these accountable, serialized documents are to be destroyed or discarded, even if one is illegible or contains inaccuracies requiring document replacement. If an error is made on an accountable document assigned to one individual, that individual will make all corrections simply by crossing a *single* line through the error, initialing and dating the correction, and entering the correct information. The erroneous information will not be obliterated. The person who made the entry will correct any subsequent error discovered on an accountable document. Sample documentation will be audited quarterly by the QA Official to verify that all necessary documentation is included in the project files.

The field books, or just the pertinent pages, shall be submitted at the end of the sampling event or at an assigned frequency if the event is ongoing. The project team is responsible for transcribing the sampling information, field parameters and water levels to the Field Sample Key (FSK). The FSK is the mechanism to standardize the capture of field data for submission to the Data Management Group enabling automation to the database. The submission of the completed document shall be weekly to the edds@craworld.com email address with the subject line of:

e.g., 55364-Tier 1 RI-123110 (SSOW#55364-24)

where:	55364	-	project number
	Tier 1 RI	-	event name
	123110	-	date of collection in "mmddyy"
	SSOW#	-	SSOW number

Survey information should be submitted in electronic format from the project group regardless of the source (i.e., professional land surveyor or CADD extraction). These data should include the X, Y, and ground surface, coordinate system and coordinate datum.

5.0 SAMPLE MANAGEMENT AND TRACKING

Sample custody and documentation procedures described herein must be followed throughout all sample collection activities. Components of sample custody procedures include the use of field log books, sample labels, custody seals, and COC forms. The COC form must accompany the samples during shipment from the field to the laboratory.

A sample is under custody under the following conditions:

- It is in one's actual possession
- It is in one's view, after being in his or her physical possession
- It was in one's physical possession and that person then locked it up to prevent tampering
- It is in a designated and identified secure area

Two of the four copies of the COC record (white and green) will accompany the samples to the laboratory. The yellow copy will be kept in the QA/QC file, and the pink copy will be retained in the project file. A photocopy of the COCs shall be submitted to the project chemist in a timely manner. The project chemist will use the COC to cross check against the laboratory sample confirmation receipt (SCRs). The COC record makes provision for documenting sample integrity and the identity of any persons involved in sample transfer. Information entered on the COC record will include the following for shipment to the laboratory:

- Signature of collector(s)
- Client name
- Site address (if confidential, put NA)
- Sample identification number for each sample in the cooler
- Date and time of collection for each sample
- Sample type (e.g., G=Grab, C=Composite)
- Sample matrix (e.g. W=Water, S=Soil/sediment, etc.)
- Type of preservative (write "none" if none used)
- Number of containers per sample
- Parameters requested for analysis
- Signature and printed name of person(s) involved in the chain of possession

- Date of possession
- Date of relinquishment
- Project and task numbers
- Simplified Scope of Work (SSOW) number
- Total number of containers in cooler
- Identification number of cooler (if available)
- Method of shipment
- Airbill number (if applicable)
- To whom the results should be sent (CRA contact)
- Laboratory turnaround time requested
- Identification of any known hazards
- Comments as appropriate, such as "For lab QC use"
- Name, address, and telephone number of laboratory
- Name, address, and telephone number of person to whom laboratory report will be sent
- Method of delivery and courier

Completed COC forms will be sealed inside a plastic zip-top bag and taped to the inside cover of the shipping container used for sample transport from the field to the laboratory when a courier or shipping company is used. The shipping company will not sign for custody of the samples.

When samples are relinquished to a courier for transport, the tracking number from the shipping bill or receipt will be recorded on the COC form and in the site log book.
Custody seals must be affixed on shipping containers when samples are shipped to the laboratory to prevent sample tampering during transportation.

The QA Official or Field Team Leader will notify the appropriate Laboratory Project Manager of upcoming field sampling activities and the subsequent transfer of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped, analyses requested, and the expected date of arrival. The Laboratory Project Manager will notify appropriate laboratory personnel, including the sample custodian, about the expected shipment.

Upon arrival at the laboratory, the samples will be received and logged in by a trained sample custodian in accordance with the laboratory's sample handling program. The

laboratory custodian will retrieve the project SSOW from their system to assist with sample login. A description of laboratory's program is provided in their QAPP. Procedures are summarized below.

Upon sample receipt, the sample custodian is responsible for performing the following activities during sample receipt where appropriate:

- Examining the shipping containers to verify custody tape is intact
- Measuring and documenting the shipping container temperature (from the temperature blank vial) on the documentation log
- Examining all sample containers for damage
- Comparing samples received against those listed on the COC
- Verifying sample holding times have not been exceeded
- Determining sample temperature (from the temperature blank vial) and documenting variations from the acceptable range on the documentation log
- Immediately signing and dating COC after shipment is accepted
- Noting any sample receipt problems on the COC, initiating a Sample Receipt Checklist (SRC), and notifying the Laboratory Project Manager
- Attaching laboratory sample container labels with laboratory identification number and test
- Placing the samples in proper laboratory storage

In addition, a completed Chain of Custody Record (after receipt and log-in by the laboratory) should contain the following information:

- Name of person receiving the sample
- Laboratory sample number
- Date of receipt of sample

The completed COC record will accompany the laboratory data report.

The Laboratory Project Manager is responsible for contacting the QA Official as soon as possible if any problems are identified during sample receipt. All identified sample receiving problems will be resolved before sample preparation and analysis.

Following sample receipt, the sample custodian is responsible for logging the samples in the laboratory sample log-in book, and/or the Laboratory Information Management System (LIMS) with the following information:

- Laboratory project number
- Sample numbers (laboratory and client)
- Type of samples
- Required tests
- Date collected
- Date received

The sample custodian is also responsible for notifying the Laboratory Project Manager and appropriate Group/Team Leader(s) of sample arrival and placing completed COCs, waybills, and any additional documentation in the project file.

The laboratory shall generate a Sample Confirmation Receipt (SCR) after sample login. The SCR shall be submitted to CRA's project chemist for cross check against the COCs to ensure correct sample login.

Samples will be stored appropriately within the laboratory to maintain any prescribed temperature, protect against contamination, and to maintain the security of the samples.

Any samples transferred to a different laboratory will be transferred under COC procedures, and the initiating laboratory will maintain the appropriate documentation to preserve the traceability of the samples through final analysis and disposal.

6.0 DATA MANAGEMENT

The Data Management Group's process and business rules are governed by CRA's Data Management Standard Operating Procedures. All data analysts follow the same process to ensure the highest data quality.

The data analyst shall coordinate receipt of the laboratory electronic data deliverables (EDDs), FSK and survey information. An overview of the process steps are below:

- Ensure all samples on the FSK & COC match the information on that of what is in the EDDs.

- Track the data quality of the EDDs in the master labs database.
- Submit new reference values for authorization and inclusion in the database.
- Perform a 10 percent data quality check. If minor errors are found, the data analyst shall correct. If major errors are found, document findings in a deficiency memo and provide to the laboratory for resubmission of EDDs.
- Import the field parameter and water level information from the FSK.
- Import the survey information.
- Populate the SSOW number to the associated samples for the event.
- Link the laboratory and field data to the sample locations.
- Complete the database build and populate the associated metadata.
- Audit the complete project database.
- Tabulate the data for visual and patterning review.
- Create a standard data export to assist CRA's project chemist during the data validation.
- Link the data qualifiers and associated metadata after the project chemists data quality review.
- Notify the project team of completion of the database.
- Perform data mining and generate deliverables as directed by the project team.

6.1 DATA QUALITY REVIEW

CRA's chemistry group will provide third-party data quality assessment and validation of the laboratory work. Data verification and validation will be completed in accordance with CRA's Standard Operating Procedure (SOP) and the U.S. EPA National Functional Guidelines. Data validation qualifiers that result from this third-party data validation process are added electronically and uploaded into the database along with reason codes describing all rationale for data qualifications.

CRA will generate comprehensive data validation reports with qualification tables summarizing data outliers and the associated data qualifiers.

7.0 DOCUMENT CONTROL

The project team is committed to assuring that the quality of the data required from environmentally related measures is supported by sufficient computer hardware and software resources to assure that an adequate level of QA is performed. The project team's offices are linked by computer systems with a wide area network (WAN) and a full staff of Information Technology (IT) professionals.

The QA management policy objective is that data collected, analyzed, processed, and maintained on all automated data processing (ADP) systems, in support of environmental activities, be accurate and of sufficient integrity to support effective environmental management. The project team supports this objective and will adhere to the specific data management procedures, which assures the effective and efficient use of hardware and software.

The laboratories will provide data in electronic format as electronic EDDs consistent with CRA's Standard Operation Procedure for Laboratory EDDs. This EDD specification is based on Earthsoft's EQuIS EDDs and was customized by CRA for our specific use. EDDs shall be generated directly from the LIMS, thereby eliminating the possibility of manual transcription errors. The laboratory EDDs are uploaded to CRA's data management system's web enabled data processor (EDP) eliminating human intervention upon import to the data repository.

The following is the contact information for EDD questions or for the laboratory to obtain a copy of CRA's EDD SOP specification document:

Julie Lidstone
jlidstone@craworld.com
519-884-0510 extension 3527

Laboratory EDDs are imported into the EQuIS database, and the data are maintained in the database for presentation. CRA's data repository for chemistry, field, spatial and geographical data is EQuIS based on a SQL platform.

CRA's project team, QA Officer and database analyst are responsible for verifying the correctness of the analytical database after each event has been imported. This is accomplished by comparing the data from the database to the hardcopy analytical reports for a minimum of 10 percent of the sample results. If discrepancies between the database and hardcopy analytical reports are detected, a complete verification of the database will be performed. In the event major EDD errors are identified, the

deficiencies will be documented and the laboratory will be notified via email requesting correction and resubmission of the EDD.

7.1 DATA STORAGE AND RETRIEVAL

Laboratory data will be stored in hardcopy and/or electronic format for a minimum period of 10 years. Electronic instrument data will be maintained for this same time period. All laboratory records for this project will be maintained consistent with CRA's and the laboratories' record retention policies and agency requirements.

CRA's Project Manager is responsible for project data storage and retrieval. Final evidence files, which will include a copy of all laboratory data, will be maintained by CRA or Clean Harbors.

7.2 DATA SECURITY

Laboratory data security is the responsibility of the Laboratory's Operations Manager. Archived data cannot be accessed without authorization, and the name and purpose of personnel accessing archived data are recorded. The Laboratory's LIMS is password protected and access rights are restricted by job function. CRA's data security procedures include limiting project database access to database managers and analysts, in addition to maintaining general building security procedures.

7.3 SYSTEM MAINTENANCE/ADMINISTRATION

System Security

CRA houses its database server and information infrastructure in a CRA owned and operated secure data facility (Data Center), employing state of the art technology. This facility is constructed with a concrete block exterior, and includes sufficient and significant uninterrupted power supply (UPS) and generator capacity and utilizes fully monitored environmental systems.

The Data Center is located at 34 Durward Place, and the Data Recovery Center is located at 40 Bathurst Drive, both in Waterloo, Ontario separated by a distance of approximately 1.5 miles. The Data Center is monitored 24 hours per day, 7 days per week for physical security as well as fluctuations in power and temperature. Physical security monitoring

includes video surveillance, photo ID card verification for access and the recording of all visitors, including available escorted access.

The facility is equipped with a cooling (HVAC) system and a CO_2 fire detection and suppression system. Preventative maintenance checks are conducted monthly on the power infrastructure and HVAC systems and annually on the CO_2 fire detection and suppression systems. All components of the power infrastructure, HVAC, and fire suppression systems have 24/7 maintenance contracts, allowing any problems to be addressed very quickly by factory trained technicians.

A variety of redundant systems reinforce the security of the Data Centre, in that if one system should fail, another is available to carry the load. These systems include:

- Fail-over to battery power and a diesel generator (with minimum 2.5 day fuel capacity on hand at all times)
- HVAC (air conditioning) systems
- Fiber cable connections

System Data Recovery

The Data Recovery Center is located in a separate building which is another active CRA office and is secured by the normal building security system and also by means of a secure locked room.

System Backup

All repositories are backed up to the Data Recovery Center. CRA's off site data backup environment, located in the Data Recovery Center allows for geographic separation and an optimum recovery environment. Data backups are tested on at least a weekly basis to ensure that data can be recovered when needed. For backing up data, CRA uses a combination of spinning disk and tape (type LTO-3) media.

In general, the following media rotation/retention policy is used:

GFS (Grandfather/Father/Son)

Three pools of media are utilized with this policy.

- Grandfather – 6 end of month media are rotated. Maximum retention is 6 months.
- Father – 4 end of week media are rotated. Maximum retention is 4 weeks.

- Son – 4 end of day (M/T/W/Th) media are rotated. Maximum retention is 6 days.

The backup media is stored in CRA's Data Recovery Center.

Access Control

CRA will provide strong access controls to restrict access to the repository using the following procedures:

- CRA will restrict data access based upon identity and role
- CRA will assign unique logon ID's to individuals with access to the systems and data
- CRA will require unique and complex passwords
- CRA will restrict physical access to data storage
- CRA will relay any new user requests to a designated contact for approval before access credentials are provided
- CRA will provide users access to only the data repositories deemed appropriate

APPENDIX E

POLLUTION CONTROL AND MITIGATION PLAN

POLLUTION CONTROL AND MITIGATION PLAN
TIER 1 REMEDIAL INVESTIGATION WORK PLAN

DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
AGENCY INTEREST (AI) NO. 86800
EPA ID LAD981155872, SSID #06N1
CERCLA DOCKET NO. 06-04-10

Prepared For:
Baton Rouge Disposal, LLC
Baton Rouge, Louisiana

NOVEMBER 2010
Ref. No. 055364-00 (9) APP E

APPENDIX E

POLLUTION CONTROL AND MITIGATION PLAN

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1.0 INTRODUCTION

This Pollution Control and Mitigation Plan (PCMP) was prepared to outline the processes and procedures that will be used to verify that constituents are not released off-Site during implementation of the Remedial Investigation/Feasibility Study (RI/FS) activities at the Devil's Swamp Lake Site in East Baton Rouge Parish, Louisiana (Site). The PCMP is intended to supplement the Tier 1 RI Work Plan (WP) as a supporting document to be referenced during implementation of the Tier 1 RI activities.

The objective of this PCMP is to provide specific information and guidance to protect human health and the environment, to address the most typical scenario that may be encountered, and to describe cost-effective methods of handling both hazardous and non-hazardous investigation-derived material (IDM). This plan addresses site control procedures, typical IDM management, and cost-effective methods to:

- remove material that poses an immediate threat to human health and/or the environment
- minimize the quantity of IDM generated
- leave the Site in the same or equivalent condition prior to the investigation

2.0 PROJECT OVERVIEW

Devil's Swamp Lake is a man-made, crescent-shaped lake located on the Mississippi River east bank floodplain approximately ten miles north of Baton Rouge, Louisiana. The lake was excavated in 1973 and 1974 by the United States Army Corps of Engineers New Orleans District to provide a source of borrow material for levee construction to reinforce the levee along the north and west sides of the Port of Greater Baton Rouge Terminal (Baton Rouge Barge Harbor).

Baton Rouge Disposal, LLC, currently owns and Clean Harbors Baton Rouge, LLC, currently operates the former Rollins facility adjacent to the Devil's Swamp Lake Site. Beginning in 1971, the Rollins facility discharged treated process wastewater to Devil's Swamp Lake through National Pollutant Discharge Elimination System (NPDES) permitted Outfall 001 and stormwater runoff through Outfall 002. In 1993, the treated water discharge line (Outfall 001) was installed directly to the Mississippi River. Stormwater from Outfall 002 continues to discharge to Devil's Swamp Lake through the drainage ditch from the former Rollins facility.

Previous risk assessments indicate reportedly unacceptable human health and ecological risks in the lake and portions of the swamp surrounding the lake. Polychlorinated biphenyls (PCBs) have been identified by the EPA as the primary constituent of concern (COC) in the sediment and in aquatic receptors at Devil's Swamp Lake. In March 2004, the EPA identified the commercial hazardous waste disposal facility, formerly operated by Rollins, as the apparent source of the Devil's Swamp Lake PCB impact.

This PCMP was prepared in accordance with the requirements outlined in the Unilateral Administrative Order (UAO) for RI/FS for the Devil's Swamp Lake Site issued on December 3, 2009. The UAO was issued to Baton Rouge Disposal, LLC, by EPA Region 6 and became effective on December 18, 2009. This Report was prepared to meet the requirements of Task 1.1.2.2 of Appendix A of the UAO (Statement of Work [SOW]).

3.0 SITE CONTROL

The purpose of site control is to minimize potential adverse impact to workers and to protect the public from hazards at the Site. Site control is especially important in emergency situations.

Site control and work area demarcation will be achieved through posting of signage and placement of barricades. All investigation areas will have the appropriate signage posted. Barricades and warning signs will be placed to warn personnel of potential hazards. A standby person (spotter) may be utilized in place of barricades, where appropriate. The following materials may be used to barricade sampling and/or staging areas, as needed:

- Temporary fence
- High visibility tapes, ropes, or chains
- Traffic cones
- Sawhorses
- Wood or metal guardrails

3.1 WORK ZONES

A three-zone approach will be used during Site operations in order to contain the potential spread of impact. The three zones will include the Exclusion Zone, the Contamination Reduction Zone, and the Support Zone. Delineation of these three zones

will be based on previous sampling results, evaluation of potential exposure routes, and the amount of potential impact dispersion in the event of a release. Movement of personnel and equipment among these zones will be minimized and restricted to necessary personnel and equipment.

3.1.1 EXCLUSION ZONE

The Exclusion Zone is the area where RI/FS sample collection activities will occur. This area will be clearly marked with hazard tape or by other means. Only personnel involved in the work activities will be allowed in the Exclusion Zone.

Prior to entering the Exclusion Zone, the following conditions will be met: personnel will be suited in the designated level of protection, a decontamination station shall be established at the entrance to the exclusion zone, and all personnel leaving the area shall decontaminate and dispose of all disposable garments.

The Exclusion Zone will be marked off during mobilization activities and prior to the commencement of RI/FS sample collection activities. If necessary, the size of the Exclusion Zone may be increased to allow more working area or to incorporate greater area for higher levels of protection.

3.1.2 CONTAMINATION REDUCTION ZONE

The Contamination Reduction Zone is the transition area between the potentially impacted area and the non-impacted area. Decontamination is the main focus in this area. This area will also be clearly marked with hazard tape or by other means, and only personnel involved in the work activities or decontamination will be allowed in the Contamination Reduction Zone. A Contamination Reduction Zone will be established surrounding all of the work areas involving field investigation activities. A contamination reduction corridor containing a decontamination pad (if needed) will be located in this zone. A contamination reduction corridor is a pathway in which decontamination occurs. One pathway will be established for equipment and one for personnel decontamination. This area will also serve as an access control point for personnel entering the Exclusion Zone.

3.1.3 SUPPORT ZONE

The Support Zone is a non-impacted zone, which is the location of administrative and other support functions including first aid, equipment supply, and emergency information. The Support Zone would have negligible potential for exposure to impacted material and is equivalent to that of background.

The majority of Site operations will be controlled from the staging area located in the Support Zone. The staging areas will provide for team communications and emergency response, and sanitary facilities. Appropriate safety and support equipment also will be located in this zone.

The Support Zone will be located upwind of Site operations, if possible, and would be used as a potential evacuation point, if appropriate. No potentially impacted personnel or materials are allowed in this zone, except for appropriately packaged/ decontaminated and labeled samples. Meteorological conditions shall be observed and noted from this zone as well as those factors pertinent to heat and cold stress.

4.0 IDENTIFICATION OF IDM

The identification of IDM is essential to appropriate handling of the potential hazardous materials. A step-by-step process will be followed to properly characterize the material, locate similar areas of impact, and profile in accordance with the applicable requirements to the appropriate permitted disposal facility. Although none of the material generated on-Site are anticipated to be characterized as hazardous, this plan will describe appropriate methods for identifying potentially hazardous wastes and properly managing both hazardous and non-hazardous wastes. Management of IDM will be completed in accordance with the U.S. Environmental Protection Agency (EPA) *Guide to Management of Investigation-Derived Waste (*Publication: 9345.3-03FS, January 1992).

4.1 MATERIAL CHARACTERIZATION

The available material characterization information includes manifests, Material Safety Data Sheets (MSDS), previous analytical results, knowledge of material generation process, other relevant records, and the best professional judgement. The valid material characterization does not always require new analysis of IDM samples. IDM will not be considered Resource Conservation Recovery Act (RCRA) hazardous material just

because it contains Comprehensive Environmental Recovery, Compensation, and Liability Act (CERCLA) hazardous substances. The determination of a RCRA waste must be based on the presence of listed waste generated after 1976 or exhibiting hazardous characteristics.

4.2 ON-SITE HANDLING

An on-Site staging area will be identified for non-hazardous IDM or RCRA hazardous soil IDM. In accordance with EPA's guidance, on-Site handling of RCRA non-hazardous waste will include:

- sediment/soil cuttings – containerize in drums
- decontamination fluids – pour into drum
- decontaminated personal protective equipment (PPE) and Disposable Sampling Equipment (DE) – double bag and deposit (at Site if recommended by the property owner or responsible party or EPA approved dumpster), or in an approved landfill

4.3 OFF-SITE DISPOSAL

IDM will be disposed off-Site in the following situations:

- It is RCRA hazardous water and is generated in excess of 100 kilograms per month
- It may pose a substantial risk if left at the Site
- It is RCRA hazardous PPE or DE
- The Site conditions would change substantially with increased risk from leaving it on-Site

EPA does not recommend removal of materials from all sites and, in particular, from those sites where IDM does not pose any immediate threat to human health or the environment. All off-Site IDM disposal will be transported to facilities that comply with EPA's off-Site disposal policy.

4.4 SAMPLING AND ANALYSIS OF IDM

IDM will be temporarily stored at an approved, authorized location on-Site during field activities. A representative sample of soil/sediment and water will be obtained and

analyzed for disposal characterization as described below unless previous characterization data is available. All drums containing IDM solids or liquids will be stored in an appropriate location. Drums containing IDM soil/sediment will be opened and a consistently-sized and representative volume of soil will be removed with a clean soil-sampling device. Non-soil solid IDM will be not be analyzed. The sampler will wear clean latex gloves during the sample collection. A composite sample will then be placed in a laboratory-supplied glass container, labeled, sealed in a plastic bag, and placed on ice in a shipping container. The sample will be shipped via commercial courier to the selected analytical laboratory within 24 hours using proper chain-of-custody procedures. Soil remaining in the compositing container will then be resealed for subsequent transport and disposition as appropriate and in accordance with analytical results.

Drums containing liquid IDM will similarly be opened and a composite sample obtained by mixing consistent, representative liquid volumes from each drum in a suitable clean container. A composite sample will be placed in a laboratory-supplied container, labeled, sealed in a plastic bag, and placed on ice in a shipping container. The sample will be shipped via commercial courier to the selected analytical laboratory using proper chain-of-custody procedures.

The types and number of analyses of IDM soil and water constituents will ultimately be determined by the requirements of the receiving disposal facility for the IDM. For soil IDM, the analyses may include Toxic Characteristic Leaching Procedure (TCLP) analyses; organic analyses; Reactivity, Corrositivity, Ignitibility (RCI) characterization; flashpoint; and any parameter specifically required by the selected disposal facility. A waiver for other constituents, such as pesticides, PCBs, and other metals, may be provided based on process knowledge. For water IDM, organic analyses may be performed, but the disposal facility may waive the need for analyses if the constituents are characterized through analyses completed for the investigation and through process knowledge.

5.0 RESPONSIBILITIES

The CRA Project Manager is responsible for verification that all personnel and pieces of equipment coming off-Site are properly decontaminated according to the procedures outlined above. Documentation of decontamination must be made in the field log book and will become part of the permanent project file.

Daily accounts of IDM management activities will be recorded in the field book by the Site supervisor for identifying information such as date and time of activities and any other identifying information will be maintained on-Site. In addition, all shipping paperwork, such as manifests and bills of lading, will be maintained in the project file following completion of work activities.

APPENDIX F

SITE-SPECIFIC HEALTH AND SAFETY PLAN

SITE-SPECIFIC HEALTH AND SAFETY PLAN
TIER 1 REMEDIAL INVESTIGATION WORK PLAN

DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
AGENCY INTEREST (AI) NO. 86800
EPA ID LAD981155872, SSID #06N1
CERCLA DOCKET NO. 06-04-10

Prepared For:
Baton Rouge Disposal, LLC
Baton Rouge, Louisiana

NOVEMBER 2010
REF. NO. 055364-00 (9) APP F

EMERGENCY CONTACT LIST AND HOSPITAL ROUTE MAP
DEVIL'S SWAMP LAKE SITE

EMERGENCY INFORMATION		
Contact	**Phone Number**	**Hospital Directions**
Local Police	**911**	Directions: See the attached map on the next page.
Fire Department	**911**	
Ambulance	**911**	
Local Hospital: **Baton Rouge General Medical Center** Address: **3600 Florida Blvd.** **Baton Rouge, Louisiana 70806**	**225-387-7000**	Driving Time: 14 minutes Driving Distance: 9.6 miles **(Attach Map)**
National Poison Center	**800-222-1222**	CRA – Incident Reporting Hotline Please call **(866) 529-4886** and provide: • Name and location of caller • Description of incident • Name of any injured persons • Description of injuries • Phone number for return call
Project Manager Pressley Campbell Work: Cell:	 225-292-9007 225-963-6754	
Site Supervisor Katie Menard Work: Cell:	 225-292-9007 225-603-7829	
CRA Regional S&H Manager Jeff Maranciak Work: Cell:	 713-734-3090 412-225-6375	
Site Contact John Arbuthnot Work: Cell:	 225-778-3596 225-772-5324	
Client Contact John Arbuthnot Work: Cell:	 225-778-3596 225-772-5324	
Other Contact Work: Cell:		
Person to verify hospital route Katie Menard	**Signature**	

* Hospital Route must be field validated before site work commences.

Directions from the Devil's Swamp Lake Site to the Baton Rouge General Medical Center:

- Take first right onto US-61 S/Scenic Highway
- Take the I-110 S ramp towards Baton Rouge
- Merge onto I-110 S
- Take exit 2B to merge onto LA-67 S/Plank Rd toward N 22nd St/Memorial Stadium
- Keep left at the fork
- Continue onto N 22nd St
- Turn left at Florida Blvd/US-61 BUS S
- Turn right at Peachtree Blvd
- Arrive at Baton Rouge General Medical Center

APPENDIX F

SITE-SPECIFIC HEALTH AND SAFETY PLAN

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HEALTH AND SAFETY PLAN
Signature Page

Site Name: Devil's Swamp Lake Site

Location Address: 13351 Scenic Hwy., Baton Rouge, Louisiana

Reference No.: 055364 CRA Office: Baton Rouge

Anticipated Start Date: September 2010 Anticipated Project Duration: September 2012

Prepared By (Signature): Katie E Menard Date: 7/16/10

Project Manager (Signature): Presley L. Campbell Date: 7/16/10

Reviewed By (Signature:) RBeep Date: 7/14/10

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this site-specific health and safety plan (HASP) is to provide specific guidelines and establish procedures for the protection of personnel performing the activities described in Section 2.0 Site Operations. The information in this HASP has been developed in accordance with applicable standards and is, to the extent possible, based on information available to date. The HASP is also a living document, in that it must continually evolve as site conditions and knowledge of the site work activities develop.

A vital element of CRA's Safety and Health Policies and Procedures is the implementation of a site-specific HASP for field activities. The HASP, as applicable to this project, includes the following measures:

- Communicate the contents of this HASP to site personnel.
- Eliminate unsafe conditions. Efforts must be initiated to identify conditions that can contribute to an incident and to remove exposure to these conditions.
- Utilize the STAR (Stop, Think, Act, and Review) process before beginning any activity/task/job, after an incident, and/or during any unusual circumstances. Stop the activities to think about the task, analyze the task hazards and determine methods to reduce risk, and review the results with affected personnel.
- Revise or develop Job Safety Analysis (JSA) forms for activities. Supervisors and affected personnel are responsible for JSA development. A blank JSA form has been included in Appendix A of this HASP.
- Complete behavioral-based safety (BBS) observations via the use of the Safe Task Evaluation Process (STEP).
- Reduce unsafe acts. Please note that 88 percent of all incidents are directly caused by unsafe acts. Use the CRA BBS tools (STEPs, JSAs, STAR, etc.) to reduce the number of unsafe acts. Personnel shall make a conscious effort to work safely. A high degree of safety awareness must be maintained so that safety factors become an integral part of the task. Supervisory personnel shall ensure that personnel committing unsafe acts are held accountable via counseling, mentoring, and, if necessary, reprimand.
- Inspect frequently. Regular documented safety inspections of the work site, materials, and equipment by qualified persons ensure early detection of unsafe conditions. Safety and health deficiencies shall be corrected as soon as possible or

project activities shall be suspended. Documentation of daily inspections and corrective actions should be kept with the project files.

1.2 STOP WORK AUTHORITY

All CRA employees are empowered and expected to stop the work of co-workers, subcontractors, client employees, or other contractors if any person's safety or the environment are at risk. No repercussions will result from this action. Reporting of unsafe condition/acts and/or Stop Work Authority (SWA) shall be documented using the Unsafe Condition/Acts and SWA form located in Appendix A.

The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated shall result in the removal of site personnel from that area and re-evaluation of the hazard and the levels of protection.

1.3 PERSONNEL REQUIREMENTS

All personnel conducting activities on site must conduct their activities in compliance with all applicable Safety and Health legislation throughout North America to include, but not limited to the Occupational Safety and Health Administration (OSHA) 29 CFR 1910, 29 CFR 1926 and CRA's policies and procedures. **Project personnel must also be familiar with the procedures and requirements of this HASP**. In the event of conflicting safety procedures/requirements, personnel must implement those safety practices affording the highest level of safety and protection.

1.4 SHORT SERVICE EMPLOYEES

Any employee or sub-contractor performing a job within their probationary period or less than 6 months of experience in the same job type/duty, whichever is greater shall be deemed a Short Service Employees (SSE). The SSE must meet all the requirements under CRA's Short Service Employee requirements, which include the following requirements.

- A crew is defined as those workers working at a single location who are employed by the same contractor
- A single person "crew" cannot be SSE

- 2-4 ;person crews can have only 1 SSE per crew
- Crews with 5 persons or more should not exceed 20% SSE
- Exceptions for crews with SSE greater than 20% requires approval by the CRA Project Manager
- SSEs will be required to wear a high visibility ORANGE colored hard hat
- SSEs will be assigned as experienced mentor

CRA Employees identified as SSE (6 months or less) shall not be permitted to work without another non-SSE employee present.

1.5 PROJECT MANAGEMENT AND SAFETY RESPONSIBILITIES

Project Manager – CRA – Pressley Campbell

The CRA Project Manager (PM) shall be responsible for the overall implementation of the HASP, and for ensuring that all safety and health (S&H) responsibilities are carried out in conjunction with this project. This shall include, but is not limited to, review and approval of the HASP, ensuring that the Safe Task Evaluation Process (STEP) forms are completed properly, qualifying and directing subcontractors relative to S&H performance, coordinating all S&H submittals, and consultation with the SS regarding appropriate changes to the HASP. The PM will also ensure that the appropriate resources are provided to support the project with respect to all operations.

Site Supervisor – CRA – Katie Menard

The Site Supervisor (SS) is the person who, under the supervision of the project manager, shall be responsible for the communication of site requirements to site project personnel and subcontractors, and is responsible for carrying out the safety and health responsibilities by verifying that:

1. A daily Tailgate Safety meeting that communicates the site-specific hazards for the operations that day and what proactive measure will minimize the hazards is conducted. Each meeting must be documented on the Tailgate Safety Meeting Form to include all topics covered and the signatures of those in attendance.
2. All necessary cleanup and maintenance of safety equipment is conducted by project personnel.
3. Emergency phone numbers and services, including hospital and clinic locations, are verified.

4. Site personnel are implementing the STAR process before initiating activities.
5. JSA forms are developed and revised accordingly.
6. Forms attached to the HASP are completed, filed, and submitted correctly, including daily tailgate meetings and completion of daily inspection checklists.
7. A pre-entry briefing is conducted and documented, and serves to familiarize on-site personnel with the procedures, requirements, and provisions of the HASP.

Other duties include overall implementation of the HASP and ensuring that all safety and health responsibilities are carried out in conjunction with the project. This shall include, but is not limited to, review and approval of the HASP, communication of site requirements to subcontractor personnel, and consultation with the client/site representative regarding appropriate changes to the HASP.

The SS is also responsible for enforcing safe work practices for project employees. The SS watches for ill effects on any crew member, especially those symptoms caused by cold/heat stress or chemical exposure. The SS oversees the safety of visitors who enter the site. The SS maintains communication with the client/site representative(s).

Other specific duties of the SS include:

- Ordering the immediate shutdown and/or stop work of site activities in the case of a medical emergency, unsafe condition, or unsafe practice
- Providing the safety equipment, personal protective equipment (PPE), and other items necessary for employees
- Enforcing the use of required safety equipment, PPE, and other items necessary for employee or community safety
- Conducting job site inspections as a part of quality assurance for safety and health
- Reporting safety and health concerns to site and/or project management as necessary

Regional Safety & Health Manager - CRA – Jeff Maranciak

The Regional Safety & Health Manager (RSHM) is a full-time CRA employee who is trained as a safety and health professional, and serves in a consulting role to the PM and SS regarding potential safety and health issues.

Employee Safety Responsibility

CRA employees are responsible for their own safety as well as the safety of those around them. CRA employees shall use any equipment provided in a safe and responsible manner, as directed by their supervisor.

Employees are directed to take the following actions when appropriate:

- Suspend any operations that may cause an imminent health hazard to employees, subcontractors, or others.
- Utilize the STAR process before initiating work.
- Assist in the development and revision of JSA forms that are appropriate to their current scope of work.
- Prepare, submit, and review behavior-based safety observations using the STEP form. The STEP form is to be used in conjunction with the appropriate JSA to identify positive aspects of task performance as well as to identify any deficiencies associated with the observed task.
- Inspect tools and other equipment before each use or as manufacturer and/or OSHA dictates.
- Correct job site hazards when possible without endangering life or health.
- Report safety and health concerns to the SS, PM, or RSHM.

Subcontractors. CRA subcontractors are responsible for the implementation of their own HASP and agree to comply with its contents. In the event of conflicting safety procedures or requirements, personnel must implement those safety practices that afford the highest level of safety and protection. In addition, non-compliance with safety and health policies and procedures may subject the subcontractor to disciplinary action up to and including termination of their contract with CRA. Subcontractors will be required to attend an initial site orientation and subsequent safety meetings.

Equipment Operators. All equipment operators are responsible for the safe operation of heavy equipment. Operators are responsible for inspecting their equipment on a daily basis to ensure safe performance. Brakes, hydraulic lines, backup alarms, and fire extinguishers must be inspected routinely throughout the project. Equipment will be taken out of service if an unsafe condition occurs. Documentation of daily inspections is required.

Authorized Visitors. Authorized visitors, as approved by the CRA Site Supervisor shall be provided with all known information with respect to the site operations and hazards as applicable to the purpose of their visit.

1.6 SITE HASP AMENDMENTS

Any change to the scope of work must be evaluated for its impact on the overall health and safety of the project and associated personnel. A minor change is one that adjusts already documented hazards within the HASP and does not expose site personnel to chemicals above exposure limits, such as the introduction of a new JSA/JLA, Journey Management Plan, or PPE that does not involve a change in respiratory protection. Minor amendments must be documented on the Site Health and Safety Plan Minor Amendment Form located in Appendix A, in addition to notifications to key personnel.

Significant changes to the scope of work require a rewrite and review/approval of the HASP.

1.7 TRAINING REQUIREMENTS

All personnel conducting work at this site shall have completed the appropriate safety and health training as applicable to their job tasks/duties. The required training is referenced throughout the HASP and identified on each JSA form.

1.7.1 SITE-SPECIFIC TRAINING

An initial site-specific training session or briefing shall be conducted by the PM or SS prior to commencement of work activities. During this initial training session, employees shall be instructed on the following topics:

- Personnel responsibilities
- Content and implementation of the HASP
- Site hazards and controls
- Site-specific hazardous procedures (e.g., drilling, excavations, etc.)
- Training requirements
- PPE requirements

- Emergency information, including local emergency response team phone numbers, route to nearest hospital, incident reporting procedures, and emergency response procedures
- Instruction in the completion of required inspections and forms
- Location of safety equipment, such as portable eyewash, first aid kit, fire extinguishers, etc.

The various components of the project HASP will be presented, followed by an opportunity to ask questions to ensure that each attendee understands the HASP. Personnel will not be permitted to enter or work in potentially contaminated areas of the site until they have completed the site-specific training session.

In addition to the initial site briefing conducted at the commencement of the project, supplemental brief safety meetings shall be conducted by the SS to discuss potential safety and health hazards associated with upcoming tasks and necessary precautions to be taken.

1.7.2 SAFETY MEETING/SAFETY AND HEALTH PLAN REVIEW

"Tailgate" safety meetings will take place each day prior to beginning the day's work. All site personnel will attend these safety meetings conducted by the SS. The safety meetings will cover specific safety and health issues, including the appropriate JSAs, site activities, changes in site conditions, and a review of topics covered in the site-specific pre-entry briefing. The safety meetings will be documented each day with written sign-in sheets containing a list of topics discussed. To assist with the compliance of documentation of the Tailgate safety meetings, there are two formats available. For meetings attended by more than four people, please use the Tailgate Safety Meeting Form-Large Group daily format, which requires one page for each Tailgate safety meeting conducted. If there are four or less people at the site, please use the Tailgate Safety Meeting Form-Small Group multiple-day format, which provides room to document three Tailgate safety meetings on one page. The two Tailgate Safety Meeting Forms (Large Group and Small Group) are located in Appendix A.

2.0 SITE OPERATIONS

2.1 SITE HISTORY/BACKGROUND

The Devil's Swamp Lake Site consists of a man-made crescent-shaped lake and associated wetlands located on the Mississippi River east bank floodplain approximately ten miles north of Baton Rouge, Louisiana. The location of the Site is shown on a vicinity map attached as Figure 1. The Devil's Swamp Lake is a man-made, crescent-shaped lake that was excavated in 1973 and 1974 to provide a source of borrow material for levee construction to reinforce the levee along the north and west sides of the Baton Rouge Barge Harbor. Devil's Swamp Lake is surrounded by low-lying bottom lands that grade into the swamp toward the Mississippi River, located approximately 3,600 feet west of the lake. The lake covers approximately 39 acres in the central portion of the swamp and roughly divides Devil's Swamp into northern and southern halves in that area of Devil's Swamp. Figure 2 shows the current Site features.

Baton Rouge Disposal, LLC currently owns and Clean Harbors Baton Rouge, LLC currently operates the former Rollins facility adjacent to the Site. Beginning in 1971, the Rollins facility discharged treated process wastewater to Devil's Swamp Lake through National Pollutant Discharge Elimination System (NPDES) permitted Outfall 001 and stormwater runoff through Outfall 002. In 1993, the treated water discharge line (Outfall 001) was installed directly to the Mississippi River. Stormwater from Outfall 002 continues to discharge to Devil's Swamp Lake through the drainage ditch from the former Rollins facility. The current discharge locations for the outfalls and the assumed flow paths are shown on Figure 2.

Previous risk assessments indicate reportedly unacceptable human health and ecological risks in the lake and portions of the swamp surrounding the lake. PCBs have been identified by the EPA as the primary constituent of concern (COC) in the sediment and in aquatic receptors at Devil's Swamp Lake. In March 2004, the EPA identified the commercial hazardous waste disposal facility formerly operated by Rollins as the apparent source of the Devil's Swamp Lake PCB impact.

2.2 SCOPE OF WORK

The objective of this project is to gather information sufficient to support an informed risk management decision regarding a potential remedial alternative that may be most appropriate for the Site. The Work Plan (WP) objectives will be completed through

Tier 1 Remedial Investigation (RI) activities including site characterization, completion of a screening level ecological risk assessment (SLERA), and identification of chemicals of potential concern (COPCs) for a potential human health risk assessment (HHRA).

This HASP covers the specific Site activities that will be conducted by CRA personnel and their subcontractors during completion of the Tier 1 and Tier 2 RI activities. These activities are as follows:

- Travel
- Mobilization/demobilization
- Site reconnaissance
- Boat/airboat use
- Sediment and surface water sample collection
- Biological tissue sample collection
- Equipment decontamination

3.0 HAZARD EVALUATION

This section identifies and evaluates the potential chemical, physical, and biological hazards that may be encountered during the completion of this project. These hazards and the anticipated initial exposure levels are based on historical data.

Specific activity JSA forms (located in Appendix B) have been developed to address the hazards associated with the site operations outlined in Section 2.0. New JSAs will be developed on an as-necessary basis if a JSA for that specific task is not available in the HASP. Additionally, current JSAs will be modified and customized in the field to ensure that the task-specific requirements are addressed each time the task is performed.

3.1 CHEMICAL HAZARDS

The chemical hazards associated with conducting Site operations include the potential exposure to on site contaminants encountered during field activities, including sediment sampling, surface water sampling, and products used in decontamination of equipment and support products such as fuel. The potential routes of exposure from these products during normal use may occur through inhalation of vapors/dusts or direct contact or absorption with the materials. Based upon previous sampling of the site, the chemical hazards of concern that may be encountered during the tasks identified in the project's scope of work include PCBs. Table 1 presents the exposure routes and exposure levels for the chemical hazards of concern. These levels are set to protect the health of workers.

3.1.1 CHEMICAL HAZARD CONTROLS

Exposure to potential on-site contaminants/chemicals, such as those listed in Table 1.0 and Appendix C Material Safety Data Sheets (MSDSs), shall be controlled by:

- Monitoring air concentrations with appropriate equipment in the breathing zone
- Revising JSAs to list chemical hazards and associated hazard controls on a task-specific basis
- Employing dust control measures such as wetting the immediate area
- Using PPE/respiratory protection, as appropriate, in areas known to have concentrations above the specified action level for each contaminant

3.1.2 SKIN CONTACT AND ABSORPTION CONTAMINANTS

Skin contact with chemicals may be controlled by use of the proper PPE and good housekeeping procedures. The proper PPE (e.g., Tyvek®, gloves) as described in Section 4.0 shall be worn for all activities where contact with potentially harmful media or materials is anticipated. Utilize manufacturer data on permeation and degradation to minimize skin contact potential (see Section 4.2.1 for additional information).

3.1.3 HAZARD COMMUNICATION

Personnel required to handle or use hazardous materials as part of their job duties will be trained and educated in accordance with the Hazard Communication standard. The training shall include instruction on the safe use and handling procedures of hazardous materials, how to read and access MSDSs, and the proper labeling requirements.

The appropriate MSDS for the chemicals in use at the site will be maintained by and available for project personnel throughout the course of the project. A copy of all MSDSs is provided in Appendix C.

3.1.4 FLAMMABLE AND COMBUSTIBLE LIQUIDS

The storage, dispensing, and handling of flammable and combustible liquids must be in accordance with industry standards such as National Fire Protection Agency (NFPA) guidelines. The specific flammable or combustible liquids used at the site may include gasoline, diesel, kerosene, oils, and solvents.

Flammable and combustible liquids are classified according to flash point. This is the temperature at which the liquid gives off sufficient vapors to readily ignite. Flammable liquids have flash points below 100°F (37.8°C). Combustible liquids have flash points above 100°F (37.8°C) and below 200°F (93.3°C).

Storage

Many flammables can ignite at temperatures at or below room temperature. They are far more dangerous than combustibles when they are heated. As a result, these products must be handled very carefully. At normal temperatures, these liquids can release vapors that are explosive and hazardous to employee health. Exposure to heat can

cause some of these liquids to break down into acids, corrosives, or toxic gases. For this reason, flammable and combustible liquids should be stored in cool, well ventilated areas away from any source of ignition. Always consult the MSDS of the product for specific information.

Flammable and combustible liquids must be stored in designated areas. Such areas must be isolated from equipment and work activity that may produce flames, sparks, heat, or any form of ignition, including smoking. The most practical method is the use of one or more approved (commercially available) flammable/combustible liquid storage cabinets.

Cabinets must be labeled "Flammable – Keep Fire Away." Doors must be kept closed and labeled accordingly. Containers must be kept in the cabinet when not in use.

General Requirements

- Keep containers of flammable/combustible liquids closed when not in use.
- Keep flammable/combustible liquids in designated areas and approved cabinets.
- Do not allow use of unapproved containers for transfer or storage. Use only approved safety cans (5-gallon maximum) with a spring closing lid and spout cover, designated to safely relieve internal pressure when exposed to heat or fire.
- Use only approved self-closing spigots, faucets, and manual pumps when drawing flammable/combustible liquids from larger containers/barrels.
- Use only approved metal waste cans with lids for disposal of shop towels/oily rags.
- Designate "Smoking" and "No Smoking" areas.
- Designate fueling areas.
- Observe all signs indicating "No Smoking," "No Flames," and "No Ignition."

Transferring Flammable/Combustible Liquids

- This seemingly routine task can be hazardous if certain precautions are not followed. Grounding and bonding must be observed at all times to prevent the accumulation of static electricity when transferring containers/barrels one to another.
- Drums should be grounded to a grounding rod using a #4 copper conductor.
- Bonding is necessary between conductive containers (e.g., a barrel and a 5-gallon container).

3.2 PHYSICAL HAZARDS

Physical hazards that may be present during project work include: potential for close proximity to heavy equipment and drilling devices, noise, overhead or underground utilities, vehicle traffic, material handling, heavy lifting, electrical or stored energy, excavations, use of hand and power tools, use of all terrain vehicles, use of utility task vehicles, slip/trip/hit/fall injuries, hot work (e.g., welding, cutting, and open flame), heat/cold stress, working on or near water, boating, working at night or with illumination difficulties, biological hazards, other potential adverse weather conditions, working alone, and aggressive or menacing behavior. In addition, personnel must be aware that the protective equipment worn may limit dexterity and visibility and may increase the difficulty of performing some tasks.

3.2.1 HEAVY EQUIPMENT SAFETY

Heavy Equipment

The following practices shall be adhered to by personnel operating heavy equipment (such as backhoes) and personnel working in the vicinity of heavy equipment:

- Heavy equipment is to be inspected when equipment is initially mobilized, delivered to a job site, or after it is repaired and returned to service, to ensure that it meets all manufacturer and OSHA specifications (e.g., fire extinguishers, backup alarms, etc.).
- Heavy equipment is to be inspected on a daily basis. Documentation of this daily pre-operational inspection is to be filed with the project files.
- Heavy equipment is only to be operated by authorized, competent operators.
- Seat belts are to be provided on heavy equipment that is not designed for stand-up operation.
- Equipment/vehicles whose payload is loaded by crane, excavator, loader, etc. will have a cab shield and/or canopy to protect the operator.
- Personnel will not be raised/lowered in buckets.
- Personnel will not ride on fender steps or any place outside the cab.
- Before leaving the equipment controls, ensure that the equipment is in its safe resting position. For a backhoe, apply the parking brake, put the front loader bucket down on the ground level, and ensure that the rear excavator bucket is locked in the

travel position. Bulldozers and scraper blades, loader buckets, dump bodies, and similar equipment will be fully lowered or blocked when not in use.

- Before raising any booms, buckets, etc., check for overhead obstructions.
- Employees involved in the operation shall not wear any loose-fitting clothing, as it has the potential to be caught in moving machinery.
- Personnel shall wear high visibility safety vests, steel toed shoes, safety glasses, hearing protection, and hard hats during heavy equipment operations.
- When moving heavy equipment or when working within 10 feet of a stationary object or in tight quarters, a spotter will be used.

3.2.2 NOISE

Project activities that include working in close proximity to heavy equipment and/or drilling operations, or using power tools that generate noise levels exceeding the decibel range of 85 dBA, will require the use of hearing protection with a Noise Reduction Rating (NRR) of at least 20. Hearing protection (earplugs/muffs) will be available to personnel and visitors requiring entry into these areas.

When it is difficult to hear a coworker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All site personnel who may be exposed to high noise levels will participate in CRA's Hearing Conservation Program.

3.2.3 UTILITY CLEARANCES

Elevated superstructures (e.g., drill rigs, back hoes, scaffolding, ladders, cranes) shall remain a distance of 10 feet away from utility lines (<50 kV) and 20 feet away from power lines (>50 kV). Underground utilities, if present, shall be clearly marked and identified prior to commencement of work. Follow local/state/provincial regulations and client requirements with regards to utility locating requirements (e.g., One-Call).

Personnel involved in intrusive work shall:

- Confirm proposed excavation(s) and heavy truck routes are not in the area of subsurface utilities. This meeting is to be documented.

- Review and adhere to CRA's Subsurface Utility Clearance Protocol. Use prudent digging techniques inside 18 inches of the outside edge of an underground facility. This distance will vary based on state law, facility/client requirements, etc.
- **Utilize the Property Access/Utility Clearance Data Sheet (QSF-019). This is to be completed prior to initiating excavation activities.**
- Be able to determine the minimum distance from marked utilities, identify the work that can be conducted with the assistance of the locator line service, coordinate document/drawing review, and inspect the site for manholes, catch basins, valve boxes, etc. that may indicate the direction/depth of underground installations. Marking indicates only the approximate location of buried lines. After obtaining the facility owner's permission, hand dig test holes (or use an equivalent means) in a careful and prudent manner to determine the precise location of underground facility lines. If the location of the lines is still undeterminable after hand digging/probing/soft digging, call the facility owner for additional direction and assistance prior to initiating intrusive operations.
- If you must expose a line, state law requires CRA to protect and support the underground facility line while working at the site.

3.2.4 VEHICLE TRAFFIC AND CONTROL

The following safety measures are to be taken by CRA personnel that have the potential to be exposed to vehicle traffic:

- A high visibility safety vest meeting ANSI Class II garment requirements is to be worn at all times
- Employees will work using the "buddy system"
- Cones and other visible markers will be used to demarcate a safe work zone around the active work zone(s)
- Appropriate signage will be posted as necessary, to inform roadway/parking lot users of any additional control measures necessary to protect the public and CRA employees

Additionally**, when working on an active roadway or along the shoulder or side of the road is necessary**, project personnel must follow the requirements presented in the Manual on Uniform Traffic Control Devices (MUTCD), which is found at: http://mutcd.fhwa.dot.gov/kno-millennium.htm This will include the implementation of a Temporary Traffic Control Plan (TTCP) and discussion with the local municipality

as to the responsible party who will implement the TTCP. The TTCP has four components: The Advanced Warning Area, the Transition Area, the Activity Area, and the Termination Area.

3.2.5 RAILYARD SAFETY

The PM has evaluated this condition and determined it is not hazard at this site.

3.2.6 MATERIAL HANDLING AND STORAGE

Material handling and storage practices to be conducted at the project site include manual lifting of materials and possibly the use of hoisting and rigging equipment. As a rule, use mechanical means for lifting heavy loads whenever possible.

General Storage Practices

The basic safety requirement for storage areas is that the storage of materials and supplies shall not create a hazard. Additional general storage area practices include the following:

- Bags, containers, bundles, etc. stored in tiers shall be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
- All stacked materials, cargo, etc. shall be examined for sharp edges, protrusions, signs of damage, or other factors likely to cause injury to persons handling these objects. Defects should be corrected as they are detected.
- Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage.
- Storage areas shall have provisions to minimize manual lifting and carrying. Aisles and passageways shall provide for the movement of mechanical lifting and conveyance devices.
- Stored materials shall not block or obstruct access to emergency exits, fire extinguishers, alarm boxes, first aid equipment, lights, electrical control panels, or other control boxes.
- "NO SMOKING" signs shall be conspicuously posted, as needed, in areas where combustible or flammable materials are stored and handled.

Cylindrical materials such as pipes and poles shall be stored in racks or stacked on the ground and blocked.

Special Precautions for Hazardous or Incompatible Materials Storage

Generally, materials are considered hazardous if they are ignitable, corrosive, reactive, or toxic. Manufacturers and suppliers of these materials must provide the recipient with MSDSs, which describe their hazardous characteristics and give instructions for their safe handling and storage.

Many hazardous materials are incompatible, which means they form mixtures that may have hazardous characteristics not described on the individual MSDSs. The following special precautions shall be followed regarding the storage of hazardous materials:

- Based on the information available on the MSDSs, incompatible materials shall be kept in separate storage areas
- Warning signs shall be conspicuously posted, as needed, in areas where hazardous materials are stored

3.2.7 HOISTING AND RIGGING

The PM has evaluated this condition and determined it is not hazard at this site.

3.2.8 CRANES AND HOISTS

The PM has evaluated this condition and determined it is not hazard at this site.

3.2.9 MANUAL LIFTING

Proper lifting takes the hazard out of moving heavy objects. Below are some items that should be considered prior to a lift.

- Establish that you can lift the load safely; if the load is in excess of 50 pounds, you are required to ask for assistance
- Use a mechanical lifting device if available
- Inspect route to be traveled, confirming sufficient clearance

- Look for any obstructions or spills
- Inspect the object to determine how it should be grasped
- Look for any sharp edges, slivers, or other things that may cause personal injury
- Do not move any object that will obstruct your field of vision when transporting the load

When lifting objects, use the following proper lifting techniques:

- Feet must be parted, with one foot alongside the object being lifted and one foot behind. When the feet are comfortably spread, a more stable lift can occur and the rear foot is in a better position for the upward thrust of the lift.
- Use the squat position and keep the back straight - but remember that straight does not mean vertical. A straight back keeps the spine, back muscles, and organs of the body in correct alignment, and minimizes the compression of the guts that can cause a hernia.
- Grip is one of the most important elements of correct lifting. The fingers and the hand are extended around the object, using the full palm. Fingers have very little power, so use the strength of your entire hand.
- The load must be drawn close, and the arms and elbows must be tucked into the side of the body. Holding the arms away from the body increases the strain on the arms and elbows. Keeping the arms tucked in helps keep the body weight centered.

The body must be positioned so that the weight of the body is centered over the feet. This provides a more powerful line of thrust and also ensures better balance. Start the lift with a thrust of the rear foot. Do not twist.

3.2.10 HAND AND POWER TOOLS

Hand Tools

- Hand tools must meet the manufacturer's safety standards
- Hand tools must not be altered in any way
- At a minimum, eye protection must be used when working with hand tools
- Wrenches (including adjustable, pipe, end, and socket wrenches) must not be used when jaws are sprung to the point that slippage occurs

- Impact tools (such as drift pins, wedges, and chisels) must be kept free of mushroom heads
- Wooden handles must be free of splinters or cracks and secured tightly to the tool
- Any damaged or defective tools must be immediately removed from service and tagged for destruction

Power Tools

- All power tools must be inspected regularly and used in accordance with the manufacturer's instructions and the tool's capabilities
- Electric tools must not be used in areas subject to fire or explosion hazards, unless they are approved for that purpose
- Portable electric tools must be connected to a Ground Fault Circuit Interrupter (GFCI) when working in wet areas
- Proper eye protection must be used when working with power tools
- Personnel must be trained in the proper use of each specific tool
- Any damaged or defective power tools must be immediately tagged and removed from service

3.2.11 ELECTRICAL HAZARDS

The PM has evaluated this condition and determined that it is not a hazard for this site or project. If conditions change, SWA will be exercised and the HASP will be revised to include this section. Those affected will be notified.

3.2.12 CONTROL OF HAZARDOUS ENERGY

The PM has evaluated this condition and determined that it is not a hazard for this site or project. If conditions change, SWA will be exercised and the HASP will be revised to include this section. Those affected will be notified.

3.2.13 EXCAVATIONS

The PM has evaluated this condition and determined it is not hazard at this site.

3.2.14 UST/AST REMOVALS

The PM has evaluated this condition and determined it is not hazard at this site.

3.2.15 CONFINED SPACE ENTRY

The PM has evaluated this condition and determined it is not hazard at this site.

3.2.16 COMPRESSED GAS CYLINDERS

The PM has evaluated this condition and determined that it is not a hazard for this site or project. If conditions change, SWA will be exercised and the HASP will be revised to include this section. Those affected will be notified.

3.2.17 FALL HAZARDS

The PM has evaluated this condition and determined it is not hazard at this site.

3.2.18 PORTABLE LADDERS

The PM has evaluated this condition and determined it is not hazard at this site.

3.2.19 SLIP/TRIP/HIT/FALL

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but can be minimized by the following prudent practices:

- Spot check the work area to identify hazards
- Establish and utilize a pathway free of slip and trip hazards
- Beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain
- Carry only loads you can see over
- Keep work areas clean and free of clutter, especially in storage rooms and walkways

- Communicate hazards to on-site personnel
- Secure all loose clothing and ties, and remove jewelry while around machinery
- Report and/or remove hazards
- Keep a safe buffer zone between workers using equipment and tools

3.2.20 HEAT STRESS

Recognition and Symptoms

Temperature stress is one of the most common illnesses faced by project personnel when working in elevated temperatures and/or humidity. Acclimatization and frequent rest periods must be established for conducting activities where temperature stress may occur. Below are listed signs and symptoms of heat stress. Personnel should follow appropriate guidelines if any personnel exhibit these symptoms:

- **Heat Rash**: Redness of skin. Frequent rest and change of clothing.
- **Heat Cramps**: Painful muscle spasms in hands, feet, and/or abdomen. Administer lightly salted water by mouth, unless there are medical restrictions.
- **Heat Exhaustion**: Clammy, moist, pale skin, along with dizziness, nausea, rapid pulse, fainting. Remove to cooler area and administer fluids.
- **Heat Stroke**: Hot dry skin; red, spotted, or bluish; high body temperature of 104°F; mental confusion; loss of consciousness; convulsions or coma. Immediately cool victim by immersion in cool water. Wrap with wet sheet and sponge with cool liquid while fanning, treat for shock. **DO NOT DELAY TREATMENT. COOL BODY WHILE AWAITING AMBULANCE.**

Work Practices

The following procedures will be carried out to reduce heat stress:

- Heat stress monitoring
- Acclimatization
- Work/rest regimes (schedule of breaks) - mandatory breaks scheduled in summer months or during high risk activities for heat stress
- Heat stress safety personal protective equipment (cool-vests, bandanas, etc.)
- Liquids that replace electrolytes, water, and salty foods available during rest
- Use of buddy system

Acclimatization

The level of heat stress at which excessive heat strain will result depends on the heat tolerance capabilities of the worker. Each worker has an upper limit for heat stress, beyond which the resulting heat strain can cause the worker to become a heat casualty. In most workers, appropriate repeated exposure to elevated heat stress causes a series of physiologic adaptations called acclimatization, whereby the body becomes more efficient in coping with the heat stress. Work/rest regimes should be planned as a component of project preparation and discussed during the daily tailgate safety meetings.

Worker Information and Training

All new and current employees who work in areas where there is a reasonable likelihood of heat injury or illness should be kept informed through continuing education programs (e.g., hazards, effects, preventative measures, drug/alcohol interaction).

3.2.21 SUN EXPOSURE

Overexposure to sunlight is a common concern when field activities occur during warm weather conditions. Overexposure can occur on clear, sunny days as well as on overcast and cloudy days. Ultraviolet (UV) rays from the sun can cause skin damage or sunburn, but can also result in vision problems, allergic reactions, and other skin concerns. Two types of UV rays are emitted from the sun: UVA and UVB rays.

UVB rays cause sunburn, skin cancer, and premature aging of the skin. UVB rays stimulate tanning but are also linked to other problems such as impaired vision, skin rashes, and some allergic and other reactions to certain drugs. Extra care should be taken if activities are to be conducted on or near water. Sunlight reflected off the surface of the water is intensified resulting in accelerated effects. The following steps should be taken to protect against overexposure to sunlight:

- **Always Use Sunscreen**: Apply a broad spectrum sunscreen with Sun Protection Factor (SPF) of at least 15 or higher liberally on exposed skin. Reapply every 2 hours or more. Even waterproof sunscreen can come off when you towel off or sweat.
- **Cover Up**: Wearing tightly woven, loose-fitting, and full-length clothing is a good way to protect your skin from UV rays.

- **Wear a Hat**: A hat with a wide brim offers good sun protection to your eyes, ears, face, and the back of your neck – areas particularly prone to overexposure to the sun.
- **Wear Sunglasses That Block 99 to 100 Percent of UV Radiation**: Sunglasses that provide 99 to 100 percent UVA and UVB protection will greatly reduce sun exposure that can lead to cataracts and other eye damage. Check the label when buying sunglasses.
- **Seek Shade**: Shade is a good source of protection, but keep in mind that shade structures (e.g., trees, umbrellas, canopies) do not offer complete sun protection.
- **Limit Time in the Midday Sun**: The sun's rays are strongest between 10 a.m. and 4 p.m. Whenever possible, limit exposure to the sun during these hours.

3.2.22 COLD STRESS

Cold stress is similar to heat stress, in that it is caused by a number of interacting factors including environmental conditions, clothing, and workload, as well as the physical and conditioning characteristics of the individual. Fatal exposures to cold have been reported in employees failing to escape from low environmental air temperatures or from immersion in low temperature water. Hypothermia, a condition in which the body's deep core temperature falls significantly below 98.6°F (37°C), can be life threatening. A drop in core temperature to 95°F (35°C) or lower must be prevented.

Air temperature is not sufficient to determine the cold hazard of the work environment. The wind chill must be considered as it contributes to the effective temperature and insulating capabilities of clothing. The equivalent chill temperature should be used when estimating the combined cooling affect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the body's core temperature.

The body's physiologic defense against cold includes constriction of the blood vessels, inhibition of the sweat glands to prevent loss of heat via evaporation, glucose production, and involuntary shivering to produce heat by rapid muscle contraction.

The frequency of incidents increases with cold temperature exposures as the body's nerve impulses slow down, individuals react sluggishly, and numb extremities make for increased clumsiness. Additional safety hazards include ice, snow blindness, reflections from snow, and possible skin burns from contact with cold metal.

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 95°F (35°C). This must be taken as a sign of danger to the employees on site, and cold exposures should be immediately terminated for any employee when severe shivering becomes evident. Useful physical or mental work is limited when severe shivering occurs.

Predisposing Factors for Cold Stress

Certain predisposing factors make an individual more susceptible to cold stress. The project team members are responsible for informing the SHO/SS to monitor an individual, if necessary, or use other means of preventing/reducing the individual's likelihood of experiencing a cold related illness or disorder.

Predisposing factors that will increase an individual's susceptibility to cold stress are listed below:

- **Dehydration:** The use of diuretics and/or alcohol, or diarrhea can cause dehydration. Dehydration reduces blood circulation to the extremities.
- **Fatigue During Physical Activity:** Exhaustion reduces the body's ability to constrict blood vessels. This results in the blood circulation occurring closer to the surface of the skin and the rapid loss of body heat.
- **Age:** Some older and very young individuals may have an impaired ability to sense cold.
- **Poor Circulation:** Vasoconstriction of peripheral vessels reduces blood flow to the skin surface.
- **Heavy Work Load:** Heavy workloads generate metabolic heat and make an individual perspire even in extremely cold environments. If perspiration is absorbed by the individual's clothing and is in contact with the skin, cooling of the body will occur.
- **Use of PPE:** PPE usage that traps sweat inside the PPE may increase an individual's susceptibility to cold stress.
- **Lack of Acclimatization:** Acclimatization, the gradual introduction of workers into a cold environment, allows the body to physiologically adjust to cold working conditions.
- **History of Cold Injury:** Previous injury from cold exposures may result in increased cold sensitivity.

Prevention of Cold Stress

A variety of measures can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders. These include acclimatization, fluid and electrolyte replenishment, eating a well-balanced diet, wearing warm clothing, the provision of shelter from the cold, thermal insulation of metal surfaces, adjusting work schedules, and employee education.

- **Acclimatization:** Acclimatization is the gradual introduction of workers into the cold environment to allow their bodies to physiologically adjust to cold working conditions. However, the physiological changes are usually minor and require repeated uncomfortably cold exposures to induce them.
- **Fluid and Electrolyte Replenishment:** Cold, dry air can cause employees to lose significant amounts of water through the skin and lungs. Dehydration affects the flow of blood to the extremities and increases the risk of cold injury. Warm, sweet, caffeine-free, non-alcoholic drinks and soup are good sources to replenish body fluids.
- **Eating a Well-Balanced Diet:** Restricted diets including low salt diets can deprive the body of elements needed to withstand cold stress. Eat high-energy foods throughout the day.
- **Warm Clothing:** Maintaining air space between the body and outer layers of clothing is beneficial in order to retain body heat. However, the insulating effect provided by such air spaces is lost when the skin or clothing is wet.
- **Work/Rest Regimes:** Schedule work during the warmest part of the day, if possible. Rotate personnel and adjust the work/rest schedule to enable employees to recover from the effects of cold stress.

The parts of the body most important to keep warm are the feet, hands, head, and face. As much as 40 percent of body heat can be lost when the head is exposed.

3.2.23 ADVERSE WEATHER CONDITIONS

The SS shall decide on the continuation or discontinuation of work based on current and pending weather conditions. Electrical storms, heavy rains or snow falls, tornado warnings, and sustained strong winds (approximately 40 mph) are examples of conditions that would call for the discontinuation of work and evacuation of Site. The SS and/or field project personnel will implement Stop Work Authority. Field activities may resume if 30 minutes have lapsed from the last sign of lightning; however, if

conditions worsen, work will be postponed indefinitely for the remainder of the day and the site will be evacuated.

In addition, no work with boats will be permitted during any type of electrical storm or during wind events that have wind speeds exceeding 40 mph.

3.2.24 HOT WORK HAZARDS

The PM has evaluated this condition and determined it is not hazard at this site.

3.2.25 AFTER HOURS WORK

The procedures outlined in this section are to be implemented by all CRA, , and subcontractor personnel when working outside during evening, nighttime and/or early morning hours.

- All employees will use the "Buddy System."
- At least one member of the field team/pair will be equipped with a radio and/or cell phone.
- Ensure that personnel have had sufficient rest prior to beginning night activities.
- Use clear safety glasses.
- Use adequate lighting equipment. Inspect and ensure that the equipment is in proper working order before field activities begin.
- Increased awareness of biological hazards should be taken, as many potentially harmful organisms increase their activity at night, such as mosquitoes, alligators, and many snakes (see section 3.3 for additional information regarding biological hazards).
- Wear insect repellent and appropriate clothing, such as long sleeves and/or a mosquito jacket.
- When working over or near aquatic environments, avoid working directly in areas where juvenile/hatchling alligators are present.
- Always use a reliable light source to illuminate areas where you will be walking and/or placing your hands.

3.2.26 SPECIAL WORK CONDITIONS/SITUATIONS

CRA may be asked to conduct work that requires special precautions/considerations due to the following factors:

• Remote work locations.	Mandatory: No working alone, Journey Management Plan, call in procedure to include use of satellite phone if no cell or direct line access.
• Project site is in an area known for high crime or violence activity.	Mandatory: No working alone, police or security escort.
• Entry into abandoned buildings.	Mandatory: No working alone, call in procedure.
• Entry into wooded areas during hunting season.	Mandatory: No working alone, reflective vest, Journey Management Plan, call in procedure.
• Project work involving single employees (lone worker).	Mandatory: Call in procedure.

If these situations are possible, please consult with your Regional Safety Manager to develop a plan.

Safety During Hunting Season

A significant number of hunting clubs and deer stands may be in the project area; precaution is advised. During hunting season, blaze orange vests and hats must be worn at all times. Also, unless absolutely required, avoid field surveys or land entry before 10 a.m. and after 3 p.m. during active hunting. When walking or driving on or near active hunting areas, make noise at regular intervals using air horn, whistle, or equivalent. Be aware the large animals are on the move and drive accordingly.

3.2.27 AGGRESSIVE OR MENACING BEHAVIOR

When confronted by an individual whose behavior becomes aggressive or menacing, staff should remain as calm as possible. Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call 911. Use the team approach. A staff member who is physically unable to break away from an attacker should shout for help.

The use of physical force is justified when a person believes that such force is necessary to protect himself or herself against the use or imminent use of unlawful physical force by another person. The use of physical force is also justified in the defense of another party, such as a co-worker, who is being subjected to unlawful physical force. Staff members can use any technique of legal self-defense in order to halt or distract an attacker until law officers arrive on the scene.

Should an aggressor only be interested in the taking or damaging of property, do not interfere. Obtain a description of the individual to provide to local authorities, including height, weight, race, sex, clothing, accent, unusual markings such as tattoos, facial piercings, scars, hair color, and weapon, if any.

File an Incident Report with your immediate supervisor who will forward same accordingly.

3.2.28 WORKING OVER OR NEAR WATER

The procedures outlined in this section are to be implemented by all CRA and subcontractor personnel when there is potential to slip or fall into water that is greater than 3 feet in depth. Additionally, these procedures are to be adhered to when water is flowing and has the potential to carry personnel away.

- All field personnel working in a boat over water will be required to have no less than one spotter equipped with emergency contact capabilities at all times.
- Personnel will follow the Boating JSA and all safety procedures referenced in Section 3.2.1. Personnel will not be permitted to enter a boat unless they have all proper PPE and safety requirements are met.
- Standard guardrails are required on any walking/working surface over or near water. Where guardrails are not practical due to impairment of work being performed, other types of safeguarding, such as safety harnesses, lifelines, and lanyards may be used (see CRA's Fall Protection standard of practice).
- If it is not feasible to provide fall protection due to the scope of work or location, personnel will be required to wear U.S. Coast Guard-approved life jackets or buoyant work vests. Prior to each use and after each use, the buoyant work vests and life preservers must be inspected for defects which would affect strength and/or

buoyancy. Any damaged or defective buoyant work vest or life preserver cannot be used.

- Call in or make prearranged contacts after each activity posing a drowning hazard is completed.
- If it is necessary to work on wet/slippery surfaces above water, non-slip tape or other methods are to be used to increase traction.

Ring buoys with a minimum of 90 feet of line must be readily available for emergency operations. The distance between buoys cannot exceed 200 feet.

3.2.29 BOATING SAFETY

There are many issues to be aware of when project activities include working in or from an airboat, motor boat, and paddle boat. Some of the primary boating rules and regulations for Louisiana are attached to this section for your review and reference. These regulations will be used as guidance whether or not the activity takes place within Louisiana jurisdictional waters.

These persons must carry with them on the vessel the following:

- Photographic identification, such as a driver's license
- A boater education certification card issued by the Louisiana Department of Wildlife and Fisheries upon successful completion of a boater education course.

Louisiana law prohibits anyone from boating while intoxicated (BWI), that is, while under the influence of alcohol or drugs. Alcohol and drugs cause impaired balance, blurred vision, poor coordination, impaired judgment.

Negligent and reckless operation of a vessel is illegal in Louisiana. Negligent and reckless operation of a vessel is defined as the failure to exercise the care necessary to prevent the endangerment of life, limb, or property of any other person.

Some examples of negligent and reckless operation follow:

- Boating in restricted areas that have been clearly marked by buoys or in some other manner.
- Allowing passengers to ride on the bow, gunwale, transom, seat backs, seats on raised decks, or any other place where there may be a chance of falling overboard.

- Operating at speeds that are not reasonable and prudent based on boating traffic, weather conditions, visibility or other potential hazards. If no limits are posted you should operate a vessel so that it does not endanger others. Vessel speed should always be maintained so that the vessel can be stopped safely.
- Causing damage to a person or property with a vessel's wake in posted "No Wake" areas. You should operate the vessel slowly enough so that your vessel does not throw a wake. An operator should reduce speed when passing a swim area or close to a shoreline.
- Another vessel where people are fishing, water skiing, diving, or anchored.
- Encircling swimmers, divers, or boaters who are fishing. This includes vessels pulling water-skiers.

Boating Safety Equipment

All vessels must be equipped with U.S. Coast Guard-approved life jackets called personal flotation devices (PFDs). The quantity and type depends on the length of your vessel and the number of people onboard and/or being towed. Each PFD must be in good condition, the proper size for the intended wearer, and be readily accessible! Readily accessible means you must be able to put the PFD on in a reasonable amount of time in an emergency (vessel sinking, on fire, etc.). PFDs should not be stowed in plastic bags, in locked or closed compartments or have other gear stowed on top of them. Vessel operators should ask everyone on their vessel to wear a PFD whenever on the water. Other safety items that should be present on all vessels include:

- first aid kit
- radio and/or cell phone
- air horn
- fire extinguisher with a current inspection sticker
- fuel (if vessel is motorized)
- docking rope
- rescue rope
- one ring buoy
- navigation lights
- two oars/paddles

PFD Requirements

- All vessels must have at least one Type I, II, III or V personal flotation device that is U.S. Coast Guard-approved, wearable and of the proper size for each person onboard. Sizing for PFDs is based on body weight and chest size.
- All PFDs must be in good and serviceable condition and must be readily accessible.
- Louisiana law requires all children under 13 years of age to wear a U.S. Coast Guard-approved PFD while underway (not at anchor or moored or aground) in a vessel of less than 26 feet long.
- One Type IV U.S. Coast Guard-approved PFD must be onboard vessels 16 feet or longer and readily accessible in addition to the above requirements.
- One Type V may be substituted for any other type if it is specifically approved by the U.S. Coast Guard for the activity at hand.
- Each person riding on or being towed behind a PWC must wear a U.S. Coast Guard-approved Type I, II, III or V PFD.

Operator's Responsibilities

1. Make sure the boat is in top operating condition and that there are no tripping hazards. The boat should be free of fire hazards and have clean bilges.
2. Safety equipment, required by law, is on board, maintained in good condition, and you know how to properly use these devices.
3. File a float plan with a co-worker who is ashore.
4. Have a complete knowledge of the operation and handling characteristics of your boat.
5. Know your position and know where you are going.
6. Maintain a safe speed at all times to avoid collision.
7. Keep an eye out for changing weather conditions, and act accordingly.
8. Know and practice the Rules of the Road (Navigational Rules).
9. Know and obey federal and state regulations and waterway markers.
10. Maintain a clear, unobstructed view forward at all times. "Scan" the water back and forth; avoid "tunnel" vision. Most boating collisions are caused by inattention.

Fire Extinguisher

- **Type A** fires are of combustible solids like wood, paper, etc.
- **Type B** fires are of flammable liquids like gasoline or oil.

- **Type C** fires are electrical fires.

All vessels are required to have a **Type B** fire extinguisher(s) onboard if one or more of the following conditions exist:

- Closed compartments under seats where portable fuel tanks may be stored.
- Closed storage compartments in which flammable or combustible materials may be stored.
- Closed living spaces.
- Permanently installed fuel tanks.

Collision Prevention

Collisions can be easily prevented if every vessel operator fulfills these three major responsibilities:

1. **Practice good seamanship -** It is the responsibility of every vessel operator to take all necessary action to avoid a collision, taking into account the weather, vessel traffic and limits of other vessels. Such action should be taken in ample time to avoid a collision and at a safe distance from other vessels.
2. **Keep a proper lookout -** Failing to keep a sharp lookout is the most common cause of collisions. Every operator must keep a proper lookout, using both sight and hearing, at all times. Watch and listen for other vessels, radio communications, navigational hazards and others involved in water activities.
3. **Maintain a safe speed -** Safe speed is the speed that ensures you will have ample time to avoid a collision and can stop within an appropriate distance. Safe speed will vary depending on conditions such as wind, water conditions, navigational hazards, visibility, surrounding vessel traffic density, and the maneuverability of your vessel. Always reduce speed and navigate with extreme caution at night and when visibility is restricted.

Overloading

Never overload your boat with passengers and cargo beyond its safe carrying capacity. Too many people and/or gear will cause the boat to become unstable. Always balance the load so that the boat maintains proper trim. Here are some things to remember when loading your boat:

1. Distribute the load evenly fore and aft from side to side.

2. Keep the load low.
3. Keep passengers seated (do not stand up in a small boat!).
4. Fasten gear to prevent shifting.
5. Do not exceed the "U.S. Coast Guard Maximum Capacities" information label (commonly called the Capacity Plate). This plate displays three important items: a) the maximum weight of persons on board in pounds; b) the maximum carrying weight of the vessel in pounds; and c) the maximum horsepower recommended for the boat.
6. If there is no capacity plate, use the following chart as a guide to determine the maximum number of persons you can safely carry in calm weather. The chart is applicable only to mono-hull boats less than 20 feet in length. A mono-hull is a boat, which makes a single "footprint" in the water when loaded to its rated capacity. For example, a catamaran, trimaran, or a pontoon boat is not a mono-hull boat.

Never overload your boat with passengers and cargo beyond its safe carrying capacity. Too many people and/or gear will cause the boat to become unstable.

Maximum Persons	Boat Length (feet)
1	6
2	8
2	10
3	12
4	14
5	16
6	18
7	20

Or use the following formula to determine the safe loading capacity when a capacity plate is not available.

Formulas for Safe Loading			
Horsepower Capacity:		**Person Capacity:**	
For small, flat-bottom boats:		Average weight per person is 150 lbs	
Multiply boat length (ft) times transom width (ft)			
If answer is:	Maximum HP is:		
35 or less	3	(Boat length	
36-39	5	X	=
40-42	7.5	Boat width)	Number of People
43-45	10	15	
46-52	15		
Note: for flat-bottom, hard chine boats, with an answer of 52 or less, reduce one increment (e.g. 5 to 3).		Boat length and width are measured in feet. Round fractions down to next lower number.	

Always check the capacity plate to make sure you are not overlooking or over-powering the vessel. Too many people (and/or gear) will also cause the boat to become unstable. Always balance the load so that your vessel maintains proper trim. Too much weight to one side or the other will cause the boat to list and increase the chance of taking on water. Too much weight in the bow causes the vessel to plow through the water and too much weight in the stern will create a large wake. All of these situations make the vessel difficult to handle and susceptible to swamping.

Anchoring

Anchoring is done for two principal reasons: first, to stop and stay in one location and secondly, to keep you from running aground in bad weather as a result of engine failure. Anchoring can be a simple task if you follow these guidelines:

1. Make sure you have the proper type of anchor (danforth/plow/mushroom).

2. A three to six foot length of galvanized chain should be attached to the anchor. The chain will stand up to the abrasion of sand, rock or mud on the bottom much better than a fiber line.
3. A suitable length of nylon anchor line should be attached to the end of the chain (this combination is called the "Rode"). The nylon will stretch under heavy strain cushioning the impact of the waves or wind on the boat and the anchor.
4. Determine depth of water and type of bottom (preferably sand or mud).
5. Calculate the amount of anchor line you will need. General rule: 5 to 7 times as much anchor line as the depth of water plus the distance from the water to where the anchor will attach to the bow. For example, if the water depth is 8 feet and it is 2 feet from the top of water to your bow cleat, you would multiply 10 feet by 5 to 7 to get the amount of anchor line to put out.
6. Secure the anchor line to the blow cleat at the point you want it to stop.
7. Bring the bow of the vessel into the wind or current.
8. When you get to the spot you want to anchor, place the engine in neutral.
9. When the boat comes to a stop, slowly lower the anchor. Do not throw the anchor over, as it will tend to entangle the anchor.
10. When all anchor line has been let out, back down on the anchor with engine in idle reverse to help set the anchor.
11. When anchor is firmly set, use reference points (landmarks) in relation to the boat to make sure you are not drifting. Check these points frequently.

Do Not Anchor by the Stern! Anchoring a small boat by the stern has caused many to capsize and sink. The transom is usually squared off and has less freeboard than the bow. In a current, the force of the water can pull the stern under. The boat is also vulnerable to swamping by wave action. The weight of a motor, fuel tank, or other gear in the stern increases the risk.

Capsizing and Swamping

To reduce the risk of capsizing or swamping, follow these rules:

- Don't overload your vessel. Balance the load of all passengers and gear.
- Turn your vessel at controlled speeds.
- If anchoring, secure the anchor line to the bow of the vessel, never to the stern.
- Don't boat in rough water or bad weather.

To prevent falling overboard:

- Don't sit on the gunwale, bow, seat backs, motor cover or any other area not designed for seating.
- Don't sit on pedestal seats when underway at greater than idle speed.
- Don't stand up in the vessel.
- Don't move about the vessel when underway.
- Don't lean out from small vessels.

If someone on your vessel falls overboard, you need to immediately:

- Reduce speed and throw the victim a PFD unless you know he or she is already wearing one.
- Turn the vessel around and slowly pull alongside the victim, approaching the victim from downwind or into the current, whichever is stronger.
- Stop the engine. Pull the victim on board over the stern, keeping the weight in the vessel balanced.

Fueling Precautions

Most fires and explosions happen during or after fueling. To prevent an accident, follow these rules:

1. Portable tanks should be refueled ashore.
2. Close all hatches and other openings before fueling.
3. Extinguish all smoking materials.
4. Turn off engines, all electrical equipment, radios, stoves and other appliances.
5. Remove all passengers.
6. Keep the fill nozzle in contact with the tank and wipe up any spilled fuel.
7. Open all ports, hatches and doors to ventilate.
8. Run the blower for at least four minutes.
9. Check the bilges for fuel vapors before starting the engine.
10. Do the "sniff test". Sniff around to make sure there is no odor of gasoline anywhere in the boat.

A JSA has been prepared for fueling activities to be conducted at the Site and is included in Appendix B.

Fuel Management

Practice the "One-Third Rule" by using:

1. One-third of the fuel going out.
2. One-third to get back.
3. One-third in reserve.

3.3 BIOLOGICAL HAZARDS

3.3.1 VEGETATION OVERGROWTH

Overgrown weeds, bushes, trees, grass and other vegetation can be safety hazards when working from a boat on water. The can act as hazardous obstacles, and there are a number of hidden hazards not immediately recognized due to the overgrowth of vegetation in areas including discarded junk, litter, and debris. Additionally, there are biological hazards such as alligators, snakes, ticks, chiggers, and mosquitoes that seek refuge in overgrowth conditions.

Here are some simple actions you can take:

- Continually assess the work area as the boat moves through the water and adjust the boat speed as necessary.
- Determine if the area is safe to work in by identifying areas that might be hiding potential hazards and adjust the work zone accordingly. Maneuver boats around densely vegetated areas to avoid bottoming out or coming into contact with biological hazards. Consider the limitations of the equipment.
- Adequately protect yourself against the hazards by wearing boots, long sleeves, and other protective clothing/equipment that protects the body.

Before taking any action, determine whether there any ecological issues that would affect or prevent the removal of overgrowth in protected areas such as wetlands, wildlife habitats, or sanctuaries for endangered and/or protected species.

3.3.2 POISONOUS PLANTS

Common ***Poison Ivy*** grows as a small plant, a vine, and a shrub. Poison Ivy occurs in every state. The leaves always consist of three glossy leaflets. ***Poison Sumac*** grows as a woody shrub or small tree 5 to 25 feet tall. It usually contains nine leaves, with eight paired leaves and one on top, and is common in swampy areas. The plants are potent sensitizers and can cause a mild to severe allergic reaction, referred to as "contact dermatitis". ***These plants are found in the U.S. and Canada.***

Dermatitis, in Rhus-sensitive persons, may result from contact with the milky sap found in the roots, stems, leaves, and fruit, and may be carried by contacted animals, equipment or apparel.

The best form of prevention is to avoid contact. Wearing long sleeves and gloves, and disposable clothing, such as Tyvek, is recommended in high-risk areas to avoid exposure from contaminated apparel. Barrier creams and cleaners are also recommended.

3.3.3 INSECTS

Ticks

Ticks are blood feeding external parasites of mammals, birds, and reptiles throughout the world. Some human diseases of current interest in the United States caused by tick-borne pathogens include Lyme disease, ehrlichiosis, babesiosis, Rocky Mountain Spotted Fever, tularemia, and tick-borne relapsing fever. Lyme disease is caused by a bacterial parasite called spirochete and is spread by infected ticks that live in and near wooded areas, tall grass, and brush. The ticks that cause the disease in the Northeast and Midwest are often no bigger than a poppy seed or a comma in a newsprint. The peak months for human infection are June through October. There are many other tick borne diseases such as Rocky Mountain Spotted Fever, which can be carried by a variety of ticks. The prevention and treatment of these diseases are similar to those of Lyme disease.

Prevention

Preventative measures include wearing light-colored clothing, keeping clothing buttoned, tucking pant legs in socks, and keeping shirttails tucked in. Periodic checks

for ticks should be made during the day, and especially at night. Hair should also be checked by parting it and combing through it to make sure that no ticks have attached to the scalp. Also, check clothing when it is first removed, before ticks have a chance to crawl off.

The most common repellent recommended for ticks is N,N-dimethyl-m-toluamide, or DEET. It is important to follow the manufacturer's instructions found on the container for use with all insecticides especially those containing DEET.

In general, DEET insect repellent should only be applied to clothing, not directly on the skin. Do not apply to sunburns, cuts, or abrasions. Use soap and water to remove DEET once indoors.

Removal

The best way to remove a tick is removal by tweezers. If tweezers are not available, cover your fingers (tissue paper) while grasping the tick. It is important to grasp the tick as close as possible to the site of attachment and use a firm steady pull to remove it. When removing the tick, be certain to remove all the mouth parts from your skin so as not to cause irritation or infection. Wash hands immediately after with soap and water, and apply antiseptic to the area where tick was removed. Get medical attention if necessary.

Symptoms of Lyme Disease

The first symptoms of Lyme Disease usually appear from 2 days to a few weeks after a person is bitten by an infected tick. Symptoms usually consist of a ring-like red rash on the skin where the tick attached, and is often bulls eye like with red on the outside and clear in the center. The rash may be warm, itchy, tender, and/or "doughy" and appears in only 60 to 80 percent of infected persons. An infected person also has flu-like symptoms of fever, fatigue, chills, headaches, a stiff neck, and muscle aches and pains (especially knees). Rashes may be found some distance away from original rash. Symptoms often disappear after a few weeks.

Bees, Wasps, and Yellow Jackets

Insects that sting are members of the order Hymenoptera of the class Insecta. There are two major subgroups: aphids (honeybees, bumblebees) and vespids (wasps, yellow jackets, hornets). Aphids are docile and usually do not sting unless provoked. The stinger of the honeybee has multiple barbs, which usually detaches after a sting. Vespids have few barbs and can inflict multiple stings.

Types of stinging insects that might be encountered on this project site may include:

Carpenter Bees	Africanized Killer Bees	Honeybees
Bumblebees	Cicada Killer Wasps	Paper Wasps
Mud Dauber Wasps	Giant Hornets	Yellow Jackets

Symptoms

If you are stung there are three types of reactions you can have, a normal, a toxic, or an allergic reaction.

- Normal reaction - only lasts a few hours and consists of pain, redness, swelling, itching, and warmth near the sting area.
- Toxic reaction - will last for several days and results from multiple stings and may cause cramps, headaches, fever, and drowsiness.
- Allergic reaction - might cause hives, itching, swelling, tightness in the chest area and a possibility of breathing difficulties, dizziness, unconsciousness, and cardiac arrest.

The stingers of many *Hymenoptera* may remain in the skin and should be removed as quickly as possible without concern for the method of removal. An ice cube placed over the sting will reduce pain; aspirin may also be useful. Persons with known hypersensitivity to such stings should carry a kit containing epinephrine in a prefilled syringe. Antihistamines may help decrease hives and angioedema. Persons who have severe symptoms of anaphylaxis, have positive venom skin test results, and are at risk for subsequent stings should receive immunotherapy regardless of age or time since anaphylaxis.

Precautions

The following precautions can help you avoid stings. Try to wear light colored clothing and shy away from dark or floral prints. Avoid wearing perfumes, hairsprays, colognes, and scented deodorants while working outside. If eating outside, keep all food and drinks covered; sweet foods and strong scents attract stinging insects as well. Never swat or swing at the insect, it is best to wait for it to leave, softly blow it away, or gently brush it aside. Seek medical attention when the reaction to a sting includes swelling, itching, dizziness or shortness of breath.

If physical control measures are not effective, use a pesticide that will have a minimal impact on both you and the environment.

Fire Ants

Fire ants are reddish-brown in color and range from 1/8 inch to 3/8 inch in length. When a fire ant stings an individual, the individual is rarely only stung once. Most fire ant stings result in a raised welt with a white pustule. If stung by a fire ant, continue to observe the welt and try to prevent secondary infection by keeping the welt intact. However, some individuals may have an allergic reaction to a fire ant sting and require immediate medical attention. Pesticides and even hot water can be used to kill fire ant colonies. ***Fire ants are normally seen in the southern states.***

Mosquitoes

Mosquitoe*s* are common pests that can be found in any state and any work environment where warm, humid conditions exist. Mosquitoes can pass along diseases such as West Nile virus and Malaria. Several different methods can be used to control adult mosquito populations: repellants such as DEET, mosquito traps, foggers, and vegetation and water management. ***Mosquitoes are found from the tropics to the Arctic Circle and from lowlands to the peaks of high mountains***.

3.3.4 POISONOUS SPIDERS

Black Widow

Black Widow spiders are not usually deadly (especially to adults) and only the female is venomous. The female spider is shiny black, usually with a reddish hourglass shape on the underside of her spherical abdomen. Her body is about 1.5 inches long while the adult male's is approximately half that. The spider's span ranges between 1 to 3 inches. The adult males are harmless, have longer legs, and usually have yellow and red bands and spots over their back, and the young black widows are colored orange and white. The bite of a black widow is often not painful and may go unnoticed. However, the poison injected by the spider's bite can cause severe reactions in certain individuals.

Symptoms

Symptoms that may be experienced include abdominal pain, profuse sweating, swelling of the eyelids, pains to muscles or the soles of the feet, salivation and dry-mouth (alternating), and paralysis of the diaphragm. If a person is bitten, they should seek immediate medical attention. Clean the area of the bite with soap and water. Apply a

cool compress to the bite location. Keep effected limb elevated to about heart level. Ask doctor if Tylenol or aspirin can be taken to relieve minor symptoms. Additional information can be obtained from the Poison Center (1-800-222-1222). ***Black widows are found throughout the tropics, U.S. and Canada.***

Brown Recluse

Brown recluse spiders are usually light brown in color, but in some instances they may be darker. Brown recluse spiders are highly venomous spiders, native to the United States and found coast to coast. The brown recluse can vary in size, but some can obtain bodies of 5/8 inches in length with a leg span of 1 1/2 inches in diameter. They can be identified by their three pairs of eyes along the head area and their fiddle shaped markings on the back. Most brown recluse bites are defensive rather than offensive. They generally only bite when they feel threatened.

Symptoms

If bitten by a brown recluse, an individual may experience open, ulcerated sores, which when left untreated may become infected and cause tissue necrosis. If an individual believes a spider has bitten them, they need to seek medical attention as soon as possible. In order to minimize the occurrence of brown recluse bites, individuals should shake their clothing and shoes thoroughly, eliminate the presence of cluttered areas, and spray the building perimeters with pesticides. ***Brown recluse are found throughout the U.S., Mexico, and Canada.***

3.3.5 THREATENING DOGS

If you are approached by a frightened or menacing dog:

- Do not attempt to run and don't turn your back
- Stay quiet, and remember to breathe
- Be still, with arms at sides or folded over chest with hands in fists
- Slowly walk away sideways
- Don't stare a dog in the eyes, as this will be interpreted as a threat
- Avoid eye contact
- If you have a jacket, you could wrap it around your arm and should he snap, take the bite harmlessly

3.3.6 RODENTS

Rodentia: (rats, mice, beavers, squirrels, guinea pigs, capybaras, coypu)

Rodents, or Rodentia, are the most abundant order of mammals. There are hundreds of species of rats; the most common are the black and brown rat.

The **Brown Rat** has small ears, blunt nose, and short hair. It is approximately 14 to 18 inches long (with tail). They frequently infest garbage/rubbish, slaughterhouses, domestic dwellings, warehouses, shops, and supermarkets; they also frequent any space with an easy meal and potential nesting sites.

The **Black Rat** can be identified by its tail, which is always longer than the combined length of the head and body. It is also slimmer and more agile than the Norwegian or Brown rat. Its size varies according to its environment and food supply.

The **House Mouse** has the amazing ability to adapt and now can frequently be found in human dwellings. In buildings, mice will live anywhere and they are very difficult to keep out. Mice are also totally omnivorous; in other words, they will eat anything.

Rats and mice often become a serious problem in cold winter months when they seek food and warmth inside buildings. They may suddenly appear in large numbers when excavation work disturbs their in-ground nesting locations or their food source is changed.

There are six major problems caused by rats and mice:

1. They eat food and contaminate it with urine and excrement.
2. They gnaw into materials such as paper, books, wood, or upholstery, which they use as nest material. They also gnaw plastic, cinder blocks, soft metals such as lead and aluminum, and wiring, which may cause a fire hazard.
3. Rats occasionally bite people and may kill small animals.
4. They, or the parasites they carry (such as fleas, mites, and worms), spread many diseases such as salmonella, trichinosis, rat bite fever, hantavirus, Weil's disease, and the bubonic plague.
5. Rats can damage ornamental plants by burrowing among the roots or feeding on new growth or twigs. They also eat some garden vegetables, such as corn and squash.

6. Rats and mice are socially unacceptable. These rodents have been a problem for centuries, chiefly because they have an incredible ability to survive and are so difficult to eliminate. In addition, they are extremely compatible with human behavior and needs.

3.3.7 SNAKES

Snakes may be found in any region of the country. While many snakes encountered are not venomous, a few are; so it is best that you give a wide berth to all snakes. Of the 7,000 venomous snakebites reported each year, only about 15 prove to be fatal; so your chances of survival are extremely high. The usual snake encounter is one in which they see you before you see them, and they slither away from you quickly, startling you. If you see a snake, back away from it slowly and do not touch it. If you or someone you know are bitten, try to see and remember the color and shape of the snake, which can help with treatment of the snakebite.

Venomous snakes include the Coral Snake and Pit Vipers, such as the Cottonmouth (Water Moccasin), Copperhead, and Rattlesnake. The venom of pit vipers is primarily *hematoxic* because it acts upon the victim's blood system. This venom breaks down blood cells and blood vessels and affects heart action. Bite victims experience severe burning pain, localized swelling and discoloration for the first 3 to 30 minutes, followed by nausea, vomiting, and occasional diarrhea and usually shock.

Preventing Snakebites

Watching where you step, put your hands, or sit down is one of the best ways to prevent snakebites. Poisonous snakes live on or near the ground and often like rocks, woodpiles, and other spots that offer both a place to sun and a place to hide. Most bites occur in and around the ankle. About 99 percent of all bites occur below the knee, except when someone accidentally picks up or falls on the snake.

Watching where you step and wearing boots in tall grass can prevent most snakebites. Another means to protect against snakebites is snake chaps.

Emergency First Aid for Poisonous Snakebite

Although it is important to obtain medical aid immediately, emergency first aid can slow the spread of poison from the bite. Remain calm and avoid unnecessary movement, especially if someone is with you. The rate of venom distribution

throughout your body will be slower if you are still and quiet. *Do not* use home remedies, and *do not* drink alcoholic beverages.

In addition, learn the following procedures so you do not waste time before getting medical attention.

If less than 60 minutes is required to reach a hospital or other medical aid, follow this procedure:

- Apply a constricting band 2 to 4 inches on each side of the bite. The band should be loose enough to slip your finger under without difficulty, so that you do not cut off circulation completely. Properly applied, the constricting band can be left safely in place for 1 hour without adjustment.
- If ice is available, place some in a towel, shirt, or other piece of cloth and apply it to the bite area. Do not bind it to the bite, but keep it loosely in place. Do not use the ice pack for more than *1 hour*. The objective is to cool the venom and slow its action, but not to freeze the tissue.
- The primary function of the constricting band and ice pack is to slow the spread of venom through your body. Remove them slowly so there will not be a sudden rush of venom through your blood stream.

3.3.8 ALLIGATORS/CROCODILES

Alligators, crocodiles, and gharials make up the group of animals known as crocodilians. Crocodilians are the world's largest reptiles. The American alligator or *Alligator mississippenisis* is the least aggressive crocodilian.

Similar to snakes, lizards, and other reptiles, alligators are cold-blooded (or ectothermic), meaning the air (or water) temperature around them determines their body temperature. The **American alligator** primarily ***inhabits the area of the Southeastern United States: Alabama, Arkansas, North and South Carolina, Florida, Georgia, Louisiana, Mississippi, Oklahoma, Texas.*** They primarily live in freshwater swamps and marshes, but also in rivers, lakes, and smaller bodies of water. They can tolerate a reasonable degree of salinity for short periods of time, being occasionally found in brackish water around mangrove swamps, although they lack the buccal salt-secreting glands present in crocodiles. Adult males typically reach 4 to 4.5 meters (approximately 13 to 14.7 feet). Alligators are classified as a threatened species and thus enjoy the

protection of state and federal law. State and federal law prohibits people from killing, harassing, molesting, or attempting to move alligators. The potential for being bitten or injured by a provoked alligator is high. Maintain a distance of at least 15 feet from any alligator. Again, 15 feet is the outside range for the alligator's frightening burst of speed.

If an alligator attacks:

- Run away in a straight line. Alligators will outrun you for about 30 feet [10 meters] or so [up to 20 mph] after which they will need a bit of a rest/lie down. They will out-swim you all day long.

If an alligator has grabbed you:

- Hit it repeatedly on its relatively sensitive nose, poke it in the eyes, and scream. Alligators don't like resistance.
- Don't try to pry the jaws open. You won't be able to.
- Play dead. They stop shaking their prey when they think that it's dead, wedging the body in their pantry for later consumption. This is when you can escape.

Seek immediate medical attention if you are bitten by an alligator. Alligators harbor a very infectious bacteria, and even minor bites may require special treatment.

3.3.9 BEARS

Bears

Black bears generally avoid contact with humans; however, this species quickly adapts to **any** source of food that humans provide (whether intentionally or accidentally). Black bears should not be fed - avoid unnecessary bear encounters! Signs of bear presence include tracks, droppings, or torn-up trees. Stay on established trails, hike only during daylight hours, and use caution when travelling near natural bear foods (e.g., berries, fish). ***Black bear habitats range from the tropics of Florida to the Arctic.*** Precautions to take include modifying and adhering to the PPE requirements section of the JSA to include bells, bear spray, and the use of the Buddy System.

3.3.10 COUGARS

The **Eastern Cougar** is the second largest cat (after the jaguar) found in the Americas. ***A cougar, also called puma or mountain lion, is a carnivore of North and South America*** with thick fur that ranges from reddish-brown in tropical forms to bluish-gray in northern forms. Its body is lithe, muscular, deep chested, and compact; it has a rounded and shortened head, large eyes, and a distinctively long tail. The male can weigh up to 71 kg and measure 2 meters in length. Cougars are extremely elusive and usually avoid contact with people. However, they are known to stalk their prey, striking with full impact, and most often kill by suffocating their victim with a prolonged bite across the throat or by breaking the victim's neck. Stay on established trails, hike only during daylight hours, and use caution.

3.3.11 BLOODBORNE PATHOGENS

Hepatitis and other communicable diseases are largely transmitted through exposure to bodily fluids containing the hepatitis virus, which could be found on refuse encountered in subsurface investigations. This includes activities occurring at landfills, sewage treatment facilities, sewers, topical spreading of treated waste and medical wastes (e.g., contaminated needles and syringes). Individuals performing tasks for these types of project should consult with their physicians and be properly vaccinated. The primary method of transmission depends on the prevalence of the disease in a given area.

Hepatitis A is a liver disease caused by the hepatitis A virus. Hepatitis A can affect anyone and can occur in situations ranging from isolated cases of disease to widespread epidemics.

Hepatitis B is a serious disease caused by a virus that attacks the liver. The virus, which is called hepatitis B virus (HBV), can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death.

Hepatitis C is a liver disease caused by the hepatitis C virus (HCV), which is found in the blood of persons who have the disease. HCV is spread by contact with the blood of an infected person.

Hepatitis D is a liver disease caused by the hepatitis D virus (HDV), a defective virus that needs the hepatitis B virus to exist. HDV is found in the blood of persons infected with the virus.

Hepatitis E is a liver disease caused by the hepatitis E virus (HEV) and is transmitted in much the same way as hepatitis A virus. Hepatitis E, however, does not often occur in North America.

Prevention

Preventative measures include wearing appropriate PPE: leather work gloves, a long sleeved shirt, and safety footwear. Several vaccines have been developed for the prevention of hepatitis B and C virus infection. Vaccines rely on the use of one of the viral proteins (hepatitis B surface antigen or HBsAg). The vaccine was originally prepared from plasma obtained from patients who had long-standing hepatitis B virus infection. However, currently these are more often made using recombinant technology, though plasma-derived vaccines continue to be used; the two types of vaccines are equally effective and safe.

3.4 AGRICULTURAL HAZARDS

Special Note for Farm Visits

- The need to be aware of the dangers associated with heavy equipment still exists when on location. Ensure that the operator is aware of your presence, be mindful of the blind spots the operator may have, and wear reflective vests if you are in an area where farm equipment traffic is a potential hazard.
- Ensure that the farm operator is aware of your presence before beginning sampling activities. Wear the life vest provided at the facility or your own. If at all possible, have the farm operator accompany you for the sampling. Provide the farm operator with your anticipated completion time. Do not lean past the edge of the tank or place your center of gravity above the top of the tank. Ensure that your sampling pole is securely tethered outside the tank so that no tank entry or other measures will be required to retrieve a dropped sampling pole.
- **Pathogen Exposure**: Wear impervious gloves while collecting samples. Wear safety glasses to avoid eye contact with sample material/manure. Ensure that sampling equipment, gloves, boots, glasses, hands, and clothing (if necessary) are cleaned with a disinfecting soap/solution before leaving the site. Ensure that sufficient PPE and cleanup materials are taken for the day's activities. Take extra plastic bags to place any contaminated material in as may be required. Take every reasonable precaution to avoid any site–to-site contamination.

4.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

4.1 GENERAL

This section shall cover the applicable personal protective equipment (PPE) requirements, which shall include eye, face, hand, head, foot, and respiratory protection.

The purpose of PPE is to shield or isolate individuals from the chemical and physical hazards that may be encountered during work activities.

4.2 TYPES OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE required for a project will vary based on the level of protection required to protect the employee from physical, chemical, biological, and thermal hazards.

The following types of PPE will be available for use at the Site:

i) ***Hardhats -*** Regulated by 29 CFR Part 1910.135; specified in the ANSI Z89.1, Safety Requirements for Industrial Head Protection;

ii) ***Face Shields, Safety Glasses, and Safety Goggles -*** Regulated by 29 CFR Part 1910.133(a); specified in ANSI Z87.1, Eye and Face Protection;

iii) ***Hand Protection***: Viton, polyethylene, polyvinyl acetate (PVA), polytetrafluoroethylene (PTFE), butyl rubber, nitrile rubber, or Neoprene gloves

iv) ***Hearing Protection;***

v) ***Protective Clothing***; and

vi) ***PFD's.***

4.2.1 TYPES OF PROTECTIVE MATERIAL

Protective clothing is constructed of a variety of different materials for protection against exposure to specific chemicals. No universal protective material exists. All will decompose, be permeated, or otherwise fail to protect under certain circumstances.

Fortunately, most manufacturers list guidelines for the use of their products. These guidelines usually concern gloves or coveralls and generally only measure rate of degradation (failure to maintain structure). It should be noted that a protective material

may not necessarily degrade but may allow a particular chemical to permeate its surface. For this reason, guidelines must be used with caution. When permeation tables are available, they should be used in conjunction with degradation tables.

In order to obtain optimum usage from PPE, the following procedures are to be followed by all site personnel using PPE:

- When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift
- Inspect all clothing, gloves, and boots both prior to and during use for
  - Imperfect seams
  - Non-uniform coatings
  - Tears
  - Poorly functioning closures
- Inspect reusable garments, boots, and gloves both prior to and during use for
  - Visible signs of chemical permeation
  - Swelling
  - Discoloration
  - Stiffness
  - Brittleness
  - Cracks
  - Any sign of puncture
  - Any sign of abrasion

Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above will be discarded. PPE used in areas known or suspected to exhibit elevated concentrations of chemicals will not be reused.

4.3 LEVELS OF PROTECTION

The level of protection must correspond to the level of hazard known or suspected in the specific work area. PPE has been selected with specific considerations to the hazards associated with site activities. The specific PPE to be used for each activity is outlined in each JSA table located in Appendix A.

- All PPE will be disposed of and/or decontaminated at the conclusion of each workday as described below. Decontamination procedures will follow the concept of decontaminating the most contaminated PPE first.
- All disposable equipment shall be removed before meal breaks and at the conclusion of the workday, and replaced with new equipment prior to commencing work.
- Eating, drinking, chewing gum or tobacco, and smoking are prohibited while working in areas where the potential for chemical and/or explosive hazards may be present. Personnel must wash thoroughly before initiating any of the aforementioned activities.

4.3.1 REASSESSMENT OF PROTECTION LEVELS

Protection levels provided by PPE selection shall be upgraded or downgraded based upon a change in site conditions or the review of the results of air monitoring or the initial exposure assessment-monitoring program, if one was conducted.

When a significant change occurs, the hazards shall be reassessed. Some indicators of the need for reassessment are:

- Commencement of a new work phase
- Change in job tasks during a work phase
- Change of season/weather
- Temperature extremes or individual medical considerations limit the effectiveness of PPE
- Chemicals other than those expected to be encountered are identified
- Change in ambient levels of chemicals
- Change in work scope, which affects the degree of contact with areas of potentially elevated chemical presence

All proposed changes to protection levels and PPE requirements will be reviewed and approved prior to their implementation by the SS.

5.0 AIR MONITORING PROGRAM

Inhalation hazards are caused from the intake of vapors and contaminated dust. Air monitoring shall be performed while intrusive activities are taking place to detect the presence and relative level of those air contaminants that are inhalation hazards. The purpose of air monitoring is to identify and quantify airborne contaminants in order to determine the level of worker protection needed. Initial screening for identification is often qualitative, but the determination of its concentration (quantification) must await subsequent testing.

All instruments will be calibrated on a daily basis in accordance with the manufacturer's guidelines. Records of all calibrations and real-time measurements will be kept in a bound field logbook or documented via air monitoring and calibration log sheets.

When air monitoring is required, the workers breathing zone(s) will be monitored and the results recorded. Additionally, area samples at the following locations will be taken daily. Record time, location, and results of monitoring and actions taken based on the readings:

- Upwind of work areas to establish background concentrations
- In support zone to check for contamination or migration of emissions
- Along decontamination line to check that decontamination workers are properly protected and on-site workers are not removing protective equipment in a contaminated area
- Downwind of work area to track any contaminants/emissions leaving the site

The data collected throughout the monitoring effort shall be used to determine the appropriate levels of protection. Action levels for upgrading or downgrading of PPE have been established and Table 2 presents the action levels for the on-site Air Monitoring Program.

5.1 EXPOSURE MONITORING

5.1.1 MONITORING FREQUENCY

Monitoring will be conducted continuously during ground intrusive activities or during any activity where airborne hazards (e.g., organic vapors) may be present. The

monitoring equipment listed per work activity relates to the initial level of protection. The monitoring frequency may be decreased if the work areas and activities are unchanging, the result of the first hour of monitoring indicate contaminant concentrations are non-detect, and no differing conditions are observed.

Monitoring results will be legibly documented each work day. They will note project name/number, date, time, serial number, date of last calibration, name of person performing calibration, name of person performing monitoring, monitor location within the site, and monitoring results. Daily documentation will be kept with the SS and included in the project file.

5.1.2 SAFETY AND HEALTH ACTION LEVELS

An action level is a point at which increased protection or cessation of activities is required due to the concentration of contaminants in the work area. All activities shall be initiated in Modified Level D. The appropriate actions are to be taken at designated action levels. The initial action level(s) for site work can be located in Table 2.

In addition to the action level, an upgrade to Level C is required if:

- Any symptoms occur, as described in Section 3.0
- Requested by an individual performing the task
- Any irritation to eye, nose, throat, or skin occurs

A work stoppage and evacuation (cease and desist) at the specific work area is required if levels in the breathing zone exceed the protection factor of the respirator.

6.0 SITE CONTROL

The purpose of site control is to minimize potential contamination of workers and protect the public from hazards found on site. Site control is especially important in emergency situations.

- Site control and work area demarcation will be achieved through posting of signage and placement of barricades. All construction areas will have the appropriate signage posted. Barricades and warning signs will be placed to warn personnel of potential hazards. A standby person (spotter) may be utilized in place of barricades, where appropriate. The following materials may be used to control traffic:
  - Temporary fence
  - High visibility tape, rope, or chains
  - Traffic cones

One pathway should be established for heavy equipment and one for personnel decontamination.

The majority of site operations, as well as access to the site, could be controlled from the support zone. The support zone will provide for team communications, emergency response, and sanitary facilities. Appropriate safety and support equipment also will be located in this zone.

The support zone will be located upwind of site operations if possible, and would be used as a potential evacuation point if appropriate. No potentially contaminated personnel or materials are allowed in this zone.

6.1 COMMUNICATION

Each member of the project team will be able to communicate with other team members at all times. Communications will be by way of an air horn, walkie-talkie, telephone, or hand signals.

The primary means for external communication are telephones and radio. If telephone lines are not installed at a site, all team members should:

- Know the location of the nearest telephone

- Have a cell phone or radio

(Note: The authorized use of cellular phones must be cleared by the client prior to entering site.)

- Have the necessary telephone numbers readily available

Understanding of the following standard hand signals will be mandatory for all employees, regardless of other means of communication:

- Hand gripping throat — Cannot breathe
- Hands on top of head — Need assistance
- Thumbs up — OK, I'm all right, I understand
- Thumbs down — No, negative
- Gripping partner's wrist, or gripping both of your own hands on wrist (if partner is out of reach) – Leave area immediately

6.2 BUDDY SYSTEM

6.2.1 RESPONSIBILITIES

A buddy system shall be implemented when conducting intrusive activities on this site. This buddy shall be able to:

- Provide his or her partner with assistance
- Observe his or her partner for signs of chemical exposure or temperature stress
- Periodically check the integrity of his or her partner's protective clothing
- Notify emergency personnel if emergency help is needed

6.3 SITE SECURITY

Site security is necessary to prevent the exposure of unauthorized, unprotected people to site hazards and to avoid interference with safe working procedures. Security shall be maintained outside of the actual work area(s) so as to prevent unauthorized entry into the work area(s). Members of the general public are to be protected from site hazards. The fieldwork staging area will be determined at the time of mobilization. The

fieldwork staging area is used to conduct daily fieldwork activities such as tailgate safety meetings, sample characterization, sample preparation, sample containerizing, and to dock sample crafts. In addition, portions of the staging and work areas are enclosed by a locked gate to enforce security on the Site. The purpose of these procedures is to limit access to areas with potentially elevated chemical presence, and to protect the public from hazards found in work areas.

6.4 DECONTAMINATION

The following are questions/items that may need to be addressed based on site-specific protocols:

- Is formal equipment and/or personal decontamination necessary? If so, what measures will be implemented to manage residual wash waters, sediments, soils, etc.? Disposal measures for used/spent PPE?
- Does a decontamination pad already exist?
- What type(s) of equipment and decontamination cleansers/reagents will be necessary?
- Will wipe sampling and/or other forms of verification be required?
- Is there a decontamination pad/facility present at the site or will a pad need to be constructed? Location(s) of permanent and/or temporary facilities?
- Who is responsible for disposal of any wastes generated by decontamination activities?

The SS is responsible for ensuring that all personnel and pieces of equipment coming off site are properly decontaminated according to the procedures outlined below. Documentation of decontamination must be made in the field log notebook and will become part of the permanent project file.

6.4.1 PERSONNEL AND EQUIPMENT DECONTAMINATION PROCEDURES

All PPE will be disposed of and/or decontaminated at the conclusion of each workday as described below. Decontamination procedures will follow the concept of decontaminating the most contaminated PPE first.

All disposable equipment shall be removed before meal breaks and at the conclusion of the workday, and will be replaced with new equipment prior to commencing work.

Procedures for decontamination must be followed to prevent the spread of contamination and to eliminate the potential for chemical exposure:

- **Personnel:** Decontamination will be initiated prior to exiting the contaminated work area and completed in the Contamination Reduction Zone.
- **Modified Level D**: First, remove outer protective wear. Remove gloves and properly dispose in designated waste container. Wash hands and face.
- **Level C**: Wash and rinse outer gloves, boots and suit, and remove; remove respirator; dispose of cartridges; wash respirator; and remove inner gloves and dispose. Wash hands and face. Handle all clothing inside out when possible.
- **Equipment:** All equipment must be decontaminated with Alconox/Liquinox solution or discarded upon exit from the contaminated area in a well-ventilated area. A temporary decontamination pad with a low-volume high-pressure washer will be set up on site during project operations. All decontamination materials will be drummed for subsequent disposal.

6.5 MANAGEMENT OF INVESTIGATION DERIVED MATERIAL

All investigation-derived material (IDM), such as soil cuttings, purge water, protective clothing, etc. will be collected and properly disposed in accordance with EPA *Guide to Management of Investigation-Derived Waste (January 1992)*. Any IDM generated will be containerized, labeled, and staged on-Site until proper disposal can be arranged. Composite samples of the materials will be collected following the guidelines for the particular media and transported with Chain-of-Custody procedures to an analytical laboratory. The composite samples will be analyzed for waste disposal characteristics, using approved EPA methods based upon field observations of the material and the requirements of the receiving disposal facility. Upon classification of the material, it will be transported by a licensed waste transporter and disposed of in a licensed regulated facility, following all manifesting requirements. The final disposition of the material shall be reported to the appropriate regulatory agency.

7.0 EMERGENCY PROCEDURES

7.1 ON-SITE EMERGENCIES

Emergencies can range from minor to serious conditions. Various procedures for responding to site emergencies are listed in this section. The PM or SS is responsible for contacting local emergency services, if necessary, for specific emergency situations. Various individual site characteristics will determine preliminary action to ensure that these entry procedures are successfully implemented in the event of an emergency. The project team will address necessary facility/client emergency protocols to ensure compatibility between this document and facility/client programs and expectations.

An Emergency Information Sheet containing the hospital location, directions, government agency phone numbers, emergency phone numbers, and a map with directions to the hospital is located in Appendix A.

7.2 INCIDENT, INJURY, AND ILLNESS REPORTING AND INVESTIGATION

Any work-related incident, injury, illness, exposure, or property loss must be reported to your supervisor, the SS, the client contact, and **within 1 hour** through the CRA Incident Reporting Hotline. Motor vehicle accidents must also be reported through this system. CRA's Incident Reporting Form, located in Appendix A, must also be filled out and provided to the SS. The report must be filed for the following circumstances:

- Incident, injury, illness, or exposure of an employee
- Injury of a subcontractor
- Damage, loss, or theft of property
- Any motor vehicle accident, regardless of fault, which involves a company vehicle, rental vehicle, or personal vehicle while the employee is acting in the course of employment

Occupational incidents resulting in employee injury or illness will be investigated by the SS. This investigation will focus on determining the cause of the incident and modifying future work activities to eliminate the hazard.

All employees have the right and obligation to report unsafe work conditions, previously unrecognized safety hazards, or safety violations of others. If you wish to

make such a report, it may be made orally to your supervisor or other member of management, or you may submit your concern in writing, either signed or anonymously.

7.3 EMERGENCY EQUIPMENT/FIRST AID

Safety equipment will be available for use by site personnel, located within 30 feet of the work area(s), and maintained at the site. The safety equipment may include, but is not limited to, the following:

- First Aid kit (size is dependant upon the number of personnel on-site):

  Contents: Each first aid kit shall contain, as a minimum (ANSI 308.1-2003):

1	Absorbent Compress (32 square inches, no side less than 4 inches)
16	Adhesive Bandages (1 inch x 3 inches)
1	Adhesive Tape (roll, 3/8 inch x 5 yards)
10	Individual Antiseptic (0.5 g)
6	Burn Treatments (Antibiotic) (each 1/32 oz.)
2 pair	Medical Exam Gloves (not to be reused)
4	Sterile Pads (3 inches x 3 inches)
1	Triangular Bandage

This list shall be placed in each first aid kit for the purposes of inspection and restocking.

- Automated External Defibrillators (AEDs) are optional first aid response equipment for conditions related to heart stoppage. If a unit is on site, designated personnel must be trained in the specific AED unit in addition to First Aid and CPR certification, conduct monthly inspections, and contact listed AED Unit coordinator.
- Emergency eyewash bottles and/or an eyewash station lasting 15 minutes.
- Emergency alarms as a means to alert all personnel instantaneously for an emergency.
- Fire extinguisher (at a minimum, a 2A/10BC will be on site).

7.4 EMERGENCY PROCEDURES FOR CONTAMINATED PERSONNEL

Whenever possible, personnel should be decontaminated in the contamination reduction zone before administering first aid, without causing further harm to the patient.

- **Skin Contact:** Remove contaminated clothing, wash immediately with water, and use soap, if available.
- **Inhalation:** Remove victim from contaminated atmosphere. Remove any respiratory protection equipment. Initiate artificial respiration, if necessary. Transport to the hospital.
- **Ingestion:** Remove from contaminated atmosphere. Do not induce vomiting if victim is unconscious. Never induce vomiting when acids, alkalis, or petroleum products are suspected. Transport to the hospital, if necessary.

Any person transporting an injured/exposed person to a clinic or hospital for treatment should take with them directions to the hospital and a listing of the contaminants of concern to which they may have been exposed.

Any vehicle used to transport contaminated personnel will be cleaned or decontaminated, as necessary.

7.5 SITE EVACUATION

In the event of an emergency situation such as fire, explosion, or significant release of toxic gases, project personnel in the field will be notified through air horn, walkie-talkie, telephone, or hand signals. In the event of an emergency, CRA personnel will gather at their primary mustering point for a head count. The SS will determine a primary and secondary muster point to be used as an assembly area in the event of an emergency. The secondary muster point will be located at least 90 degrees from the primary. These locations will be communicated to the work crew(s) during the site-specific training prior to commencement of work activities, weekly thereafter, and prior to the advent of potentially threatening weather. Muster points will be identified in the Emergency Information Sheet and may be indicated on the map.

7.6 SPILL AND RELEASE CONTINGENCIES

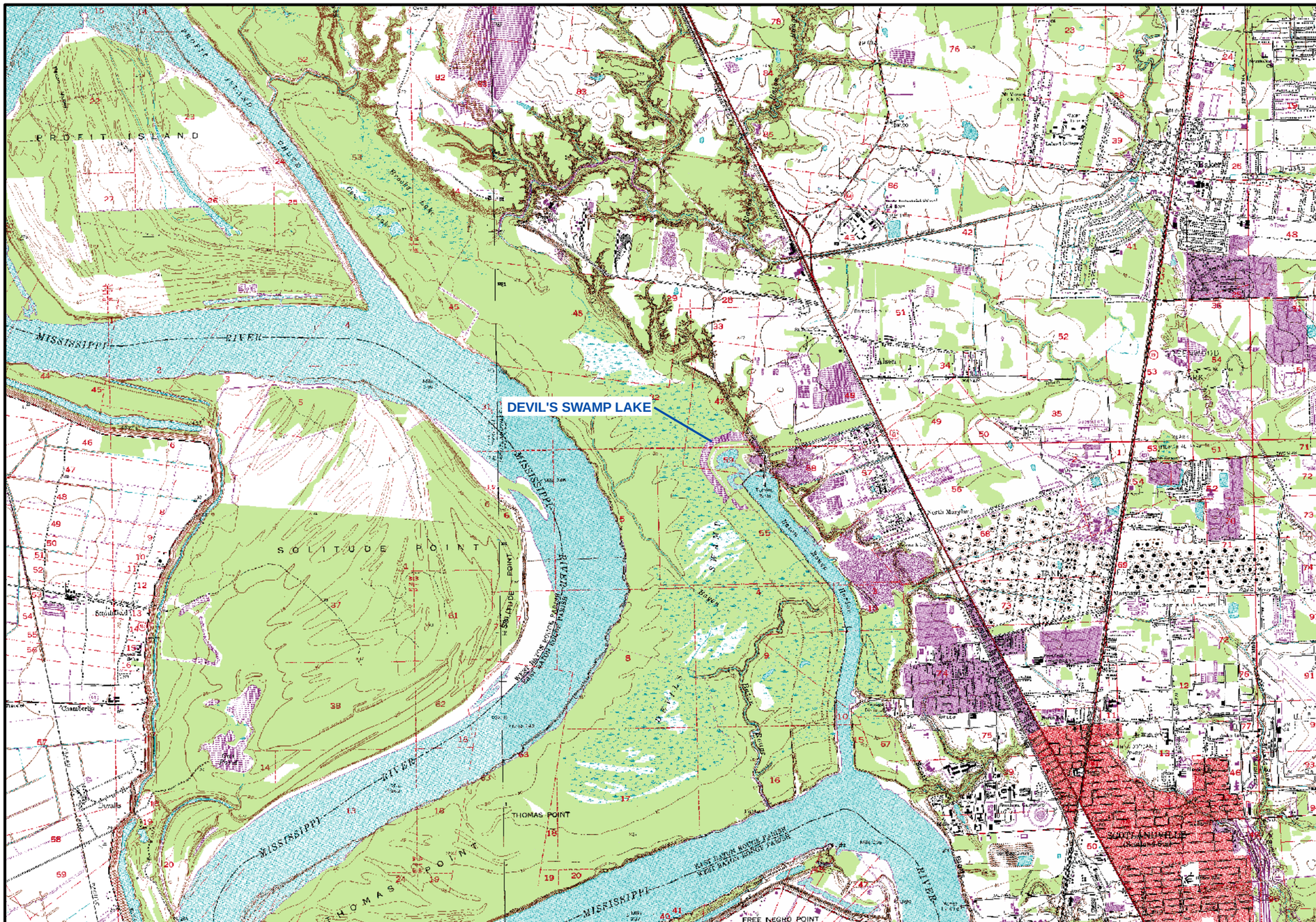
If a spill has occurred, the first step is personal safety, then controlling the spread of contamination, if possible. CRA personnel will immediately contact site management to inform them of the spill and activate emergency spill procedures.

8.0 RECORDKEEPING

The SS shall establish and maintain records of all necessary and prudent monitoring activities as described below:

- Name and job classification of the employees involved on specific tasks
- Air monitoring/sampling results and instrument calibration logs
- Records of training acknowledgment forms (site-specific training, toolbox meetings, etc.)
- Documentation of site inspections, results of inspections, and corrective actions implemented
- Emergency reports describing any incidents or accidents

FIGURES



LOUISIANA

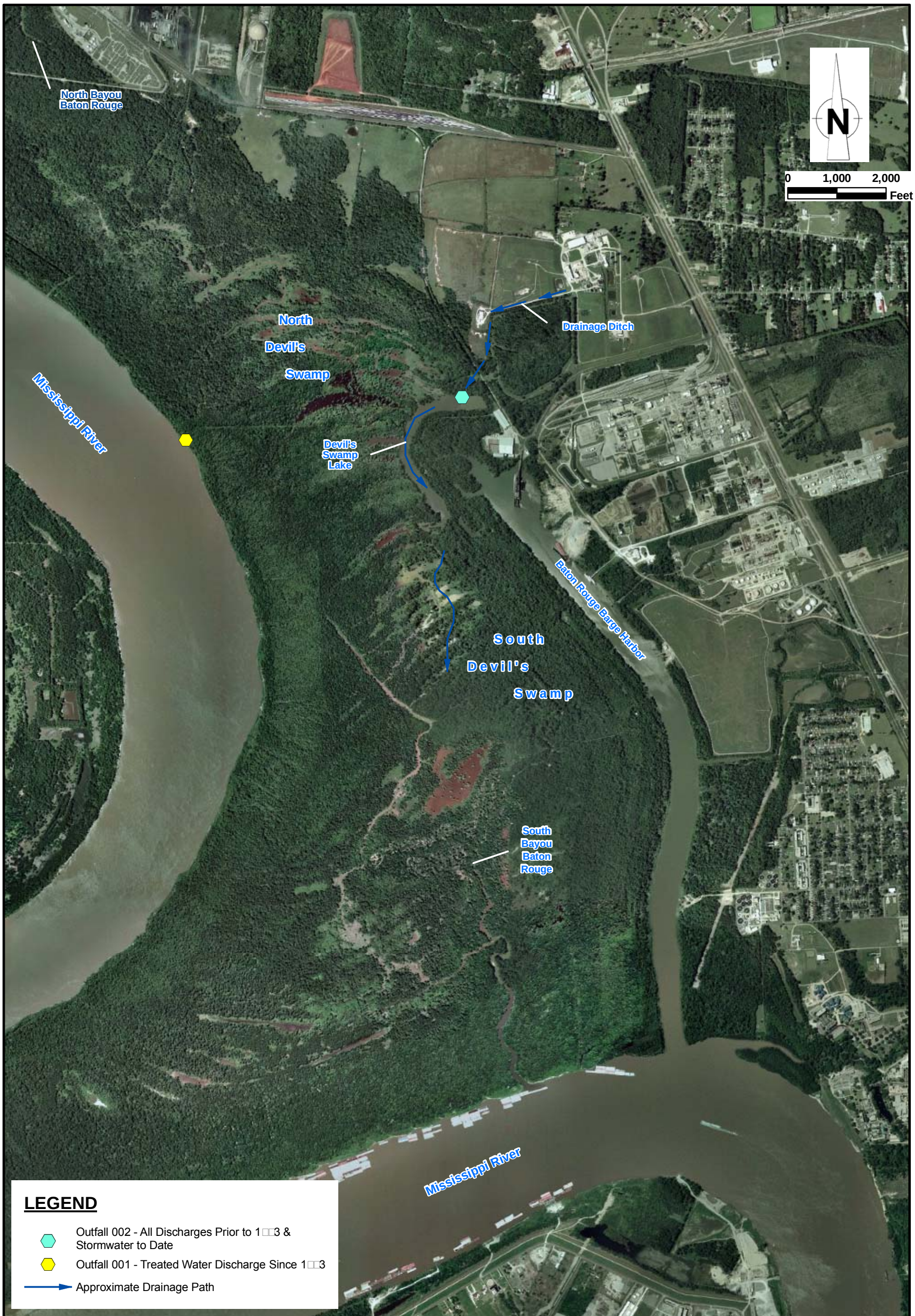
N

0 2,000 4,000 Feet

RE: USGS 7□5 Minute Topographic Maps, Walls, La and Scotlandville, La
dated 1□63, photorevised 1□70 and 1□80□

Figure 1
VICINITY MAP
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

55364-00(004)PR-BR001 MAR 10/2010



RE: Aerial Photograph by AE□ dated May 15, 2006□

Figure 2
SITE PLAN
DEVIL'S SWAMP LAKE SITE
EAST BATON ROUGE PARISH, LOUISIANA
Baton Rouge Disposal, LLC, Baton Rouge, Louisiana

055364-00(004)PR-BR003 MAR 18/2010

TABLES

TABLE 1

PROPERTIES OF POTENTIAL SITE CONTAMINANTS

Chemical Name (Synonyms)	Concentration at Site	Exposure Limits	Routes Of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics
Polychlorinated Biphenyls PCB (54□) Chlorodiphenyl (54□ chlorine) Aroclor 1254 CAS-110□7-6□-1	0□05 - 5□0 ppm	TLV: 0□5 mg/m3 [skin] PEL: 0□5 mg/m3 [skin] STEL: NA IDLH: 5 mg/m3	Inhalation Absorption (skin) Ingestion	ACUTE: Eye irritation□ CHRONIC: Dermatitis, chloracne, liver damage□	(FP) NA (VP) 0□00006 mm (IP) NA (UEL) NA (LEL) NA	Colorless to pale yellow viscous li□uid or solid (□50□F) with a mild hydrocarbon odor□

Notes:

FP	FP - Flash Point	PEL	PEL - OSHA Permissible Exposure Limit
IDLH	IDLH - Immediately Dangerous to Life ord Health	STEL	STEL - Short Term Exposure Limit
IP	IP - Ionization Potential	TLV	TLV - ACGIH Threshold Limit Value
NE	NE - Not Established (Information Not Available)	VP	VP - Vapor Pressure
NA	NA - Not Applicable	C	C - Ceiling Exposure Limit
CNS	CNS - Central Nervous System	[skin]	[skin] - potential for dermal absorption
PNS	PNS - Peripheral Nervous System	mm	mm - milimeters Hg (mercury)
ppm	ppm - parts per million	eV	eV - electrovolts
mg/m3	mg/m3 - miligrams per cubic meter		

TABLE 2

ON-SITE AIR MONITORING PROGRAM ACTION LEVELS
HEALTH AND SAFETY PLAN
DEVIL'S SWAMP LAKE
EAST BATON ROUGE PARISH, LOUISIANA

Monitoring Device	*Action Level*	*Action*
Combustible Gas Indicator	>10 Percent LEL	Cease operations and move to a safe place. Notify SHO. Do not continue working until conditions are constantly below 10 percent LEL
Oxygen Meter	<19.5 Percent or >23.5 Percent	Cease operations and move to a safe place. Notify SHO. Do not continue working until oxygen levels are between 19.5 and 23.5 percent
		Note: When oxygen levels are outside this range, percent LEL readings are not reliable
Photoionization Detector (PID)	**Benzene present in the Breathing Zone:**	Determine via Colorimetric Sampling
10.6 or greater eV lamp	<1.0 ppm or Background	Full-Face Respirator Available
Detector Tubes	≥1.0 ppm and ≤5 ppm	Full-face air purifying respirator Level C PPE MSA GME P100 Cartridge
	>5 ppm and <500 ppm	Supplied air respirator Level B PPE. Implement additional engineering controls
	≥500 ppm	Shut down activities. Notify SHO. Implement additional engineering controls
	Benzene not present in the Breathing Zone:	Determine via Colorimetric Sampling
	<10 ppm or Background	Full-Face Respirator Available
	≥10 ppm and <50 ppm	Wear Full-Face Respirator - Level C PPE
	≥50 ppm and <1,000 ppm	Wear Supplied Air Respirator - Level B PPE, Implement Additional Engineering Controls
	≥1,000 ppm	Shut down activities. Notify SHO. Implement additional engineering controls
	Vinyl Chloride present in the Breathing Zone:	Determine via Colorimetric Sampling
	<1 ppm or Background	No Action Required - Continue Monitoring
	≥1 ppm	Level B - Continue Monitoring
Dust/Particulate - (Impacted Soils/Sludges/Sediments)	<2.0 mg/m³ or Background	Full-Face Respirator Available
	≥2.0 mg/m³ and <50 mg/m³	Wear Full-Face Respirator - Level C PPE
	>50 mg/m³	Wear Supplied Air Respirator - Level B PPE, Implement Additional Engineering Controls
Hydrogen Sulfide	>5 ppm	Shut down activities. Notify SHO. Implement additional engineering controls
Carbon Monoxide	>35 ppm	Shut down activities. Notify SHO. Implement additional engineering controls

If CRA is unable to identify/quantify the contaminants, supplied air will be required when the PID reading is greater than background, as the contaminant will be unknown and NIOSH, OSHA, and the manufacturer's use requirements for Level C (air purifying respirators) will not be met. If PID readings subside, workers can downgrade as necessary. CRA will upgrade to supplied air and attempt to obtain additional information for possible chemicals present in CRA's work area. The Owner will need to provide/obtain additional information as to the identity of the contaminant(s) in order to permit the use of Modified D and/or Level C.

Notes:

SHO Safety and Health Officer
LEL Lower Explosive Limit
PPE Personnel Protective Equipment
ppm parts per million

APPENDIX A

FORMS

1. EMERGENCY CONTACT SHEET
2. HOSPITAL MAP
3. HASP ACKNOWLEDGEMENT FORM
4. TAILGATE SAFETY MEETING FORMS:
   - LARGE GROUP
   - SMALL GROUP
5. CRA INCIDENT REPORTING FORM
6. CRA NEAR LOSS REPORTING FORM
7. UNSAFE ACT AND CONDITIONS AND STOP WORK AUTHORITY FORM
8. SAFE TASK EVALUATION PROCESS FORM
9. PROPERTY ACCESS/UTILITY CLEARANCE DATA SHEET
10. SAFETY COORDINATION REVIEW
11. DAILY OPERATOR CHECKLIST
12. SITE HASP MINOR AMENDMENT FORM
13. CLEAN HARBORS CONTRACTOR SAFETY ORIENTATION FORM

EMERGENCY CONTACT LIST AND HOSPITAL ROUTE MAP
DEVIL'S SWAMP LAKE SITE

EMERGENCY INFORMATION		
Contact	**Phone Number**	**Hospital Directions**
Local Police	**911**	Directions: See the attached map on the next page.
Fire Department	**911**	
Ambulance	**911**	
Local Hospital: **Baton Rouge General Medical Center** Address: **3600 Florida Blvd.** **Baton Rouge, Louisiana 70806**	**225-387-7000**	Driving Time: 14 minutes Driving Distance: 9.6 miles **(Attach Map)**
National Poison Center	**800-222-1222**	CRA – Incident Reporting Hotline Please call **(866) 529-4886** and provide: • Name and location of caller • Description of incident • Name of any injured persons • Description of injuries • Phone number for return call
Project Manager Pressley Campbell Work: Cell:	 225-292-9007 225-963-6754	
Site Supervisor Katie Menard Work: Cell:	 225-292-9007 225-603-7829	
CRA Regional S&H Manager Jeff Maranciak Work: Cell:	 713-734-3090 412-225-6375	
Site Contact John Arbuthnot Work: Cell:	 225-778-3596 225-772-5324	
Client Contact John Arbuthnot Work: Cell:	 225-778-3596 225-772-5324	
Other Contact Work: Cell:		
Person to verify hospital route Katie Menard	**Signature**	

* Hospital Route must be field validated before site work commences.

Directions from the Devil's Swamp Lake Site to the Baton Rouge General Medical Center:

- Take first right onto US-61 S/Scenic Highway
- Take the I-110 S ramp towards Baton Rouge
- Merge onto I-110 S
- Take exit 2B to merge onto LA-67 S/Plank Rd toward N 22nd St/Memorial Stadium
- Keep left at the fork
- Continue onto N 22nd St
- Turn left at Florida Blvd/US-61 BUS S
- Turn right at Peachtree Blvd
- Arrive at Baton Rouge General Medical Center

HASP ACKNOWLEDGMENT SHEET

This is to certify that I have received a pre-entry briefing regarding this HASP (Devil's Swamp Lake Site), and I understand its contents. My failure to follow and comply with the requirements contained in this plan may result in disciplinary action and/or termination.

Print Name	Signature	Date

TAILGATE SAFETY MEETING FORM
SMALL GROUP FORMAT - MULTIPLE DAYS
DEVIL'S SWAMP LAKE SITE

Date: _____ Time: _____ Presenter: _____

Safety topics/items discussed:

_____
_____
_____

Site personnel in attendance:

Print Name	Signature	Company

Date: _____ Time: _____ Presenter: _____

Safety topics/items discussed:

_____
_____
_____

Print Name	Signature	Company

Date: _____ Time: _____ Presenter: _____

Safety topics/items discussed:

_____
_____
_____

Print Name	Signature	Company

TAILGATE SAFETY MEETING FORM
LARGE GROUP FORMAT - SINGLE DAY
DEVIL'S SWAMP LAKE SITE

Date: _____ Time: _____ Presenter: _____

Safety topics/items discussed:

_____

_____

_____

_____

Site personnel in attendance:

Print Name	Signature	Company

CONESTOGA-ROVERS & ASSOCIATES (CRA) INCIDENT REPORTING FORM

Incidents must be called into Incident Hot Line: 1-866-529-4886

Instructions: For Personal Injuries, Occupational Illnesses, and Property Damage, complete Sections 1 and 2.
For Vehicle Accidents, Complete Sections 1, 2, and 4. **Initial report must be submitted within 24 hours.**

Report Status (insert date)					
	Initial Report	**Update Report**	**Final Report**	**Verification/Validation**	**Report Input into SMART Database**

SECTION 1

A. Employee Identification ☐ **CRA Employee** ☐ **Temporary Employee** ☐ **Subcontractor**

Employee No.	Last Name	First Name	Middle Name/Initial	☐ Male ☐ Female

Area Code ( )	Telephone Number	Employee Home Address (Street, City, State, Province, Zip Code)

Date of Hire	Position/Title	Supervisor	Employee's Company/Home Office Location

B. General Information

Where did the Incident occur and which country?	Type of incident (Check all that apply)
☐ Office ☐ Project Site ☐ Other _____ ☐ Canada ☐ United States ☐ UK	☐ Employee Injury/Illness ☐ Vehicle Accident ☐ Property Damage Only

Address of Incident (City, State, Providence, Zip Code)	Specific Location of incident (e.g., where on site)

Date and Hour of Incident		Date and Hour Reported to Employer		Date and Hour Last Worked		Time Employee Began Work
MM/DD/YYYY	am pm	MM/DD/YYYY	am pm	MM/DD/YYYY	am pm	am pm

Normal Work Hours	Witnesses?	Witness Name and Telephone Number
From: To:	☐ Yes ☐ No	

C. Project Information (Project Related Incident Only) Project Related? ☐ Yes ☐ No

Project #	Project Name	Project Manager	Site Telephone Number ( )	Project Manager Cell Number ( )

Client Name	Was the Client Advised of the Incident? ☐ Yes ☐ No	Name of Person Contacted	Date and Time Contacted

SECTION 2

A. Details of the Incident

1. What job/task was being performed when the incident occurred? (Example: collecting groundwater samples)?

2. Provide a detailed description of the employee's specific activities at the time of the incident. Include details of equipment/materials being used, including the size and weight of objects being handled, and weather conditions at time of the incident. If necessary, attach additional pages to the report.

3. For injuries, identify the specific part of body injured, and specify left or right side. For illnesses, identify and describe the affected area/body part.

4. Identify the object or substance that directly injured the employee and how. Include size, weight, and shape of object, quantity of substance, etc.

5. Identify property damaged and how it was damaged (include owner of property, nature and source of damage, and model and serial number, if appropriate).

B. Health Care/Medical Treatment

Employee received health care?	Identify the type of health care provided and where it was performed? **(Check all that apply).**
☐ Yes ☐ No	☐ First Aid ☐ Medical treatment other than first aid (sutures, etc.) ☐ Hospitalized ☐ Clinic ☐ Hospital emergency room ☐ On location by self or CRA employee) ☐ On site by EMT

Name of Health Care Provider, Physician's Name, Phone Number, Address (Street, City, Province/State, and Postal/Zip Code)

SECTION 2 (continued)

C. Incident Investigation ☐ **5 Why Root Cause Analysis Investigation [Non-OSHA Recordable, <$5,000 damage]** ☐ **Tap Root Cause Analysis [OSHA Recordable, and/or >$5,000 damages]**	
HASP prepared ☐ Yes ☐ No ☐ N/A Submit a PDF of HASP and relevant JSA(s) to Investigation Team If yes, was the HASP on site ☐ Yes ☐ No	Did the safety plan identify and provide safety procedures for the specific tasks the employee was conducting when injured ☐ Yes ☐ No If no, why not (Explain) _____ Did the employee utilize the STAR process before initiating the task ☐ Yes ☐ No If no, why not (Explain) _____ Was the employee drug & alcohol tested post incident ☐ Yes ☐ No

5-Why Root Cause: Incident Statement	Additional information: Attach photos, witness statement(s), affected employee statement, accident diagrams, as applicable, to the end of this document
1. Why did "above" happen?	
2. Why did "1" happen?	
3. Why did "2" happen?	
4. Why did "3" happen?	See *Corrective Actions/Verification and Validation* Section (Page 4)
5. Why did "4" happen?	
6. Why did "5" happen?	

D. Accountability		
Initial Report Date Month Day Year	Initial Report Prepared by: (please print)	Initial Report Prepared by: (signature)
Investigation Team	Company	Position/Title
Final Report Date Month Day Year	Final Report Prepared by: (please print)	Final Report Prepared by: (signature)

E. Stewardship		
Will an Incident Summary be Prepared ☐ Yes ☐ No By:	Disciplinary Action Taken ☐ Yes ☐ No	
Quality Review By:	Date:	Findings:

Fax Completed Form to CRA's Incident Reporting Fax: (832) 485-5259
Send Original to CRA's Incident Reporting Department, Houston, Texas

SECTION 3

A. Agency Reporting and Recording Information (To be completed by the Regional Safety and Health Manager)			
CANADA			
Form 7 Sent to WSIB ☐ Yes ☐ Not required	Employee Injury Information (Injury met the following criteria): ☐ First Aid ☐ Medical Treatment ☐ Critical Injury ☐ Modified Duty ☐ Lost Time Injury If medical treatment, what		
Joint Safety and Health Committee Notified ☐ Yes ☐ No	Total days of modified duty If exceeds 7 days, report to WSIB	Total days of lost time (if any)	Date employee returned to work Month Day Year
UNITED STATES			
OSHA Recordable Injury ☐ Yes ☐ No	Employee Injury Information (Injury met the following OSHA 300 Log criteria) ☐ First Aid ☐ Medical Treatment ☐ Restricted Duty ☐Lost Time Injury If medical treatment, what		
Total days of restricted duty:	Total days of lost time (if any)		Date employee returned to work Month Day Year

THE CONTENTS OF THIS DOCUMENT ARE THE SOLE PROPERTY OF CRA. REPRODUCTION OF ANY PART BY ANY MEDIUM IS NOT AUTHORIZED WITHOUT THE EXPRESS WRITTEN CONSENT OF CRA.

VEHICLE ACCIDENT SECTION

(Complete this Section for all Vehicle Accidents)

SECTION 4

A. Vehicle CRA Employee was Operating ☐ Personal ☐ CRA-Owned ☐ Rental - Rental Company:

License Plate No	State/Province	Police Department	City	State/Province

Vehicle Year/Make/Model	Odometer Reading at Time of Accident	Police Report Number	Weather Conditions

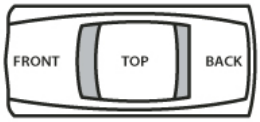
Name of Person Operating Vehicle

Address

City State/Province Zip Code

Telephone: Area Code ( )

X IN AREA OF VEHICLE DAMAGE



CIRCLE
0 No Damage
1 Light
2 Moderate
3 Heavy
4 Rolled
5 Burned

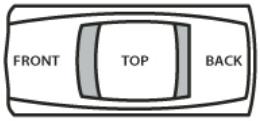
Description of Vehicle Damage:

B. Other Vehicles Involved

Name of Owner	Address	City/State/Prov/Zip	Area Code and Telephone Number ( )
Operator's Name (if different from above)	Address	City/State/Prov/Zip	Area Code and Telephone Number ( )

Year/Make/Model	Description of Property Damage:
Insurance Co Name & Telephone	
License Plate No/State/Province	

x IN AREA OF VEHICLE DAMAGE



CIRCLE
0 No Damage
1 Light
2 Moderate
3 Heavy
4 Rolled
5 Burned

C. Injured Persons

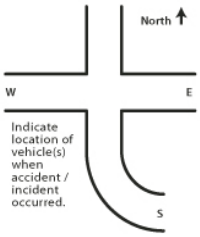
Name	Address Street, City, State/Prov/Zip Code	Phone Number	Nature of Injury	Indicate if Injured was a Vehicle Driver/ Passenger, CRA Employee, Other, or Pedestrian
1				
2				
3				

D. Witnesses

Name	Address Street, City, State/Prov/Zip Code	Area Code and Telephone Number
1		( )
2		( )

E. Description of Accident

PLEASE COMPLETE OR ATTACH SEPARATE DIAGRAM



Was Ticket Issued Reason:

☐ Other Operator

☐ CRA Operator

Report Date Month Day Year	Report Prepared by: (please print)	Report Prepared by: (signature)

Note: If Additional Space is Required to Complete this Report, Use Separate Sheet of Paper and Attach

Fax Completed Form to CRA's Incident Reporting Fax: (832) 485-5259
Send Original to CRA's Incident Reporting Department, Houston, Texas

INCIDENT REPORT
CORRECTIVE ACTIONS/VERIFICATION AND VALIDATION

Safety Means Awareness Responsibility Teamwork

Causative Factors and Corrective Actions						Verification (Did we do what we said we would do?) and Validation (Is it working?)		
Item No.	CF	Corrective Actions (Must match Causative Factor)	Responsible Party	Date Due	Date Completed	Verified By/ Validated By	Date	Details
						Verified By: Validated By:		
						Verified By: Validated By:		
						Verified By: Validated By:		
						Verified By: Validated By:		

CRA 10 CAUSATIVE FACTORS

Personal Factors		Company Factors		External Factors	
1	Insufficient training for task	5	Incomplete or no procedures	10	Exposure to conditions
2	Hurrying to complete the task	6	Procedures not known or enforced		
3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
			Improper workplace layout		

NL CONESTOGA-ROVERS & ASSOCIATES (CRA) NEAR LOSS REPORTING FORM

A Significant Near Loss must be called into Incident Hot Line: 1-866-529-4886

CRA SMART PROGRAM
Safety Means Awareness Responsibility Teamwork

Instructions:
1) *Employee completes the Near Loss Report and submits to Supervisor.*
2) *Supervisor reviews and makes other comments.*
3) *Employee discusses Near Loss with Project Manager.*
4) *Submit to Regional Safety & Health Manager.*

Report Status (insert date)					
	Initial Report	**Update Report**	**Final Report**	**Verification/Validation**	**Report Input into SMART Database**

SECTION 1

A. Employee Identification	☐ **CRA Employee**	☐ **Temporary Employee**	☐ **Subcontractor**
Employee No.	Last Name	First Name	Employee's Company - if Subcontractor
Date of Hire	Position/Title	Supervisor	Home Office Location - if CRA Employee

B. General Information	
Where did the Near Loss occur? ☐ Office ☐ Project Site ☐ Other _____ ☐ Canada ☐ United States ☐ UK	Type of Near Loss (Check all that apply) ☐ Employee Injury/Illness ☐ Vehicle Accident ☐ Property Damage ☐ Environmental
Address of Near Loss (City, State, Province, Zip Code)	Specific Location of Near Loss (e.g., where on site)

Date and Hour of Near Loss		Date and Hour Reported to CRA		Time Employee Began Work
Month Day Year	am pm	Month Day Year	am pm	am pm
Witnesses? ☐ Yes ☐ No	Witness Name and Telephone Number			

C. Project Information (Project Related Near Loss Only): Project Related: ( ) Yes ( ) No				
Project #	Project Name	CRA Project Manager	Client	Client Contact
Was the Client Advised of the Near Loss? ☐ Yes ☐ No ☐ N/A		Name:	Date and Time	

SECTION 2

A Details of the Near Loss
1. What job/task was being performed when the Near Loss occurred? (Example: collecting groundwater samples)?
2. Provide a detailed description of the employee's specific activities at the time of the Near Loss. Include details of equipment/materials being used, including the size and weights of objects being handled, and weather conditions at time of the Near Loss. If necessary, attach additional pages to the report.

B. Near Loss Investigation	
Conduct a 5-Why Root Cause Analysis Investigation. In addition, if there was the potential for a significant injury or loss, report the Near Loss to the Incident Hot Line (this will determine if a Tap Root Cause Analysis is necessary).	
HASP prepared? ☐ Yes ☐ No ☐ N/A Submit a PDF of HASP to Investigation Team. If yes, was the HASP on site? ☐ Yes ☐ No	Did the safety plan identify and provide safety procedures for the specific tasks being performed when the Near Loss occurred? ☐ Yes ☐ No If no, why not? (Explain) _____ Did the employee utilize the STAR process before initiating the task? ☐ Yes ☐ No If no, why not? (Explain) _____

SECTION 2 (continued)

5-Why Root Cause:	Additional information: Attach photos, witness statement(s), affected employee statement, as applicable, to the end of this document.
1. Why did "above" happen?	
2. Why did "1" happen?	
3. Why did "2" happen?	
4. Why did "3" happen?	
5. Why did "4" happen?	See Section 3 Below: Corrective Actions/ Verification and Validation
6. Why did "5" happen?	

C. Accountability		
Initial Report Date Month Day Year	Initial Report Prepared by: (please print)	Initial Report Prepared by: (signature)
Investigation Team	Company	Position/Title
Final Report Date Month Day Year	Final Report Prepared by: (please print)	Final Report Prepared by: (signature)

D. Stewardship		
Will a Near Loss Summary be Prepared ☐ Yes ☐ No If yes, by:		
Quality Review By:	Date:	Findings:

SECTION 3

Corrective Action					Validation & Verification		
CF	**Corrective Actions (Must match Causative Factor)**	**Responsible Party**	**Due Date**	**Date Completed**	**Verified By/ Validated By**	**Date**	**Details**
					Verified By		
					Validated By		
					Verified By		
					Validated By		
					Verified By		
					Validated By		

CRA 10 CAUSATIVE FACTORS (CF)

PERSONAL FACTORS		COMPANY FACTORS		EXTERNAL FACTORS	
1	Insufficient training for task	5	Incomplete or no procedures	10	Exposure to conditions
2	Hurrying to complete the task	6	Procedures not known or enforced		
3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
			Improper workplace layout		

UNSAFE ACTS/UNSAFE CONDITIONS/ STOP WORK AUTHORITY (SWA) REPORT

Reported By:					
To:	CRA RSHM -	Date:		Time:	
Employee Supervisor:		Employee Shareholder:			
Pro□ect Related:	☐ No ☐ Yes If yes, Name of Client:				

Re: (check all that apply) ☐ **Unsafe Act** ☐ **Unsafe Condition** ☐ **Stop Work Authority (SWA)**
Location: (check one) ☐ Driving ☐ Field ☐ Office

Date Reported to Supervisor/PM:		Date Corrected:	
Time Reported to Supervisor/PM:		Time Corrected:	

Describe the unsafe act, unsafe condition, or SWA Situation:

List corrective action(s) implemented:

Did the corrective action(s) mitigate the unsafe act/unsafe condition?

For SMART Administrators Use Only:

CRA Category:

- ☐ **PPE** - Personal Protective E□uipment
- ☐ **BP** - Body Positioning
- ☐ **WE** □ Work Environment
- ☐ **OP** □ Operating Procedures
- ☐ **TE** □ Tools and E□uipment
- ☐ **CU** □ Computer Usage
- ☐ **PD** □ Pre-Driving
- ☐ **OPP** □ Operating Procedures □ Parking

Chevron Category:

- ☐ **A –** Person or People
- ☐ **B –** E□uipment
- ☐ **C –** Environmental
- ☐ **D –** Procedures/ Processes/JSA-review/revise
- ☐ **E –** Visitors

Energy Source:

- ☐ **G –** Gravity
- ☐ **M –** Motion
- ☐ **ME –**Mechanical
- ☐ **E –** Electrical
- ☐ **P –** Pressure
- ☐ **T –** Temperature
- ☐ **C –** Chemical
- ☐ **B –** Biological
- ☐ **R –** Radiation
- ☐ **S –** Sound

Are additional actions re□uired□ ☐ No ☐ Yes If yes, what□ _____

DRIVING SAFE TASK EVALUATION PROCESS (D-STEP)

Report Status: (insert date)	Initial Report	Updated Report	Final Report	Verification/Validation	Report Input to SMART Database

Observer's Name	Date:	Time:
Client:	Project Name:	
Observer's Office:	Site Location:	
Observer's Supervisor:	Project No. (If applicable):	
Subcontractor: ☐ Yes ☐ No	Subcontractor Company Name:	

Feedback Conducted By:	Date:
Observee's Supervisor:	Time:

Driving Conditions			
☐ Freeway/Interstate	☐ Wet	☐ Day	☐ Raining
☐ Surface Street	☐ Dry	☐ Night	☐ Windy
☐ Dirt Road	☐ Snow/Ice		☐ Snowing
	☐ Mud		☐ Fog

Driving Conditions			
☐ Car	☐ Truck	☐ Van	☐ Pulling Trailer
☐ Company Owned	☐ Rental	☐ Personal	

Give a brief description of where you are driving from and to and your surroundings

Observer's Positive Comments

1.

2.

3.

Feedback Session Conclusion:
If NO Questionable Items: Brief Recap of Positive Actions/Comments
If Questionable Items: Brief Recap of Positive Actions/Comments AND Why the Questionable Item(s) Occurred

DRIVING SAFE TASK EVALUATION PROCESS (D-STEP)

PRE-DRIVING	Meets Work Standards	???	N/A	Evaluation Comments
1 JMP/JSA developed and/or reviewed			☐	
2 STAR performed/ob planning			☐	
3 Stop Work Authority understood and considered			☐	
4 Registration/insurance/last maintenance report			☐	
5 Tire inflation and tread			☐	
6 Wipers and washer fluid/clean windows/mirrors			☐	
7 Horn/lights operation/instrument panel			☐	
8 Body damage/overall vehicle appearance			☐	
Under-vehicle check for leaks/obstructions			☐	
10 Secure loose items			☐	
11 Check fluid levels			☐	
12 Fire extinguisher/triangles/first aid kit/ack/spare			☐	
13 Verifies area is clear before moving vehicle			☐	

BODY POSITIONING	Meets Work Standards	???	N/A	Evaluation Comments
14 Adust seat			☐	
15 Adust head rest			☐	
16 Adust mirrors to minimie blind spots			☐	
17 Seat belts (driver/passengers)			☐	
18 Locks doors			☐	

OPERATING PROCEDURES	Meets Work Standards	???	N/A	Evaluation Comments
1 Yields right-of-way and allows other vehicles to merge, change lanes, turn			☐	
20 Respects pedestrians, cyclists, other drivers			☐	
21 Is courteous/tolerant of others' poor driving			☐	
22 Two hands on wheel at and 3 or 10 and 2			☐	
23 Skill in handling distractions			☐	
24 Adusts to traffic conditions (speed / traffic)			☐	
25 Uses turn signals (for turns and lane changes)			☐	
26 Following distance is appropriate (4-second rule)			☐	
27 Avoids sudden acceleration and deceleration			☐	
28 Before backing up, looks behind vehicle/checks for traffic, pedestrians, parked vehicles, uses spotter			☐	
2 Scans the road ahead (15-second eye lead or 2-3 blocks-1/4 mile) and anticipates actions of others to avoid sudden swerves, stops, lane changes			☐	
30 Checks mirrors every 5-8 seconds			☐	
31 Checks for haards on the road (eg, animals, debris, road conditions)			☐	
32 Reads and obeys traffic signals			☐	
33 Makes complete stops at signals, at a safe distance			☐	
34 Scans intersection left and right/anticipates intent of other vehicles before reaching point of no return			☐	
35 Covers brakes safely and adusts speed			☐	
36 Does not use cell phone during operation of vehicle			☐	
37 Other (be specific)			☐	

OPERATING PROCEDURES - PARKING	Meets Work Standards	???	N/A	Evaluation Comments
38 Looks for pull through parking before backing in			☐	
3 Uses signals, leaves adeuate space before pulling back into lane			☐	
40 Obeys signs and uses signals in parking lot			☐	
41 Maintains proper speed inside the lot			☐	
42 Ensures vehicle is legally/properly parked			☐	
43 Sets parking brake and secures vehicle			☐	
44 Other (be specific)			☐	

Observation Total Occurrences				
% Observations to Meet Work Standards				

Item Specific to Work Task	Meets Work Standards	???		Evaluation Comments
Insert Task/JSA/SOP Step				
Insert Task/JSA/SOP Step				
Insert Task/JSA/SOP Step				

DRIVING SAFE TASK EVALUATION PROCESS (D-STEP)

Causative Factors and Corrective Actions						Verification (Did we do what we said we would do?) and Validation (Is it working?)		
Item No.	CF	Corrective Actions (Must match Causative Factor)	Responsible Party	Date Due	Date Completed	Verified By/ Validated By	Date	Details
						Verified By: Validated By:		
						Verified By: Validated By:		
						Verified By: Validated By:		
						Verified By: Validated By:		

CRA 10 CAUSATIVE FACTORS

Personal Factors		Company Factors		External Factors	
1	Insufficient training for task	5	Incomplete or no procedures	10	Exposure to conditions
2	Hurrying to complete the task	6	Procedures not known or enforced		
3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
			Improper workplace layout		

FIELD SAFE TASK EVALUATION PROCESS
(F-STEP)

Report Status: (insert date)	Initial Report	Updated Report	Final Report	Verification/Validation	Report Input to SMART Database

Observer's Name	Date:	Time:
Client:	Project Name:	
Observer's Office:	Site Location:	
Observer's Supervisor:	Project No. (If applicable):	
Subcontractor: ☐ Yes ☐ No	Subcontractor Company Name:	

Feedback Conducted By:	Date:
Observee's Supervisor:	Time:

Check Task Being Observed (if not listed here, go to columns at right)		If checking this column, write in the specific task	
☐ Air Knifing	☐ Mob/Demob	☐ Agricultural Services	
☐ Clearing	☐ Project Oversight	☐ Construction	
☐ Demolition	☐ Soil Sampling	☐ Landfill	
☐ Drilling	☐ Stack Testing	☐ Office Operations	
☐ Electrical Work	☐ Surveys & Audits	☐ O&M	
☐ Excavation	☐ Traffic Control	☐ Pipeline	
☐ General Site Cleaning	☐ UST Removal	☐ Refinery	
☐ Heavy Equipment Operations	☐ Water Sampling	☐ Treatment Plants	
☐ IH Sampling	☐ Well Management	☐ Other	
☐ Manual Lifting			

Give a brief description of task being performed and your surroundings

Observer's Positive Comments

1.

2.

3.

Feedback Session Conclusion:
If NO Questionable Items: Brief Recap of Positive Actions/Comments
If Questionable Items: Brief Recap of Positive Actions/Comments AND Why the Questionable Item(s) Occurred

FIELD SAFE TASK EVALUATION PROCESS (F-STEP)

PERSONAL PROTECTIVE EQUIPMENT	Meets Work Standards	???	N/A	Evaluation Comments
1 Hearing Protection (e.g., Ear Plugs)			☐	
2 Head Protection (e.g., Hard Hat)			☐	
3 Eye Protection (e.g., Safety Glasses/Goggles)			☐	
4 Hand Protection (e.g., Gloves)			☐	
5 Foot Protection (e.g., Steel-toe Boots)			☐	
6 Respiratory Protection			☐	
7 Fall Protection (e.g., lanyard/harness)			☐	
8 High Visibility Clothing (e.g., Work Vest)			☐	
First Aid Kit/Fire Extinguisher			☐	
10 Other (be specific)			☐	
BODY POSITION	**Meets Work Standards**	**???**	**N/A**	**Evaluation Comments**
11 Proper Body Positioning When Exerting Force (Lifting/Pushing/Pulling)			☐	
12 Pinch Points/Moving Equipment - Hands/Body Placement			☐	
13 3-Points of Contact			☐	
14 Other (be specific)			☐	
WORK ENVIRONMENT	**Meets Work Standards**	**???**	**N/A**	**Evaluation Comments**
15 Work/Walk Surface Clear (Free And Clear Pathway)			☐	
16 Housekeeping/Equipment Storage			☐	
17 Controlled Work Zone (e.g., Warning Devices, Barricades, Cones, Flags)			☐	
18 Emergency Stop/Safety Switches			☐	
1 Materials Labeled Correctly			☐	
20 Storage/Disposal of Waste			☐	
21 Other (be specific)			☐	
OPERATING PROCEDURES	**Meets Work Standards**	**???**	**N/A**	**Evaluation Comments**
22 STAR Performed/Job Planning			☐	
23 Stop Work Authority Process understood and considered			☐	
24 JSA/JLA Reviewed and Followed			☐	
25 Daily Site Inspection			☐	
26 High Risk Task Specific (Hot Work, Confined Space, LOTO, Excavation/ Trenching)			☐	
27 Inspect Work Zone for Hazards			☐	
28 Coordinate/Communicate with Site Rep and/or others on site			☐	
2 Spotters used appropriately			☐	
30 Underground/Overhead Utilities Identified			☐	
31 Other (be specific)			☐	
TOOLS/EQUIPMENT	**Meets Work Standards**	**???**	**N/A**	**Evaluation Comments**
32 Hand/Power Tool - Selection, Condition, and Use			☐	
33 Field/Test Equipment - Selection, Condition, and Use			☐	
34 Heavy Equipment - Selection, Condition, and Use			☐	
35 Other (be specific)			☐	
Observation Total Occurrences				
% Observations to Meet Work Standards				
Item Specific to Work Task	**Meets Work Standards**	**???**		**Evaluation Comments**
Insert Task/JSA/SOP Step				
Insert Task/JSA/SOP Step				
Insert Task/JSA/SOP Step				

FIELD SAFE TASK EVALUATION PROCESS
(F-STEP)

Causative Factors and Corrective Actions						Verification (Did we do what we said we would do?) and Validation (Is it working?)		
Item No.	CF	Corrective Actions (Must match Causative Factor)	Responsible Party	Date Due	Date Completed	Verified By/ Validated By	Date	Details
						Verified By: Validated By:		
						Verified By: Validated By:		
						Verified By: Validated By:		
						Verified By: Validated By:		

CRA 10 CAUSATIVE FACTORS

Personal Factors		Company Factors		External Factors	
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3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
			Improper workplace layout		

PROPERTY ACCESS/UTILITY CLEARANCE DATA SHEET

(QSF-019)

PROJECT NAME: _____ PROJECT NUMBER: _____

CRA REPRESENTATIVE: _____

CLIENT: _____ CLIENT REPRESENTATIVE: _____ PHONE: _____

ON-SITE PROPERTY ACCESS APPROVAL _____ (OWNER OR AUTHORIZED AGENT SIGNATURE)

OFF-SITE PROPERTY ACCESS APPROVAL (if applicable) _____ (OWNER OR AUTHORIZED AGENT SIGNATURE)

UTILITY CLEARANCE APPROVAL _____ (OWNER OR AUTHORIZED AGENT SIGNATURE)

CONTRACTOR VERIFICATION APPROVAL _____ (OWNER OR AUTHORIZED AGENT SIGNATURE)

UTILITIES (INDICATE THAT LOCATION/UTILITY PRESENCE WAS CHECKED) *												
Borehole/ Excavation Location	Date (m/d/y)	Telephone	Water	Storm Sewer	Sanitary Sewer	Process Sewer	Gas	Electrical	Cable	Overhead Utilities	Other	Comments/Warnings

Additional Comments:

_____

_____

_____

* Note as appropriate, Contractor, Client or Owner, or Agent to sign, indicating no utilities are at the selected borehole/excavation locations.

THIS COMPLETED FORM IS A QUALITY RECORD

DAILY OPERATOR CHECKLIST

Date:		**Vehicle/License Number:**	
Odometer:		**Driver:**	

PRE-DEPARTURE CHECK			**Status (√)**	
			OK	**Needs Attention**
1. Lights	a. Headlights			
	b. Tail Lights			
	c. Turn Signals			
	d. Brake Lights			
	e. Emergency Flashers			
2. Tires - Gauge Check	Actual PSI	Recommended PSI (inside vehicle driver door)		
3. Windshield and Windows (cracks or chips)				
4. Mirrors (cracks, broken)				
5. Horn				
6. Paperwork (registration, insurance card, inspection sticker)				
7. Safety Items (first aid kit, fire extinguisher, road hazard kit)				
POST-DEPARTURE CHECK			**Status (√)**	
			OK	**Needs Attention**
1. Engine	a. Overheating			
	b. Oil Leaks			
	c. Knocks			
	d. Engine Lights			
	e. Emergency Flashers			
2. Transmission (Shifting)				
3. Brakes	a. Squeaking			
	b. Excessive Pedal Travel			
	c. Grinding			
4. Steering	a. Alignment			
	b. Grinding			
	c. Steering Wheel Vibrations			

Please note any observations on the maintenance board and report to your vehicle manager.

Additional Comments:

Printed Name _____ Signature _____

Return completed forms to your Vehicle Maintenance Manager.

CRA SAFETY COORDINATION REVIEW

SECTION A - JOB SCOPE

	Pre-Job Meeting/Prep HASP	Completed by:	
	On-Site Orientation Meeting		
	End of Job Evaluation		
	Tailgate Safety Meeting Planning Tool		
	Site Audit		

Date: _____ Project Name:_____ Project Number: _____

Project Location: _____

Project Description _____

CRA Project Team

PM:_____ Site Supervisor: _____ SHO: _____

Technician(s): _____ Others:_____

CLIENT INFORMATION
Company Name: _____
Address: _____
Primary Contact: _____
Phone: _____ Cell: _____ Fax: _____

SUBCONTRACTOR INFORMATION
Company Name: _____
Address: _____
Primary Contact: _____
Phone: _____ Cell: _____ Fax: _____
additional subcontractors listed on last page

SECTION B - PROJECT SAFETY COORDINATION

1.1 High Risk Activities

Confirm activities to be conducted during project	Resource	Yes	No
Working at or above 6 feet (fall protection)	PM		
Aerial lift	PM		
Heavy equipment	PM		
Drilling	PM		
Excavation	PM		
Lock-Out Tag-Out permit(s) required	PM		
Hot work	PM		
Hot work permit(s) required	PM		
Confined space entry	PM		
Confined space entry permit required	PM		
Subsurface activities	PM		
ATV, Snowmobile, 4 wheeler	PM		
Access agreements in-hand and signed by property owner	PM		
Permit requirements communicated to affected employees	PM		

CRA SAFETY COORDINATION REVIEW

1.2 Guiding Principals

(All items identified, verified and discussed)	Resource	Yes	No
Safety Commitment	SMART		
Injury Free Operation (IFO)	SMART		
Stop Work Authority	SMART		
Lessons Learned	SMART		
Any unresolved safety concerns or issues	SS		

1.3 Personnel Requirements

(All items identified, verified and discussed)	Resource	Yes	No	N/A
Site personnel trained to execute the Scope of Work	PM			
Verification of all personnel's training certifications	PM			
Potential for language barrier issues for this project	PM			
Potential technical understanding barriers for this project	PM			
Number of SSE(s) on site concurrent with CRA/client policy	PM			
Short Service Employee(s) identification	PM			
Mentor assignment for each SSE(s)	PM			
Employees trained to use the tools/equipment	PM			
Verification of all personnel's:				
- Medical clearance & respirator fit test (as required)	Safety Admin			
- Alcohol & drug clearance	Safety Admin			
Daily personnel evaluation if they are fit to function and working safely	SS			
Safety Health Officer required for the site	PM			

1.4 Behavior Based Safety - SMART Tools

(All items identified, verified and discussed)	Resource	Yes	No	N/A
STAR/Loss Prevention Self Assessment (LPSAs)	SMART			
Near loss/incident reporting procedure	SMART			
STEP/LPO	SMART			
At-risk behaviors and observation trends	SMART			

1.5 HASP Development & Review

(All items identified, verified and discussed)	Resource	Yes	No	N/A
Site-specific Health & Safety Plan developed	HASP			
Site-specific Health & Safety Plan approval by CRA safety professional	HASP			
System to modify the Health & Safety Plan in the field (i.e., "dirty JSA/JLA")	HASP			

1.6 JSA/JLA

(All items identified, verified and discussed)	Resource	Yes	No	N/A
On-site hazard assessment	PM			
JSA/JLAs available for all tasks including those performed by subcontractors	HASP			
Requirement to have JSA/JLAs modified in the field daily (i.e., "dirty JSA/JLA")	SS			
MSDSs obtained, reviewed, and hazards incorporated into JSA/JLAs	HASP			

CRA SAFETY COORDINATION REVIEW

1.7	**PPE**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Confirm task-specific PPE per JSA/JLAs	HASP			
	System to inspect PPE before start of work	SS			
1.8	**Site Emergency Response**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	First-aid requirements	HASP			
	Minimum - one first-aid trained person on-site	HASP			
	First-aid equipment within 50 feet of risk	HASP			
	Eye wash/shower within 50 feet of risk	HASP			
	Spill response equipment inspected and available within 50 feet of risk	HASP			
	Emergency Action Plan (EAP) - specific personnel identified for key incident command roles - discussed role responsibilities and actions with all site personnel, mustering/meeting location set	HASP			
	Site emergency evacuation alarm confirmed	SS			
	EAP drill schedule	HASP			
	Nearest hospital confirmation	HASP			
	Nearest hardwired telephone confirmation	Site Drawing			
	Emergency shut-off switch/valve locations confirmation	Site Drawing			
	Emergency contact confirmation - coordinate with facility and client	HASP			
1.9	**Utility Locates**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	CRA and/or client-specific Subsurface Utility Clearance Protocol reviewed and adhered to	PM			
	QSF-019 Property Access Form completed	PM			
	Client-specific requirements communicated to all affected employees	PM			
	One-call responses verified	PM			
1.10	**Traffic Control Program**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Temporary Traffic Control Plan (TTCP) required	PM			
	TTCP provided	PM			
	TTCP approval by the client, if required	PM			
1.11	**Site Control**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Have the following areas been considered for site control:				
	Fencing, barricades or other identifiers	SS			
	Signage to control pedestrian traffic	SS			
	Safety perimeter around equipment and work zone	SS			
	Swing radius barricades and/or signage struck-by (crush zones) reviewed and controlled.	SS			
1.12	**Equipment**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Proper lifting/transport of heavy objects (drums, augers)	SS			
	Equipment inspected and documented where required	SS			
	GFCI used and tested	SS			

CRA SAFETY COORDINATION REVIEW

1.13	**Weather**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Weather condition changes discussed - how to handle during work	HASP			
	Weather monitoring- who is responsible	HASP			
	Weather related hazards (heat/cold accommodations)	HASP			
	Hold time after lightning and thunder	SS			
1.14	**Crew Commitment**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Crew is aware of Safety Commitment that they are making	TBD			
1.15	**Materials**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	MSDSs availability for all HAZCOM/WHMIS regulated materials on the job site	HASP			
	Affected employees aware of special handling instructions for hazardous materials	HASP			
	Hazardous materials stored appropriately	HASP			
	Plan for dealing with leftover and/or waste materials	WP			
1.16	**Sub-Contractors**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Approval through the QSF 12, 22, 30, 31	PM			
	CRA Safety Coordination Review Form completed with the subcontractor as applicable	PM			
1.17	**Documentation**				
	All required QS Forms are available and attached to the project file	PM	**Yes**	**No**	**N/A**
	- QSF-12	PM			
	- QSF-13	PM			
	- QSF-16	PM			
	- QSF-19	PM			
	- QSF-22	PM			
	- QSF-30/31	PM			
	- Meeting attendance sign in sheets	PM			
	Daily Tailgate sign in sheets	PM			
	Permits/air monitoring records	PM			
	STEP observation form	PM			
	Equipment inspection forms	PM			
	Client specific forms	PM			

CRA SAFETY COORDINATION REVIEW

SECTION C - ACTION ITEMS		
Action Items:	Responsible	Due Date

HASP Health and Safety Plan
PM Project Manager
SS Site Supervisor
SHO Safety & Health Officer

SUBCONTRACTOR INFORMATION
Company Name: _____
Address: _____
Primary Contact: _____
Phone: _____ Cell: _____ FAX: _____

SUBCONTRACTOR INFORMATION
Company Name: _____
Address: _____
Primary Contact: _____
Phone: _____ Cell: _____ FAX: _____

Copies of the forms for Pre-Job Meeting and On-Site Orientation shall be maintained in the Project File

SITE HEALTH AND SAFETY PLAN MINOR AMENDMENT FORM

Amendment # _____

Site Name/Project ID _____

JSA/JLA Title _____

Date _____

Type of Amendment _____

Reason for Amendment _____

_____

_____

Alternate or Additional Safeguard Procedures _____

_____

_____

Required changes in PPE _____

_____

_____

Project Manager Notified ☐

RSHM Notified ☐

Client PM Notified (if necessary) ☐

_____ _____

Site Safety and Health Officer Date

Note: To be used for changes such as MSDS additives, JSA changes, and equipment changes.

This original form must remain on site and a copy placed in the project file. Any changes to the original HASP must be discussed with all affected site personnel prior to commencing work.

Clean Harbors Baton Rouge, LLC.

Contractor / New Hire Safety Orientation

Date_____ Employee Name (Print)_____

SS#_____ Contracted Company_____

Contractor's Direct Supervisor's Name_____(Phone)_____

Initial As Completed (Contractor Initials)

General Plant Safety Rules

___ 1. Smoking is prohibited except in designated, properly, marked areas. These areas are marked as "Designated Smoking Areas" and are equipped with fire extinguishers and butt cans.

___ 2. Only company vehicles are allowed in operational areas unless permission is obtained from the General Manager. GM (signature required)_____. (N/A if not applicable)

___ 3. No firearms, ammunition, illegal drugs or alcohol are allowed on CH property. CH conducts pre-employment and random tests for drugs/alcohol.

___4. No cameras are allowed on CH premises without written permission from the General Manager. GM signature required _____.

___ 5. No visitors/guests are allowed in operating areas unless escorted by CH personnel.

___ 6. Speeding on site will not be tolerated. The posted speed limit is 15 MPH. All drivers must have a valid driver's license.

___ 7. All injuries and near misses must be reported immediately to a CH Supervisor as well as to the Contractor's Supervisor.

___ 8. No horseplay will be tolerated on CH property.

___9. Contractor will provide a MSDS to CH H&S and Environmental for any product brought onto the site.

General Work Practices

___1. Always locate the nearest safety shower/eyewash prior to job start and make sure it works. Know where the nearest fire extinguisher and spill control equipment are stored.
___2. Ask CH personnel for clarification if you do not understand your job assignment.
___3. Contractors are not allowed to operate CH equipment/vehicles unless they have appropriate certifications and have permission from the CH General Manager. GM signature required_____.
___4. All work will be conducted in a safe and environmentally compliant manner.
___5. In the event of an emergency involving a Contract Worker, the incident will be immediately reported to the coordinating CH Employee. If a plant emergency alarm is sounded, all contractors will assemble at the East side of the Firewater Tank (Training Center). Contractors must provide CH with a list of personnel accounted for in an emergency. CH alarms are tested each Wednesday at 12:00 NOON.
___6. No food, drinks, or tobacco allowed inside of operational buildings. Employees and Contractors may have drinks in established break areas. Personal decontamination is required prior to eating, drinking, or smoking.
___7. Never stand behind or under a load.
___8. Keep work areas clean and free of contamination and slip, trip, and fall hazards.

Fall Protection/Walking and Working Surfaces

___1. Use handrails and do not skip steps. If ladder use is required, ladders must be inspected prior to work start. Ladders must be appropriately secured and workers must use three-point contact rule when ascending or descending ladders.
___ 2. Any work at heights greater than 6 ft. will require fall protection.
___ 3. Work on scaffolding will require H&S approval prior to job start. Scaffolding work will require daily documented inspections by a competent person.

Personal Protective Equipment

___1. Any work in operational areas will require hard hat, safety glasses, long sleeves, long pants, gloves, and steel toe boots. Prior to beginning a job, contractors will be made aware of specific additional PPE requirements as part of the Job Safety Briefing (form attached). Contractors must comply with these requirements. Failure to wear required PPE may result in removal from the CH site.
___2. Respirators (APRs / ASRs) are required for certain jobs. Half-face respirators are not allowed. CH does not furnish respirators or any type of PPE to Contractors. Contractors must have current fit tests and must have a written statement from a qualified physician stating that he/she is cleared to work with hazardous waste.
___3. Contractors working in waste treatment/storage areas will be clean-shaven.
___4. Chemical resistant clothing, boots, and gloves may be required.

Permits

___1. CH requires permits for the following activities: Hot Work, Confined Space, Line Breaking, Excavation, and Lockout / Tagout. Additional training documentation is required for these activities. Contractors will not conduct any of the above activities without approval from CH. The CH General Manager will be notified of all contractor work that requires a permit. Additionally, any confined space entry by a contractor will require notification and approval from CH Health and Safety.

Contingency Plan

1. The CH Supervisor of my job is _____. I will contact him via _____(phone or radio). His number is _____.
2. The Primary Emergency Coordinator at CH is_____. In his absence _____is the Secondary Coordinator.
3. I will be working (area)_____. If a site evacuation is necessary, I will report to the Contractor Assembly area next to the Fire House. I will wait for additional instructions from the Emergency Coordinator. Should an emergency occur in my area that does not require a full site evacuation, I will follow all directives given by the CH job supervisor.
4. Should a medical emergency occur, I will notify _____(CH Supervisor of job) via radio, or phone.
5. The Emergency Alarm system is tested each _____ at _____.

I fully understand all of the above information and agree to conduct myself accordingly. I also understand that failing to comply with these or other CH directives may result im my removal from this site.

_____ **Contractor Signature**

_____ **Date**

Clean Harbors Representative Conducting Training: _____

Attach the Job Safety Briefing form to the orientation.

APPENDIX B

JOB SAFETY ANALYSIS FORMS

JOB SAFETY ANALYSIS (JSA)

Mobilization/Demobilization

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	5/21/2010	**JSA Type:**	Mobilization/Demobilization
Work Type:	Environmental	**Client:**	Baton Rouge Disposal, LLC
Work Activity:	Mobilization/Demobilization		
Work Site:	Devil's Swamp Lake		
Key Equipment:	360-degree topper		
Task-specific Training:	CRA's Motor Vehicle Safety Training		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☐ Reflective Vest	☐ Goggles	☒ Gloves	**Supplied Air**	**APR**	
☐ Hard Hat	☐ Face Shield	☐ Coveralls	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness	☐ Hearing Protection	☐ PPE Clothing	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☐ Other			☐ Other	☐ Other	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Wear safety glasses while loading/unloading materials/equipment					

Project Development Team						
Name	**Signature**	**Position/Title**	**Modified By**	**Reviewed By**	**Position/Title**	**Date**
Jimmy McAllister		Project Engineer				

JOB SAFETY ANALYSIS (JSA)

Mobilization/Demobilization

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Pro□ect team (CRA) discusses importance of and documentation procedures for SWA during pre-□ob safety meeting • Use SWA to stop any work that is unsafe	
2	Check weather	• Unexpected storm • Fog, rain, snow□lightening/thunder • Heat/cold stress	• Check local weather forecast • If adverse weather conditions are likely, prepare a contingency plan for lodging, etc□with pro□ect manager • Discuss weather issues and precautions to take while driving and on site during the pre-□ob safety meeting • If weather conditions (e□g□, fog, rain, snow, etc□) impair the ability/vision of the driver, exit at nearest safe location and assess the situation • While on site, at first sign of lightening/thunder utili□e SWA and assess weather conditions • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e□g□, canopy, fan, glove warmers)	
3	Load e□uipment into vehicle	• Eye in□ury from materials/e□uipment while being loaded/unloaded • Lifting ha□ards • Manual material handling • Back in□ury • Cuts • Pinch points • Hand/foot in□ury • Forgotten or damaged e□uipment	• **Wear safety glasses while loading/unloading materials/equipment** • Reduce travel distance when there is a need to carry/lift materials • Make sure grip is ade□uate□wear leather/cotton gloves • Si□e up the load□if the ob□ect is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be re□uired • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible□maintain awareness of footing • Avoid placing hands/fingers in pinch point locations • Wear safety-toed boots • Verify re□uested e□uipment against warehouse form • Load e□uipment in an organi□ed manner to prevent shifting during transport or use cargo netting	
4	Complete CRA Daily Operator Vehicle Checklist	• Damaged vehicle lights, tires, windows, mirrors, horn • Inade□uate vehicle documents and/or safety items	• Check for fluid leaks under vehicle • Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers • Visually check the pressure/wear of tires • Ensure the vehicle has a spare tire • Assure windshield and window glass is clean and free from obstructions • Test the windshield wipers and horn • Verify vehicle registration, insurance card, and inspection sticker is present and valid • Ensure the vehicle contains a first aid kit, fire extinguisher, and road ha□ard kit • Check immediate vehicle perimeter and initial path of travel for obstructions	
5	Check and ad□ust seat, steering wheel, headrest, and mirrors	• Back/body strain • Blind spot • Impaired vision	• Ad□ust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach • Ensure mirrors are properly ad□usted	
6	Fasten seat belt(s) and ensure passenger(s) seat belts are fastened	• Serious in□ury, e□ection, or death from collision and/or traffic citation	• Verify driver and passenger(s) seat belts are in good condition and properly latched	

JOB SAFETY ANALYSIS (JSA)

Mobilization/Demobilization

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
7	Ensure vehicle doors are locked	• Serious in□ury, e□ection, or death from collision • Unwanted intrusion • Lost e□uipment	• Manually lock all doors to vehicle	
8	Start engine and check gauges and warning lights	• Vehicle breakdown	• Verify sufficient fuel and other ha□ard lamps (e□g□, battery, oil, and temperature) are not lit	
□	Mobili□e to site	• Arriving late • Collision • In□ury or death to occupants or other parties	• Do not use cell phones or perform other distracting activities while vehicle is in motion • Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs□stale) • Maintain safety cushion around vehicle (front, sides, and rear) and 4-second following distance • Utili□e all driving defensive techni□ues	
10	Arrive at site	• Pedestrian in□ury • Collision	• Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work □one	
11	Park vehicle	• Pedestrian in□ury • Collision • Property damage	• Maintain awareness of pedestrian/vehicular traffic • Park vehicle in pull-through parking space or facing the exit • Parking in a parking space that is not a designated parking space will re□uire the placement of the 360-degree topper on the hood of the vehicle • Use caution and mirrors/spotter when backing vehicle • Set parking brake	
12	Demobili□ation	• Collision • In□ury or death to occupants or other parties	• Check immediate vehicle perimeter and initial path of travel for obstructions • Maintain awareness of pedestrian/vehicular traffic when exiting site • Utili□e defensive driving techni□ues • Complete post-departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency	

(1) Each Job or Task consists of a set of steps□ Be sure to list all the steps in the se□uence that they are performed□ Specify the e□uipment or other details to set the basis for the potential (associated) ha□ards□

(2) A ha□ard is a potential danger□ What can go wrong□ How can someone get hurt□ Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an ob□ect□ **Caught** - victim is caught on, caught in or caught between ob□ects□ **Fall** - victim falls to ground or lower level (includes slips and trips)□ **Exertion** - excessive strain or stress/ergonomics/lifting techni□ues□ **Exposure** - inhalation/skin ha□ards□ Specify the ha□ards and do not limit the description to a single word such as □Caught□□

(3) Aligning with the Job Steps, Task Activity Description, and Potential Ha□ard columns, describe what actions or procedures are necessary to eliminate or minimi□e the ha□ards□ Be clear, concise and specific□ Use ob□ective, observable, and □uantified terms□ Avoid sub□ective general statements such as □be careful□or □use as appropriate□□

JOB SAFETY ANALYSIS (JSA)

Small Equipment and Container Fueling

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	5/21/2010	**JSA Type:**	Environmental
Work Type:	Environmental	**Client:**	Baton Rouge Disposal, LLC
Work Activity:	Pumping fuel into equipment		
Work Site:	Devil's Swamp Lake		
Key Equipment:	Fuel container		
Task-specific Training:			

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☒ Reflective Vest	☐ Goggles	☒ Gloves	**Supplied Air**	**APR**	
☒ Hard Hat	☐ Face Shield	☐ Coveralls	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness	☐ Hearing Protection	☐ PPE Clothing	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☐ Other			☐ Other	☐ Other	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Leather or cotton palm gloves					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Jimmy McAllister		Project Engineer				

JOB SAFETY ANALYSIS (JSA)

Small Equipment and Container Fueling

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	If appropriate, meet with owner's representative to determine if there is a designated fueling area	• Fueling in ha□ardous or environmentally sensitive area	• Perform fueling in designated or appropriate area	All Personnel
2	Proceed to fueling area and make safety preparations	• Traffic ha□ard • Slip/trip/fall ha□ards • Short service employees	• Be aware of site traffic ha□ards • Perform STAR process • Refer to e□uipment manufacturer's operating manual before using any machineryHave two 20-pound fire extinguishers upwind within 25 feet of the fueling area • No cell phone use allowed on site • No cell phone use allowed in fueling area • No smoking allowed • No fueling allowed during storm events • Wear appropriate PPE	All Personnel
3	Dispense fuel	• Property damage and personal in□ury from fire • Fire potential from static/contact spark • Personal in□ury due to skin/eye contact with fuel due to splash/ spills of fuel • Environmental damage from spill	• Switch off e□uipment • Delay refueling at least 10 minutes or engine and exhaust are cool before inititating refueling□ • Remove cap • Insert no□□le securely in fuel tank • Do not use fuel cap as a wedge to keep no□□le open • Turn on fuel pump • Stay upwind when fueling e□uipment • Be aware of your surroundings • Do not rush • Remain in attendance of no□□le at all times during fueling • Avoid overfilling • Release pressure from fuel hose into fuel tank before removing no□□le to prevent drips and spills • Turn off pump • Securely return no□□le to proper location	All Personnel
4	Leave fueling area	• Slip/trip/fall ha□ards • Traffic ha□ard	• Pick up tools, e□uipment, and trash • Be aware of site traffic ha□ards	

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(2) A ha□ard is a potential danger□ What can go wrong□ How can someone get hurt□ Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an ob□ect□**Caught** - victim is caught on, caught in or caught between ob□ects□**Fall** - victim falls to ground or lower level (includes slips and trips)□**Exertion** - excessive strain or stress/ergonomics/lifting techni□ues□**Exposure** - inhalation/skin ha□ards□ Specify the ha□ards and do not limit the description to a single word such as □Caught□□

(3) Aligning with the Job Steps, Task Activity Description, and Potential Ha□ard columns, describe what actions or procedures are necessary to eliminate or minimi□e the ha□ards□ Be clear, concise and specific□ Use ob□ective, observable, and □uantified terms□ Avoid sub□ective general statements such as □be careful□or □use as appropriate□□

JOB SAFETY ANALYSIS (JSA)

Initial Site Recon and Walkthrough

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	5/21/2010	**JSA Type:**	Hazard Assessment - Site Inspection
Work Type:	Environmental	**Client:**	Baton Rouge Disposal, LLC
Work Activity:	Site walkthrough to assess and inventory hazards posed by site work activities		
Work Site:	Devil's Swamp Lake		
Key Equipment:	Basic PPE, hand/power tools based on site condition, site inspection checklist or notebook, JSA forms, pens		
Task-specific Training:	SMART Safety training (STAR), JSA development, Poison Plant Identification		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)						
☒ Reflective Vest	☐ Goggles	☒ Gloves	**Supplied Air**	**APR**		
☒ Hard Hat	☐ Face Shield	☐ Coveralls	☐ SCBA	☐ Full Face APR	☐ Particulate	☐ Organic Vapor
☐ Lifeline/Harness	☐ Hearing Protection	☐ PPE Clothing	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined	
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas	
☒ Other Flashlight			☐ Other	☐ Other		
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)						
Insect repellant. Coveralls may be necessary based on type of brush/plants/insects in work area(s) being inspected. Leather gloves if overgrown vegetation or rundown buildings.						

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Jimmy McAllister		Project Engineer				

JOB SAFETY ANALYSIS (JSA)

Initial Site Recon and Walkthrough

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre-job safety meeting • Use SWA to stop any work that is unsafe	All persons on project team
2	Check weather	• Unexpected storm, fog, rain, snow, lightening, thunder • Heat/cold stress	• Check local weather forecast • Discuss weather issues and precautions to take while driving and on site during the pre-job safety meeting • If weather conditions (e.g., fog, rain, snow) impair the ability/vision of the driver, exit at nearest safe location and assess the situation • While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)	Assessor
3	Sign in	• Site Manager and Operator not aware of CRA staff presence in facility or on grounds	• Sign in at front desk • Ask to speak to Site Manager or alternate designate	Assessor
4	Don necessary CRA and client required PPE	• Contact with recyclable material or equipment	• Wear all required PPE (hard hat, vest, boots, and glasses) at all times while in the facility	Assessor
5	Unload equipment from vehicle	• Lifting hazards • Back injury • Manual material handling • Cuts • Pinch points • Hand/foot injury • Forgotten equipment • Damaged equipment	• Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate, wear leather/cotton gloves • Size up the load, if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible, maintain awareness of footing • Wear leather/cotton gloves and avoid placing hands/fingers in pinch point locations • Wear steel-toed boots • Verify requested equipment against warehouse form • Load equipment in an organized manner to prevent shifting during transport or use cargo netting	Assessor
6	Complete site inspection and walkover of the property and work areas. Note any hazards that will impact site personnel and/or their operations	• Slip/trip/fall hazards • Insects/reptiles • Pedestrian injury • Poison plants	• Check in with site personnel and sign appropriate visitor or safety log (may require watching safety video [i.e., plant]) • Check with site contact to determine safely accessible areas and areas where PPE are required • Wear PPE as directed by site personnel or dependent upon your evaluation of conditions • If building(s) looks dilapidated or in poor condition, do not enter • Watch for vehicles or other mobile equipment moving around • Make sure areas are well lit and you are accompanied by a site representative (if applicable) • Watch where you step on pavement (potholes, dips, or obstructions) and in vegetated/wooded areas (dips, holes, branches, vines, etc.) • Do not take photographs while walking • Do not talk on cell phone while walking • If in vegetated or wooded areas, watch for beehives, wear insect repellent (if area and season dictate) as needed, be mindful of gopher holes/tunnels, small animal dens, snakes, stray dogs/cats, transient/homeless individuals, poison ivy/oak/sumac, etc.	Assessor

JOB SAFETY ANALYSIS (JSA)

Initial Site Recon and Walkthrough

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
7	Sign out	• Site Manager and Operator not aware that CRA staff have left facility	• Sign out at front desk • Ask to speak to Site Manager or alternate designate	Assessor
8	Demobili□ation	• Collision • In□ury or death to vehicle occupants or other parties	• Perform perimeter vehicle check • Maintain awareness of pedestrian/vehicular traffic when exiting the site • Utili□e defensive driving techni□ues • Complete post-departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency	Assessor

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(2) A ha□ard is a potential danger□ What can go wrong□ How can someone get hurt□ Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an ob□ect□**Caught** - victim is caught on, caught in or caught between ob□ects□**Fall** - victim falls to ground or lower level (includes slips and trips)□**Exertion** - excessive strain or stress/ergonomics/lifting techni□ues□**Exposure** - inhalation/skin ha□ards□ Specify the ha□ards and do not limit the description to a single word such as □Caught□□

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JOB SAFETY ANALYSIS (JSA)

Sediment Lagoon Sampling

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	5/21/2010	**JSA Type:**	Sampling
Work Type:	Environmental	**Client:**	Baton Rouge Disposal, LLC
Work Activity:	Sediment sampling (general procedures)		
Work Site:	Devil's Swamp Lake		
Key Equipment:	Hand core piston type, hand core split barrel type, Vibracore, drill rig, other proprietary core sampler		
Task-specific Training:	CRA Field Method Training on Soil Sampling Procedures. Boating Safety		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☒ Reflective Vest	☒ Goggles	☒ Gloves.	**Supplied Air**	**APR**	
☒ Hard Hat	☐ Face Shield.	☐ Coveralls.	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness.	☐ Hearing Protection.	☐ PPE Clothing.	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☒ Other. Personal Flotation Device (PFD) and sunscreen			☐ Other.	☐ Other.	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Gloves will depend on the task and chemical contamination present or suspected present, safety-toed boots may not be required if sampler is required to wear waders or hip boots.					
Reflective vest or hi-viz shirt					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Jimmy McAllister		Project Engineer				

JOB SAFETY ANALYSIS (JSA)

Sediment Lagoon Sampling

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Inspection and setup of sampling e□uipment on boat or barge	• Lost time from missing or improperly functioning e□uipment • Incorrect sampling procedures/ collection due to malfunctioning e□uipment	• Ensure all PPE is worn including PFD for each person • Ensure all e□uipment is functioning properly□complete Quality Control documents • Ensure boat/barge sufficiently stable for retrieval of samples	Sampling Technician
2	Prepare to lower sampler into water	• Lifting ha□ards • Back in□ury • Manual material handling • Pinch points • Cuts • Punctures • Sample misidentification	• Reduce travel distance when there is a need to carry/lift materials • Make sure grip is ade□uate□wear leather/cotton gloves • Si□e up the load□if the ob□ect is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be re□uired • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible□maintain awareness of footing • Sampler will be heavier when raised□take breaks to rest arms/shoulders • Avoid placing hands/fingers in pinch point locations • Use proper tools when opening container packaging • Wear leather or cut-resistant gloves • Do not use fixed open blade knives when opening boxes or containers • Ensure the sample id label matches sample location with site plan/CRA Site Supervisor/subcontractor	Sampling Technician
3	Retrieve sampler when sample collected	• Cuts due to sharp edges of sample sleeve□Contaminant exposure • Lifting ha□ards • Back in□ury • Manual material handling • Cuts from sharp ob□ects retrieved by sampler • Contamination ha□ards	• Refer to step 2 and the HASP for additional lifting information • Wear nitrile gloves over Kevlar gloves • Maintain awareness of sharp edges from ob□ects that may be in sampler	Sampling Technician
4	Sieving sample collection using mesh sieve (if applicable)	• Contaminant exposure • Cuts from container breakage • Sample misidentification • Chemical exposure to reagent if used	• Wear nitrile gloves over Kevlar gloves and replace Nitrile between soil samples • Inspect glass bottles for breaks/cracks□do not attempt to use any suspect containers • Close glass sample containers carefully to avoid breakage • Check sample labels for accuracy prior to placing in cooler • Wear O/V respirator/cartridge when handling reagent (potential formaldehyde exposure)	Sampling Technician
5	Headspace screening of samples (if applicable)	• Contaminant exposure • Incorrect headspace readings	• Wear nitrile gloves over Kevlar gloves • Ensure proper calibration of e□uipment	Sampling Technician
6	Sample selection	• Bottle breakage • Contaminant exposure • Pinch points • Lost time due to incorrect sample selection	• Wear nitrile gloves over Kevlar gloves when handling sample containers • Confirm selected samples are correct based on work plan selection criteria, PID readings, and soil boring logs • Avoid placing hands/fingers in pinch point locations (e□g□, between cooler and lid)	Sampling Technician

JOB SAFETY ANALYSIS (JSA)

Sediment Lagoon Sampling

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
7	Packing samples in cooler(s)	• Bottle breakage • Contaminant exposure • Cuts • Pinch points • Lifting ha□ards • Back in□ury • Manual material handling • Lost time due to incorrect sample packaging or hold time exceedances	• Wear nitrile gloves over Kevlar gloves when handling sample containers • Pack glass containers in bubble wrap • Check COC against sample labels and SSOW for accuracy before shipping • Avoid placing hands/fingers in pinch point locations (e□g□, between cooler and lid) • Refer to step 2 and the HASP for additional lifting information • Ensure e□uipment and supplies are loaded correctly and do not shift during transport	Sampling Technician
8	Investigation derived waste (IDW) management	• Contaminant exposure • Heavy lifting • Pinch points • Slips/trips/fall ha□ards • Mislabeled waste	• Wear nitrile gloves when handling IDW • Use proper lifting techni□ues to transport/dispose of IDW into drums and use buddy system if needed • Avoid placing hands/fingers in pinch point locations • Maintain awareness of walking surfaces • Label IDW with generator, a contact number, identification of contents, and site location • Specify IDW as either ha□ardous or non-ha□ardous material	Sampling Technician

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(2) A ha□ard is a potential danger□ What can go wrong□ How can someone get hurt□ Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an ob□ect□**Caught** - victim is caught on, caught in or caught between ob□ects□**Fall** - victim falls to ground or lower level (includes slips and trips)□**Exertion** - excessive strain or stress/ergonomics/lifting techni□ues□**Exposure** - inhalation/skin ha□ards□ Specify the ha□ards and do not limit the description to a single word such as □Caught□□

(3) Aligning with the Job Steps, Task Activity Description, and Potential Ha□ard columns, describe what actions or procedures are necessary to eliminate or minimi□e the ha□ards□ Be clear, concise and specific□ Use ob□ective, observable, and □uantified terms□ Avoid sub□ective general statements such as □be careful□or □use as appropriate□□

JOB SAFETY ANALYSIS (JSA)

Preservative Bottle Labeling

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	5/21/2010	**JSA Type:**	Sample Bottle Labeling (pre-labeling bottle sets before field use)
Work Type:	Environmental	**Client:**	Baton Rouge Disposal, LLC
Work Activity:	Preservative bottle labeling		
Work Site:	Devil's Swamp Lake		
Key Equipment:	Marker, PPE		
Task-specific Training:	Bottle Labeling, PPE. reference HASP for additional site/client safety training requirements		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☐ Reflective Vest	☒ Goggles	☒ Gloves.	**Supplied Air**	**APR**	
☐ Hard Hat	☐ Face Shield.	☐ Coveralls.	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness.	☐ Hearing Protection.	☐ PPE Clothing.	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☐ Safety Glasses	☐ Safety-toed Boots				☐ Acid Gas
☐ Other.			☐ Other.	☐ Other.	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Use nitrile gloves over kevlar gloves and chemical-resistant goggles when performing work					

Project Development Team						
Name	**Signature**	**Position/Title**	**Modified By**	**Reviewed By**	**Position/Title**	**Date**
Jimmy McAllister		Project Engineer				

JOB SAFETY ANALYSIS (JSA)

Preservative Bottle Labeling

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Opening cooler	• Chemical exposure to skin, eyes, and/or inhalation from preservative leakage • Cuts from broken glass	• Inspect cooler for signs of broken bottles or bottle preservative leakage • Wear nitrile gloves over kevlar gloves and goggles	Sampling Technician
2	Open specific bottle set bag prepared by laboratory	• Chemical exposure to skin, eyes, and/or inhalation from preservative leakage • Cuts from broken glass	• Wear proper PPE (Ndex nitrile gloves over kevlar gloves) and safety goggles for task • Inspect bag for broken glass and other sharp ob□ects • Inspect bottle set bag for li□uid preservative leakage before placing hand inside plastic bag	Sampling Technician
3	Label individual bottles	• Chemical exposure to skin, eyes, and/or inhalation from preservative leakage • Cuts from broken glass	• Check seal on each bottle by tipping away from the body • Wear proper PPE (Ndex nitrile gloves over kevlar gloves) and safety goggles for task • Label individual bottles with Sharpie marker • Inspect for other ha□ards that may affect the hands (broken glass or other sharp ob□ects)	Sampling Technician
4	Place labeled bottle set back inside cooler	• Hand in□ury	• Wear proper PPE (Ndex nitrile gloves over kevlar gloves) • Be careful not to break glass containers • Use sufficient ice and packing material	Sampling Technician

(1) Each Job or Task consists of a set of steps□ Be sure to list all the steps in the se□uence that they are performed□ Specify the e□uipment or other details to set the basis for the potential (associated) ha□ards□

(2) A ha□ard is a potential danger□ What can go wrong□ How can someone get hurt□ Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an ob□ect□**Caught** - victim is caught on, caught in or caught between ob□ects□**Fall** - victim falls to ground or lower level (includes slips and trips)□**Exertion** - excessive strain or stress/ergonomics/lifting techni□ues□**Exposure** - inhalation/skin ha□ards□ Specify the ha□ards and do not limit the description to a single word such as □Caught□□

(3) Aligning with the Job Steps, Task Activity Description, and Potential Ha□ard columns, describe what actions or procedures are necessary to eliminate or minimi□e the ha□ards□ Be clear, concise and specific□ Use ob□ective, observable, and □uantified terms□ Avoid sub□ective general statements such as □be careful□or □use as appropriate□□

JOB SAFETY ANALYSIS (JSA)

Boat Launch

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	5/21/2010	**JSA Type:**	Environmental
Work Type:	General	**Client:**	Baton Rouge Disposal, LLC
Work Activity:	Boat launch/retrieval		
Work Site:	Devil's Swamp Lake		
Key Equipment:	Boat, pick-up truck for transport, equipment used for cutting vegetation		
Task-specific Training:	Proper Lifting Techniques, Hand and Power Tools, Water Safety, boat handling training from a recognized nautical organization		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☒ Reflective Vest	☐ Goggles	☒ Gloves	**Supplied Air**	**APR**	
☐ Hard Hat	☐ Face Shield	☐ Coveralls	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness	☒ Hearing Protection	☒ PPE Clothing	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☒ Other PFD (personal floatation device)			☐ Other	☐ Other	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
A third person should be present for assistance from shore, hearing protection (ear plugs or muffs) will be required if air boats are used.					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Jimmy McAllister		Project Engineer				

JOB SAFETY ANALYSIS (JSA)

Boat Launch

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Setup of boat and e□uipment onboard	• In□ury due to e□uipment being in an awkward position with respect to occupants • Back in□ury • Boat not seaworthy • Lost time due to improperly functioning e□uipment	• Allow for enough space to work safely • Use proper lifting techni□ues	Sampling Technician
2	Inspection of launch site prior to launching the boat	• Slip/trip/fall ha□ards • Complications in boat launch/retrieval due to poor location selection • Cuts • Biological ha□ards • Back in□ury	• Apply STAR • Wear leather or cut-resistant gloves • Always put-in at a launch point□if there is no launch point dedicated to your body of water, select a launch/ retrieval location that has minimal vegetation and obstruction • If vegetation is a concern, then trim or remove it if possible to minimi□e physical efforts by the boat occupants • A launch point should also be sloped but not so much that entry can create increased risk of falling • Make sure launch site is visible by spotter in case of emergency	Sampling Technician
3	Load and unload e□uipment into boat	• Personnel in□ury • E□uipment loss • Slip/trip/fall ha□ards • Pinch points • Cuts • Unbalanced cargo/personnel	• Use proper lifting techni□ues • Avoid directly carrying anything onboard □ have someone hand them to you one by one • Maintain proper footing while carrying ob□ects and securing cargo • Access the boat from the sides as opposed to the ends • Wear leather gloves when necessary • Always load the boat from side to side	Sampling Technician
4	Boat Operation	• Slip/trip/fall ha□ards • Fire ha□ard • E□uipment damage • Fines from law enforcement • Collision with an obstacle or another boat • Open water	• Perform daily boat inspection prior to operation • Check fuel and oil levels • Check that all safety e□uipment such as personal floatation devices, docking rope, rescue rope, one ring buoy, navigation lights, and communication devices are on the boat • Check for obstacles in the water • Only a trained and competent person, whom is licensed by a recogni□ed nautical organi□ation may operate the boat • Use and maintain a safe operating speed • Avoid sudden and/or excessive movements while on the boat • If boatload is more than 100 pounds, remove e□uipment (i□e□, oars, sample bottles, PFDs) before launching□if total weight is still greater than 100 pounds, launch the boat with three people • Check weather prior to launch, to assure safety of boaters • Use protective sun block	Sampling Technician

JOB SAFETY ANALYSIS (JSA)

Boat Launch

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
5	Docking the boat	• Slip/trip/fall ha□ards • Cuts • Back in□ury • Open water	• Apply STAR when launch point is not available • Take time to identify and use safe footing to avoid slips/trips/falls • Wear leather or cut-resistant gloves • Make sure you can see the spotter • When securing the boat, use ties or another support that can withstand the load	Sampling Technician

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(2) A ha□ard is a potential danger□ What can go wrong□ How can someone get hurt□ Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an ob□ect□**Caught** - victim is caught on, caught in or caught between ob□ects□**Fall** - victim falls to ground or lower level (includes slips and trips)□**Exertion** - excessive strain or stress/ergonomics/lifting techni□ues□**Exposure** - inhalation/skin ha□ards□ Specify the ha□ards and do not limit the description to a single word such as □Caught□□

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JOB SAFETY ANALYSIS (JSA)

Surface Water Sampling

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	5/21/2010	**JSA Type:**	Sampling
Work Type:	Environmental	**Client:**	Baton Rouge Disposal, LLC
Work Activity:	Surface Water Sampling		
Work Site:	Devil's Swamp Lake		
Key Equipment:	Horiba, peristaltic pump and associated tubing, PVC bailers		
Task-specific Training:	CRA Field Method Training on Surface Water Sampling Procedures. Boating Safety		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)						
☒ Reflective Vest	☐ Goggles	☒ Gloves.	**Supplied Air**	**APR**		
☒ Hard Hat	☐ Face Shield.	☐ Coveralls.	☐ SCBA	☐ Full Face APR	☐ Particulate	☐ Organic Vapor
☐ Lifeline/Harness.	☐ Hearing Protection.	☐ PPE Clothing.	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined	
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas	
☒ Other. Personal Floatation Device			☐ Other.	☐ Other.		
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)						
Use nitrile gloves over kevlar gloves while collecting surface water samples						

Project Development Team						
Name	**Signature**	**Position/Title**	**Modified By**	**Reviewed By**	**Position/Title**	**Date**
Jimmy McAllister		Project Engineer				

JOB SAFETY ANALYSIS (JSA)

Surface Water Sampling

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Inspection and setup of sampling e□uipment on boat or barge	• Lost time from improperly functioning e□uipment • Incorrect sampling procedures/ collection due to malfunctioning e□uipment	• Ensure all PPE is worn including PFD for each person • Ensure all e□uipment is functioning properly□complete Quality Control documents • Ensure boat/barge sufficiently stable for retrieval of samples	Sampling Technician
2	Access the sample location by boat	• Water ha□ards • Biological ha□ards • Slips, trips, and falls	• Utili□e personal floatation device • Inspect overall sampling area for biological ha□ards • Follow boating procedures outlined in the HASP	Sampling Technician
3	Collect surface water samples	• Chemical exposure • Strain from lifting or twisting • Loss of time from container breakage • Sample misidentification • Slips, trips, and falls • Pinch points • Water ha□ards	• Reduce travel distance when there is a need to carry/lift materials • Make sure grip is ade□uate□wear leather/cotton gloves • Si□e up the load□if the ob□ect is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be re□uired • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible□maintain awareness of footing • Avoid placing hands/fingers in pinch point locations • Use proper tools when opening container packaging • Do not use fixed open blade knives when opening boxes or containers • Ensure the sample id label matches sample location with site plan/CRA Site Supervisor/subcontractor	Sampling Technician

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APPENDIX C

MATERIAL SAFETY DATA SHEETS

The information provided in this Material Safety Data Sheet has been obtained from sources believed to be reliable. RW Packaging Ltd. provides no warranties, expressed or implied and assumes no responsibility for the accuracy of the data contained herein.

1. IDENTIFICATION

Product Name:	**ISOPROPYL ALCOHOL 99%**
Manufacturer:	RW Packaging Ltd. 200 Omand's Creek Blvd. Winnipeg, Manitoba Canada R2R 1V7 Ph: (204) 786-6873
Emergency Telephone No.:	(613) 996-6666 (Canutec)
Composition/Purity of Hazardous Ingredients:	Isopropyl Alcohol 99%
IUPAC Chemical Name:	2-Propanol
Synonym(s):	* Sec-Propyl Alcohol * Isopropanol * Dimethylcarbinol * Alcohol Isopropylique
CAS Registry Number:	67-63-0
PIN-UN/NA Number(s):	1219
TDG Classification (Class, Division and Packing Group):	3 II
Chemical Family:	Aliphatic Alcohol

Molecular Formula:	C3-H8-0
Structural Formula:	CH3-CH(OH)-CH3
WHMIS Classification:	B,2 D2B
Warning Properties:	Toxic, Flammable.

General Descriptions

Appearance, Odour and State:	Colourless liquid with odour of rubbing alcohol
Odour Threshold:	22-200 ppm (Can be detected below the recommended exposure limit.)
Uses and Occurrences:	Manufacturer of acetone and its derivatives, glycerol and isopropyl acetate; solvent for oils; alkaloids, gums, resins, cellulose derivatives; coatings and lacquers; used as a de-icing agent for liquid fuels; dehydrating agent, denaturant, preservative in extraction processes, and as an antiseptic in the 30-50% concentration range.

2. PHYSICAL DATA

Boiling Point:	82 deg. C (180 deg. F)
Molecular Weight:	60.09 (amu)
Melting Point/Freezing Point:	-86 deg. C (-122 deg. F)
Specific Gravity (Water=1):	.785
Solubility in Water:	100%
pH:	N/A
Solubility in Other Liquids:	Miscible with most organic solvents in addition to alkaloids, essential oils, gums, shellac, phenolic resins, chloroform and most petroleum solvents. It is not miscible in salt solutions.
Vapour Density:	2.07
Vapour Pressure:	33 mm Hg @ 20 deg. C

% Volatiles:	100
Saturation Vapour Concentration:	142 g/m^3 @ 25 deg. C
Evaporation Rate (Butyl Acetate = 1):	2.3
Co-efficient of Water/Oil Distribution:	No data

3. FIRE AND EXPLOSION HAZARDS

Flash Point and Method:	12 deg. C (52 deg. F) closed cup; 17 deg. C (63 deg. F) open cup;
Lower Explosive Limit/Lower Flammable Limit (%):	2.0 %
Upper Explosive Limit/Upper Flammable Limit (%):	12%
Autoignition Temperature:	399 deg. C (750 deg. F)
Extinguishing Media:	carbon dioxide, dry chemical, alcohol foam.
Special Fire Fighting Procedures:	Water is not generally suitable for fighting fires involving this material due to its low flash point. However, water can be used in the form of a spray or mist to absorb heat, keep containers cool and protect exposed material.
Combustion Products:	Carbon dioxide (co_2) and carbon monoxide (co)
Hazardous Explosion Data	
- Sensitivity to Impact:	No Data.
- Sensitivity to Static Discharge:	No Data.

4. REACTIVITY DATA

Chemical Stability:	Normally stable.
Incompatibility:	Strong Oxidizing Agents (ie. nitrates, perchlorates, peroxides) – increased risk of fire and explosion Phosgene- forms isopropyl chloroformate and hydrogen chloride Iron Salts – explosive thermal decomposition may occur Hydrogen Palladium mixture can ignite in air Potassium T- Butoxide Nitroform. Avoid high temperatures, sparks, open flames and other sources of ignition.
Hazardous Decomposition Products:	None
Hazardous Polymerization:	Does not occur.
Corrosiveness to Metals:	Not corrosive.

5. HEALTH HAZARD DATA

A. Routes of Entry

	Yes	No
i) Inhalation	X	
ii) Eye Contact	X	
iii) Skin Contact	X	
iv) Skin Absorption	X	
v) Ingestion	X	

B. Effects of Short-Term (Acute Exposure)

Inhalation:	Mild irritation of the upper respiratory tract at 400 ppm. High concentrations can cause drowsiness, ataxia (incoordination) and deep narcosis. Move victim to fresh air. Obtain medical attention immediately.

Eye Contact: Vapour mildly irritating at 400 ppm. Direct eye contact with the liquid can cause severe irritation.

Skin Contact: Brief exposures are not irritating. Absorption through the skin does not readily occur so toxic doses are not likely to happen through this route. Wash affected areas thoroughly with soap and water.

Ingestion: May cause drowsiness, gastrointestinal pain, cramps, nausea, vomiting and diarrhoea; unconsciousness and death following massive exposures. Lethal dose for humans is estimated to be approximately 131 grams. The emetic effects of isopropyl alcohol limit the possibility of ingesting a fatal dose. If victim is alert and not convulsing, rinse mouth out and give ½ to 1 glass of water to dilute material.

C. Animal Toxicity Data

Toxicity: LD50 (rat, oral): 4.42 5.84 g/kg LD50 (mouse, oral): 4.8 g/kg LD50 (rabbit, oral): 7.9 g/kg LD50 (rabbit, dermal): 13 g/kg Irritant dose (rabbit, skin): 500 mg/24 hours (mild skin irritant) Irritant dose (rabbit, eye): 0.1 ml 70% solution (severe eye irritant) Experiments on animals showed little absorption of alcohol intoxication of animals are mild leg paralysis, unsteadiness, lack of muscular coordination, respiratory depression and stupor. No serious long-term effects have been reported in animals.

D. Effects of Long-Term (Chronic) Exposure

Irritancy of Product:

Skin:	Repeated or prolonged skin contact can cause drying and cracking.
Ingestion/Inhalation:	No significant changes were found in the chemical or cellular compositions of the blood and urine after humans ingested 6.4 mg/kg of isopropyl alcohol on a daily basis for six weeks. No long-term health effects have been reported in humans.
Sensitizing Capability:	No data.
Carcinogenicity:	No carcinogenic by animal testing.
Mutagenicity:	Negative in animals.
Teratogenicity:	No reproductive effects in animal testing
Synergistic Materials:	May interact with chlorinated solvents.

E. Occupational Exposure Limits

Threshold Limited Values (TLVS):	ACGIH / NIOSH
Time-Weighted Average (TLV-TWA):	400 ppm (980 mg/m^3)
Short-Term Exposure Limit (TLV-STEL):	500 ppm (1225 mg/m^3)

6. FIRST AID

IN ALL CASES GET IMMEDIATE MEDICAL ATTENTION!

Inhalation:	Remove source of contamination or move victim to fresh air. Begin artificial respiration immediately if victim is not breathing.
Eye Contact:	As quickly as possible, begin rinsing affected eye(s) thoroughly with lukewarm, gentle running water for at least 15 minutes.
Skin Contact:	Wash skin with lots of soap and water. Remove contaminated clothing and shoes. Launder before reusing or discard.
Ingestion:	Unless unconscious or convulsing, induce vomiting by having the victim drink a large amount of water.
Special Equipment/Antidotes:	None needed
First Aid Comments:	Provide general supportive measures, (warmth, comfort and rest). Consult a physician and/or the nearest Poison Control Centre for all cases of ingestion or eye contact and all but trivial cases of inhalation or skin contact.

7. PREVENTATIVE MEASURES

A. Environmental and Disposal Information

Spill and Leak Procedures:	Provide adequate protective equipment and ventilation. Remove sources of heat and flame. Stop the flow if it can be done safely. Contain the spill. Recover liquid for recycling or disposal if feasible. Otherwise absorb the liquid on clay or other absorbent material.

Disposal: Dispose of in designated landfill site or burn in an approved solvent burner. If small amounts are disposed of into a sink or sewer, rinse with ample water to prevent the accumulation of flammable vapours. Notify environmental agencies in the event of any significant release of this material into the environment. Confirm disposal practices with regulatory agencies.

B. Storage and Handling

Storage: Store in tightly closed electrically grounded containers in a cool area separate from normal work areas. The storage area should have adequate independent ventilation and have no sources of heat or sparks. Fans and other electric motors should be spark resistant.

Handling: Use in minimal quantities in designated areas with adequate ventilation and away from sources of heat or sparks. Containers should be electrically grounded during transfer or mixing operations. Containers should be covered when not in use and should be stored in a grounded, fire resistant cabinet. Whenever possible, fire resistant containers should be used.

Exposure Control: Exposure to this material can be controlled in many ways. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. Use this general information to help develop specific control measures. Ensure that control systems are properly designed and maintained. Comply with occupational, environmental, fire and other applicable regulations.

Engineering Controls: Engineering control methods to reduce hazardous exposures are preferred. Methods include mechanical ventilation (dilution and local exhaust), process or personnel enclosure, control of process conditions and process modification (ie. substitution of a less hazardous material). Administrative controls and personal protective equipment may also be required. Use a non-sparking grounded ventilation system separate from other exhaust ventilation systems. Exhaust directly to the outside. Supply sufficient replacement air to make up for air removed by exhaust systems. It should be remembered that toxic levels of vapours are reached before explosive limits and these should be included in the design criteria for ventilation. As well, the type of ventilation equipment, location and capacity will depend on vapour density, dead air spaces, temperature, convection currents, wind direction, etc.

C. Personal Protective Equipment

Respiratory Protection: If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protective equipment including approved respiratory protection. Have appropriate equipment available for use in emergencies such as spills or fire. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Refer to the CSA Standard Z94.4–M1982, “Selection, Care, and Use of Respirators,” available from the Canadian Standards Association, Rexdale, Ontario M9S 1R3

Respiratory Protection Guidelines:	NIOSH RECOMMENDATIONS FOR ISOPROPYL ALCOHOL CONCENTRATIONS IN AIR: Up to 1000 ppm: Powered air-purifying respirator with organic vapour cartridge(s). Up to 10,000 ppm: SAR operated in a continuous flow mode. Up to 12,000 ppm: Gas mask with organic vapour canister; or full-facepiece SAR. EMERGENCY OR PLANNED ENTRY IN UNKNOWN CONCENTRATION OR IDLH CONDITIONS: Positive pressure, full face piece SAR with an auxiliary positive pressure SCBA. ESCAPE: Gas mask with organic vapour canister; or escape-type SCBA. Note: The IDLH concentration for isopropyl alcohol is 2,000 ppm. Note: Substance causes eye irritation or damage; eye protection needed. ABBREVIATIONS: SAR = supplied-air respirator; SCBA = self-contained breathing apparatus. IDLH = Immediately Dangerous to Life or Health. NOTE: in these recommendations, the IDLH concentration is defined as the maximum concentration which would not cause any escape-impairing systems or irreversible health effects to a person exposed for 30 minutes if the respirator failed. Recall that if the worker is using a canister-type gas mask it will not protect against low oxygen concentrations in the environment. The oxygen content of the room should not be less than 16% by volume.
Eye/Face Protection:	Chemical splash goggles or full face mask to protect eyes from liquid or concentrated vapours.
Skin Protection:	Gloves, coveralls, boots, etc. to prevent exposure of skin to liquid or concentrated vapours.

Resistance of Materials for Protective Clothing:	EXCELLENT – Neoprene, natural rubber or latex, Buna-N, polyethylene GOOD – Polyvinyl chloride (PVC) FAIR – Polyvinyl alcohol (PVA) note: Resistance of special materials can vary from product to product. Evaluate resistance under conditions of use and maintain clothing carefully.
Personal Protection Comments:	Remove contaminated clothing promptly. Keep contaminated clothing in closed containers. Discard or launder before re-wearing. Do not eat, drink or smoke in work areas. Wash hands thoroughly after handling this material. Maintain good housekeeping. Remember that personal protective equipment is not an adequate substitute for good, safe, working conditions, adequate ventilation and intelligent conduct in the workplace.

8. REFERENCES

Mackison, F.W.: Stricoff, R.S.:Partride, L.J., eds. Occupational Health Guidelines for Isopropyl Alcohol. In: Occupational Health Guidelines for Chemical Hazards (DHHS (NIOSH) Publication; Nº 81-123). Washington, D.C.:NIOSH/OSHA, 1981

Wimer, W.W.; Russel, J.A.; Kaplan, H.L. Alcohols Toxicology. Park Ridge, NJ: Noyes Data Corporation, 1983. p.46-55

Rowe, V.K.I.; McCollister, C.B., Alcohols. In:Clayton, G.D.;Clayton, F.E., ed. Patty's Industrial Hygiene and Toxicology. 3rd Revised Edition. Vol. 2c Toxicology. New York; Toronto,

Ontario: Wiley-Interscience, 1982. p. 4527-4708.

NIOSH Pocket Guide to Chemical Hazards (Repr. With corr.) NIOSH, Feb 1987 p.144-145

- Canada Centre for Occupational Health and Safety.

- Trade names – data base

- CHEM INFO – data base

- RTECS – data base

- Supplier Material Safety Data Sheets

- Manufacturing Chemists Association – Material Safety Data Sheets.

- American Conference of Governmental Industrial Hygienists Handbook of Threshold Limit Values and Biological Indices.

Prepared by: Diego Zabalegui
Specialist in Charge, Quality Assurance
RW Packaging Ltd.
(204) 786-6873

Updated: May 10, 2006

ALCONOX

Section 1: PRODUCT INFORMATION

Chemical family: Detergent.

Product name: Alconox

Manufacturer: Alconox, Inc.
30 Glenn St. Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800−255−3924.
813−248−0573 (outside of the United States).

Supplier: Same as manufacturer.

TDG classification: Not regulated.

WHMIS classification: D2B

DSL status: The supplier has certified that all substances in this product appear on the domestic substances list.

Supplier MSDS date: 2008/01/07

Section 2: HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155−30−0	10−30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497−19−8	7−13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722−88−5	10−30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE
7758−29−4	10−30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

Section 2A: ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
CAS# 497−19−8: LD50 4020 mg/kg − rat oral.
CAS# 7758−29−4: LD50 3100 mg/kg − rat oral.

Section 3: PHYSICAL DATA

Physical state:	Solid
Appearance & odor:	Almost odourless. White granular powder.
Odor threshold (ppm):	Not available.
Vapour pressure (mmHg):	Not applicable.
Vapour density (air=1):	Not applicable.
By weight:	Not available.
Evaporation rate (butyl acetate = 1):	Not applicable.
Boiling point (°C):	Not applicable.
Freezing point (°C):	Not applicable.
pH:	(1% aqueous solution). 9.5
Specific gravity @ 20 °C:	(water = 1). 0.85 − 1.10
Solubility in water (%):	100 − > 10% w/w
Coefficient of water\oil dist.:	Not available.
VOC:	None

Section 4: FIRE & EXPLOSION DATA

Flammability:	Not flammable.
Conditions of flammability:	Surrounding fire.
Extinguishing media:	Carbon dioxide, dry chemical, foam. Water Water fog.
Special procedures:	Self−contained breathing apparatus required. Firefighters should wear the usual protective gear.
Auto−ignition temperature:	Not available.
Flash point (°C), method:	None
Lower flammability limit (% vol):	Not applicable.
Upper flammability limit (% vol):	Not applicable.
Explosion Data	
Sensitivity to static discharge:	Not available.

Sensitivity to mechanical impact:	Not applicable.
Hazardous combustion products:	Oxides of carbon (COx). Hydrocarbons.
Explosive power:	None

Section 5: REACTIVITY DATA

Chemical stability:	Stable under normal conditions.
Conditions of instability:	None known.
Hazardous polymerization:	Will not occur.
Incompatible substances:	Strong acids. Strong oxidizers.
Hazardous decomposition products:	See hazardous combustion products.

Section 6: TOXICOLOGICAL PROPERTIES

Route of entry:	Skin contact, eye contact, inhalation and ingestion.
Effects of acute exposure	
Eye contact:	May cause irritation.
Skin contact:	Prolonged contact may cause irritation.
Inhalation:	Airborne particles may cause irritation.
Ingestion:	May cause vomiting and diarrhea. May cause abdominal pain. May cause gastric distress.
Effects of chronic exposure:	Contains an ingredient which may be corrosive.
LD50 of product, species & route:	> 5000 mg/kg − rat oral.
LC50 of product, species & route:	Not available for mixture, see the ingredients section.
Exposure limit of material:	Not available for mixture, see the ingredients section.
Sensitization to product:	Not available.
Carcinogenic effects:	Not listed as a carcinogen.
Reproductive effects:	Not available.
Teratogenicity:	Not available.
Mutagenicity:	Not available.
Synergistic materials:	Not available.
Medical conditions aggravated by exposure:	Not available.

Section 7: PREVENTATIVE MEASURES

Precautionary Measures

Gloves/Type:	 Neoprene or rubber gloves.
Respiratory/Type:	 If exposure limit is exceeded, wear a NIOSH approved respirator.
Eye/Type:	 Safety glasses with side−shields.
Footwear/Type:	Safety shoes per local regulations.
Clothing/Type:	As required to prevent skin contact.
Other/Type:	Eye wash facility should be in close proximity. Emergency shower should be in close proximity.
Ventilation requirements:	Local exhaust at points of emission.
Leak/Spill:	Contain the spill. Recover uncontaminated material for re−use. Wear appropriate protective equipment. Contaminated material should be swept or shoveled into appropriate waste container for disposal.
Waste disposal:	In accordance with municipal, provincial and federal regulations.
Handling procedures and equipment:	Protect against physical damage. Avoid breathing dust. Wash thoroughly after handling. Keep out of reach of children. Avoid contact with skin, eyes and clothing. Launder contaminated clothing prior to reuse.
Storage requirements:	Keep containers closed when not in use. Store away from strong acids or oxidizers. Store in a cool, dry and well ventilated area.
TDG classification:	Not regulated.
Special shipping information:	Not regulated.

Section 8: FIRST AID MEASURES

Skin contact:	Remove contaminated clothing. Wash thoroughly with soap and water. Seek medical attention if irritation persists.
Eye contact:	Check for and remove contact lenses. Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
Seek medical attention if symptoms persist.

Ingestion: Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

Additional information: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. This company shall not be held liable for any inaccuracies.

Section 9: ADDITIONAL INFORMATION

General note: This material safety data sheet was prepared from information obtained from various sources, including product suppliers and the Canadian Center for Occupational Health and Safety.

Husky Energy Material Safety Data Sheet

WHMIS	Personal Protection	TDG Road/Rail

Section I. Product Identification and Uses

Common/Trade name	**Gasoline (Midgrade Unleaded)** **Gasoline (Premium Unleaded)** **Gasoline (Regular Unleaded)**		
Synonyms	Not available□	**CAS #**	8006-61-□
Chemical family	Petroleum Hydrocarbon□	**DSL**	Listed on the DSL (Domestic Substancs List)□
Supplier	Husky Oil Marketing Company Box 6525 Station 'D' Calgary, Alberta T2P 3G7 (403) 2□8-6111	**Manufacturer**	Husky Oil Box 13□0 Prince George, B□C□ V2L 4V4 250-□60-2500
Material uses	Motor Fuel		

Section 2. First Aid Measures

Eye contact	Flush eyes for at least 15 minutes with clean water□ Patch lightly, allowing drainage□ Seek medical attention□
Skin contact	Remove contaminated clothing□ Wash skin thoroughly with soap and water□ Seek medical attention if irritation develops□
Inhalation	Protect rescuer□ Move exposed person to fresh air□ If breathing has stopped apply artificial respiration□ Seek medical attention□
Ingestion	If swallowed, do not induce vomiting or give li□uids□ Seek immediate medical attention□

Section 3. Hazardous Ingredients

		Exposure Limits						
Name	**CAS #**	**TWA (ppm)**	**TWA (Mg/M3)**	**STEL (ppm)**	**STEL (Mg/M3)**	**CEIL (ppm)**	**CEIL (Mg/M3)**	**% by Weight**
GASOLINE (MIDGRADE UNLEADED)								
Naphtha, catalytic reformed	68□55-35-1	100	525	n/av	n/av	n/av	n/av	30-60
Naphtha, light catalytic cracked□	64741-55-5	100	525	n/av	n/av	n/av	n/av	15-40
Naphtha, petroleum	64741-70-4	100	525	n/av	n/av	n/av	n/av	5-10
Hydrocarbons, C1-C4	68527-1□-5	n/av	n/av	n/av	n/av	n/av	n/av	1-5
Ben□ene	71-43-2	0□5	1□6	2□5	8	n/av	n/av	1
Proprietary Detergent Additive □	n/av	n/av	n/av	n/av	n/av	n/av	n/av	□1
GASOLINE (PREMIUM UNLEADED)								
Naphtha, catalytic reformed	68□55-35-1	100	525	n/av	n/av	n/av	n/av	60-100
Naphtha, light catalytic cracked□	64741-55-5	100	525	n/av	n/av	n/av	n/av	15-40
Naphtha, petroleum	64741-70-4	100	525	n/av	n/av	n/av	n/av	1-5
Hydrocarbons, C1-C4	68527-1□-5	n/av	n/av	n/av	n/av	n/av	n/av	1-5
Ben□ene	71-43-2	0□5	1□6	2□5	8	n/av	n/av	1
Proprietary Detergent Additive □	n/av	n/av	n/av	n/av	n/av	n/av	n/av	□1
GASOLINE (REGULAR UNLEADED)								

Continued on Next Page

Naphtha, catalytic reformed	68□55-35-1	100	525	n/av	n/av	n/av	n/av	7-13
Naphtha, light catalytic cracked□	64741-55-5	100	525	n/av	n/av	n/av	n/av	40-70
Naphtha, petroleum	64741-70-4	100	525	n/av	n/av	n/av	n/av	10-30
Hydrocarbons, C1-C4	68527-1□-5	n/av	n/av	n/av	n/av	n/av	n/av	1-5
Ben□ene	71-43-2	0□5	1□6	2□5	8	n/av	n/av	1
Proprietary Detergent Additive	n/av	n/av	n/av	n/av	n/av	n/av	n/av	□1

Toxicity values of the hazardous ingredients

Naphtha, catalytic reformed:
ORAL (LD50): Acute: 6620 mg/kg [Rat]□

Naphtha, light catalytic cracked.:
ORAL (LD50): Acute: 5000 mg/kg [Rat]□
DERMAL (LD50): Acute: 3000 mg/kg [Rat]□

Naphtha, petroleum
LD50: Not available□
LC50: Not available□

Hydrocarbons, C1-C4
LD50: Not available□
LC50: Not available□

Benzene:
ORAL (LD50): Acute: 3400 mg/kg [Rat]□
VAPOUR (LC50): 10,000 ppm 8 hr (rat)

Section 4. Physical Data

Physical state and appearance	Li□uid□ Colourless or dyed red or purple□
Odor	Petroleum Odour
pH (1% soln/water)	Not applicable□
Odor threshold	0□12 - 0□15 ppm recognition□ 0□06 - 0□08 ppm threshold□
Evaporation rate	Not available□
Freezing point	Not available□
Boiling point	30□C - 215□C
Specific gravity	0□7 (Water □1)
Volatility	Not available□
Vapor density	Not available□
Vapor pressure	Not available□
Water/oil dist. coeff.	Not available□
Solubility	Insoluble in cold water□
Molecular Weight	Not applicable□
Melting Point	Not available□
Density	Not available□

Section 5. Fire and Explosion Data

Auto-ignition temperature	257□C (4□4□6□F)
Flash points	CLOSED CUP: -50□C (-58□F) (TCC)
Flammable limits	LOWER: 1□3□ UPPER: 7□1□

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Extinguishing Media	Use DRY chemicals, CO2, or foam to extinguish fire□Water may not be an effective medium to extinguish fire□ Product will float and can be reignited on the water surface□ Cool containing vessels with water □et in order to prevent pressure build-up, autoignition or explosion
Special fire fighting procedures	Use supplied air or self contained breathing apparatus (SCBA) for large fires or for fires in enclosed areas□
Flammability	Extremely flammable□ Released vapours may form flammable/explosive mixtures at or above the flash point□ Vapours may travel considerable distances to ignition sources and cause a flash fire□ All storage containers and pumping e□uipment must be grounded□ **Remark** No additional remark□
Risks of explosion	This material is sensitive to static discharge□ This product is not sensitive to mechanical impact□ **Remark** No additional remark□

Section 6. Reactivity Data

Stability	The product is stable□
Hazardous decomp. products	Carbon monoxide, carbon dioxide and irritant fumes and gases including sulphur oxides, nitrogen oxides and aldehydes□
Reactivity	Incompatible material: Strong acids, strong oxidi□ers, chlorine□ Ha□ardous polymeri□ation: Will not occur□ **Remark** No additional remark□

Section 7. Toxicological Properties

Routes of entry	Ingestion□ Inhalation□ Eye contact□ Skin contact□
TLV	Gasoline TWA: 300 STEL: 500 (ppm) from ACGIH TWA: 8□0 STEL: 1480 (mg/m3) from ACGIH Ben□ene TWA: 1 ppm 3□2 mg/m3 STEL: 5 ppm 16 mg/m from Alberta OEL's (Occupational Exposure Limits) SKIN TWA: 0□5 ppm 1□6 mg/m3 STEL: 2□5 ppm 8 mg/m3 from ACGIH (TLV) [United States] SKIN Stoddard Solvent: TWA: 100 ppm, 525 mg/m3 from ACGIH Consult local authorities for acceptable exposure limits□
Toxicity to animals	Gasoline: LC50: Inhalation: Rat & mouse 300 gm/m3□ LD50: Acute, Rat 18□75 mL/kg, rabbit 5 mL/kg **Remark** No additional remark□
Chronic effects	Gasoline has been classified by IARC (International Agency for Research on Cancer) as a product which is possibly carcinogenic to humans (IARC group 2B)□This product contains ben□ene□ Ben□ene has been classified by IARC as a group 1 product indicating sufficent evidence of carcinogenicity□ Prolonged exposure to ben□ene at concentrations exceeding the exposure limit may cause damage to the blood producing system resulting in blood disorders such as leukemia□ This product contains xylene□ High exposure to xylene has produced fetotoxic effects in animal studies□ **Remark**

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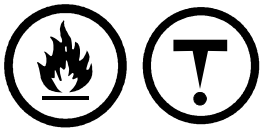
	No additional remark□
Acute effects	Sensiti□ing Capabiltiy: No effects known□ Irritancy: Moderate skin, eye and upper respiratory tract irritant□
Ingestion	Pulmonary aspiration ha□ard if swallowed and vomiting occurs□ Product is irritating to the digestive tract□ Ingestion may result in central nervous system depression with symptoms including di□□iness, nausea, headache, and unconsciousness□
Skin	Prolonged skin contact can cause defatting of the skin resulting in dry cracked skin and dermatitis□
Eyes	Product vapours are moderately irritating to the eyes with effects beginning near 200-500 PPM□
Inhalation	Product vapours are moderately irritating to the respiratory tract□ At concentrations near 1000 ppm, central nervous system effects such as headache, blurred vision, di□□iness, and loss of coordination may occur□ Exposure to vapour concentrations exceeding 5000 PPM may result in loss of consciousness, coma and death□
	Remark No additional remark□
Synergistic materials	Not available□

Section 8. Preventive Measures

Waste disposal	Dispose of in accordance with all federal, provincial and local regulations□
Storage	Store in cool, well ventilated areas away from all sources of ignition□ Confined spaces and head spaces in storage tanks may contain toxic, and flammable concentrations of hydrocarbon vapours□
Ventilation	In poorly ventilated areas, provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapours below their respective threshold limit values□
Spill and leak	Evacuate unecessary personnel□ Eliminate all ignition sources□ Stop leak if without risk□ Contain spill and absorb with inert absorbent□ Large spills should be removed with explosion proof vacuum e□uipment□ Large pools may be covered with foam to prevent vapour evolution□ Comply with federal, provincial, and local re□uirements for spill notification□

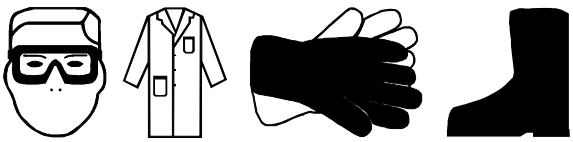
Section 9. Classification/Regulatory Information

TDG road / rail	TDG CLASS 3□1: Flammable li□uid□
	UN1203 Shipping Name: Gasoline
	Remark No additional remark□
WHMIS	WHMIS CLASS B-2: Flammable li□uid with a flash point lower than 37□8□C (100□F)□ WHMIS CLASS D-2A: Material causing other toxic effects (VERY TO□IC)□
	
	Remark Not acceptable for transport by passenger ship□
Other	This product is on the Domestic Substances List (DSL)□ TSCA (Toxic Substance Control Act): This product is listed on the TSCA Inventory□ **Refer to federal, provincial, and local legislation for further requirements.**

Continued on Next Page

Section 10. Protective Clothing

Eye	Non-vented chemical goggles to protect against splashing of product into the eyes and to prevent eye irritation from the solvent vapours□
Skin	Impervious gloves and clothing should be worn as appropriate to protect against skin contact□ Neoprene or nitrile material is suggested□
Respiratory	Respiratory protection may be re□uired in poorly ventilated areas□ Properly fitted air purifying masks e□uipped with organic vapour filters will provide protection at low concentrations□ Air supplied respirators or positive pressure self contained breathing apparatus is re□uired when atmospheric concentrations of hydrocarbon vapours are likely to exceed 10□ the occupational exposure limit □
Other	As re□uired by the situation according to your companies policies and procedures□ Contact your supervisor for direction□



Section 11. Preparation Information

References	TOMES PLUS by Micromedex Inc□ Provisional Domestic Substances List (CEPA) CPPI WHMIS Classification Guidelines Product/stream Toxicology Testing Priority List□ -Manufacturer's Material Safety Data Sheet□ -SA□, N□□ Dangerous Properties of Industrial Materials□ Toronto, Van Nostrand Reinold, 6e ed□ 1□84□
MSDS Status	

Acronyms: TLV = Threshold Limit Value N/AP = Not applicable N/AV = Not Available COC = Cleveland Open Cup PMCC = Pensky Martens Closed Cup

Validated by Bernard Bradford on 3/19/2006.	**Verified by Bernard Bradford.**
Supersedes: 03/19/2003	**Printed 1/25/2006.**

Emergency Phone # 403-262-2111

While the company believes the data set forth herein are accurate as of the date hereof, the company makes no warranty with respect thereto and expressly disclaims all liability for reliance thereon. Such data are offered solely for your consideration, investigation and verification.

APPENDIX D

JOURNEY MANAGEMENT PLAN

PURPOSE

The purpose of this Journey Management Plan (JMP) is to prevent losses associated with motor vehicle related incidents including: in□uries to drivers, passengers and pedestrians, damage to motor vehicles and damage to third party property□ By communicating potential safety risks before mobili□ing to a site, a motor vehicle operator will be able to prepare for and avoid potential ha□ards□

SCOPE

This JMP applies to all vehicles assigned for the support of site operations, including company owned and personal use vehicles□ This JMP does not apply to vendors (such as UPS, FedEx□etc□) not under contract with Baton Rouge Disposal, LLC or their supplier□This JMP does not address ha□ards that are external to the site access/egress and on the onsite pro□ect operations□

SPECIAL NOTE

Because the site, weather and traffic conditions may change fre□uently the JMP shall be maintained and updated separate from the Site Health and Safety Plan (HASP)□

RESPONSIBILITIES

Contract Project Manager

The contract pro□ect manager is responsible to ensure that the site has a current JMP□

Field Manager

The field manager is responsible to create and keep current a JMP that is appropriate for the site conditions□ It is also the field manager□s role to ensure each vehicle operator has a JMP that describes the conditions for his vehicle and e□uipment prior to mobili□ing to the site□ A common JMP may be used for several vehicles or as conditions dictate a separate JMP may be specific or uni□ue to an individual vehicle□

Vehicle Operator

The assigned vehicle operator shall not mobili□e to the site without first receiving and reviewing the JMP□ It is the vehicle operator□s responsibility to read and become familiar with the description and stipulations of the JMP prior to mobili□ing to the site□ DO NOT mobili□e to the site to get clarification to the JMP□ Because driving conditions may vary, vehicle operators shall also notify the field manager of any ha□ards not identified on the JMP so that the field manager can update the JMP□ Because traffic conditions may change fre□uently on a pro□ect, the JMP shall be maintained and updated separate from the Site Health and Safety Plan□

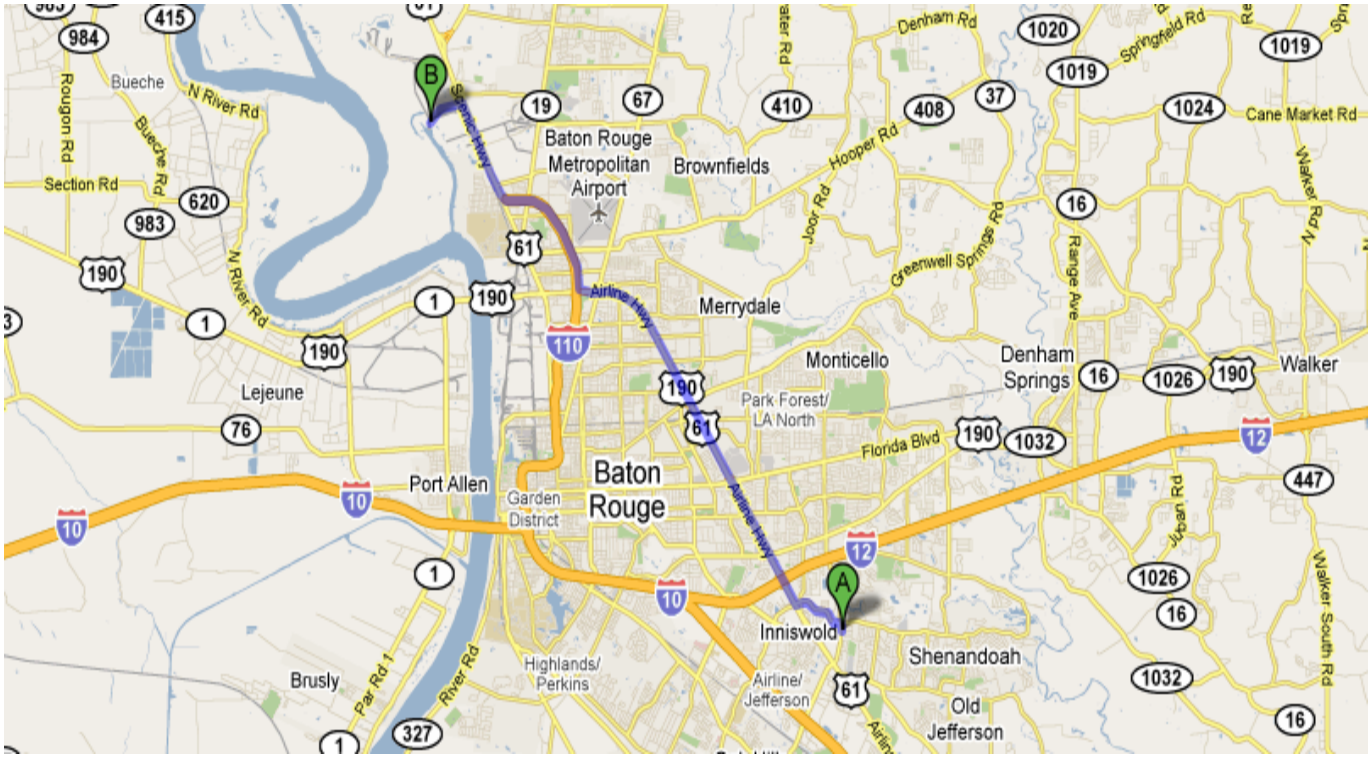
Scope of this JMP

This JMP shall include the operation and use of the following vehicles and e□uipment: Conestoga-Rovers & Associates (CRA) and subcontractor trucks/vans and personal vehicles□

All vehicle operators shall be responsible for ensuring their vehicles are maintained and being familiar with and obeying all laws related to vehicle operation□

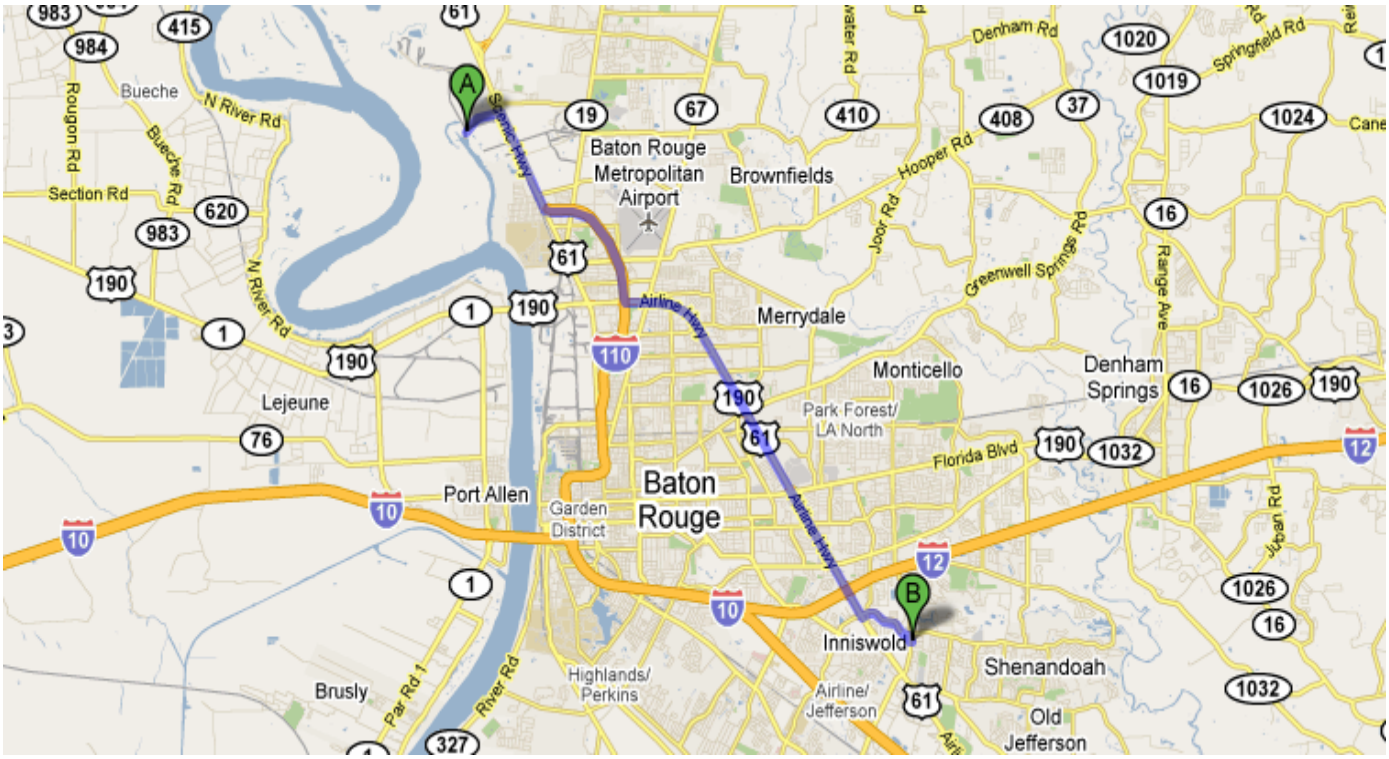
The route to Devil's Swamp Lake in Baton Rouge, LA from the mobilization point of the CRA Baton Rouge office:

- Head North on S. Sherwood Forest Blvd. toward I-12
- Turn left to Merge onto I-12W
- Merge onto I-10W
- Slight right at I-110N
- Take exit 8C to merge onto US-61N/Scenic Highway toward Natchez
- Turn left at Barge Canal Road/Terminal Road
- Arrive at Devil's Swamp Lake



The route to the CRA Baton Rouge office from the mobilization point of Devil's Swamp Lake in Baton Rouge, Louisiana:

- Head Northeast on Barge Canal Road/ Barge Terminal Road towards US-61 S/Scenic Highway
- Take right onto US-61 S/Scenic Highway
- Take the I-110 S towards Baton Rouge
- Merge onto I-110 S
- Merge onto I-10E
- Merge onto I-12E
- Take Exit 4 for Sherwood Forest Blvd
- Turn right at S Sherwood Forest Blvd
- Make a U-turn
- Arrive at CRA Baton Rouge office



General Hazards
It is the vehicle operator's sole responsibility to read and become familiar with the description and stipulations of the JMP prior to mobilizing to the site. All drivers will avoid distractions including but not limited to using cell phones in any form.

High volume facility with heavy traffic flow at peak driving times (early morning, mid-day, and evening rush hour).

The driver should anticipate hazards, maintain a safety cushion around the vehicle, and adjust their driving speed. Weather conditions will be monitored throughout the day and prior to mobilization. Rain or mist reduces visibility and wet pavement reduces traction. Turn headlights on to increase visibility regardless of weather conditions. Make sure windshield wipers are in proper working condition. Reduce speed so that stopping can be made safely and obey posted speed limits. Use turn signals appropriately.

Site Specific Hazards
Specific hazards include heavy traffic on expressways, state roadways, residential neighborhoods, semi-trucks, sudden stops and merging traffic.

Directions: Access to the Site
Ingress can be made to the Devil's Swamp Lake site at Barge Canal Road. As one approaches the site from the south of Barge Canal Road.

Directions: Leaving the Site
Egress from the Devil's Swamp Lake site can be made by turning right onto Barge Canal Road and proceeding to US-61 S/Scenic Highway

Site Specific Restrictions and Controls
Use proper highway driving techniques and maintain proper highway speeds. Use proper parking lot driving procedures. Maintain a low speed at all times when driving in the office parking lots. Utilize turn signals and proper parking methods.

This Journey Management Plan will be implemented during field activities at the Devil's Swamp Lake Site. This Journey Management Plan was created and will be maintained by CRA.

CHANGES TO THE JOURNEY MANAGEMENT PLAN

Date	Name	Change/Comment (be specific)

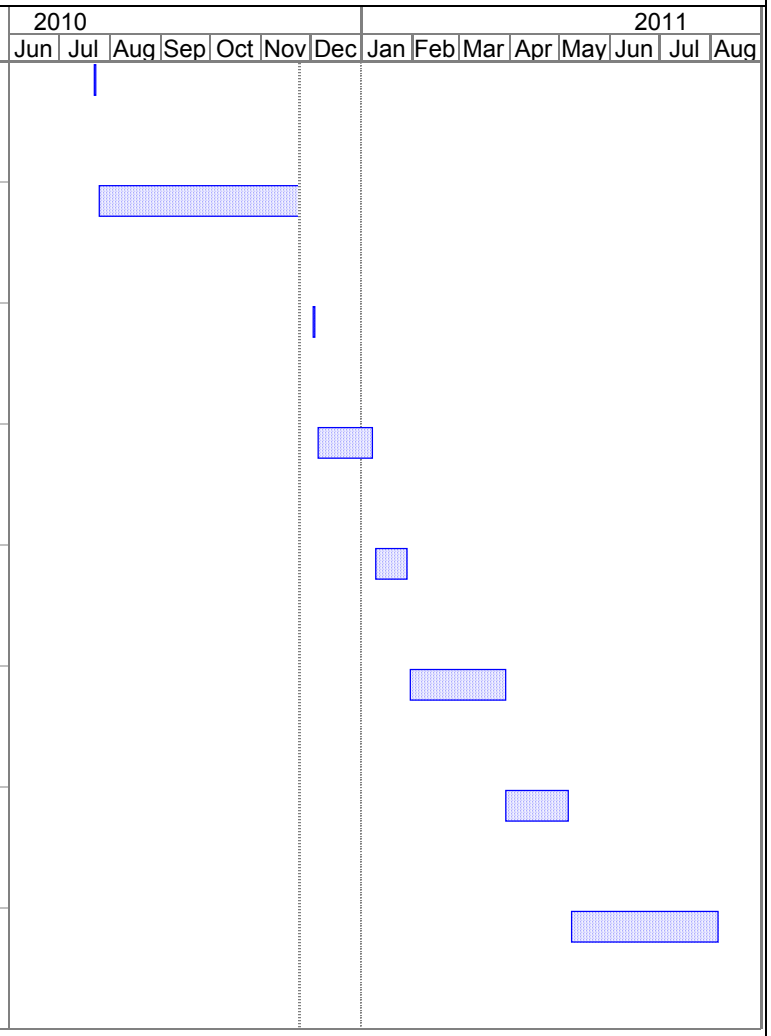
Manager Review and Approval

Signature: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

Date: □□□□□□□□□□□□□□□□□

EXHIBIT 1

PROPOSED PROJECT SCHEDULE

EXHIBIT 1
PROPOSED PROJECT SCHEDULE
TIER 1 REMEDIAL INVESTIGATION
DEVIL'S SWAMP LAKE SITE

ID	Task Name	Duration	Start	Finish
1	Submittal of the Draft Tier 1 RI Work Plan	1 day	Fri 7/23/10	Fri 7/23/10
2	Draft Tier 1 RI Work Plan Review Comment Period and Submittal of the Final Tier 1 RI Work Plan and Quality Assurance Project Plan	122 days	Mon 7/26/10	Wed 11/24/10
3	Agency Approval of the Final Tier 1 RI Work Plan (ASSUMED)	1 day	Fri 12/3/10	Fri 12/3/10
4	Fieldwork Preparation	31 days	Mon 12/6/10	Fri 1/7/11
5	Tier 1 RI Sample Collection Fieldwork	15 days	Mon 1/10/11	Fri 1/28/11
6	Laboratory Analysis and Reporting	42 days	Mon 1/31/11	Tue 3/29/11
7	Data Validation	28 days	Wed 3/30/11	Fri 5/6/11
8	Draft Tier 1 RI Report Preparation and Submittal	65 days	Mon 5/9/11	Fri 8/5/11